PROCEEDINGS OF ABSTRACTS VII. INTERNATIONAL AGRICULTURAL, BIOLOGICAL, LIFE SCIENCE CONFERENCE AGBIOL 2025

07-10 SEPTEMBER 2025

ISTANBUL, TURKEY

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Organized by
Trakya University
Istanbul Beykent University
International Researchers Association

ISBN #:
978-625-96407-1-6

WELCOME NOTES

You are welcome to our VII. AGBIOL Conference that is organized by Trakya University, Beykent University and International Researchers Association. The aim of our conference is to present scientific subjects of a broad interest to the scientific community, by providing an opportunity to present their work as oral or poster presentations that can be of great value for global science arena. Our goal was to bring three communities, namely science, research and private investment together in a friendly environment of Edirne, Turkey in order to share their interests and ideas and to get benefit from the interaction with each other.

In September 2018, we organized the first AGBIOL Conference with more than 700 scientists and researchers from all over the world with over 800 scientific papers. Due to COVID-19 situation, II. AGBIOL 2020 has organized fully on-line event which was one of the biggest online conferences in recent years in the world with 499 papers and 1133 authors with 333 oral and 166 e-poster presentations from 55 countries. Due to COVID-19 situation, AGBIOL 2021 was organized online again. AGBIOL 2022 conference was organized with a worldwide participation from 44 countries over 522 papers contributed by over 1300 authors. AGBIOL 2023 was organized with a record and worldwide participation from 33 countries 833 papers contributed by over 2000 authors with 522 oral and 311 poster presentations. AGBIOL 2024 consisted of 835 papers contributed by about 2000 authors with worldwide recodr participation again from 55 countries with 522 oral and 311 poster presentations.

There is a worldwide record participation from 60 countries 988 papers contributed over 2300 authors with 400 oral and 588 poster presentations in AGBIOL 2025.

The AGBIOL 2025 is normal participation as well as with online participation in Beykent University in Istanbul, Turkey on 07-10 September, 2025. The program included oral talks by invited prominent scientists and oral and e poster presentations by participants in selected topics from the submitted abstracts focusing on Agriculture, Biology and Life Sciences topics.

With care for our nature and environment, we aim the green congress, meaning that as little as possible papers will be used. Abstract book is published in electronic book and is distributed to the participants by e mail for online participants. All the e-posters are prepared in electronic form and then submit to via the conference e mail and exhibited in electronical poster boards as well as in online e poster hall in our web page during the conference.

The participants with paid conference fee accesssed all the normal and virtual presentation talks in each session, as well as to visit the virtual poster hall via preliminary provided. The abstracts were published in the Conference Abstract and Proceedings Book. Participants might send us their full papers, which based on their preferences are published either in our Conference Abstract and Proceedings Book or in selected International Indexed Scientific Journals.

Conference Topics:

Agriculture, Forestry, Life Sciences, Agricultural Engineering, Aquaculture and Biosystems, Animal Science, Biomedical science, Biochemistry and Molecular Biology, Biology, Bioengineering, Biomaterials, Biomechanics, Biophysics, Bioscience, Biotechnology, Botany, Chemistry, Chemical Engineering, Earth Sciences, Environmental Science, Food Science, Genetics and Human Genetics, Medical Science, Machinery, Pharmaceutical Sciences, Physics, Soil Science.

We would like to thank all of you for joining this conference and we would like to give also special thanks to TUBITAK and collaborators for giving us a big support to organize this event.

Prof Dr Yalcin KAYA
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CONTENTS

WELCOME NOTES ... 3

ORGANIZING COMMITTEE ... 4

INVITED SPEAKERS ... 5

SCIENTIFIC COMMITTEE ... 6

POTENTIALITIES OF SPIRULINA PLATENSIS AND AZOLLA FILICULOIDES AS BIOSTIMULANTS TO MITIGATE SALT STRESS IN HORDEUM VULGARE L. ... **44**

HERBICIDE-RESISTANT WEEDS A THREAT FOR THE SUSTAINABILITY OF RICE CROPPING SYSTEM: CALIFORNIA CASE STUDY ... **45**

THE REUSE OF TREATED WASTEWATER IN AGRICULTURE IN ALGERIA: CHALLENGES AND PERSPECTIVES ... **46**

PLANT-DERIVED MONOTERPENES: A PROMISING ALTERNATIVE TO SYNTHETIC INSECTICIDES FOR CONTROLLING DROSOPHILA PESTS ... **47**

ASSESSMENT OF THE TRANSITION FROM CONVENTIONAL SOIL TILLAGE TO MINIMUM TILLAGE TECHNOLOGY IN A MAIZE CROP WITH THREE HYBRIDS - A THREE YEAR CASE STUDY IN LANURILE, CONSTANȚA COUNTY ... **48**

IMPACT OF BASE FERTILIZERS ON THE BEHAVIOR OF DURUM WHEAT IN THE PRESENCE OF WATER STRESS ... **49**

CONTRIBUTIONS TO THE INVESTIGATION OF SPECIFIC TECHNOLOGICAL ASPECTS OF SOFT WHEAT SEEDS TREATED WITH PURIFIED WASTEWATER ... **50**

INSECTICIDAL ACTIVITY OF MONOTERPENE AGAINST DROSOPHILA MELANOGASTER (DIPTERA): DEVELOPMENT AND LOCOMOTOR BEHAVIOR ... **51**

YIELD RESPONSES TO A REDUCTION MINERAL NITROGEN FERTILISER APPLICATION RATES FOR MAJOR CROPS IN EUROPE ... **52**

CHILLI VIRAL DISEASES: EXPLORING VIRUSES AND PLANT DEFENCE MECHANISMS ... **53**

EFFECTIVENESS OF WILD BEES IN THE POLLINATION OF CITRULLUS LANATUS L. IN THE ALGERIAN SAHARA ... **54**

EXPLORING THE IMPACT OF FARMERS' STRESS, SELF-EFFICACY AND STRESS RESILIENCE ON PENNSYLVANIA DAIRY FARM OPERATORS' CAREER COMMITMENT ... **55**

HERDING THROUGH CRISIS: EXPLORING STRESS AND DEMOGRAPHICS AMONG GOAT AND SHEEP PRODUCERS ... **57**

POTATO BIOTIZATION: PHYTOPROTECTION AND GROWTH PROMOTION ... **59**

RESEARCH ON CONVENTIONAL WHEAT CULTIVATION TECHNOLOGY, INCLUDING SOIL TILLAGE AND PHASED FERTILIZATION, APPLIED TO THREE WHEAT VARIETIES UNDER NON-IRRIGATED CONDITIONS, IN THE PEDOCLIMATIC CONDITIONS OF GĂLBINAȘI, BUZĂU COUNTY, DURING THE 2023-2024 AGRICULTURAL YEAR ... **60**

YPOLOGY ASSESSMENT OF DAIRY CATTLE PRODUCTION IN THE MAJOR PRODUCTIVE REGION OF TUNISIA ... **61**

EFFECT OF JASMONIC AND SALICYLIC ACIDS ON CONTROLLING OLIVE FRUIT FLY, FRUIT QUALITY, AND OIL IN OLIVE PLANTS ... **62**

POTENTIALITIES OF SPIRULINA PLATENSIS AS BIOSTIMULANT TO MITIGATE SALINITY STRESS IN HORDEUM VULGARE L. 63

RECYCLING OF SEEDS AND KERNELS FROM DIFFERENT FRUIT TREES BY GERMINATION 64

LIGHT-EMITTING DIODE LIGHT QUALITY INFLUENCES GERMINATION, GROWTH AND BIOCHEMICAL INDICES OF ARNEBIA EUCHROMA 65

ASSESSING THE EFFECTS OF CLIMATE PATTERNS ON CEREAL CROP PRODUCTION IN THE FES-MEKNES REGION OF MOROCCO 66

HIGHER MUSHROOMS AS A POTENTIAL SOURCE FOR DEVELOPMENT OF BIOPREPARATIONS WITH ANTIOXIDANT, ANTIMICROBIAL AND PHYTOTOXIC PROPERTIES FOR AGRICULTURAL NEEDS 67

STUDY OF THE NEUROBEHAVIORAL TOXICITY OF THYMUS MUNBYANUS ON EPHESTIA KUEHNIELLA 68

BOLTING IN SPINACH; GENETIC AND ENVIRONMENTAL FACTORS 69

ENDOPHYTIC BACTERIA FROM ECHIUM AMOENUM FISCH & MEY. AS A NEW ELICITOR OF PHENOLIC BIOSYNTHESIS 70

BIOCHAR IMPROVES SALT TOLERANCE IN RICE BY LIMITING APOPLASTIC SODIUM TRANSPORT AND PROMOTING SUBERIN BIOSYNTHESIS 71

TOWARDS A SUSTAINABLE FUTURE: CITROBACTER FREUNDII AF-56, A CLIMATE-SMART ENDOPHYTIC MICROBE FOR REDUCING CHEMICAL USE AND ENVIRONMENTAL IMPACT 72

MORPHOLOGICAL AND DECORATIVE EVALUATION OF NEW, PROMISING GLADIOLUS VARIETIES 73

VIABILITY AND VIGOUR OF CARROT (DAUCUS CAROTA L.) SEEDS IN DIFFERENT FERTILIZATION REGIMES 74

ALLELOPATHIC POTENTIAL OF MARIGOLD EXTRACT IN THE CONTROL OF WEEDS IN TOMATO CROP 75

TOXIC EFFECTS OF BACILLUS THURINGIENSIS VAR. KURSTAKI (VAR.SEROTYPE:H-7) ON THE THIRD INSTAR LARVAE OF ARCHIPS ROSANA (LINNAEUS, 1758) (LEPIDOPTERA: TORTRICIDAE) 76

INTEGRATED CONTROL OF THE CODLING MOTH (CARPOCAPSA POMONELLA) IN THE KORCA REGION 77

MONITORING OF THE GREENHOUSE WHITEFLY (TRIALEURODES VAPORARIORUM) IN THE LUSHNJA DISTRICT 78

PHYTOREMEDIATION OF MERCURY CONTAMINATION: MECHANISMS, HYPER-ACCUMULATOR PLANTS, AND FUTURE PROSPECTS 79

EFFECT OF SOME ELICITORS ON TAXOL PRODUCTION IN HAZELNUT CELL SUSPENSION CULTURE 80

AGROECOLOGICAL PRACTICES AND FARMING SYSTEM DIVERSITY IN MOROCCAN PERI-URBAN ZONES: INSIGHTS FROM THE CASABLANCA METROPOLIS 81

IMPROVEMENT OF EMPLOYABILITY IN AGRICULTURAL COMPANIES THROUGH MENTORSHIP-BASED PRACTICAL TRAINING 82

THE INTERPLAY OF MICROBIAL PROCESSES AND MANAGEMENT IN SOIL METHANE CONTROL 83

DETECTION OF CYT2 GENE IN BACILLUS THURINGIENSIS ISOLATES WITH ACTIVITY AGAINST WIREWORMS 84

REDEDGE SPECTRAL SENSITIVITY FOR DISTINGUISHING VIRAL STRESS IN POTATO CROPS USING UAV-BASED MULTISPECTRAL IMAGERY 85

IDENTIFICATION OF ISOLATED FUSARIUM WILT PATHOGENS FROM KIRKAĞAÇ MELONS 86

RESILIENCE OF BARLEY MANAGED UNDER CONSERVATION AGRICULTURE BY USE OF PHENOLIC AS STRESS BIO-INDICATOR IN TUNISIAN SEMI-ARID 87

NEUROTOXIC EFFECTS OF PREIMAGINAL EXPOSURE TO SPIROMESIFEN IN DROSOPHILA MELANOGASTER 88

STUDY OF THE TECHNOLOGICAL CHARACTERISTICS OF THE WHITE WINE VARIETIES TAMYANKA, SLAVA AND DRUZHBA, GROWN IN THE KYUSTENDIL REGION (BULGARIA) 89

STUDY OF THE POSSIBILITIES FOR PRODUCING WHITE WINE FROM THE MISKET VRACHANSKI AND MISKET KAYLASHKI VARIETIES, GROWN ORGANICALLY AND CONVENTIONALLY 90

DIFFERENTIATION OF NEW COMMON WINTER WHEAT VARIETIES TO DIFFERENT TYPES OF ABIOTIC STRESS RELEASED IN DOBRUDZHA AGRICULTURAL INSTITUTE, BULGARIA 91

APPLICATION OF ADAMS-BASHFORTH-MOULTON METHOD IN PREDICTING VEGETABLE PRODUCTION IN ALBANIA 92

BIOLOGICAL EFFICACY OF THE CLIC PRO HERBICIDE IN GRAPEVINE NURSERY 93

COMPENSATING FOR NEGATIVE HERBICIDAL EFFECTS IN GRAPEVINE NURSERY THROUGH BIOSTIMULANTS 94

RESPONSE OF INTERSPECIFIC SUNFLOWER FORMS TO PEG-MEDIATED WATER STRESS 95

ASCOCHYTA BLIGHT IN LENTIL PRODUCTION: HISTORICAL ORIGINS, BIOLOGY OF Ascochyta lentis, ECONOMIC IMPACTS, AND MANAGEMENT STRATEGIES 96

MICRONUTRIENT CONTENT OF AGRICULTURAL SOILS IN ISTANBUL PROVINCE . 96

ADDED VALUE OF CEREALS FOR HUMAN NUTRITION 98

HORTICULTURAL PRACTICES IN POT CULTIVATION OF RHODODENDRON SPECIES: A CASE FROM TURKEY 99

EFFECTS OF CHEMICAL AND ORGANOMINERAL FERTILIZERS ON MORPHOLOGICAL CHARACTERISTICS AND YIELD 100

EFFECT OF FARMING SYSTEMS ON THE QUALITY OF TRITORDEUM UNDER SLOVAK CONDITIONS 101

REASONS FOR THE UNDERDEVELOPMENT OF CANOLA IN TÜRKİYE 102

ANTI-NUTRITIONAL SUBSTANCES CONTAINED IN RAPESEED 103

CHARACTERIZATION AND DIFFERENTIATION OF FEMALE SUNFLOWER LINES THROUGH CHANGE OF THE NDVI INDEX 104

THE SPONTANEOUS FLORA OF CITRUS ORCHARDS IN THE BOUNAMOUSSA PLAIN (EL TARF, NORTHEASTERN ALGERIA) 105

EVALUATION OF DROUGHT AND HERBICIDE STRESS IN GLYPHOSATE-RESISTANT AND SENSITIVE HORSEWEED (ERIGERON CANADENSIS L.) BIOTYPES USING NORMALIZED DIFFERENCE VEGETATION INDEX 106

SMART MATURITY MONITORING IN OLIVE ORCHARDS: USING VIS/NIR TOOLS FOR OPTIMAL HARVEST INTERVAL. CASE STUDY IN ALBANIA..... 107

PHYSIOLOGICAL EFFECTS OF LOW AND HIGH TEMPERATURE STRESS ON CORN WITH MYCORRHIZAL SYMBIOSIS 108

LINES OF SUNFLOWER, WITH IMPROVED BIOCHEMICAL PROFILE, OBTAINED AS A RESULT OF INTERSPECIFIC HYBRIDIZATION BETWEEN CULTIVATED SUNFLOWER (HELIANTHUS ANNUUS L.) AND PERENNIAL SPECIES (HELIANTHUS GIGANTEUS GT-– M-030) VIA EMBRYOCULTIVATION..... 109

ORGANIC OILSEED RAPE CULTIVATION - PROBLEMS AND SOLUTIONS IN PROTECTION..... 110

CORRELATION DEPENDENCIES OF STRUCTURAL ELEMENTS OF NEW SUNFLOWER HYBRIDS..... 111

EVALUATION OF SUGAR, ORGANIC ACID, AND AROMA PROFILE IN BITTER MELON (MOMORDICA CHARANTIA L.) 112

THYME SPECIES ARE POTENT GROUND COVERING LANDSCAPING PLANTS..... 114

DETERMINATION OF BIODEGREDATION POTENTIAL OF BENEFICIAL BACTERIA IN SOME PESTICIDE; IN VITRO..... 115

CHANGES IN SUGAR, ORGANIC ACID, AND VOLATILE COMPOUND PROFILES OF PERSIMMON (DIOSPYROS KAKI L.) FRUITS HARVESTED AT DIFFERENT MATURITY STAGES..... 116

A SUSTAINABLE APPROACH FOR THE DEVELOPMENT OF THE ALGERIAN OLIVE SECTOR 117

MINT IN AQUAPONICS: OPPORTUNITIES FOR INTEGRATED PRODUCTION OF MEDICINAL PLANTS 118

TOWARDS NUTRITIONALLY ENHANCED MAIZE: A MOLECULAR APPROACH..... 119

CONSERVED MOTIFS IDENTIFICATION OF THIONIN PROTEIN OF TWENTY-SIX PLANTS SPECIES..... 120

BIOINFORMATICS STRUCTURAL ANALYSIS OF THIONIN PROTEIN IN SIX PLANT SPECIES OF BRASSICALES..... 121

STUDY OF SOME PHYSICAL AND CHEMICAL PARAMETERS IN THE PLANT-GRAPE-WINE RELATIONSHIP IN THE VINEYARD PLANTATIONS IN DOBROGEA REGION 122

BARRIERS IN ACCEPTING THAT SOCIAL-INNOVATION CAN BE ADDED TO TRADITIONAL KNOWLEDGE FOR RURAL AREAS IN THE EASTERN EUROPEAN COUNTRIES 123

ASSESSMENT OF RESISTANCE TO SOME HERBICIDES OF SUNFLOWER GENOTYPES OF DIFFERENT ORIGINS..... 124

AIOT-ENABLED PLASMA AGRICULTURE: A SIMULATION ROADMAP FOR DIGITAL AND SCALABLE FARMING 125

RESPONSE OF FENNEL (FOENICULUM VULGARE MILL.) TO SUB-LETHAL RATES OF GLYPHOSATE AND FLAZASULFURON 126

MOLECULAR MARKER-BASED APPROACHES IN DETERMINING ALMOND GENETIC DIVERSITY: A REVIEW OF RECENT STUDIES 127

CORIANDRUM SATIVUM L.: A REVIEW ON BOTANICAL CHARACTERISTICS AND AGRICULTURAL SIGNIFICANCE 128

USE OF ORGANIC FERTILIZERS AS AN ALTERNATIVE FOR CHEMICAL PRODUCTS IN CURLY LETTUCE PRODUCTION 129

BIOCONTROL ACTIVITY OF TRICHODERMA HARZIANUM AGAINST FUSARIUM CULMORUM CAUSING ROOT AND CROWN ROT IN WHEAT UNDER SALT STRESS CONDITIONS 130

PROPOLIS AGAINST BOTRYTIS CINEREA: A REVIEW OF STUDIES COMBINING IN VITRO AND IN VIVO TESTS 131

EFFECTS OF FOLIAR MINERAL TREATMENTS ON PHYSIOLOGICAL PERFORMANCE AND BERRY QUALITY OF 'RODITIS' GRAPEVINES (VITIS VINIFERA L.) 132

INFLUENCE OF SOIL TILLAGES AND CROP ROTATION ON THE EVOLUTION OF MAIZE CROP IN SOUTHERN ROMANIA 133

RECENT ADVANCES IN ALMOND MICROPROPAGATION AND FUTURE PERSPECTIVES 134

BIOSTIMULANT POTENTIAL OF PLANT EXTRACTS IN ENHANCING PLANT TOLERANCE TO ABIOTIC STRESSES: A REVIEW 135

VARIATION IN PHENOLIC AND PROLINE CONTENT OF ECLIPTA PROSTRATA INFLUENCED BY ARBUSCULAR MYCORRHIZAL FUNGI AND DIFFERENT SAND/PEAT SUBSTRATE RATIOS" 137

GENERATIVE ADVERSARIAL NETWORKS AND THEIR APPLICATION AREAS IN SMART AGRICULTURE 138

SAHARAN AGRICULTURE: FROM TRADITIONAL OASIS SYSTEM TO THE DEVELOPMENT OF A MARKET ECONOMY AND SUSTAINABLE DEVELOPMENT ... 139

STRATEGIC DIAGNOSIS OF THE DATE PALM VALUE CHAIN IN THE WILAYA OF OUARGLA (SOUTHEASTERN ALGERIA) 140

AN ECO-FRIENDLY TECHNIQUE FOR ENHANCING CARROT SEED QUALITY: PRIMING AND DRYING TREATMENTS USING SEAWEED EXTRACT 141

THE INFLUENCE OF AGROFORESTRY CURTAINS ON THE PRODUCTION OF AUTUMN CEREALS, IN THE CLIMATIC CHANGES CONDITIONS FROM BRAILA PLAIN, ROMANIA 142

STUDIES ON THE IMPROVEMENT OF SALINE SOILS IN COMPLEX AGRICULTURAL EXPERIMENTS WITH SALINITY-TOLERANT SPECIES, GREEN CROPS AND DIFFERENT TYPES OF FERTILIZERS 143

BOTANICAL NEMATICIDES: A SUSTAINABLE APPROACH FOR CROP PROTECTION 144

SOME CULTURAL STRATEGIES DEVELOPED FOR DROUGHT CONDITIONS IN FRUIT SPECIES 145

VERTICAL FARMING: MEASURING AWARENESS AND WILLINGNESS TO PAY AMONG ALBANIAN UNIVERSITY STUDENTS 147

ASSESSMENT OF THE AGRONOMIC POTENTIAL OF PHACELIA TANACETIFOLIA DEPENDING ON SOWING TIME AND SPACING 148

VARIABILITY OF QUALITY PARAMETERS OF TUBERS IN DIFFERENT ROMANIAN POTATO VARIETIES 149

EMERGENCE AND MANAGEMENT STRATEGIES OF ECHINOCHLOA WALTERI (PURSH) A.HELLER 150

THE INFLUENCE OF THE WEATHER CONDITIONS ON THE MAIN COLEOPTERAN SOIL PESTS' OCCURRENCE AND DYNAMIC IN MAIZE CROPS FROM SOUTHERN ROMANIA 151

LEGAL ISSUES FACED BY FARMERS AND AWARENESS OF AGRICULTURAL LAW IN THE TRAKYA REGION 152

THE IMPACT OF LOCATIONS AND VARIETIES ON QUALITY PARAMETERS OF PEANUT 153

EFFECTS OF SILVER NANOPARTICLES ON WHEAT: CONTRASTING RESPONSES AT DIFFERENT DEVELOPMENTAL STAGES 154

CIRCULAR ECONOMY IN AGRICULTURE: A TRANSFORMATIVE MODEL FOR A SUSTAINABLE FUTURE 156

POTENTIAL OF TRICHODERMA SPP. IN THE BIOLOGICAL CONTROL OF WEEDS 157

DIFFERENTIATING CHRONIC KIDNEY DISEASE TYPES USING PHYSICOCHEMICAL PARAMETERS IN AGRICULTURAL AREAS THROUGH EXPLAINABLE MACHINE LEARNING 158

EFFECTIVENESS OF MECHANICAL PRECISION WEED CONTROL IN ORGANICALLY GROWN WINTER SPELT WHEAT 159

EVALUATION OF FUNGICIDE EFFICACY AGAINST NEOSCYTALIDIUM DIMIDIATUM UNDER ELEVATED TEMPERATURE AND CO_2 CONDITIONS 161

DEVELOPING A NEW TECHNOLOGY FOR WATER TREATMENT USING NANOTECHNOLOGY-MAGNETIZATION TO ENHANCE IRRIGATION EFFICIENCY AND AGRICULTURAL PRODUCTION IN ARAB COUNTRIES: ARICA23_711 162

MACHINE LEARNING FOR THE STUDY AND MONITORING OF WATER INFILTRATION 163

EFFECT OF MAGNETIC INTENSITY ON TREATED IRRIGATION WATER AND SEED GERMINATION 164

SPRAYABLE BIOPOLYMERS WITH MULTIPLE BENEFITS FOR AGRICULTURE 165

AGRICULTURAL WATER MANAGEMENT TECHNOLOGIES 166

STUDY OF THE DRYING KINETICS OF APPLE, BANANA AND GRAPE..... 167

EXPERIMENTAL DETERMINATION OF SORPTION ISOTHERMS OF PARSLEY (PETROSELINUM HORTENSE VAR. FOLIOSUM) FOR ITS DRYING AND CONSERVATION 168

HYDROSMART: A RESEARCH-GRADE STATION FOR HYDROPONIC SOLUTIONS DESIGN..... 169

TECHNO-ECONOMIC EVALUATION AND CONCEPTUAL DESIGN OF A DUAL-COMPARTMENT NUTRIENT MIST BIOREACTOR SYSTEM FOR SCALABLE AMF BIOFERTILIZER PRODUCTION..... 171

A WEARABLE 3D-GLOVE SYSTEM FOR HYPERSPECTRAL AND CONTACT IMAGING OF ROOT AND RHIZOSPHERE MICROBIOMES : A CONCEPTUAL DESIGN 172

FUNCTIONALIZATION OF RAW BIOMASS WITH MAGNESIUM OXIDE : SYNTHESIS AND CHARACTERIZATION 173

DETERMINING THE PROPERTIES OF ORGANIC FERTILIZERS FOR DEM MODELLING: EXPERIMENTAL ASSESSMENT AND CALIBRATION 174

EFFECTS OF NANOPARTICLES ON MORPHOLOGICAL CHARACTERISTICS AND SECONDARY METABOLITE PRODUCTION OF SNAPDRAGON FLOWERS..... 175

TURNING REAL-WORLD MAIZE SEED PRODUCTION RESULTS INTO DECISION-MAKING INFORMATION WITH REMOTE SENSING AND DYNAMIC VEGETATIVE INDICES 176

FROM SOIL TO SURVIVAL: PGPB-TRIGGERED DEFENSE AND ADAPTATION IN PLANTS 177

TOXIC DIALOGUES: HERBICIDES, MICROBIAL VOICES, AND THE ECOSYSTEM'S RESPONSE..... 178

TECHNICAL AND ECONOMIC ANALYSIS OF THE SOLAR ENERGY SYSTEM DESIGNED FOR EDIRNE PROVINCE AGRICULTURAL RESEARCH INSTITUTE BUILDING IN THE CASE OF ROOF AND FACADE APPLICATION 179

SMALL PARTICLES, BIG IMPACT: THE ROLE OF NANOFERTILIZERS IN IMPROVING FOOD QUALITY..... 180

THE EVALUATION OF AGRICULTURAL DROUGHT IN COASTAL AND INTERIOR REGIONS BASED ON DROUGHT INDICES..... 181

THE ROLE OF HOBBY GARDENS IN ADVANCING SUSTAINABLE URBAN AGRICULTURE..... 182

OPTIMISATION OF AGRICULTURAL AND ENERGY EFFICIENCY THROUGH SELECTIVE SPECTRAL UTILISATION 183

IDENTIFICATION OF THERMAL CHARACTERISTICS OF SOUTH SULAWESI COFFEE SKIN AS A BIOPOLYMER MATERIAL..... 184

ASSESSING THE POTENTIAL OF COFFEE FERMENTATION BY-PRODUCTS THROUGH COLOR METRICS IN OHMIC HEATING-BASED PROCESSING 185

EXPLORATORY FACTOR ANALYSİS OF FRUİT FARMERS' ECO-FRİENDLY AGRİCULTURAL TECHNİQUES APPLİCATİONS İN TERMS OF SUSTAİNABLE AGRİCULTURE-ENVİRONMENT RELATİONS: EVİDENCE FROM EĞİRDİR LAKE İN TURKEY..... 186

MODERN TECHNOLOGICAL APPLICATIONS FOR SUSTAINABLE TURF MANAGEMENT SYSTEMS 187

EFFECT OF MAGNETIC FIELD INTENSITY ON WATER TREATMENT 189

PRACTICES ENHANCING ANDROGENESIS EFFICIENCY IN EGGPLANT (SOLANUM MELONGENA L.) ANTHER CULTURE..... 190

DEVELOPMENT OF MIDWAY BREEDING MATERIALS RESISTANT TO POWDERY MILDEW (LEVEILLULA TAURICA) IN PEPPER..... 191

FACTORS AFFECTING FRESHWATER FISH REPRODUCTION CARASSIN CARASSIUS) IN THE HAMMAM DEBAGH DAM (GUELMA, ALGERIA)..... 192

GREEN BIOCATALYSIS WITH MICROBIAL PROTEASES: UNLOCKING THE POTENTIAL OF KERATINOUS AGRI-FOOD RESIDUES FOR FISH FEED PRODUCTION 193

CURRENT STATUS OF SOME FISHERY COOPERATIVES IN GIRESUN (EASTERN BLACK SEA REGION) AND SOCIO-DEMOGRAPHIC CHARACTERISTICS OF ARTISANAL FISHERMEN 194

FISH SPECIES SETTLING ON THE ARTIFICIAL REEF MODEL CREATED FROM FALLEN CONCRETE SUPPORTS OF WATER INTAKE PIPES IN THE SEA AT ANTALYA, KONYAALTI 195

SUSTAINABILITY ASSESSMENT OF OPEN AND CLOSED SYSTEMS IN MICROALGAE CULTIVATION: A REVIEW..... 196

EFFECT OF TEMPERATURE AND PHOTOSYNTHETIC ACTIVITY ON METABOLISM AND FOOD INTAKE IN RED TILAPIA..... 197

TEMPORAL VARIABILITY OF POTENTIALLY HARMFUL PHYTOPLANKTON IN A MEDITERRANEAN COASTAL LAGOON..... 198

CHARACTERIZATION of ARTEMIA FROM EL BAHIRA LAKE AND STRESS RESPONSE 199

DETERMINATION OF CHLOROPHYLL CONTENT IN MAIZE AND BEANS (2M+1B) SOWN AT DIFFERENT RATES IN THE SAME ROW..... 201

PROTECTIVE EFFECT OF POLLEN SEEDS AGAINST THE IMMUNOTOXICITY OF ETHYLENE GLYCOL MONOMETHYL ETHER IN MALE WISTAR RATS..... 202

RETROSPECTIVE ANALYSIS OF HYDATID CYST IN THE WILAYA OF SKIKDA: PREVALENCE AND EPIDEMIOLOGICAL TRENDS 203

EFFECT OF CROSSING OVER DISTRIBUTION IN GENOME ON THE POWER OF QTL CONTINUITY EFFECT 204

PARASITIC INFESTATION IN PASSERINES IN THE FORESTS OF NORTHEASTERN ALGERIA 205

EFFECTS OF PROBIOTIC SUPPLEMENTATION ON GROWTH PERFORMANCE OF HOLSTEIN CALVES..... 206

INFLUENCE OF PROBIOTIC SUPPLEMENTATION ON BLOOD PARAMETERS AND DIARRHEA INCIDENCE IN HOLSTEIN CALVES..... 207

EVALUATION OF NUTRITIONAL VALUE OF GREEN AND BLACK TEA WASTES USING GAS PRODUCTION TECHNIQUE FOR RUMINANT FEEDING 208

IMPACT OF SPINOSAD IN DROSOPHILA MELANOGASTER (DIPTERA): DELAYED TOXIC EFFECTS ON TWO SUCCESSIVE GENERATIONS..... 209

EFFECT OF LASALOCID ON THE RUMEN ECOSYSTEM AND FERMENTATION PARAMETERS IN GHEZEL SHEEP..... 210

INTERRELATIONSHIP BETWEEN ADRENAL AND GONADAL ACTIVITY IN OULED DJELLAL LAMBS REARED IN ARID ZONES 211

STUDY OF INTESTINAL PARASITES AND BACTERIAL TRANSPORT OF NOCTURNAL AND DIURNAL RAPTORS LIVING IN CAPTIVITY AT THE JARDIN D'ESSAI EL HAMMA (ALGIERS, ALGERIA)..... 212

WALKING THE LAST MILES ON THE LONG ROAD TO DEVELOP IMPORTANT GENETIC MARKERS FOR ESR2 GENE POLYMORPHISM ANALYSIS OF LITTER SIZE PREDICATION IN SHEEP: 5 YEARS OF EXPERIENCE FROM FARM TO LABORATORY WORK..... 213

EFFECT OF SUPPLEMENTATION OF DAIRY COWS IN MID-LACTATION WITH HYDROPONIC BARLEY ON MILK PRODUCTION PERFORMANCE 214

AN OBSERVATION ON AN ANOMALY IN THE SETAE SCE DISRUPTING BILATERAL SYMMETRY IN TYCHEROBIUS IZMIRENSIS AKYOL & KOÇ (ACARIFORMES: CAMEROBIIDAE) 215

EFFECT OF INCORPORATION OF PHYTASE INTO A FEED ENRICHED WITH ACID OILS ON GROWTH PERFORMANCE OF BROILER CHICKEN 216

EFFECTS OF GINGER POWDER SUPPLEMENTATION IN WHEAT-BASED DIETS ON SERUM AND EGG YOLK CHOLESTEROL AND ANTIOXIDANT INDICES IN POST-MOLT LAYING HENS 217

EFFECT OF PROPOLIS WITH DIFFERENT LEVELS OF ENZYME IN WHEAT-BASED DIET ON SERUM AND YOLK CHOLESTEROL AND OXIDATION INDEX IN LAYER HENS 219

SEASONAL HISTOMORPHOMETRIC CHANGES OF THE ADRENAL CORTEX IN D'MAN RAMS REARED IN ARID LANDS 221

ASSESSMENT OF PLASMA GSH AS A BIOMARKER OF ANTIOXIDANT STATUS IN LACTATING LOCAL GOATS LIVING IN SEMI-ARID REGION OF M'SILA, ALGERIA 222

ASSESSMENT OF LIPID OXIDATIVE STRESS THROUGH PLASMA MDA LEVELS IN LACTATING LOCAL GOATS REARED UNDER SEMI-ARID CONDITIONS IN M'SILA, ALGERIA 223

MORPHOMETRIC STUDY OF EGGS OF TWO SPECIES OF QUAIL COTURNIX JAPONICA AND COTURNIX COTURNIX (AVES, PHASIANIDAE) IN ALGERIA 224

COMPARATIVE MORPHOMETRIC ANALYSIS OF THE EGGS OF TWO ALECTORIS SPECIES: THE ENDEMIC BARBARY PARTRIDGE AND THE INTRODUCED CHUKAR PARTRIDGE 225

COPROSCOPY AND ECTOPARASITES OF BATS IN CHREA NATIONAL PARK (BLIDA - ALGERIA) 226

STUDY OF RED MEAT CONSUMPTION AND THE PLACE OF GOAT MEAT IN THE KEF REGION 227

EFFECTS OF DAILY COOKING OIL CONSUMPTION ON HORMONE PRODUCTION AND OVARIAN STRUCTURE IN PREGNANT RABBITS 228

IMPACT OF MASTITIS PATHOGENS ON BLOOD ANTIOXIDANT ENZYMES IN TRANSITION DAIRY COWS 230

ASSESSMENT OF HABITAT HEALTH IN ÇARDAK LAGOON USING CARCINUS AESTUARII NARDO, 1847 AS A BIOINDICATOR 231

AGE AND BODY SIZE OF THE BULGARIAN BENT-TOED GECKO, MEDIODATYLUS DANILEWSKII (STRAUCH, 1887) IN A TURKISH POPULATION 232

THE EFFECT OF ENERGY STATUS INDICATORS ON OVARIAN REACTIVATION AND POSTPARTUM CYCLE RESUMPTION IN DAIRY COWS 233

EFFECT OF FEED IMBALANCE ON REPRODUCTIVE PARAMETERS OF DAIRY COWS ON FOUR FARMS IN THE TIZI-OUZOU REGION 234

COMPARATIVE CHROMOSOMES AND CHROMOSOME PAINTING ANALYSIS OF A THREATENED SPECIES : THE BARBARY SHEEP AMMOTRAGUS LERVIA 235

PRELIMINARY STUDY: EVALUATION OF THE EFFECTS OF BLACK CUMIN SEED POWDER SUPPLEMENTATION ON SPERM PARAMETERS IN JAPANESE QUAIL..... 236

THERAPEUTIC EFFECT OF SWEET MARJORAM (ORIGANUM MAJORANA) ON HYPERANDROGENISM IN MUS MUSCULUS MICE..... 237

RETROSPECTIVE STUDY OF BOVINE TUBERCULOSIS IN A PROVINCE OF EASTERN ALGERIA, REPORT FROM 2016-2025 238

TREATING PSORIASIS WITH MEDICAL LEECHES 239

EXPLORING THE FACTORS INFLUENCING AVIAN SPERM QUALITY 240

EFFECTS OF VEGETABLE OILS ON ORGANIC SOLVENT –INDUCED TOXICITY IN WISTAR RATS 241

PRELIMINARY STUDY: EFFECT OF DIETARY SUPPLEMENTATION WITH NIGELLA SEED POWDER ON SERUM CHOLESTEROL CONCENTRATION IN QUAILS 242

MORPHOMETRIC CHARACTERIZATION OF THE FRESHWATER CRAB POTAMON ALGERIENSE (DECAPODA: POTAMIDAE) IN THE BENI HAROUN RESERVOIR, ALGERIA 243

A2 MILK: IMPLICATIONS OF GENETIC VARIANTS IN MILK PROTEINS FOR HUMAN HEALTH AND THE DAIRY INDUSTRY 244

ABSTRACT: EVALUATION OF PRODUCTIVITY AND PROTEIN RATE OF HYDROPONIC FORAGE FROM BARLEY AND TRITICALE ASSOCIATED WITH LEGUMES: PRELIMINARY RESULTS. 245

ANTIBIOTIC RESIDUE RESEARCH IN MEAT BEEF AND RAW MILK BY THE MICROBIOLOGICAL METHOD IN MÉDÉA (ALGERIA) 246

RESEARCH OF ANTIBIOTIC RESIDUES IN RAW MILK OF INFORMAL CIRCUIT BY THE DELVOTEST SP NT IN ALGIERS, BLIDA AND TIPAZA (ALGERIA) 247

REPRODUCTIVE EFFICIENCY IN AN ALGERIAN SYNTHETIC RABBIT STRAIN: FOLLICULAR DYNAMICS AND EMBRYONIC SURVIVAL 248

LACTATION PERFORMANCE AND METABOLIC CORRELATES IN ALGERIA'S SYNTHETIC RABBIT STRAIN: IMPLICATIONS FOR BREEDING PROGRAMS..... 249

EFFECTS OF COOLING METHODS OF EGGS AFTER SHORT PERIOD OF INCUBATION DURING LONG STORAGE PERIOD ON HATCHING RESULTS OF LAYERS PARENT STOCK EGGS 250

EFFECT OF ACIDIFIER (GLOBACID) ON LEVEL OF ENZYME ADDITION IN GROWING QUAIL FED WHEAT BASED DIET 251

EFFECT OF LACTOFEED PROBIOTICON LEVEL OF ENZYME ADDITION IN GROWING QUAIL FED WHEAT BASED DIET 252

BIBLIOMETRIC DECODING OF MILK: GENETICS AND TRENDS IN LIVESTOCK 253

HEAT AND COLD STRESS IN WATER BUFFALOES (BUBALUS BUBALIS): A REVIEW 254

EFFECT OF PREGABALIN ON SOCIAL, COGNITIVE BEHAVIOR, SKILLS AND PERSONAL QUALITIES 255

STUDY ON THE MANAGEMENT, DIAGNOSIS AND EVOLUTION OF ISCHEMIC STROKE IN THE MEDICAL EMERGENCY SERVICE 256

EPIDEMIOLOGICAL STUDY OF CERVICAL CANCER IN THE WILAYA OF EL TAREF REGION IN ALGERIA..... 257

TNF-α–MEDIATED INFLAMMATORY RESPONSE IN THE PREVENTIVE BIOTHERAPY OF ECHINACEA AGAINST TWO-STAGE SKIN CARCINOGENESIS: INSIGHTS FROM HISTOLOGICAL AND MORPHOLOGICAL STUDIES..... 258

ASSESSMENT OF BLOOD INFLAMMATORY SCORES FOR PREDICTING INTRACYTOPLASMIC SPERM INJECTION OUTCOMES IN INFERTILE ALGERIAN WOMEN 260

CORRELATION BETWEEN BLOOD GLUCOSE AND GLYCATED HEMOGLOBIN LEVELS IN DIABETIC PATIENTS WITH GENETIC HEMOGLOBIN VARIANTS 261

EVALUATION OF ANTIOXIDANT ACTIVITY OF SEED ORGANIC EXTRACTS OF ANISE (PIMPINELLA ANISUM L.) CULTIVATED IN ALGERIA 262

GREEN BIOSYNTHESIS OF CUO NANOPARTICLES USING SPIRULINA MAXIMA: POTENT ANTIMICROBIAL ACTIVITY AGAINST MULTIDRUG-RESISTANT BACTERIA AND FUNGI 263

ANTIFUNGAL POTENTIAL OF ATLAS CEDAR (CEDRUS ATLANTICA) ESSENTIAL OIL AND FORMULATION INTO A TOPICAL OINTMENT 264

STUDY OF THE SUBACUTE TOXICITY OF THE METANOLIC EXTRACT OF RUTA MONTANA L. ON FEMALE ALBINO WISTAR RATS: EFFECT ON THE LIVER..... 265

EVALUATION OF THE ANTIOXIDANT ACTIVITY OF DAUCUS CAROTA L. ESSENTIAL OIL FROM EL-TAREF -ALGERIA 266

ANTISTAPHYLOCOCCAL STUDY OF THE ESSENTIAL OIL OF MENTHA PULEGIUM L. FROM ALGERIA 267

SUBACUTE EFFECTS OF RUTA MONTANA PLANT EXTRACT ON RENAL FUNCTION AND STRUCTURE IN ALBINO-WISTAR RATS 268

EFFECT OF METHANOLIC CRUDE EXTRACT FROM THE AERIAL PART OF THE PLANT RUTA MONTANA ON REPRODUCTION OF PREGNANT FEMALE RATS..... 269

ACUATE POISONING BY ATRACTYLOSIDE: FATAL CASE OF A CHILD 270

CHEMICAL COMPOSITION, ANTIOXIDANT AND ANTICHOLINESTERASE ACTIVITIES OF ALGERIAN INULA CONYZA DC 271

PHYTOCHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY OF VICIA OCHROLEUCA EXTRACTS 272

FUNGAL CONTAMINATION IN HOSPITAL ENVIRONMENTS 273

SUBACUTE TOXICITY OF ACETOCHLOR IN MALE RAT : EFFECT ON LIVER METABOLISM..... 274

FROZEN EMBRYO TRANSFER OUTCOMES IN ALGERIA: BIOCHEMICAL PREGNANCY RATES AND INFLUENCING FACTORS..... 275

VALORIZATION OF ALGERIAN MEDICINAL PLANTS: AN INNOVATIVE BURN-HEALING CREAM BASED ON CUCURBITA PEPO SEED OIL" 276

EPIDEMIOLOGY AND SUSCEPTIBILITY PROFILE OF BLOOD CULTURE ISOLATES IN AN ALGERIAN UNIVERSITY HOSPITAL CENTER (UHC ANNABA)..... 277

DIAOGNOSIS OF CUTANEOUS ALTERNARIA CASE IN HUMAN SKIN AND ITS TREATMENT OPTIONS 278

THE THYMELAEACEAE AND CUPRESSACEAE PLANTS FAMILIES USED AS A TREATMENT OF CUTANEOUS LEISHMANIASIS IN ALGERIA 279

GINSENOSIDE HAS ANTI-FIBROTIC AND ANTI-NEOVASCULAR EFFECTS IN AGE-RELATED MACULAR DEGENERATION VIA THE REGULATION OF CRYSTALLIN ALPHA B 280

VOLUNTARY ALPHACHLORALOSE POISOINING CONFIRMED BY GAS CHROMATOGRAPHY-MASS SPECTROMETRY: A CASE REPORT 281

CYTOTOXIC EVALUATION OF SELECTED BIOACTIVE METABOLITES FROM INFUNDIBULICYBE GEOTROPA AGAINST HUMAN PROSTATE AND LUNG CANCER CELL LINES 282

LIFE-THREATENING PSYCHOTROPIC DRUG OVERDOSE: A CASE OF SEVERE TOXICITY 283

A SILENT THREAT TO ENVIRONMENTAL AND PUBLIC HEALTH: HOSPITAL WASTEWATER AS A RESERVOIR FOR CARBAPENEMASE-PRODUCING BACTERIA 284

A SILENT THREAT TO ENVIRONMENTAL AND PUBLIC HEALTH: HOSPITAL WASTEWATER AS A RESERVOIR FOR CARBAPENEMASE-PRODUCING BACTERIA 286

PROBABILISTIC ASSESSMENT OF FLUORIDE-RELATED HEALTH RISKS IN GROUNDWATER OF THE FELENT STREAM WATERSHED, KUTAHYA 287

SPATIAL–TEMPORAL VARIATIONS OF FLUORIDE IN SURFACE WATERS OF FELENT STREAM (TÜRKIYE) AND ASSOCIATED HEALTH RISKS 288

MOLECULAR-LEVEL DETECTION OF CELLULAR RESPONSES USING MACHINE LEARNING-ASSISTED RAMAN SPECTROSCOPY 289

NEW APPROACHES FOR ARTIFICIAL INTELLIGENCE-ASSISTED RETINOSCOPES 290

CREATION OF OXYGEN-RELEASING SANDWICH BIOMATERIALS BASED ON POLYVINYL ALCOHOL AND RESEARCH ON THEIR IMPACT ON DIABETES MELLITUS 291

CREATION OF OXYGEN-RELEASING SANDWICH BIOMATERIALS BASED ON POLYVINYL ALCOHOL AND RESEARCH ON THEIR IMPACT ON DIABETES MELLITUS 293

IMPACT OF MENOPAUSAL STATUS ON THE CLINICAL AND PATHOLOGICAL CHARACTERISTICS OF BREAST CANCER: A RETROSPECTIVE STUDY OF 196 PATIENTS FROM WESTERN ALGERIA 295

EXTRACTION OF BIOACTIVE LYSOZYME FROM CAMEL MILK WHEY USING SALTING-OUT AND PH PRECIPITATION TECHNIQUES 296

UNVEILING THE PHYTOCHEMICAL PROFILE OF CUCURBITA MAXIMA SEED OIL AND ITS PROMINENT ANTI-INFLAMMATORY, ANTIOXIDANT, AND ANTI-CANCER ACTIVITIES 297

COMPARATIVE ASSESSMENT OF PHENOLIC PROFILES AND BIOLOGICAL ACTIVITIES OF SIX TUNISIAN MEDICINAL PLANTS 298

PHYTOCHEMICAL AND BIOLOGICAL INVESTIGATION OF GARLIC AND ROSEMARY FOR THE DEVELOPMENT OF A PLANT-BASED THERAPEUTIC AGENT 299

INFLUENCE OF SYNTHESIS METHODS ON STRUCTURAL AND MORPHOLOGICAL PROPERTIES OF MAGNETITE NANOPARTICLES: A COMPARATIVE STUDY OF PRECIPITATION AND SOLVOTHERMAL TECHNIQUES 300

THERAPEUTIC EFFICACY OF SALVIA ROSMARINUS: HEALING, ANTIBACTERIAL, AND PAIN-RELIEF EFFECTS 301

IN VIVO WOUND HEALING AND IN VITRO ANTI- ANTIOXIDANT ACTIVITY EVALUATION OF COTULA CINEREA 302

INVOLVEMENT OF SIGNALING PATHWAYS IN SYSTEMIC RESPONSES FOLLOWING NEUROPATHOLOGICAL DISORDERS INDUCED BY KALIOTOXIN FROM ANDROCTONUS SCORPION VENOM 303

SALVIA ROSMARINUS ESSENTIAL OIL ATTENUATES DEMYELINATION AND NEUROINFLAMMATION IN A MURINE MODEL OF MULTIPLE SCLEROSIS 304

ANTI-INFLAMMATORY AND ANTIOXIDANT EFFECTS OF SELENIUM IN A MODEL OF LUNG INJURY: RELEVANCE TO IMMUNE AND HISTOLOGICAL ALTERATIONS..... 305

SOME RADICAL SCAVENGING ACTIVITIES OF OLIGOMERIC PROANTHOCYANIDINS OBTAINED FROM PINUS BRUTIA TEN. BARKS 306

CYTOTOXIC EFFECTS OF OLIGOMERIC PROANTHOCYANIDINS OBTAINED FROM PINUS BRUTIA TEN. BARKS 307

ANTIOXIDANT ACTIVITIES OF DIFFERENT EXTRACTS OF INONOTUS CUTICULARIS (BULL. EX FR.) KARST. FROM SOUTHWEST ANATOLIA, TURKIYE 308

INTRICATE RELATIONSHIP BETWEEN INFLAMMATION, COAGULATION DISORDERS, AND LUNG CANCER 309

CYTOTOXIC ACTIVITIES OF DIFFERENT EXTRACTS OF INONOTUS TAMARICIS (PAT.) MAIRE FROM SOUTHWEST ANATOLIA, TURKIYE 311

COAGULATION DISORDERS AND TUBERCULOSIS: CLINICAL OBSERVATIONS, DIAGNOSTIC CHALLENGES, AND EMERGING BIOMARKERS..... 312

CHEMICAL CHARACTERIZATION OF BIOACTIVE COMPOUNDS OF ALOE VERA LEAF GEL (ALOE BARDADENSIS MILLER) 313

POTENTIAL ROLE OF COX2/PGE2 PATHWAY IN BIOCHEMICAL DISORDERS FOLLOWING BRAIN INJURIES INDUCED BY POTASSIUM CHANNELS BLOKERS.... 314

PHYSICOCHEMICAL CHARACTERIZATION AND ANTITUMOR ACTIVITY OF AAHII TOXIN-LOADED CHITOSAN NANOPARTICLES TARGETING VOLTAGE-GATED SODIUM CHANNELS IN LUNG ADENOCARCINOMA 315

SALICYLIC ACID AS A MECHANISM OF PLANT DETOXIFICATION AGAINST HEAVY METALS 316

RESTORATION OF REDOX HOMEOSTASIS BY AAHII-ENCAPSULATED CHITOSAN NANOPARTICLES IN A MURINE MODEL OF LUNG ADENOCARCINOMA 318

PHENOLIC PROFILE OF DIFFERENT PARTS OF INULA GRAVEOLENS DETERMINED BY HPLC-DAD 319

EVALUATION OF THE INHIBITORY EFFECT OF 3-AMINO-THIOPHENE-2-CARBOHYDRAZIDE DERIVATIVES ON BOVINE LACTOPEROXIDASE USING IN VITRO APPROACHES 320

THE PIONEERING ROLE OF THROMBOGENIC ANIMAL MODELS IN COAGULOPATHIES INVESTIGATIONS AND THE ASSESSMENT OF NOVEL ANTITHROMBOTIC AGENTS 321

RUTIN'S IMPACT ON BRAIN INFLAMMATION IN ALUMINUM-INTOXICATED RATS 322

ROLE OF HEMOLYSIS IN THE RENAL DAMAGE INDUCED BY ANDROCTONUS AUSTRALIS HECTOR VENOM..... 323

EFFECT ANTI HÉMOLYTIQUE OF ESSENTIAL OIL FROM CITRUS SINENSIS AND CITRUS AURANTIUM..... 324

IN VITRO A-AMYLASE AND A-GLUCOSIDASE INHIBITORY ACTIVITIES OF INULA GRAVEOLENS EXTRACTS 325

TOWARD AN INTEGRATED DIAGNOSTIC APPROACH: EXPERIMENTAL LUNG INJURY MODEL INDUCED BY HEAVY METALS (CADMIUM) AND AI-BASED DETECTION OF LUNG CANCER IN HISTOLOGICAL IMAGES..... 326

VALORIZATION OF LAVANDULA ANGUSTIFOLIA DISTILLATION RESIDUES: CHEMICAL CHARACTERIZATION AND ANTIOXIDANT ACTIVITY EVALUATION .. 328

BIOCHEMICAL AND OXIDATIVE CHANGES CAUSED BY AAH II TOXIN ISOLATED FROM ANDROCTONUS AUSTRALIS HECTOR SCORPION VENOM 329

IN VITRO INHIBITORY ACTIVITY OF FUNCTIONALIZED IRIDIUM COMPLEXES ON HUMAN CARBONIC ANHYDRASE ISOENZYMES..... 330

ANTIOXIDANT POTENTIAL AND PHYTOCHEMICAL PROFILING OF SALICORNIA EUROPAEA EXTRACTS: A STEP TOWARD SUSTAINABLE MANAGEMENT OF STRESS IN WHEAT CROPS..... 331

PHYSICOCHEMICAL, BIOCHEMICAL, AND STRUCTURAL ANALYSIS OF SNAIL MUCUS FROM TWO SPECIES: HELIX ASPERSA (FARMED) AND OTALA SP. (WILD)333

GREEN VALORIZATION OF DATE SEED BYPRODUCT: ANTIOXIDANT, ANTI-INFLAMMATORY, AND PHOTOPROTECTIVE POTENTIAL FOR PHARMACEUTICAL APPLICATIONS..... 334

SURVEY ON TWO OLIVE GROVES CULTIVATION MODELS IN KHENCHELA (NORTHEASTERN ALGERIA) 335

COMPARISON OF DIETS SUPPLEMENTED WITH FISH OIL OR OLIVE OIL ON OXIDATIVE STRESS MARKERS IN CYCLISTS DURING TRAINING..... 336

VALORIZATION OF MEDICINAL AROMATIC PLANTS AND THEIR ANTIMICROBIAL ACTIVITY..... 337

DOSAGE OF POLYPHENOLS, FLAVONOIDS, AND EVALUATION OF THE ANTIBACTERIAL ACTIVITY OF MARRUBIUM VULGARE.L 339

D- GLUCOSE-INDUCED SENESCENCE IN BV-2 MICROGLIAL CELLS AND THE PROTECTIVE EFFECTS OF BLUEBERRY EXTRACT..... 340

DYNAMIC EXPLORATION OF TESTICULAR ACTIVITY AND LIPID BALANCE IN RESPONSE TO DEXAMETHASONE INJECTION IN BUCKS RAISED IN ARID AREAS 341

LC-ESI-MS/MS PHYTOCHEMICAL PROFILING, CYTOTOXICITY, ANTIOXIDANT AND ANTIACHOLINESTERASE ACTIVITIES OF ETHYL ACETATE AND N-BUTANOL FRACTIONS OF HYPERICUM EXCTRACT 342

MELANOMACROFAGES IN THE LIVER OF PELOPHYLAX RIDIBUNDUS (PALLAS, 1771); CASE STUDY INDUSTRIALLY CONTAMINATED AREA IN KOSOVO 343

EFFECT OF AQUEOUS EXTRACT OF SAUSSUREACOSTUSON COLON INFLAMMATION IN FEMALE ALBINO WISTER RATS 344

INSECTICIDAL AND BACTERICIDAL BIOACTIVITY OF ESSENTIAL OILS FROM SELECTED AROMATIC PLANTS IN THE CONTROL OF STORED-PRODUCT PESTS . 345

BIOVALORIZATION OF THE MICROALGAE NANNOCHLOROPSIS GADITANA THROUGH ITS ANTIOXIDANT ACTIVITY BY MEASURING DPPH AND FRAP 346

DIET OF THE COMMON CUTTLEFISH SEPIA OFFICINALIS (LINNAEUS, 1758) (CEPHALOPODA: SEPIIDAE) IN THE WESTERN ALGERIAN COAST (ORAN BAY) 347

LC-ESI-MS/MS PHYTOCHEMICAL PROFILING , ANTIOXIDANT AND CYTOTOXICITY ACTIVITIES OF EHTYL ACETATE AND N-BUTANOL FRACTIONS OF HYPERICUM EXCTRACT..... 348

HPLC-DAD ANALYSIS, ANTIOXIDANT AND CYTOTOXICITY ACTIVITIES OF ETHYL ACETATE AND N-BUTANOL EXTRACTS FROM ECHIUM 349

EXPLORING THYROID CANCER IN SÉTIF , ALGERIA 351

INSPECTING THE PREVALENCE OF FETAL MACROSOMIA IN SÉTIF , ALGERIA - 5 YEARS REVIEW (2020-2024)..... 352

INVESTIGATION OF CARBAPENEM RESISTANCE AND VIRULENCE FACTORS IN ANIMAL FOOD-ORIGIN E. COLI AND K. PNEUMONIAE 353

THE CHEMICAL COMPOSITION AND NEMATICIDAL ACTIVITY OF ALGERIAN WHITE MUGWORT..... 354

PRE-TREATMENT WITH GILABURU EXTRACT ALLEVIATES H_2O_2-INDUCED CYTOTOXICITY IN ENDOTHELIAL CELLS 355

A CASE OF ACTINOMYCOTIC MYCETOMA..... 356

POLYMORPHISM OF SILKWORM (BOMBYX MORI L.) BREEDS FROM GERMPLASM RESOURSES OF BULGARIA 357

EXPRESSION PATTERNS OF TGA2, TGA5, AND WHIRLY1 IN SUNFLOWER ROOTS EXPOSED TO OROBANCHE CUMANA 358

DETERMINATION OF THE STABILITY OF POLYPHENOL OXIDASE FROM BLACK MULBERRY TOWARDS DIFFERENT ORGANIC SOLVENTS AND SURFACTANTS 360

PHENOTYPIC AND GENOTYPIC DETECTION OF BIOFILM PRODUCTION OF Staphylococcus aureus FROM CHICKEN MEAT 361

PRESENCE OF merA GENE AND MERCURY RESISTANCE AMONG PATHOGENIC BACTERIA..... 362

BIOCONTROL AND PLANT GROWTH-PROMOTING POTENTIAL OF SACCHAROTHRIX SP. MG75: A PROMISING ACTINOBACTERIUM FOR SUSTAINABLE AGRICULTURE 363

INFLUENCE OF SACCHAROTHRIX ALGERIENSIS NRRL B-24137 ON THE EXPRESSION OF VASCULAR FUSARIUM WILT IN LENTIL 364

BIOSURFACTANT-PRODUCING BACTERIA FROM SKIKDA'S OIL-CONTAMINATED SOILS: IDENTIFICATION AND PHYLOGENETIC CHARACTERIZATION..... 365

SATUREJA CANDIDISSIMA: AN ENDEMIC MEDICINAL PLANT FROM ALGERIA WITH PROMINENT BIOLOGICAL ACTIVITIES 366

EFFECT OF Saccharomyces cerevisiae GROWTH IN YEAST SEPARATION WASTE ON THE ACTIVITY OF SOME ENZYMES USED IN BREAD MAKING..... 367

FORE-TIBIAL CLEANING DEVICES IN ODONATES (INSECTA: ODONATA: ANISOPTERA) 368

ACTINOBACTERIA: A PROMISING AGENT FOR BIOLOGICAL CONTROL 369

GENOME MINING OF A STREPTOMYCES STRAIN ESF7, ISOLATED FROM AN ALGERIAN EXTREME ENVIRONMENT, REVEALS HIGH BIOSYNTHETIC POTENTIAL 370

FIRST RECOD OF A PROTIST PATHOGEN OF LABIDOSTOMIS RUFA (COLEOPTERA: CHRYSOMELİDAE) (WALTL, 1838) IN ISPARTA, TURKIYE 372

PRESENCE OF NOSEMOSIS IN HONEY BEES IN ISPARTA PROVINCE, TURKIYE 373

EFFECTS OF MENTHA PULEGIUM ON FERTILITY OF FEMALE PRE-PUBERTAL RABBITS 374

EXPLORING THE GENOMIC LANDSCAPE OF STREPTOMYCES SPP.: REFINEMENT OF TAXONOMIC CLASSIFICATION, AND EVOLUTIONARY INSIGHTS INTO THE EMERGENCE OF PATHOGENIC LIFESTYLE..... 375

EFFECTS OF EDDHA-DERIVED MANGANESE CHELATE COMPLEXES ON SALT STRESS TOLERANCE AND ANTIOXIDANT DEFENSE MECHANISMS IN RICE (ORYZA SATIVA L.)..... 376

ENHANCED ANTIOXIDANT DEFENSE AND OSMOREGULATION IN SOYBEAN UNDER SALT STRESS WITH NOVEL PGR DERIVATIVES..... 377

ASSESSMENT OF CATAGLYPHIS NODUS (BRULLÉ, 1833) IN THE ECOSYSTEMS AROUND NARTA LAGOON AS ENVIRONMENTAL INDICATOR..... 378

ASSESSMENT OF ANTIBACTERIAL AND ANTIFUNGAL ACTIVITIES OF EXTRACTS FROM LAVANDULA ANGUSTIFOLIA DISTILLATION WASTE..... 379

NATURAL ALTERNATIVES TO ANTIBIOTICS: A STUDY ON JUNIPERUS COMMUNIS ESSENTIAL OIL 380

DOES CELIAC DISEASE AFFECT GLYCEMIC CONTROL IN CHILDREN WITH TYPE 1 DIABETES MELLITUS? A RETROSPECTIVE STUDY 381

EXPLORING THE BIOACTIVE POTENTIAL OF STREPTOMYCES ML1 ISOLATED FROM ALGERIAN SOILS: LINKING BIOSYNTHETIC GENE CLUSTERS TO ANTIMICROBIAL ACTIVITY..... 382

EVALUATION OF THE BLOOD INFLAMMATORY PROFILE IN A MURINE MODEL OF COLONIC CARCINOGENESIS INDUCED BY 1,2-DIMETHYLHYDRAZINE (DMH) 384

EFFECTS OF PRENATAL HİPOKİNESİA ON BLOOD PARAMETERS OF PREGNANT RABBİTS 385

CHARACTERIZATION OF ALGERIAN LAVENDER ESSENTIAL OIL LOADED PLA NANOFIBERS "ANTIBACTERIAL PROPERTIES"..... 386

PHYTOCHEMICAL ANALYSIS AND BIOACTIVITY ASSESSMENT OF FERULA LONGIPES COSS. EX BONN. & MAURY. METHANOLIC EXTRACT: INSIGHTS INTO ANTIOXIDANT, AND ANTI-CORROSIVE PROPERTIES..... 387

INNOVATIVE AGRICULTURE THROUGH RECYCLING: SUSTAINABLE BIOLOGICAL PRODUCTION SYSTEMS FROM DISCARDED MATERIALS 388

IDENTIFICATION OF SNP MARKERS ASSOCIATED WITH GENES CONTROLLING POTASSIUM AND SODIUM CONCENTRATION IN WALNUT FRUIT BY GWAS METHOD 389

MYCOTOXIN PROFILING OF FUSARIUM STRAINS ASSOCIATED WITH DATE PALM DISEASE SYMPTOMS IN TUNISIA 390

ANALYSIS OF THE FREQUENCY EFFECT OF ELF-EMF ON BIOFILMS BASED ON EXPERIMENTAL RESULTS 391

BIO-ADSORPTION OF ORGANIC COMPOUNDS IN LIQUID EFFLUENTS : AN EXPERIMENTAL AND STATISTICAL STUDY 392

VALORIZATION OF AGRICULTURAL WASTE IN THE PREPARATION OF VEGETALE ACTIVATED CARBON. APPLICATION IN THE ADSORPTION OF A PHARMACEUTICAL MOLECULE 393

DUAL-FUNCTIONALIZED GELATIN-BASED HYDROGEL FOR CONTROLLED DEXAMETHASONE RELEASE AND CHONDROGENIC DIFFERENTIATION OF WJ-MSCS FOR CARTILAGE TISSUE REGENERATION 394

OPTIMIZATION OF CONCRETE-OLIVE POMACE BIOCOMPOSITE: THERMAL, MECHANICAL AND HYGRIC IMPACTS 395

EFFECT OF BASIL OIL EXTRACT ON A TARGET GROUP OF HOUSE MOSQUITOES CULEX PIPIENS 396

HOME GARDENS AS BIOCULTURAL RESERVE OF LOCAL PLANT DIVERSITY AND TRADITIONAL KNOWLEDGE 397

EXPLORING THE AVAILABILITY OF BULGARIAN PLANT GENETIC RESOURCES IN THE INTERNATIONAL CROP NETWORKS 398

STUDY OF REPRODUCTION OF THE FLATHEAD GREY MULLET MUGIL CEPHALUS (LINNAEUS, 1758) (TELEOSTEI, MUGILIDAE) FROM NORTH-EASTERN ALGERIA ... 399

SCALIMETRIC STUDY AND POPULATION GROWTH OF THE FLATHEAD GREY MULLET MUGIL CEPHALUS (LINNAEUS, 1758) (TELEOSTEI, MUGILIDAE) FROM NORTH-EASTERN ALGERIA 400

CONTRIBUTION TO THE INVENTORY OF MARINE MACROALGAL SPECIES ALONG THE SKIKDA COAST (NORTHEAST ALGERIA): BIODIVERSITY AND HEALTH OF MARINE ECOSYSTEMS 401

IMPACT OF FIRE ON THE AVIFAUNA OF CORK OAK FORESTS IN EL-KALA NATIONAL PARK 403

PRELIMINARY STUDY ON THREATS AND STRANDINGS OF SEA TURTLES IN ALGERIA (WESTERN MEDITERRANEAN) 404

SOME TAXONOMIC, ECOLOGICAL AND ETHNO-ENTOMOLOGICAL DATA ON THE LOCUSTS (ORTHOPTERA) OF THE HABITATS OF VLORA 405

MORPHOMETRIC AND MERISTIC CHARACTERIZATION OF THE GOLDBLOTCH GROUPER (EPINEPHELUS COSTAE) FROM THE GULF OF ANNABA (ALGERIA) 406

AGE STRUCTURE AND GROWTH MODELING OF THE WHITE SEABREAM DIPLODUS SARGUS SARGUS FROM THE GULF OF ANNABA (ALGERIA) 407

FLORISTIC DIVERSITY IN THE SERVICE OF HEALTH: THE CASE OF PLANTS WITH THERAPEUTIC PROPERTIES USED AGAINST RESIRATORY DISEASES..... 408

ASSESSMENT OF MOLECULAR AND AGROMORPHOLOGICAL VARIATION IN ALGERIAN SAHARAN BREAD WHEAT 409

THE FLORISTIC DIVERSITY OF THE ATLAS CEDAR FOREST OF DRAA CHAAB, OULED HANNECHE FOREST, BORDJ GHEDIR (W. BORDJ BOU ARRERIDJ, ALGERIA) 410

THE MURAL FLORA OF ARCHAEOLOGICAL SITES IN ALGERIA: THE CASE OF THE ROYAL MAUSOLEUM OF MAURETANIA 411

MAIN CITRUS PESTS AND CONTROL METHODS: BIOLOGICAL CONTROL..... 412

THE ASSESSMENT OF THE FLORISTIC DIVERSITY OF GRASSLANDS IN THE REGION OF MOUDJBARA, NORTH-WEST ALGERIA 413

RAPID ASSESSMENT OF THREAT STATUSES OF FISH SPECIES IN DRIN RIVER - ALBANIA 415

COLEOPTERAN DIVERSITY IN PEAR ORCHARDS OF KHEMIS MILIANA, ALGERIA 416

BIODIVERSITY OF EPIPHYTIC LICHENS ON CEDRUS ATLANTICA IN THE CHELIA FOREST MASSIF (AURÈS, NORTHEASTERN ALGERIA)..... 417

ORNITHOLOGICAL VALUE AND NATURAL FUNCTION OF A MEDITERRANEAN WETLAND, THE MEKHADA MARSH (NORTHEASTERN ALGERIA) 418

ENTOMOLOGICAL BIODIVERSITY OF OAK FORESTS IN THE AIN ZANA REGION (SOUK-AHRAS, NORTHEASTERN ALGERIA)..... 419

MORPHOLOGICAL AND SOIL BASED DIFFERENTIATION OF A NATIVE GENETIC RESOURCE: TRACHYSTEMON ORIENTALIS..... 420

IMPACT OF PARASITIC LOAD ON THE MORPHOLOGICAL PARAMETERS OF THE MEDITERRANEAN POND TURTLE MAUREMYS LEPROSA IN NORTH-EASTERN ALGERIA 421

COUNTING OF NESTING BIRDS AT A RAMSAR SITE (NORTHEAST ALGERIA)..... 422

INVENTORY OF DAY BUTTERFLIES « RHOPALOCERANS » AT MELLAH LAKE (NORTH EASTEREN –ALGERIA)..... 424

SPATIAL AND TEMPORAL VARIABILITY OF SOIL FAUNA IN DIFFERENT RAMSAR SITES (NORTHEAST ALGERIA) 425

DIVERSITY OF ELASMOBRANCHES IN THE NORTHEAST ALGERIAN 426

ASSESSMENT OF ROTIFER DIVERSITY AND PHYSICO-CHEMICAL WATER QUALITY IN THE OURKISS RESERVOIR (OUM EL BOUAGHI, ALGERIA)..... 427

SUSTAINABLE USE AND CONSERVATION PERSPECTIVES OF PALLENIS HIEROCHUNTICA IN ARID ALGERIAN ECOSYSTEMS: BETWEEN MEDICINAL DEMAND AND ECOLOGICAL FRAGILITY 428

COMPARATIVE STUDY OF THE MALACOFAUNA IN PORTO PALERMO BAY (ALBANIA, IONIAN SEA) 429

DISTRIBUTION OF BREEDING BIRDS AT LAKE TONGA..... 430

IMPACT OF PARASITIC LOAD ON THE REPRODUCTIVE PARAMETERS OF NESTING BIRDS IN EL-KALA NATIONAL PARK (NORTH-EASTERN ALGERIA) 431

INSECTICIDAL EFFECT OF CLEOME ARABICA L. EXTRACT (PARIETALES, CAPPARIDACEAE) ON APHIDS OF MARKET GARDEN CROPS IN THE OUARGLA REGION, SOUTHERN ALGERIA 432

SYNTHESIS OF RESEARCH ON THE USE OF WILD PLANT EXTRACTS IN THE CONTROL OF PARLATORIA BLANCHARDI TARG. (HOMOPTERA – DIASPIDIDAE) IN SOUTHERN ALGERIA 433

SPECIES RICHNESS AND ECOLOGICAL IMPORTANCE OF FRESHWATER CRABS FROM THE BENI BAHDEL RESERVOIR IN NORTHWESTERN ALGERIA 434

MIGRATION OF FRESHWATER FISHES IN TÜRKİYE AND OBSTACLES ENCOUNTERED BY FISHES DURING MIGRATION 435

DNA BARCODING AND PHYLOGENETIC RELATIONSHIPS OF BARBUS SPECIES DISTRIBUTED IN TURKIYE 436

AGROBIODIVERSITY IN FRENCH GUIANA MARKETS, INDICATORS OF AGRICULTURAL, SOCIAL AND CULTURAL DYNAMICS 437

FIRST RED LIST OF ENDEMIC AND THREATENED PLANTS OF A MOROCCAN COSTAL SAND DUNE ECOSYSTEM: HIGHLIGHTING THE CONSERVATION STATUS OF THE ENDEMIC AND THREATENED SUBSPECIES: THYMUS BROUSSONNETII SUBSP. BROUSSONNETII 438

ETHNOBOTANICAL STUDY OF AN APOCYNACEAE 439

REPRESENTATION OF THREE-DIMENSIONAL PROTEIN STRUCTURE USING DOT PLOT 440

A PERSONALIZED AND LOW-RESOURCE CONSUMPTION PROTEIN DATA BANK APPROACH 441

MODERN AND ADVANCES IN SOFTWARE AND TOOLS FOR DRUG DISCOVERY 442

ANTIPROLIFERATIVE, ANTIOXIDANT ACTIVITIES AND HPLC-DAD PROFILING OF AN ALGERIAN SENECIO MASSAICUS (MAIRE) EXTRACTS 443

GC-MS ANALYSIS, ANTIOXIDANT AND ANTI-INFLAMMATORY ACTIVITIES OF CHLOROFORM EXTRACT FROM BORAGINACEAE FAMILY SPECIE 444

QUALITATIVE AND QUANTITATIVE ANALYSIS OF POLAR EXTRACTS FROM SANTOLINA SPECIES 445

HPLC ANALYSIS, ANTIOXIDANT AND ANTI-INFLAMMATORY ACTIVITIES OF AN ETHYL ACETATE EXTRACT FROM BORAGINACEAE FAMILY SPECIE 446

SPERM TAIL ABNORMALITIES IN APIS MELLIFERA DRONES: A LINK TO APIARY COLONY LOSSES 447

IN VITRO ASSESSMENT OF ANTIOXIDANT, A-AMYLASE INHIBITORY, AND ANTIBACTERIAL ACTIVITIY OF ARTEMISIA JUDAICA AERIAL PARTS 448

ANTI-PHYTOPATHOGENIC AND CYTOTOXIC BROMINATED SESQUITERPENES FROM THE INDONESIAN RED SEAWEED LAURENCIA INTRICATA 449

COMPARATIVE ANALYSIS OF RIPE AND UNRIPE BANANA PEEL AS A SUSTAINABLE FEEDSTOCK FOR BIOPLASTIC PRODUCTION 450

LAVENDER ESSENTIAL OIL AS A GREEN CORROSION INHIBITOR FOR CARBON STEEL IN SULFURIC ACID MEDIUM 451

PLANT BY-PRODUCTS AS BIOACTIVE GOLDMINES: INSIGHTS FROM SUNFLOWER SEEDS AND POMEGRANATE PEELS 452

STRUCTURAL AND FUNCTIONAL CHARACTERIZATION OF ESSENTIAL OIL MICROCAPSULES: THE ROLE OF BIOPOLYMER SELECTION IN COMPLEX COACERVATION..... 454

ANTIOXIDANT AND ANTIBACTERIAL ACTIVITIES OF ETHYL ACETATE EXTRACT FROM ARGANIA SPINOSA L. OF TINDOUF REGION..... 455

THE IMPACT OF UNIQUE YEAST EXTRACTS DERIVED FROM TURKEY'S BIODIVERSITY ON FOOD AROMA: A SENSORY ANALYSIS-BASED COMPARISON.. 456

INVESTIGATION OF THE AMELIORATIVE EFFECTS OF PHYCOCYANIN-RICH SOLUTIONS ON CADMIUM STRESS IN WHEAT LEAF SEGMENTS..... 457

THE CLP PROTEASE GENE IN CANNABIS SATIVA APPEARS TO BE A POTENTIAL HOTSPOT REGION FOR GENETIC VARIATION 458

BIOSURFACTANT POTENTIAL OF PROBIOTIC MICROORGANISMS ISOLATED FROM FERMENTED CABBAGE: A SUSTAINABLE APPROACH TO FUNCTIONAL BIOPRODUCTS..... 459

ADVANCEMENTS IN CUCUMBER MICROPROPAGATION - THE ROLE OF MEDIA, GROWTH REGULATORS AND EXPLANTS 460

APPLICATION OF HET-CAM ON MASCARAS AND EYELINERS 461

THE IMPORTANCE OF IMMERSION IN WATER FOR DIFFERENT PERIODS IN THE ADAPTATION OF TISSUE CULTURED CANNABIS PLANTS TO EXTERNAL CONDITIONS 462

COMPOSITE TRANSFORMATION OF ŞERBETÇI OTU USING AGROBACTERIUM RHIZONEGES 463

BIOTECHNOLOGICAL VALORIZATION OF LAVANDULA DENTATA: OPTIMIZED IN VITRO PROPAGATION AND CALLOGENESIS..... 464

ABIOTIC ELICITATION OPTIMIZATION FOR ENHANCED BIOMASS AND ANTIOXIDANT ACTIVITY IN CALLUS AND HAIRY ROOTS OF CATHARANTHUS ROSEUS..... 465

EFFECTS OF NACL AND MORINGA OLEIFERA EXTRACT ON SECONDARY METABOLITES ACCUMULATION AND ANTIOXIDANT ACTIVITY IN LAVANDULA DENTATA IN VITRO SHOOT CULTURES 466

THE PROPAGATION OF SOME HUMULUS LAND RACES IN VITRO CONDITIONS.... 467

APPLICATION OF BIOPROTECTION IN WINEMAKING: REDUCING SULFITE USE WITH NON-SACCHAROMYCES YEASTS..... 468

DEVELOPMENT OF ANTIBACTERIAL FILMS FROM SHRIMP CHITOSAN AND WILD CARROT ESSENTIAL OIL FOR NATURAL PACKAGING APPLICATIONS..... 469

COMPOSITE TRANSFORMATION OF HUMULUS LUPULUS (HOPS) USING AGROBACTERIUM RHIZONEGES (ENGLISH) 470

ANTIFUNGAL POTENTIAL OF PHYSALIS PERUVIANA CALYX EXTRACTS AGAINST BOTRYTIS CINEREA..... 471

CRISPR/CAS9 TECHNOLOGY: MECHANISM, APPLICATIONS IN VETERINARY MEDICINE, AND ETHICAL PERSPECTIVES..... 472

GENOMIC APPROACHES TO SILENCE CLIMATE CHANGE INDUCED STRESS FACTORS IN KALE 473

IDENTIFICATION OF GENE REGIONS ASSOCIATED WITH IMPORTANT DISEASES IN TOMATOES USING MOLECULAR MARKERS 474

THE IMPORTANCE OF MARKER ASSISTED SELECTION IN BLACKBERRY 475

MOLECULAR AUTHENTICATION OF SPICE THYME IN MARKET BY DNA BARCODING 476

INVESTIGATION OF RECOMBINANT CHYMOSIN ENZYME PRODUCTION WITH DIFFERENT FEEDING STRATEGIES IN BIOREACTOR-SCALE PRODUCTION..... 477

ENHANCING THE NUTRITIONAL VALUE OF OLIVE LEAVES THROUGH SOLID-STATE FERMENTATION WITH SELECTED MICROBIAL STRAINS 478

INSECTICIDAL POTENTIAL OF LEAVES AND FRUITS OF ZIZYPHUS LOTUS L. AGAINST TRIBOLIUM CASTANEUM (HERBST) 479

ANALYSING THE ORIGINALITY OF PISTACHIO FOOD PRODUCTS IN MARKETS BY DNA BARCODING..... 480

METABARCODING ANALYSIS OF ARBUSCULAR MYCORRHIZAL FUNGAL COMMUNITIES ASSOCIATED WITH AN ENDEMIC MEDICINAL AROMATIC PLANT IN MOROCCO 481

APPLICATION OF DAPI STAINING FOR MICROSPORE STAGE IDENTIFICATION AND NUCLEAR INTEGRITY ASSESSMENT IN EGGPLANT (SOLANUM MELONGENA L.) ANTHER CULTURE 482

USE OF MEDICINAL PLANTS BY PATIENTS ATTENDING THE ENDOCRINOLOGY DEPARTMENT AT THE UNIVERSITY HOSPITAL OF SIDI BEL ABBES, ALGERIA: PLANT-DRUG INTERACTIONS 483

NEW DATA ON DISTRIBUTION OF WULFENIA BALDACCII DEGEN 484

COMPARATIVE ANALYSIS OF THE MAIN BIOLOGICALLY ACTIVE SUBSTANCES OF THE BULGARIAN REPRESENTATIVES OF SATUREJA MONTANA L.: A REVIEW 485

ASSESSMENT OF RIPARIAN VASCULAR FLORA OF THE RIVER SHKUMBIN NEAR ELBASAN AREA, ALBANIA 486

EVALUATION OF THE NUTRITIONAL VALUE OF THREE AMARANTHUS L. SPECIES AS POTENTIAL FOOD AND FORAGE PLANTS 487

RIPARIAN FLORISTIC DIVERSITY AT TWO SAMPLING SITES ALONG THE MIDDLE-STREAM OF THE SHKUMBIN RIVER..... 488

ETHNOPHARMACOLOGICAL USES OF PALLENIS HIEROCHUNTICA IN THE TEBESSA REGION OF ALGERIA: CHALLENGES IN KNOWLEDGE TRANSMISSION AND PRESERVATION 489

ETHNOBOTANY IN BULGARIA – A REVIEW 490

EMBRYOLOGICAL STUDY ON THE DEVELOPMENT OF THE FEMALE GAMETOPHYTE OF POLYGONATUM MULTIFLORUM (L.) ALL. (ASPARAGACEAE)491

CORRELATION ANALYSIS BETWEEN PHYTOCHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY IN GALLIUM VERUM L. EXTRACTS COLLECTED FROM BULGARIA 492

DGS AND SRR-META-MATERIAL DOUBLE INSULATION MIMO ANTENNAS FOR ADVANCED WIRELESS COMMUNISATIONS..... 493

ELCTROCHEMICAL STUDY AND MODELING OF GREEN INHIBITOR BEHAVIOR USING MATLAB SOFTWARE..... 494

EXPERIMENTAL AND NUMERICAL STUDY OF CHEMICAL STRIPPING FOR SCALE AND OILY FOULING 495

STUDY OF THE EVOLUTION OF THE LOSS OF DIMENSION USING THE SIMPLE EXPONENTIAL SMOOTHING METHOD (POLLUTED ELASTOHYDRODYNAMIC CONTACT) 496

INVESTIGATION OF THE EQUIVALENT MECHANICAL PROPERTIES OF TPMS LATTICE STRUCTURES 497

EFFECT OF POROSITY RATIO ON SOUND ABSORPTION IN STRUCTURES PRODUCED WITH 3D PRINTING 498

FORECASTING HYDROCARBON STORAGE CAPACITY USING THE ARIMA APPROCH (SKIKDA DISTRIBUTION UNIT) 499

IMPACT OF REGULAR WATER-BASED CLEANING ON THE ENERGY EFFICIENCY OF PHOTOVOLTAIC PANELS 500

GATED RECURRENT UNITS-BASED ADDITIVE ATTENTION FOR RUL PREDICTION OF LI-ION BATTERIES 501

EFFECT OF IRON FOUNDRY DUST ON THE ENERGY EFFICIENCY OF HYDROPHILIC NANOCOATED PHOTOVOLTAIC PANELS 502

USE OF INFORMATION TECHNOLOGIES FOR THE MANAGEMENT OF QUALITY CONTROL DATA IN THE MANUFACTURING PROCESS OF BAKERY PRODUCTS 503

STATIC ANALYSIS OF FUNCTIONALLY GRADED POROUS SANDWICH BEAMS 504

INVESTIGATION OF THE ADHESION STRENGTH OF BIOCERAMIC COATINGS ON LIGHTWEIGHT METALS 505

CLASSIFICATION OF CURRENT ARTIFICIAL INTELLIGENCE APPLICATIONS ACCORDING TO THEIR FUNCTIONALITY 506

IMPLEMENTATION OF A SMART IRRIGATION SYSTEM FOR WATER AND ENERGY WASTE REDUCTION USING ARDUINO 507

ESTIMATION OF FUTURE FUEL STORAGE CAPACITY OF SERVICE STATIONS USING THE BOX–JENKINS APPROACH 508

INTERVAL VALUED PYTHAGOREAN AHP—INTERVAL VALUED PYTHAGOREAN TOPSIS METHOD FOR SOLAR POWER PLANT SITE DECISION 509

SYNTHESIS AND EVALUATION OF THE ANTIMICROBIAL AND ANTIOXIDANT ACTIVITY OF AN ESTER DERIVATIVE OF MALONIC ACID 510

ASSESSING THE OXIDATIVE STABILITY OF ESSENTIAL OILS VIA THE THIOBARBITURIC ACID REACTIVE SUBSTANCES (TBARS) TEST 511

ELIMINATION OF METHYLENE BLUE FROM AN AQUEOUS SOLUTION BY AN ADVANCED OXIDATION PROCESS IN THE PRESENCE OF ALUMINA-SUPPORTED TRANSITION METALS AS CATALYSTS 512

SYNTHESIS OF CUO ZNO NANOPARTICLES AND THEIR USE AS CATALYSTS FOR CYANIDE REMOVAL BY OXIDATION IN AQUEOUS SOLUTION 513

INVESTIGATION OF NICKEL OXIDE PRODUCED BY ANODIC OXIDATION OF NICKEL IN ACID MEDIUM 514

MOLECULAR DOCKING AND ADME-TOXICITY ANALYSIS OF SOME IMINES ANTICANCER ACTIVITY 515

SYNTHESIS AND EVALUATION OF A PISTACHIO SHELL-BASED COMPOSITE BIO-ADSORBENT FOR THE EFFICIENT REMOVAL OF BASIC FUCHSIN FROM AQUEOUS SOLUTION 516

POLY(4,4"-BIS(2'-FLUORENYLIDENEIMINO)-3,3"-DIMETHYLBIPHENYL): ELECTROSYNTHESIS, CHARACTERIZATION AND APPLICATION IN ORGANIC PHOTOVOLTAIC CELL 517

GREEN SYNTHESIS OF SILVER NANOPARTICLES USING PISTACIA LENTISCUS LEAF EXTRACT AND EVALUATION OF THEIR ANTIBACTERIAL ACTIVITY 518

QUANTUM-CHEMICAL STUDY OF NOVEL MULTIFUNCTIONAL POLYMER BY SUBSTITUTION REACTION OF GRAFTING ACETYLSALICYLIC ACID 519

EXCESS MOLAR VOLUMES FOR THE BINARY MIXTURES OF 1,2-DICHLOROALKANE WITH TETRAHYDROPYRANE AT DIFFERENT TEMPERATURES 520

TOTAL PHENOLIC AND FLAVONOID CONTENTS, ANTIOXIDANT AND UREASE INHIBITORY ACTIVITIES OF A WILD AMARANTHACEAE HALOPHYTE FROM THE ALGERIAN SAHARA 521

CONTROL OF THE COORDINATION MODE OF NHC LIGANDS IN SQUARE-PLANAR COMPLEXES $(M(PYR)_2(NHC)_2)^{2+}$, $(MBR(PYR)(NHC)_2)^{+}$, AND $M(BR)_2(NHC)_2$ (M = PD, NI, AND PT): A DFT STUDY 522

STUDY OF THE INTERACTIONS OF POLYMERIC BINARY MIXTURES: PHYSICO-CHEMICAL AND RHEOLOGICAL CHARACTERISATION 523

INTEGRATING BIG DATA CURATION AND PREDICTIVE MODELING IN CHEMOINFORMATICS USING KNIME 524

SOFT CHEMISTRY NANOCOMPOSITE OF MGO DOPED PVC FABRICATION FOR PHOTOCATALYTIC APPLICATIONS 525

ADSORPTION MODELING OF AN ORGANIC DYE AND HEAVY METAL USING MULTI-PARAMETER ISOTHERMS 526

IN VITRO ANTIOXIDANT AND ANTIDIABETIC OF MAESA KAMERUNENSIS MEZ. PLANT EXTRACT 527

ANTIDIABETIC AND ANTIOXIDANT ACTIVITY OF TWO SAPONINS ISOLATED FROM M. KAMERUNENSIS MEZ. 528

DEVELOPMENT OF A POST-COLUMN PHOTOCHEMICAL DERIVATIZATION HPLC-FL METHOD FOR THE SIMULTANEOUS DETERMINATION OF AFLATOXIN G1 AND G2 IN COMMERCIALLY AVAILABLE NUT PRODUCTS 529

CHLORINE CONTAMINATION IN DILUTE NITRIC ACID PRODUCTION: SOURCES, EFFECTS, AND PREVENTION METHODS 530

OXİDANT STATUS OF SPIRULINA EXTRACTS 531

PHENOLIC COMPOUND PROFILE OF SUNFLOWER HONEYS PRODUCED IN THRACE REGION 532

COMPARATIVE MOLECULAR DOCKING STUDY OF LOCALLY SYNTHESIZED SCHIFF BASES AGAINST ACETYLCHOLINESTERASE AND BUTYRYLCHOLINESTERASE: TOWARD SELECTIVE INHIBITOR DESIGN 533

EVALUATION OF THE COMPLEX STABILITY AND BIOAVAILABILITY POTENTIAL OF EDDHA-DERIVED IRON CHELATES IN RICE (ORYZA SATIVA L.) UNDER IRON DEFICIENCY AND SALT STRESS CONDITIONS 534

UTILIZATION OF LIQUID SMOKE FROM OIL PALM FROND BIOMASS AS A CALCIUM CARBONATE SCALE INHIBITOR USING THE UNSEEDED EXPERIMENT METHOD . 535

SYNTHESIS AND CHARACTERIZATION OF POLY(ACRYLIC ACID)/IRON OXIDE HYDROGEL FOR REMOVAL OF METHYLENE BLUE DYE 536

PREPARATION AND CHARACTERIZATION OF BACTERIAL CELLULOSE/IRON OXIDE COMPOSITE FOR REMOVAL OF METHYLENE BLUE DYE 537

SYNTHESIS AND PHYSICOCHEMICAL CHARACTERIZATION OF PURE FE AND SR DOPED AND CODOPED TIO2 PHOTOCATALYSTS: APPLICATION FOR REMOVING OF PHARMACEUTICAL POLLUTANT 538

GREEN FUEL FROM AGRICULTURAL BY-PRODUCTS: ENHANCING BIOETHANOL YIELD THROUGH PROCESS OPTIMIZATION 539

EFFECT OF FERRITE DOPING ON ENHANCED PHOTOCATALYSIS TOWARDS METHYLENE BLUE DYE REMOVAL 540

VALORİZATİON OF DEMOLİTİON WASTE FOR THE MANUFACTURE OF PORTLAND CEMENT 541

NUMERICAL SIMULATION OF THE REMINERALIZATION OF REVERSE OSMOSIS WATER 542

MULTI-SITE EVALUATION OF NITROGEN DYNAMICS IN INHIBITOR-ENRICHED UREA APPLICATIONS UNDER FIELD AND CONTROLLED CONDITIONS 543

INTEGRATED REMOTE SENSING AND HYDROLOGICAL ANALYSIS FOR OPTIMIZED WATER MANAGEMENT IN THE UPPER PASAK AND CHAO PHRAYA RIVER BASINS 544

SPATIO-TEMPORAL ASSESSMENT OF URBANIZATION EFFECTS ON AGRICULTURAL LAND IN THE CASABLANCA METROPOLITAN PERIPHERY 545

THE SEASONAL EVALUATION OF COSTAL POLLUTION IMPACT OF TRACE METAL ELEMENTS IN THE MEDITERRANEAN SNAIL STRAMONITA HAEMASTOMA USING THE MULTIBIOMARKER POLLUTION INDEX 546

RESEARCH AND IDENTIFICATION OF ORGANOCHLORINE PESTICIDE RESIDUES IN SEDIMENTS: THE CASE OF OUED SEYBOUSE AND ITS TRIBUTARIES IN THE GUELMA SUB-BASIN (NORTH-EASTERN ALGERIA) 547

SOURCES OF INSTITUTIONAL SUPORT FOR SUSTAINABLE MANAGEMENT OF TREES FROM THE GENUS Tilia sp. IN BOSNIA AND HERZEGOVINA 548

INVENTORY OF AQUATIC INSECTS AT EL TARF REGION (NORTHEAST ALGERIA) 549

ENVIRONMENTAL DRIVERS OF ZOOPLANKTON STRUCTURE IN MEDITERRANEAN FRESHWATER ECOSYSTEMS: A CASE STUDY FROM ALGERIA 550

TOXICITY SCREENING OF CONTAMINATED FRESHWATER SEDIMENT USING THE OSTRACOD CRUSTACEAN HETEROCYPRIS INCONGRUENS 551

ANALYSIS OF PHYTOPLANKTON BIODIVERSITY IN A MEDITERRANEAN FRESHWATER ECOSYSTEM 552

BIOSORPTION OF A CATIONIC AZO-DYE BY DEAD FUNGAL BIOMASS IN AGITATED BATCH REACTOR 553

TRIBULUS TERRESTRIS METHANOLIC EXTRACT MODULATES SPIROTETRAMAT INDUCED LIVER TOXICITY IN DOMESTIC PIGEONS (COLUMBA LIVIA DOMESTICA) 554

INNOVATIVE LOCAL MATERIAL IN WATER FILTRATION 555

SALT STRESS :ASSESSMENT OF SALT CONTENT IN THE WATERS OF THE DEVOLL RIVER, ALBANIA, FOR PLANT IRRIGATION 556

VALORIZATION OF MORINGA OLEIFERA BIOFLOCCULANTS FOR THE TEXTILE DYES BY COAGULATION-FLOCCULATION 557

THE EFFECTS OF GLOBAL WARMING ON THE WATER QUALITY OF LAKES AND RIVERS 558

ENVIRONMENTAL IMPACTS OF GREENHOUSE GAS EMISSIONS AND PROPOSED SOLUTIONS FOR THEIR REDUCTION 559

IMPROVING THE EFFICIENCY OF BIO-COAGULATION AND FLOCULATION FOR TURBIDITY CONTROL IN WASTEWATER TREATMENT 560

REMOVAL OF METHYL VIOLET DYE FROM AQUEOUS SOLUTION USING ECO-FRIENDLY TREATED KAOLIN AS ADSORBENT 561

REMOVAL OF METHYL ORANGE DYE FROM AQUEOUS SOLUTIONS USING KAOLIN-SUPPORTED ZINC NANOPARTICLES AS AN EFFECTIVE CATALYST UNDER SUN LIGHT IRRADIATION 562

QUALITATIVE MANAGEMENT OF WATER RESOURCES THROUGH THE USE OF TREATED WASTEWATER IN AGRICULTURE 563

HISTOLOGICAL STUDY OF THE EFFECT OF THE ENTOMOPATHOGENIC FUNGUS METARHIZIUM ANISOPLIAE (VAR. ACRIDIUM) "GREEN MUSCLE" ON THE GASTRIC CAECUM OF SCHISTOCERCA GREGARIA (DESERT LOCUST) 564

ELABORATION AND CHARACTERIZATION OF UNMODIFIED FUMED SILICA NANOPARTICLES FILLED NEAT AND RECYCLED HDPE POLYMER USING STEARIC ACID AS INTERFACE MODIFIER 565

MICROBIAL INTERVENTIONS FOR SUSTAINABLE FARMING: LINKING NUTRIENT SOLUBILIZATION WITH PESTICIDE BIODEGRADATION 566

UNRAVELLING MICROPLASTIC POLLUTION: SURFACE WATER CONTAMINATION, MICROBIAL REMEDIATION, AND DEGRADATION PATHWAYS 567

OPUNTIA FICUS INDICA MUCILAGE: A NATURAL, SUSTAINABLE AND VIABLE WATER TREATMENT TECHNOLOGY TO REDUCE TURBIDITY IN DRINKING WATER 568

ENVIRONMENTAL RISK ASSESSMENT RELATED TO SURFACE EXPOSURE OF MINING WASTE: THE CASE OF PHOSPHATE WASTE FROM DJEBEL ONK 569

THE VALORIZATION OF PHOSPHO-LIMESTONE FROM ECONOMIC AND ENVIRONMENTAL PERSPECTIVES 570

A PASSIVE BIOMONITORING APPROACH TO ATMOSPHERIC ACIDITY USING OLEA EUROPAEA BARK IN EASTERN ALGIERS, ALGERIA 571

EVALUATION OF THE POTENTIAL FOR RAINWATER HARVESTING IN THE AGRO-INDUSTRY: A CASE STUDY OF THE TABLE OLIVE INDUSTRY 572

BLACK CARBON CONTENT IN AIRBORNE PM2.5 DURING THE WINTER – BURGAS, BULGARIA 573

THE CORRELATION BETWEEN BLACK CARBON CONTENT IN AIRBORNE PM2.5, CONCENTRATION OF OTHER AIR POLLUTANTS, AND METEOROLOGICAL CONDITIONS DURING THE WINTER – BURGAS, BULGARIA 574

REFLECTION OF NATURE ON LIFE: BIOMIMICRY AND SUSTAINABILITY 576

WHAT HAPPENS WHEN PLASTICS ARE DISPOSED INTO THE ENVIRONMENT? MICROPLASTIC IN POLLUTION THE OCEANS 577

SAFE RECYCLING OF WASTEWATER SLUDGE IN AGRICULTURE: A CASE STUDY ON WHEAT CULTIVATION IN ALGERIA 578

EVIDENCE FOR TWO PLOIDY LEVELS IN A RELICT OLIVE POPULATION OF HOGGAR (ALGERIA) 579

VERTICAL STRATIFICATION OF SOIL ORGANIC CARBON UNDER DIFFERENT VEGETATION TYPES IN THE KARAVASTA LAGOON (ALBANIA) 580

ANALYSIS OF THE REPELLENT EFFICACY OF TEUCRIUM POLIUM ESSENTIAL OIL IN THE CONTROL OF ADULT FEMALE CULEX PIPIENS 581

SPATIOTEMPORAL PATTERNS OF TRACE ELEMENTS (LI, MN, NI, BA) IN RIVERS FEEDING THE ISTANBUL STRAIT, TURKIYE 582

DEVELOPMENT OF SUSTAINABLE PRETREATMENT COUPLED WITH MAGNETIC FILTRATION-ION EXCHANGE IN THE DESALINATION PROCES 583

ENHANCING ENERGY EFFICIENCY IN AGRICULTURAL PRACTICES 584

PRODUCTION AND CHARACTERIZATION OF A MESOPOROUS ACTIVATED CARBON FROM CAROB TREE BIOMASS FOR ENVIRONMENTAL APPLICATIONS 585

ASSESSMENT OF THE IMPACT OF SURFACE WATER TABLE IRRIGATION ON THE PHYSICOCHEMICAL PROPERTIES OF SOILS IN OUED M'ZAB (ALGERIA) 586

EFFECTS OF TREATED WASTEWATER ON SOIL QUALITY DOWNSTREAM OF THE OUED M'ZAB, ALGERIA 587

ENVIRONMENTAL AWARENESS AND PRACTICES AMONG UNIVERSITY STUDENTS: A CASE STUDY FROM SKIKDA, ALGERIA 588

EVALUATION OF SEASONAL VARIATIONS IN THE PHYSICO-CHEMICAL WATER QUALITY OF THE BENI HAROUN RESERVOIR, ALGERIA'S MAIN WATER SOURCE589

SOCIO-ECONOMIC IMPACTS OF REDUCING AIR PARTICULATE MATTER (PM10) POLLUTION IN KOCAELI USING BENMAP-CE MODEL 590

MICROBIOLOGICAL ANALYSIS OF THE CHELIFF RESERVOIR (NORTHWEST ALGERIA): POLLUTION INDICATORS AND SANITARY IMPLICATIONS 591

THE CARBON BORDER ADJUSTMENT MECHANISM (CBAM) AND TURKISH AGRICULTURE: A SUSTAINABLE TRANSITION 592

CARBON FOOTPRINT OF AGRICULTURAL ACTIVITIES AND THE EMISSION REDUCTION POTENTIAL OF WIND ENERGY IN ALIAGA DISTRICT 593

DETECTION OF ELEMENTAL POLLUTION IN THE ERGENE RIVER USING CHIRONOMID LARVAE (CHIRONOMIDAE, DIPTERA) 594

MACRO ELEMENTAL RISK ANALYSIS OF WATER IN TWO MAJOR DAM LAKES OF THE MARMARA REGION, TURKEY 595

SUSTAINABLE TOURISM IN TURKIYE AND THE BALKAN COUNTRIES: POLICY EVOLUTION AND KEY CHALLENGES 596

A PRELIMINARY ANALYSIS OF FUNCTIONAL TRAIT COMPOSITION IN ADRIATIC SEA FISHERIES 597

CHEMICAL ASSESSMENT AND BIOMONITORING OF TREATED WASTE WATER QUALITY BEFORE RELEASE INTO THE ENVIRONMENT 598

THE IMPACT OF AVAILABLE NICKEL ON METAL ACCUMULATION IN FOOD PLANTS 599

LIFE CYCLE ASSESSMENT OF DESSALINATION PROCESS IN ENVIRONMENT MANAGEMENT 600

A COMPARATIVE STUDY ON THE TOXIC EFFECTS OF LEAD AND COPPER IN DAPHNIA MAGNA 601

TOXICITY SCREENING OF CONTAMINATED FRESHWATER SEDIMENT USING THE OSTRACOD CRUSTACEAN HETEROCYPRIS INCONGRUENS 602

ENHANCED TREATMENT EFFICIENCY OF VERTICAL FLOW CONSTRUCTED WETLANDS AMENDED WITH KILN-DERIVED ALMOND SHELL BIOCHAR FOR MUNICIPAL WASTEWATER TREATMENT 603

PREVALENCE OF ANTIBIOTIC-RESISTANT ENTEROBACTERIACEAE ISOLATED FROM BEEF CATTLE IN THE STATE OF TLEMCEN "WEST OF ALGERIA" 604

PROTECTIVE EFFECT OF EXTRA VIRGIN OLIVE OIL AGAINST EXERCICE-INDUCED OXIDATIVE STRESS IN CYCLISTS DURING TRAINING 605

THE ASSOCIATION BETWEEN FOOD PREFERENCES, EATING BEHAVIOR, AND BODY WEIGHT AMONG UNIVERSITY STUDENTS 606

APPLICATION OF BOVINE BIOACTIVE LACTOFERRIN AS A NATURAL BIO-PRESERVATIVE OF FRESH DAIRY AND FRUIT-BASED LIQUID PRODUCTS 607

ARTFICIAL SWEETENERS IN FOOD PRODUCTS ON THE ALGERIAN MARKET: WHAT ARE RISKS FOR CONSUMERS? 608

ULTRASONIC EXTRACTION and ANTIOXIDANT ACTIVITY of ELAEAGNUS UMBELLATA FRUIT 609

STABILITY OF IODINE IN IODIZED SALT: INFLUENCE OF STORAGE CONDITIONS AND PHYSICOCHEMICAL CHARACTERISTICS OF SALT 610

FUNCTIONAL YOGURT PRODUCTION WITH ADDITION OF BAYBURT WILD SOUR APPLE (MALUS SYLVESTRIS MILLER) SAUCE 611

PHYTOCHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITIES OF GINGER (ZINGIBER OFFICINALE) 612

BIOACTIVE SYNERGY OF CINNAMON -TURMERIC: IN VITRO EXPLORATION OF ANTIOXIDANT, ANTI-HEMOLYTIC AND ANTI-INFLAMMATORRY EFFECTS AND THEIR IMPLICATIONS FOR HUMAN HEALTH 613

DEVELOPMENTAL NEUROTOXICITY OF CHLORPYRIFOS IN VIVO: STUDY OF CHOLINESTERASE ACTIVITY AS A BIOLOGICAL INDICATOR 614

BEETROOT WASTE ENCAPSULATE AS FUNCTIONAL FOOD ADDITIVE 615

CHARACTERIZATION OF NUTRIOSOMES LOADED WITH SUPRAMOLECULAR MICROGREEN EXTRACTS- FUNCTIONAL ADDITIVES FOR FUTURE FOOD APPLICATIONS 616

ANTIOXIDANT EFFECTS OF MAGNESIUM SUPPLEMENTATION IN RATS WITH TYPE 2 DIABETES 617

COMPARATIVE STUDY OF THE NUTRITIONAL PROFILE OF FARMED MUSSELS (MYTILUS GALLOPROVINCIALIS) AND WILD MEDITERRANEAN MUSSELS: ANALYSIS OF MACRONUTRIENT, MINERAL AND ANTIOXIDANT CONTENT 618

FORMULATION AND EVALUATION OF CHIA SEED ENRICHED ENERGY BALLS 619

EFFECT OF NATURAL SOURDOUGH FERMENTATION ON PHYTIC ACID REDUCTION IN WHOLE WHEAT FLOUR..... 620

FORMULATION OF HIGH-PROTEIN BISCUITS THROUGH SPIRULINA INCORPORATION: A TECHNOLOGICAL AND NUTRITIONAL STUDY 621

FORMULATION OF A FOOD PASTA BASED ON CAROB FLOUR”..... 622

PARTIAL REPLACEMENT OF WHEAT FLOUR BY MELON (CUCUMIS MELO L.) PEEL POWDER ON BAKERY PRODUCTS. EFFECT ON CAKES QUALITY 623

IMPROVEMENT OF CORN OIL STABILITY DURING ACCELERATED STORAGE USING POMEGRANATE (PUNICA GRANATUM L.) PEEL EXTRACT 624

SHIFT WORK AND ITS EFFECT ON NURSES' BODY COMPOSITION (KHENCHELA, 2023)..... 625

DIETARY HABITS AND NUTRITIONAL STATUS OF STUDENTS RESIDING IN UNIVERSITY DORMITORIES (CONSTANTINE – ALGERIA, 2024) 626

PHYTOCHEMICAL PROFILING AND ANTIOXIDANT POTENTIAL OF SILENE EXTRACTS FOR DAIRY FORTIFICATION 627

NUTRITIONAL FEASIBILITY OF WHEAT PURIFICATION: A CASE STUDY OF JORDAN 628

FASTING AND ITS IMPACT ON MICROBIOTA, METABOLISM AND WELL-BEING: A PHYSIOLOGICAL AND NUTRITION APPROACH 629

NUTRITIONAL EVALUATION OF PLAN-BASED MILK ALTERNATIVES WITH EMPHASIS ON PROTEIN CONTENT: A FOCUS ON SOY-BASED BEVERAGES 631

EVALUATION OF THE CHEMICAL AND NUTRITIONAL COMPOSITION OF LEGUMES AND THEIR CONTRIBUTION TO DIETS 632

PREVALENCE AND VIRULENCE PROFILING OF STAPHYLOCOCCUS AUREUS IN RAW MILK AND CHEESE SAMPLES SOLD IN EDIRNE PROVINCE 633

USE OF HYDROCOLLOID-BASED OLEOGELS IN CHOCOLATE AND SPREADABLE COCOA CREAMS..... 634

COMPLIANCE OF ALBANIAN FISHERIES LEGISLATION WITH EU REGULATIONS: A CRITICAL ASSESSMENT AND HARMONIZATION PERSPECTIVE 636

NUTRITIONAL VALUE OF TEFF SEED AND ITS USAGE IN FOOD INDUSTRY..... 637

STUDY OF INCORPORATION OF SOFT WHEAT GERM FLOUR INTO BISCUIT FLOUR 638

TOMATO SKIN/WASTE USAGE AS ALTERNANTIVE FOOD PRODUCT USING TOMATO PEEL POWDER AS A NATURAL ANTIOXIDANT AND COLORING AGENT IN KEFIR 639

COMPARATIVE MICROBIOLOGICAL ASSESSMENT OF LOCAL AND IMPORTED BEEF IN BISKRA (ALGERIA)..... 640

PHYSICO-CHEMICAL COMPARISON OF LOCAL AND IMPORTED BEEF IN BISKRA (ALGERIA), NUTRITIONAL AND TECHNOLOGICAL IMPLICATIONS 641

FUNCTIONAL NOODLES ENRICHED WITH BELL PEPPER POWDER: EFFECTS ON COLOR, TEXTURE, AND COOKING QUALITY 642

EFFECTS OF FUNCTIONAL OILSEED POWDERS ON THE QUALITY ATTRIBUTES OF CRACKERS..... 643

APPLICATION OF METSCHNIKOWIA PULCHERRIMA IN SEQUENTIAL FERMENTATIONS FOR THE PRODUCTION OF PILSNER-STYLE CRAFT BEER..... 644

SOUS-VIDE: AN INNOVATIVE APPROACH TO COOKING AQUATIC PRODUCTS 645

STUDY OF THE STABILITY AND QUALITY OF STRAWBERRY POWDER FROM THE PALMARITA VARIETY DURING STORAGE 646

SOME QUALITATIVE PROPERTIES, MINERALS AND HEAVY METALS IN JUICE AND MADZUN (GRAPE MOLASSES) PRODUCED FROM STANUSHINA GRAPE VARIETY 647

VALORIZATION OF FOOD INDUSTRY WASTES FROM CEREALS AND PULSES INTO FUNCTIONAL FOOD ADDITIVES 648

A COMPARATIVE STUDY OF PARTIAL REPLACEMENT OF TRITICALE FLOUR WITH TWO TYPES OF FERMENTED BREWERS' SPENT GRAIN ON THERMOMECHANICAL CHARACTERISTICS OF DOUGH..... 649

THE IMPACT OF ULTRASOUND TREATMENT ON THE TECHNOLOGICAL AND FUNCTIONAL MODIFICATION OF PLANT-BASED PROTEINS..... 650

APPLICATION OF SOUS-VIDE PROCESSİNG ON SELECTED FRUITS AND EVALUATION OF ITS EFFECTS ON QUALITY CHARACTERISTICS..... 651

EFFECT OF TRITICALE VARIETY AND ORIGIN ON BREAD COLOR: A CASE STUDY FROM THE REPUBLIC OF MOLDOVA..... 652

INFLUENCE OF TEMPERATURE ON FERMENTATION RATE IN PRODUCTION OF DIFFERENT WINE TYPES..... 653

THE ECOLOGICAL FOOTPRINT OF MEAT PRODUCTION, THE GREEN TRANSFORMATION APPROACH, AND ITS IMPLICATIONS FOR THE MEAT INDUSTRY 654

PREVALENCE OF COLLECTIVE FOOD FOODBORNE DISEASES IN THE BLIDA REGION DURING THE TWO LAST YEARS 655

OPTIMIZATION OF ULTRASOUND ASSISTED ENZYMATIC EXTRACTION YIELD FROM RED ONION PEEL USING RESPONSE SURFACE METHODOLOGY..... 656

COMPARISON OF GREEN EXTRACTION METHODS FOR ANTHOCYANIN RECOVERY FROM BLACKCURRANT (RIBES NIGRUM L.) 657

THE EFFECTS OF N-ACETYLCYSTEINE ON ACRYLAMIDE-INDUCED APOPTOSIS IN LEYDIG CELLS..... 658

QUERCETIN MITIGATES ACRYLAMIDE-INDUCED CYTOTOXICITY IN LEYDIG CELLS..... 659

SMART BIOPOLYMER-BASED PACKAGING SYSTEMS AND CURRENT APPLICATIONS IN FOOD QUALITY TRACEABILITY..... 660

DEGUMMING PROCESS OPTIMIZATION OF CRUDE PALM OIL WITH CITRIC AND PHOSPHORIC ACIDS..... 661

PHYSICOCHEMICAL PROPERTIES AND FLAVOR PROFILE OF COCOA BEANS (THEOBROMA CACAO L.) FERMENTED WITH LACTOBACILLUS PLANTARUM..... 662

ASSESSMENT OF THE MICROBIOLOGICAL QUALITY OF READY-TO-EAT FOODS: THE CASE OF CANNED SARDINES (LOCAL AND IMPORTED)..... 663

FRUIT SEED OIL : NEW PROMISING UNCONVENTIONAL BIO-OIL FOR NUTRITIONAL, AND COSMETIC AND PHARMACEUTICAL USES..... 664

THE IMPACT OF A CAROTENOID-ENRICHED DIET ON THE COLORATION AND GROWTH OF GREEN TERROR "ADINOACARA RIVULATUS"..... 665

A NATIONAL SURVEY OF FOOD INTOLERANCE: STATISTICAL EVIDENCE AND IMPLICATIONS FOR DIAGNOSIS AND PUBLIC AWARENESS..... 666

SUSTAINABLE VALORIZATION OF DATE SEED OIL AS A NATURAL PRESERVATIVE FOR FOOD AND PHARMACEUTICAL APPLICATIONS..... 667

DAIRY SECTOR VALUE CHAINS IN BOSNIA AND HERZEGOVINA..... 668

PRODUCTION AND MODES OF ACTION OF BACTERIOCINS PRODUCED BY ENTEROCOCCAL STRAINS..... 669

FROM GLOBAL ORIGINS TO LOCAL FIELDS: FIRST COMPREHENSIVE PROFILING OF NIGELLA SATIVA L. NUTRITIONAL AND FATTY ACID COMPOSITION IN ALBANIAN AGROECOLOGICAL CONDITIONS..... 670

FROM THE BRONTLAND REPORT TO FOOD SECURITY IN THE SUSTAINABLE DEVELOPMENT GOALS..... 672

TRUE COST ACCOUNTING (TCA) FOR THE TRANSITION TO SUSTAINABLE FOOD SYSTEMS: OPPORTUNITIES AND CHALLENGES..... 673

AI AGAINST HONEY ADULTERATION: EFFECTIVE AND RELIABLE HONEY BOTANICAL ORIGIN AUTHENTICATION..... 674

EFFECT OF SPACING AND SOIL NUTRIENT ON GROWTH OF GREVILLEA ROBUSTA A. CUNN. EX R.BR. IN THAILAND..... 675

KNOWLEDGE ABOUT THE GENETICAL, MORPHOLOGICAL AND PHENOLOGICAL DIVERSITY OF THREE LINDEN SPECIES (TILIA CORDATA MILL., TILIA PLATYPHYLLOS SCOP. AND TILIA TOMENTOSA MOENCH.) IN BOSNIA AND HERZEGOVINA AND POTENTIAL FOR BETTER MANAGEMENT OF LINDEN FORESTS 676

TESTING THE CYTO- AND GENOTOXIC EFFECTS OF THE FUNGICIDE MANCOZEB ON THE ROOT MERISTEM OF PISUM SATIVUM..... 677

DEVELOPMENT OF UKRAINIAN WINTER COMMON WHEAT LINES WITH DIFFERENT STEM RUST RESISTANCE GENES (SR33, SR39 AND SR40)..... 678

MRC1 AS A NOVEL TARGET IN FLT3-POSITIVE AML IDENTIFIED VIA INTEGRATIVE BIOINFORMATICS AND QPCR VALIDATION..... 680

GENETIC AND SPECIES DIVERSITY OF FISH IN ALBANIA'S MAJOR LAKES..... 681

EVALUATION OF NECK MASSES IN THE PATIENTS OF DIR DISTRICT (PAKISTAN) USING NON-INVASIVE DETECTION TOOLS..... 682

EVALUATION OF THE ANTI-INFLAMMATORY ACTIVITY OF THE AQUEOUS EXTRACT OF URTICA DIOICA..... 683

THE POLLEN-SENSITIZATION-POLLINOSIS RELATIONS IN JAPANESE CEDAR (CRYPTOMERIA JAPONICA) IN JEJU, KOREA..... 684

ACUTE TOXICITY DUE TO DELAYED ELIMINATION OF METHOTREXATE IN CANCER THERAPY: A CASE REPORT..... 685

HELICOBACTER PYLORI INFECTION IN ALBANIA: A TWO-YEAR RETROSPECTIVE STUDY USING ENDOSCOPIC BIOPSY FINDINGS 686

MDMA POISONING IN INFANTS : A CASE REPORT 687

THE EVALUATION OF FATAL VEGETABLE OIL POISONING IN FORENSIC MEDICINE 688

OCCUPATIONAL EXPOSURE TO AMMONIA AND DELAYED SUDDEN DEATH; REGARDING AN OBSERVATION 689

IN VITRO ASSESSMENT OF THE ANTIPROLIFERATIVE PROPERTIES OF ROSA CANINA L. ROSE HIPS AGAINST MESOTHELIOMA 690

RADIOGRAPHIC EVALUATION OF THE ROLE OF TITANIUM SCAFFOLD POROSITY ON BONE REGENERATION AND IMPLANT STABILITY IN TTA 691

EVALUATION OF THE EFFECT OF FENUGREEK SEEDS (TRIGONELLA FOENUM GRAECUM L) ON NEUROBEHAVIORAL ALTERATION IN MALE RATS 692

CONTRIBUTION TO THE PHYTOCHEMICAL AND BIOLOGICAL STUDY OF A MEDICINAL PLANT OF THE GENUS RUTA (RUTA CHALEPENSIS) 693

PHYTOCHEMICAL STUDY AND EVALUATION OF THE BIOLOGICAL ACTIVITIES OF MYRTLE (MURTUS COMMUNIS) 694

EFFECT OF GAVAGE OF FENUGREEK EXTRACT ON RENAL FUNCTION PARAMETERS IN WISTAR RATS 695

POLYPHENOLS, ANTIPROLIFERATIVE AND ANTIDIABETIC PROPERTIES OF STACHYS MIALHESII 696

CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF ACCACIA TORTILIS SUBSP. RADIANA TAR FROM BECHAR REGION, ALGERIA 697

CONSUMPTION OF AFLIBERCEPT IN THE OPHTHALMOLOGY DEPARTMENT CENTRAL PHARMACY, ABDELKADER HASSANI UNIVERSITY HOSPITAL, SIDI BEL ABBES, ALGERIA 698

FORMULATION AND CHARACTERIZATION OF AN ANTI-BURN CREAM BASED ON SAPONINS EXTRACTED FROM CLIMBING IVY (HEDERA HELIX) 699

ANTIOXIDANT, ANTI-INFLAMMATORY AND PROCOAGULANT POTENTIAL OF LEAF AND FLOWER EXTRACTS FROM A PERRALDERIA SPECIES 700

MULTIFUNCTIONAL DEXTRAN-CHITOSAN-STABILIZED ZINC OXIDE NANOCOMPOSITES FOR ANTIBACTERIAL EFFICACY AND TISSUE REGENERATION 701

DIETARY SUPPLEMENT MANUFACTURING TECHNOLOGY" 702

EVALUATION OF THE ANTIFUNGAL ACTIVITY AND PHYTOTOXICITY OF ZIZYPHUS LOTUS L. 703

EXTRACTION, PHYSICOCHEMICAL, ORGANOLEPTIC AND MICROBIOLOGICAL CHARACTERIZATION OF MARRUBIUM VULGARE ESSENTIAL OIL, APPLICATION: PREPARATION OF A MOISTURIZING CREAM 704

VALORIZATION OF FOOD WASTE AS A CULTURE MEDIUM FOR GROWTH AND ANTIBIOTIC PRODUCTION BY ACTINOKINEOSPORA MZABENSIS 705

DEVELOPING AND EVALUATING ROSEMARY ESSENTIAL OIL NANOSYSTEMS: ENHANCING STABILITY AND ANTIOXIDANT EFFICACY 706

FORMULATION AND PHYSICOCHEMICAL CHARACTERIZATION OF LIPOSOMAL NANOCARRIERS FOR CARVACROL AND THYMOL USING LIPOID® PHOSPHOLIPIDS 707

PHYTOCHEMICAL STUDY AND EVALUATION OF THE ANTI-INFLAMMATORY ACTIVITIES OF DIFFERENT EXTRACTS OBTAINED FROM RHAMNUS ALATERNUS L.: A COMPARATIVE STUDY 708

NUTRACEUTICAL POTENTIAL OF ACHILLEA MILLEFOLIUM. HEALTH BENEFITS, DERMATOLOGICAL USE AND SAFETY 709

POLYPHENOLIC PROFILE AND EVALUATION OF THE ANTIPROLIFERATIVE ACTIVITY OF THE N-BUTANOL EXTRACT AND A VLC FRACTION OF STACHYS MIALHESIII 710

PHYTOCHEMICALS USED IN CANCER THERAPY 711

POLYPHENOLIC PROFILE AND EVALUATION OF THE ANTIOXIDANT AND CYTOTOXIC ACTIVITIES OF STACHYS DURIAIE 712

TSALLIS STATISTICS AND THE DECONFINING PHASE TRANSITION TO A QUARK GLUON PLASMA 713

NONLINEAR WAVES AND MODULATIONAL INSTABILITY IN COLD QUARK-GLUON PLASMA 714

NONLINEAR WAVES AND MODULATIONAL INSTABILITY IN COLD QUARK-GLUON PLASMA 715

APPLICATION OF WIGNER-VILLE DISTRIBUTION FOR ANALYSIS VIBRATORY REGIME IN SERIES RLC CIRCUIT 716

EFFECT OF SURFACE FREE ENERGY ON NUCLEATION OF QUARK GLUON PLASMA DROPLETS FROM A HOT HADRONIC GAS 717

CRYSTAL STRUCTURE AND DFT CALCULATIONS OF C, P-CHLOROPHENYL-N-PHENYL NITRONE 718

METALLIC ELEMENTS ANALYZED VIA A NON-EXTENSIVE VERSION OF THE SOMMERFELD MODEL 719

ACTIVATION ENERGY AND GROWTH RATES OF NANOCRYSTALS YP0.5V0.5O4: 1% TB3+ DURING CALCINATION 720

DISLOCATION DENSITY AND STACKING FAULTS PROBABILITY ANALYSIS OF COAL MILLED POWDERS 721

NUMERICAL ANALYSIS OF A SOLAR GREENHOUSE'S THERMAL PERFORMANCE USING A PCM-METAL FOAM COMPOSITE ON CHARGING/DISCHARGING PROCESS 722

A THERMODYNAMIC STUDY OF A SOLAR ADSORPTION AIR-CONDITIONING SYSTEM 723

HEAT TRANSFER ENHANCEMENT IN A DIFFERENTIALLY HEATED ENCLOSURE USING TERNARY HYBRID NANOFLUID 724

INVESTIGATION OF COOLING NANOFLUIDS FLOWING DOWNWARD IN A VERTICAL CHANNEL 725

SIMULATION STUDY ON THE DIELECTRIC BEHAVIOR OF MATERIALS AS A FUNCTION OF FREQUENCY 726

THE EFFECT OF THE □-RADIATION DOSE IN THE MICROPLASMA ELECTRONIC DEVICES WITH ZEOLITE CATHODE 727

SOL-GEL SYNTHESIS AND LUMINESCENT PROPERTIES OF GREEN-EMITTING TB-DOPED Y(V0.5,P0.5)O4 PHOSPHOR 728

ANTIBACTERIAL ACTIVITY OF TERPENES AND TERPENOIDS PRESENT IN ESSENTIAL OILS 729

IN VITRO ANTIBACTERIAL ACTIVITY OF SEVERAL PLANT EXTRACTS AND OILS AGAINST SOME GRAM-NEGATIVE BACTERIA 730

PHYTOCHEMICAL STUDY AND ANTIBACTERIAL ACTIVITY OF LAVENDER (LAVANDULA OFFICINALIS) ESSENTIAL OIL 731

ALGERIAN ARTEMISIA HERBA-ALBA (ASSO): AQUEOUS EXTRACT AND ESSENTIAL OIL INVESTIGATION 732

PHYTOCHEMICAL AND ANTIBACTERIAL EVALUATION OF STEVIA REBAUDIANA GLYCOSIDES CULTIVATED UNDER MEDITERRANEAN CLIMATE CONDITIONS IN ORAN-ALGERIA 733

PHENOLOGICAL DISORDERS IN FRUIT TREE CULTIVARS UNDER CLIMATE CHANGE 734

PHYTOTOXICITY ASSESSMENT OF SILVER NANOPARTICLES ON WHEAT SEEDS AND SEEDLINGS 735

CHARACTERIZATION BY GC-MS AND IN VITRO EVALUATION OF ANTIOXIDANT AND ANTI-INFLAMMATORY ACTIVITIES OF ESSENTIAL OIL FROM LAVANDULA ANGUSTIFOLIA L. COLLECTED IN THE SOUK AHRAS REGION (NORTHEASTERN ALGERIA) 736

BIOPESTICIDES CONTROL BACTERIAL PATHOGENS ON GREENHOUSE GROWING PEPPER PLANTS 737

POLYPHENOL CONTENT AND ANTIOXIDANT POTENTIAL OF LEAVE EXTRACTS OF MARRUBUIM VULGARE L. COLLECTED IN TWO REGIONS OF NORTHERN ALGERIA 738

ANTICANCER PROPERTIES OF INULA VISCOSA: A PROMISING MEDICINAL PLANT 739

EFFECTS OF CHITOSAN COATED IRON OXIDE AND SILVER NANOPARTICLES ON GROWTH AND BIOCHEMICAL CHARACTERISTICS OF SNAPDRAGON (ANTIRRHINUM MAJUS) 740

RECYCLING ORGANIC WASTE INTO HAIR COLORING 741

QUANTIFICATION OF BIOACTIVE COMPOUNDS AND BIOLOGICAL ACTIVITIES IN URTICA URENS L. EXTRACTS 742

USE OF DITTRICHIA VISCOSE EXTRACTS IN THE FORMULATION OF NATURAL COSMETIC PRODUCTS 743

BIOLOGICAL ACTIVITIES AND THERAPEUTIC POTENTIAL OF THE ESSENTIAL OIL OF THE MEDICINAL PLANT "DITTRICHIA VISCOSA" 744

ETHNOBOTANICAL, PHYTOCHEMICAL AND ANTI-INFLAMMATORY EVALUATION OF ANASTATICA HIEROCHUNTICA L. FROM SOUTHERN MOROCCO 745

IN VITRO EVALUATION OF THE ANTIFUNGAL POTENTIAL OF THE ESSENTIAL OIL OF OCIMUM BASILICUM L. 746

ASSOCIATION OF CHEMICAL ANTIBACTERIALS WITH EXTRACTS FROM MEDICINAL PLANTS 747

EFFECT OF LOCAL PERFUMES ON THE GROWTH AND YIELD OF POVIRON VARIETY OF SWEET PEPPER (CAPSICUM ANNUM) 748

PHYTOCHEMICAL STUDY OF 03 SPECIES OF CISTUS MONSPELIENSIS, CISTUS SALVIIFOLIUS AND CISTUS ALBIDUS. EVALUATION OF ANTI-INFLAMMATORY AND ANTIFUNGAL ACTIVITIES..... 749

BIOCHEMICAL AND PHYSIOLOGICAL RESPONSES OF MATTHIOLA TRICUSPIDATA AND CAKILE MARITIMA COASTAL DUNE SPECIES OF ZEMMOURI EL BAHRI (ALGERIA)..... 750

VALORIZATION OF PHENOLIC COMPOUNDS AND ESSENTIAL OILS FROM ALGERIAN CLINOPODIUM NEPETA (L.) KUNTZE: ANTIOXIDANT ACTIVITY AND MOLECULAR SCREENING STUDY 751

THE EFFECTS OF COLD ATMOSPHERIC PLASMA TREATMENT ON GERMINATION OF HAZELNUT (CORYLUS AVELLANA L.) SEEDS..... 752

CORRELATION OF BIOMARKERS OF COMBINED STRESS TOLERANCE IN EGGPLANTS AND EVALUATION WITH POLAR HEAT MAP 753

DIFFERENTIAL PROTEOMIC RESPONSES OF TRADITIONAL AND MODERN DURUM WHEAT CULTIVARS WITH BIOCHAR TREATMENT 754

ECOLOGICAL DETERMINANTS OF ESSENTIAL OIL VARIABILITY IN TETRACLINIS ARTICULATA: A MIXED PCA APPROACH 755

A RESEARCH ON IN VITRO MICROPROPGATION OF GERANIUM (PELARGONIUM GRAVEOLENS)..... 756

A RESEARCH ON IN VITRO MICROPROPGATION OF GINGER (ZINGIBER OFFICINALE ROSCOE)..... 757

DETERMINATION OF EFFECTIVE DOSES (ED_{90}) OF SOME ACCASE-INHIBITING HERBICIDES FOR WEEDY RICE (ORYZA SATIVA L.) CONTROL..... 758

RICE BREEDING PROGRESS IN THE BLACK SEA REGION DURING THE LAST DECADE 759

SCREENING AND CHARACTERIZATION OF POTATO CYST NEMATODE RESISTANCE DERIVED FROM SOLANUM AMERICANUM SPECIES 760

TEMPORAL DYNAMICS OF PHENOLIC ACCUMULATION IN CHENOPODIUM QUINOA ACROSS PHENOLOGICAL STAGES UNDER GREENHOUSE CONDITIONS: INSIGHTS FROM LC-MS FINGERPRINTING 761

PHYTOCHEMICAL PROFILING AND IN VITRO ANTIOXIDANT EVALUATION OF GREEN COFFEE BEANS OF COFFEA ARABICA..... 762

DEVELOPMENT OF LARGE-GRAIN, SHORT-STATURE RICE (ORYZA SATIVA L.) GENOTYPE..... 763

APPLICATION OF ARTIFICIAL NEURAL NETWORKS (ANN) IN YIELD STABILITY AND ADAPTABILITY ASSESSMENT OF WINTER TRITICALE GENOTYPES..... 764

RESISTANCE RESPONSE OF NEW SUNFLOWER LINES AND HYBRIDS TO PLASMOPARA HALSTEDII..... 765

BIODIVERSITY OF FLORA OF SOME ADRIATIC ISLAND AND ISLETS OF DALMATIA IN THE CROATIA 766

THE ROLE OF SUPPLEMENTARY IRRIGATION FOR FOOD PRODUCTION IN A SEMI-ARID COUNTRY PALESTINE 767

DYNAMICS IN SOIL PROPERTIES ACROSS DIFFERENT CROPPING SYSTEMS IN SOILS OF DADIN KOWA, GOMBE STATE, NIGERIA 768

SUSTAINABLE SOIL MANAGEMENT AS ONE OF THE LAND PROTECTION ACTIONS: THE PERSPECTIVE OF THE EUROPEAN UNION GUIDELINES 769

IMPACT OF COMPOST AND BIOCHAR ON THE SOIL AND GROWTH OF A BARLEY CROP 771

THE ROLE OF THE WOMEN ON ACHIEVING THE LDN 772

SHORT-TERM EFFECTS OF DIFFERENT ORGANIC FERTILIZERS ON SOIL CHEMICAL PROPERTIES AND PLANT GROWTH IN MELON AND WATERMELON CULTIVATION 773

ASSESSING THE IMPACT OF GLOBAL WARMING ON SOIL HEALTH AND AGRICULTURAL PRODUCTIVITY 774

GIS MAPPING OF SOIL MACRONUTRIENTS FOR NUTRIENT MANAGEMENT IN HAZELNUT 775

STUDY OF THE ROOT ARCHITECTURE OF PHOENIX DACTYLIFERA IN THE HYDRO-EDAPHIC CONDITIONS OF OUARGLA (NORTHERN ALGERIAN SAHARA) 776

MODELING OF RELATIVE DATE PALM YIELD IN SALINE HYDRO-EDAPHIC CONDITIONS OF THE ALGERIAN SAHARA 777

ASSESMENT OF INCEPTISOL AND ENTISOL SOIL CLASSES COMMONLY FOUND IN TURKEY IN TERMS OF FERTILITY 778

THE ROLE OF SOIL CONDITIONERS IN CEREAL PRODUCTION 779

INTERPRETABLE MACHINE LEARNING FOR SOIL FERTILITY ASSESSMENT IN PRECISION AND SUSTAINABLE AGRICULTURE 780

QUANTITATIVE AND QUALITATIVE ANALYSIS OF MYCORRHIZAL COLONIZATION IN THE ROOTS OF AN AROMATIC PLANT ENDEMIC TO THE MIDDLE ATLAS REGION, MOROCCO 781

EFFECTS OF LINOLEIC ACID SUPPLEMENTATION ON CRYOPRESERVED OULED DJELLAL RAM SEMEN: MOTILITY AND KINEMATIC ANALYSIS 782

POST MORTEM AND ELISA DIAGNOSIS OF CYSTIC ECHINOCOCCOSIS IN SOUTHERN ALGERIA 783

PREVALENCE AND RISK FACTORS OF SUBCLINICAL MASTITIS IN GOATS REARED IN SOUTHERN ALGERIA 784

EFFECTS OF ARTEMISIA ABSINTHIUM ON EIMERIA SPP EXCRETION: A META-ANALYSIS 785

NEUTRALIZING BASED SEROPREVALENCE STUDY OF TOSCANA VIRUS IN LIVESTOCK FROM ALGERIA 787

PREVALENCE OF EIMERIA SPECIES IN FUTURE LAYING HENS AND BREEDING HENS, DETECTED BY ITS1-PCR IMMOBILIZED ON FTA CARDS, IN SIX PROVINCES IN NORTHEASTERN ALGERIA 788

REPRODUCTIVE PARAMETERS EVALUATION OF FLECKVIEH COWS IN ALGERIAN FARM 789

DETERMINATION OF ELEMENTS IN HONEY, HONEYBEE, SUNFLOWER AND BEE DRINKING WATER SAMPLES COLLECTED FROM THE ENEZ DISTRICT, EDIRNE (TURKEY) 790

EVALUATION OF THE IMPACT OF THE PROBIOTIC PEDIOCOCCUS ACIDILACTICI ON GROWTH PERFORMANCE AND THE CONTROL OF COCCIDIOSIS IN BROILERS. 791

STUDY OF THE EFFECT OF A BIMOLECULAR OF THE POMEGRANATE PUNICA GRANATUM L ON ENTEROCOCCUS ISOLATED FROM THE DIGESTIVE TUBE OF POULTRY 792

SEROPREVALENCE OF EQUINE INFECTIOUS ANAEMIA VIRUS (EIAV), USUTU VIRUS (USUV) AND WEST NILE VIRUS (WNV) IN HORSES IN ALGERIAN EASTERN DRYLANDS 793

STUDY OF REPRODUCTIVE PERFORMANCE IN DAIRY COWS 794

BACTERIOLOGICAL DIAGNOSIS OF CLINICAL MASTITIS IN DAIRY CATTLE (ALGERIA)..... 795

MORPHOLOGICAL AND PRODUCTIVE ASSESSMENT OF TELLI DROMEDARIES' MAMMARY GLANDS WITH IDENTIFICATION OF A RARE TEAT ORIFICE IN ARID DJELFA ,ALGERIA..... 796

ANALYSIS OF GASTROINTESTINAL PARASITES OF ANIMALS KEEPT IN CAPTIVITY FROM ZOOLOGICAL PARKS IN ALGERIA 797

IDENTIFICATION OF SOME DIGESTIVE PARASITES IN HORSES AT EQUESTRIAN CENTERS IN ALGERIA 798

MAMMARY MORPHOLOGICAL VARIABILITY AND MILK PERFORMANCE IN TELLI SHE-CAMELS IN THE ALGERIAN SEMI-ARID ZONE 799

RAOULTELLA ORNITHINOLYTICA ISOLATED FROM POULTRY FARMS INTENDED FOR HUMAN CONSUMPTION: PRELIMINARY STUDY OF IT'S RESISTANCE TO 07 ANTIBIOTIC MOLECULES BELONGING TO THE CEPHALOSPORIN FAMILY 800

STUDY OF THE HORMONAL AND BIOCHEMICAL COMPOSITION OF PRE-OVULATORY FOLLICULAR FLUID AND BLOOD SERUM IN THE SHE-CAMEL (CAMELUS DROMEDARIUS)..... 801

STUDY OF OVARIAN ABNORMALITIES IN THE SHE-CAMEL (CAMELUS DROMEDARIUS)..... 802

166 / 5.000 EFFECT OF AN EARLY ADMINISTERED IMMUNE COMPLEX VACCINE AGAINST INFECTIOUS BURSAL DISEASE ON THE ZOOTECHNICAL AND SEROLOGICAL PERFORMANCE OF BROILER CHICKENS IN ALGERIA..... 803

EFFECT OF MANNAN-OLIGOSACCHARIDE SUPPLEMENTATION ON BROILER GROWTH PERFORMANCE..... 804

SURVEY ON BOVINE THEILERIOSIS AMONG VETERINARIANS IN THE SÉTIF REGION 805

TOXICOLOGICAL AND BIOLOGICAL ACTIVITY OF DAUCUS CAROTA ESSENTIAL OIL AND POWDER AGAINST PLODIA INTERPUNCTELLA (LEPIDOPTERA: PYRALIDAE)..... 806

REMOVAL OF PROTOZOA AND HELMINTHS IN WWTP..... 807

BALANCE, BACTERIA, AND THE BLACK BELT: IMPACT OF PROBIOTICS ON GASTROINTESTINAL SYMPTOMS DURING JUDO TRAINING AND JUDO COMPETITIONS 808

SCREENING FOR A TARGET REGION IN SIMIAN VIRUS 40 GENOME AND REPURPOSING PHEOPHORBIDE A AS AN ANTIVIRAL MOLECULE..... 809

POSSIBLE MORPHOLOGICAL EVIDENCES FOR A NEW SPECIES OF EUPALOPSELLUS (ACARIFORMES: EUPALOPSELLIDAE): INSIGHTS FROM A FEMALE SPECIMEN COLLECTED FROM TÜRKİYE 810

DETERMINATION OF ANTIMICROBIAL AND ANTIBIOFILM EFFECTS OF POSTBIOTIC OF LATILACTOBACILLUS SAKEI FROM FERMENTED FOOD ON CLINICALLY SOURCED ANTIBIOTIC-RESISTANT PSEUDOMONAS AERUGINOSA 811

BIOCOMPUTATIONAL ANALYSIS OF TURKISH AND GERMAN HELICOBACTER PYLORI WHOLE GENOME SEQUENCES FOR A NOVEL THERAPEUTIC APPROACH 812

GENETIC DIVERSITY OF BOMBINA BOMBINA FROM TURKIYE USING COI GENE. 813

GENETIC STRUCTURE OF PELODYTES CAUCASICUS FROM RIZE USING MICROSATELLITE MARKER 814

PREDICTING FOOD SUPPLY CHAIN LOSSES IN DEVELOPING COUNTRIES WITH MACHINE LEARNING..... 815

MORPHOLOGICAL AND MOLECULAR PHYLOGENETIC ANALYSIS OF LITHOSPERMEAE (BORAGINACEAE) TRIBE GROWING IN EUROPEAN TURKEY ... 816

DETERMINATION OF MORPHOLOGICAL AND MOLECULAR PHYLOGENETIC PROPERTIES OF SOME TRIFOLIUM L. SECT. CHRONOSEMIUM (FABACEAE) TAXA GROWING EUROPEAN TURKEY USING THE TECHNIQUE OF DNA SEQUENCING... 817

AGBIOL 2025 CONFERENCE STUDENT ORGANIZING TEAM..... 818

OUR SPONSORS 819

POTENTIALITIES OF SPIRULINA PLATENSIS AND AZOLLA FILICULOIDES AS BIOSTIMULANTS TO MITIGATE SALT STRESS IN HORDEUM VULGARE L.

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ABSTRACT

Salinity is one of the major abiotic constraints that significantly impairs plant growth, crop yield and food security. Biostimulants as an eco-friendly alternative play a crucial role in sustainable agriculture. In the present work, we investigated the potent effect of Spirulina platensis and Azolla filiculoides aqueous extracts (Sp and Az) as biostimulants to mitigate the adverse effects of salinity in Hordeum vulgare L. Seed priming with different concentrations were used to evaluate physiological parameters. The optimal concentration (40%) will be chosen for the remainder of the study. It is noteworthy that Az stimulates seed germination from the second day by 65%, reaching a maximum of 100% after 5 days. This effect is accompanied by enhanced root and coleoptile length. Additionally, tissue hydration was significantly increased, highlighting Azolla's effectiveness in correcting water status. Regarding growth, bio-priming with Sp and Az boost fresh and dry weights compared to untreated plants particularly in stressed condition (100 mM NaCl). Seed bio-priming stimulated chlorophyll and carotenoid contents, decreased oxidative stress markers accumulation (hydrogen peroxide (H2O2) and malondialdehyde (MDA)). An induction of antioxidant machinery, including enzymatic and non enzymatic systems has been demonstrated in primed plants. Under control condition, enzymes in relation with secondary metabolite pathway are enhanced using Sp and Az in comparison with unprimed plants. These findings highlight that seed priming with natural extracts can enhance plant resilience to environmental stresses such as salinity. S. platensis and A. filiculoides can be used as potential biostimulants in modern horticulture and smart agriculture. All these benefits are attributed to the richness of marine algae and macrophyte with bioactive contents such as phenolics, proteins, carbohydrates, vitamins, and phytohormones.

Keywords: Azolla filiculoides; Hordeum vulgare; Salinity; Seed priming; Spirulina platensis.

HERBICIDE-RESISTANT WEEDS A THREAT FOR THE SUSTAINABILITY OF RICE CROPPING SYSTEM: CALIFORNIA CASE STUDY

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ABSTRACT

Rice (*Oryza sativa*) is one of the most important sources of human energy worldwide. In California over 200,000 hectares of flooded rice are grown in the Sacramento Valley using a water-seeded, continuously flooded system. Rice is important for CA's economy and contributes approximately $1.7 billion to the Gross Domestic Product in CA. In addition, rice fields provide many ecosystem services including wildlife habitat for more than 230 species. Weed competition is a major biological constraint of rice production and weed control has been a major concern of growers since the beginning of rice production in CA in 1912. The continuous monoculture cropping of California rice, lack of nonchemical weed control methods, limited number of herbicides available for California rice growers, and the continuous use of the same herbicides resulted in wide spread of herbicide resistance for all registered herbicides in California. In addition, there are several weeds in California with multiple herbicide resistance. For example, *Echinochloa crus-galli* and *Echinochloa phyllopogon* have developed resistance to five different modes of action herbicides. Furthermore, herbicide resistant weeds such as *Leptochloa fusca ssp. Fascicularis* developed a fitness advantage that makes it more competitive compared to susceptible biotypes. Today, herbicide resistant weeds threaten the sustainability of rice production system. Management of herbicide resistant weeds needs to include a rapid diagnostic method to identify and detect type of weed resistance, develop enough knowledge about the biology of resistant weeds, determined modes of resistance, developed novel and new cultural practice to diversify weed management program, and search for new herbicides with new or novel modes of action. Prevention, monitoring, rapid response, and integration of many tools to manage weed are the most effective approach that California adopted to control weeds and prevent further herbicide resistant development.

Keywords: Rice, Weed Control, Herbicide-Resistant Weeds, Rice Cropping System, California,

THE REUSE OF TREATED WASTEWATER IN AGRICULTURE IN ALGERIA: CHALLENGES AND PERSPECTIVES

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ABSTRACT

Algeria is among the poorest countries in terms of water potential and the water stress indicator was about 137.2 in last years, which is confirmed by the level of freshwater availability per capita which is 263 m3/inhab/year below the absolute threshold of water shortage set at 500 m3/person/year. This water stress is caused by the effects of climate change, population growth and socio-economic development. Faced with water shortages, recycling and reuse of treated wastewater (TWW) in agriculture appear to be an alternative and a water resource management tool to ensure a regulated supply. According to the National Sanitation Office, only 15 wastewater treatment plants (WWTPs) are intended for agricultural reuse, representing a volume of 15.3 million m3, or 5.5% of the total volume treated for the irrigation of 10125 hectares of agricultural land. As part of the valuation and orientation of other WWTPs towards agricultural reuse, to support the national policy on circular economy and sustainable agriculture, we conducted a study on the WWTP of Baraki (Algiers, Algeria) to evaluate the physicochemical and microbiological status of the TWW and estimate its suitability for irrigation purposes as non-conventional water. The determination of the indicators of water quality for irrigation; SAR, SSP and RSC, revealed good levels for irrigation. All the physicochemical parameters evaluated, including heavy metals, were adequate according to national and international standards except ammonia NH4+and Nt which were higher. However, a fecal contamination, without pathogenic germs, was detected in the TWW what requires disinfection and possibly adequate tertiary treatment before its use in irrigation.

Keywords: Treated wastewater; chemical quality; microbiological quality; agricultural reuse; irrigation.

PLANT-DERIVED MONOTERPENES: A PROMISING ALTERNATIVE TO SYNTHETIC INSECTICIDES FOR CONTROLLING DROSOPHILA PESTS

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ABSTRACT

The commercially used chemical insecticides have been proven toxic to humans and non-target organisms, such as beneficial insects and the environment, while promoting resistance in target species. Natural plant-derived essential oils offer a secure alternative for human and animal health, minimize environmental damage, support sustainable practices, and reduce chemical residues while effectively managing pests. Monoterpenes are the major components of essential oils from many aromatic plants, partly contributing to their insecticidal activities. In this study, the contact activity of a pure monoterpene was evaluated on the behavior (olfactory and oviposition site preference) of a model species, Drosophila melanogaster, which is commonly utilized to assess insecticide effectiveness. Results from contact treatments revealed that the monoterpene at its lethal and sublethal effects values induces adverse physiological effects and alters the behavior of Drosophila. In adult D. melanogaster, this monoterpene impaired olfactory preference. Flies avoid the monoterpene's odor and favor the control one in both the treated and control groups. Furthermore, larval exposure to monoterpene caused a repellency and deterrent effect on the egg-laying of the surviving flies. This study suggests that monoterpenes derived from essential oils could be a safer substitute for synthetic chemical insecticides in integrated pest management strategies for controlling Drosophila pests.

Keywords: Botanical insecticides; Monoterpene; Insecticidal activity; Behavior; Drosophila pests.

ASSESSMENT OF THE TRANSITION FROM CONVENTIONAL SOIL TILLAGE TO MINIMUM TILLAGE TECHNOLOGY IN A MAIZE CROP WITH THREE HYBRIDS - A THREE YEAR CASE STUDY IN LANURILE, CONSTANȚA COUNTY

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ABSTRACT

The present study aims to evaluate the impact of transitioning from conventional soil tillage to minimum tillage technology in a maize crop, cultivated over a three-year period (2022–2024) in the village of Lanurile, Constanța County, Romania. The experiment was conducted under real farm conditions and involved three late-maturing maize hybrids: DKC 5810, P0900, and P0216. The crop was grown on partially irrigated land. Soil preparation consisted of a single pass with a cultivator, followed by precision sowing, while all other technological inputs (fertilization, crop protection, and irrigation management) were kept constant across the hybrids and over the years. The agromorphological and biometric determinations revealed superior performance for the DKC 5810 hybrid, followed by P0900. Differences in productivity parameters, such as grain weight per ear and thousand-kernel weight (TKW), were statistically validated using one-way ANOVA tests, confirming significant distinctions between hybrids ($p < 0.05$). The DKC 5810 hybrid recorded the highest average kernel weight and TKW, while also achieving the greatest yield per hectare. P0900 also demonstrated high adaptability and yield potential, particularly under irrigation. In contrast, P0216, although showing vigorous vegetative development, accumulated lower grain mass and yielded less compared to the other two. Climatic analysis over the study period showed a consistent increase in mean annual temperatures and a significant decrease in rainfall, especially during critical phenological stages such as flowering and grain filling. These climatic trends emphasized the importance of water management. The irrigation applied in four key growth stages successfully offset part of the rainfall deficit and supported optimal crop development. The results demonstrate that minimum tillage, when properly implemented under the specific pedoclimatic conditions of Dobrogea and combined with efficient irrigation and hybrid selection, can ensure competitive yields. This conservation practice reduces soil disturbance, minimizes erosion and compaction, and preserves soil moisture critical factors in semi-arid regions. Therefore, minimum tillage represents a viable and sustainable alternative to conventional tillage in areas facing water scarcity and climate variability. These findings highlight the importance of hybrid selection aligned with specific tillage practices and climate adaptability. DKC 5810 is recommended for high-input, irrigated systems, while P0900 proves stable and productive in moderately intensive conditions. Further research is encouraged across other regions to validate these results and guide sustainable maize production strategies in Romania.

Keywords: minimum tillage, maize hybrids, sustainable agriculture, irrigation, climate change

IMPACT OF BASE FERTILIZERS ON THE BEHAVIOR OF DURUM WHEAT IN THE PRESENCE OF WATER STRESS

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ABSTRACT

To evaluate how fertilizer (Fosfactyl) affects the development of durum wheat during water stress. The results of our research show that chemical fertilizer (Fosfactyl) has a very important role, including improving the behavior of durum wheat, thanks to its direct impact on abscisic acid (ABA) expression, which is a phytohormone responsible for most of plant tolerance to water stress. Three durum wheat genotypes have different response variability (Triticium durum Desf.) (Simeto, Hedba-3, and GTA dur), differs depending on whether they are treated or not with water stress. The tolerance strategy adopted by each variety was characterized by analyzing several physiological and biochemical parameters. The results show that Fosfactyl under water stress caused a change in the physiology of seedlings as well as an accumulation of proline, proteins and sugars, with an increase in the activity of antioxidant enzymes. We can confirm that the response of durum wheat varies from variety to variety and is determined by the fertilizer applied through this experimental work. According to the examination, certain parameters seem to be reliable indicators of tolerance and are receptive to the pressure exerted by water stress.

Keywords: Durum wheat. Fertilizer. Fosfactyl. Genotype. Physiology. Potassium K+. Tolerance. Water stress.

CONTRIBUTIONS TO THE INVESTIGATION OF SPECIFIC TECHNOLOGICAL ASPECTS OF SOFT WHEAT SEEDS TREATED WITH PURIFIED WASTEWATER

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ABSTRACT

Our objective in carrying out this work was initially to evaluate the technological quality of soft wheat treated by purified wastewater, and in a second step to study and compare some physiological and biochemical parameters of two varieties of soft wheat (Triticum aestivum L.) El-Hiddab (HD1220) and Béni Sélimane (ARZ) irrigated with rainwater and the other with purified wastewater. According to our findings, the use of these waters is favored by technological parameters including humidity, ash, gluten content, and chlorophyll content of soft wheat. The analytical results of our experiments have largely met national standards.

Keywords: accelerated aging, irrigation, purified wastewater, soft wheat, technological parameters, viability and vigor.

INSECTICIDAL ACTIVITY OF MONOTERPENE AGAINST DROSOPHILA MELANOGASTER (DIPTERA): DEVELOPMENT AND LOCOMOTOR BEHAVIOR

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ABSTRACT

Inappropriate and excessive use of synthetic pesticides has negative effects on humans, ecosystems, and biodiversity. As an alternative to traditional crop-protection methods, botanical pesticides are gaining importance. Secondary metabolites of plants, particularly terpenes, constitute a valuable source of bioactive compounds for the formulation of biopesticides as alternatives to synthetic pesticides. In this study, the contact activity of a pure monoterpene was evaluated on the development and locomotor behavior in early third instar larvae of Drosophila melanogaster. Treatment significantly displayed different morphological defects (intense pigmentation of larvae, pupa-adult intermediates, incomplete/malformed adults). Moreover, results indicated that the compound reduced the locomotory behavior of adult males and females of D. melanogaster. Our results provide some evidence that a topical administration of monoterpene to 3rd larvae disrupts the development and locomotor behavior of D. melanogaster and might be used as potential biopesticides against different insect pests.

Keywords: Drosophila melanogaster, monoterpene, development, locomotor behavior.

YIELD RESPONSES TO A REDUCTION MINERAL NITROGEN FERTILISER APPLICATION RATES FOR MAJOR CROPS IN EUROPE

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ABSTRACT

Fertilizer application in excess of plant demand leads to environmental pollution. As part of its Farm to Fork strategy (F2F), the European Commission prioritizes reduced nitrogen fertilization in agriculture to improve nutrient management. In this study, we estimated yield responses to reduced mineral nitrogen (N) fertilization using data from European long-term experiments, national fertilization guidelines, and crop yield statistics from FAOSTAT. The yield estimations were performed for a 20% reduction of N fertilizer application rates for selected important crops, which are wheat, maize, barley, sugar beet, potato and rapeseed for 38 European countries, including Switzerland, Türkiye and the UK. The results showed that when nitrogen fertilisation was reduced by 20%, the highest yield reduction was estimated for rapeseed, between 16.6 and 20.9%. Yield reductions were lower for wheat (5.4-11.4%), maize (1.76-11.4%) and barley 8.5-11.4. However, yield responses varied among countries. These specific responses should be considered when designing region-specific fertilization guidelines. Regions where a reduction in N fertilization is associated with a low risk for crop production loss and a high risk for N leaching and greenhouse gas emission should be targeted.

Keywords: farm to fork strategy, nitrogen fertilization, nitrogen fertilizer reduction, yield

CHILLI VIRAL DISEASES: EXPLORING VIRUSES AND PLANT DEFENCE MECHANISMS

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ABSTRACT

Chilli pepper (*Capsicum annuum* L.) is among the most important spice and vegetable crops globally. Viruses can infect plants in various ways and pose a major threat to Chilli production worldwide. Chilli Leaf Curl Virus Disease (ChiLCVD) and Chilli Vein Mottle Virus (ChiVMV) are the most destructive, causing substantial yield losses. This review aims to understand the viral invasion of the host cell. We review the various viral components and their interaction with the host's replication and translation machinery, which result in viral infection and spread to other cells, causing distinctive host symptoms. The possibilities and mechanisms for overcoming viral infections are also reviewed, which showed that plants respond to viral infections through the hypersensitive response (HR), triggering defense mechanisms involving resistance (R) genes, thereby restricting the disease to the infection site. Resistance to begomoviruses can be inherited in multiple ways, including polygenic, monogenic, and strain-specific forms. Recent studies have identified new SNP-based molecular markers, which are reviewed in the context of their utilization in marker-assisted selection for breeding Chilli varieties resistant to ChiLCVD and ChiVMV. The resistance accessions of both viral diseases and identified resistant genes within these accessions may help breeders formulate future strategies for incorporating resistant genes from the identified accessions.

Keywords: Chilli, ChiLCVD, PepYLCV, ChiVMV, Resistant source, SNPs

EFFECTIVENESS OF WILD BEES IN THE POLLINATION OF CITRULLUS LANATUS L. IN THE ALGERIAN SAHARA

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ABSTRACT

Our studies are carried out at an experimental site in Laghrousse, province of Biskra, on a Watermelon crop (Citrullus lanatus L.) during the flowering of 2024 , have made it possible to identify seven groups of insects pollinating the Watermelon flowers : Hymenoptera (domestic and wild bees, hornets and ants), Diptera (flies), Lepidoptera, Coleoptera and Hemiptera , and our statistics show that Hymenoptera is the most abundant group and the main pollinators in this crop . According to these statistics, it was found that seven species of wild bees , belonging to five genera : Lasioglossum, Hylaeus ; Megachile ; Halictus and Anthophora , the most effective pollinators of Citrullus lanatus L. , although Watermelon is a self-compatible plant , the intervention of pollinators in this culture by xenogamy, improve their quantitative yield of the Watermelon by a percentage of 94,6% and qualitative by increasing the market value of the fruits by a percentage of 100 % , that in self-pollination by geitonogamy . Finally, we specified eight spontaneous plants attractive to wild bees the main pollinators of the watermelon which must be reserved for planting at the edges of the fields by farmers

Keywords: Citrullus lanatus L., Main pollinators, Quantitative and qualitative yield, Self-compatible plant, Xenogamy, geitonogamy

EXPLORING THE IMPACT OF FARMERS' STRESS, SELF-EFFICACY AND STRESS RESILIENCE ON PENNSYLVANIA DAIRY FARM OPERATORS' CAREER COMMITMENT

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ABSTRACT

The dairy farming industry plays a critical role in Pennsylvania's economy and rural sustainability. Yet, it is facing mounting challenges such as consolidation of farms, an aging workforce, and increased occupational stress. These stressors endanger the economic viability of the sector and the well-being of dairy farmers themselves. One key psychological factor that supports resilience and continuity in farming is career commitment—the degree to which an individual identifies with and invests in their occupational path. Understanding what drives or hinders career commitment is crucial to designing effective supports for farmer retention, particularly during times of increased stress. This study examines how personal and occupational stress, self-efficacy, and stress resilience influence career commitment among Pennsylvania dairy farm operators. Specifically, it explores: (1) descriptive profiles of career commitment (CC), occupational stress (OS), personal stress (PS), self-efficacy (SE), and stress resilience (SR); (2) relationships between these variables; and (3) the moderating role of SE and SR on the impact of OS and PS on CC. Data were collected using a cross-sectional online survey conducted between December 2024 and February 2025. The survey, distributed via Penn State Extension and local dairy organizations, gathered responses from a total of 101 dairy farm operators across Pennsylvania. Measures included validated Likert-scale instruments assessing each construct. Descriptive statistics, Spearman correlations, and moderation analyses were conducted to examine the study aims. Findings showed that 75% of respondents reported high levels of career commitment, despite 92% reporting intermediate to high occupational stress and 83% reporting intermediate to high personal stress. A majority (61%) also reported high levels of self-efficacy, and 63% reported high stress resilience. Correlation analyses indicated that both occupational and personal stress were negatively associated with career commitment, while self-efficacy and stress resilience were positively—though not significantly—associated. Moderation analyses revealed that self-efficacy significantly moderated the relationship between both types of stress and career commitment. Specifically, the negative effect of occupational stress on career commitment was only significant at low levels of self-efficacy, and not at medium or high levels. Similarly, the negative effect of personal stress on career commitment was strongest among those with low self-efficacy but diminished as self-efficacy increased. These findings suggest that self-efficacy may act as a protective factor, buffering the harmful effects of stress on commitment to farming. The interaction between personal stress and stress resilience approached statistical significance, suggesting a possible moderating effect of stress resilience, although more research is needed to confirm this. In conclusion, self-efficacy appears to play a critical role in maintaining career commitment among Pennsylvania dairy farmers facing occupational and personal stress.

While stress remains a major challenge for the sector, interventions that enhance self-efficacy—such as leadership training, peer mentoring, and resilience-based educational programs—could help sustain farmer engagement and long-term viability of the dairy industry. Stress resilience also shows potential as a buffering factor, though further investigation is warranted. These findings contribute to a growing body of evidence advocating for holistic, psychosocial approaches to support farmers' mental well-being and occupational longevity.

Keywords: Stress, Dairy, Resilience, Commitment, Career, Self-efficacy

HERDING THROUGH CRISIS: EXPLORING STRESS AND DEMOGRAPHICS AMONG GOAT AND SHEEP PRODUCERS

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ABSTRACT

Introduction: The multifactorial and dramatic effects of the COVID-19 pandemic on the agricultural sector and farm households (Dong and Zeballos, 2021) intensified the global race to produce food in record time, placing farmers under significant occupational pressure and challenging them to adapt their capacity to cope with stress in the workplace (Chengane et al., 2021). We found limited studies on goat and sheep farmers' stress in the U.S. However, we explored the literature on international agriculture, focusing on farmers' stress and specifically on the stress among goat and sheep producers. International research findings can provide valuable insights into the U.S. goat and sheep farming industry. Small ruminants proved to be lifesavers for farmers in many catastrophic situations (Rout and Behera, 2021). According to Vidaurreta et al. (2020), goat and sheep producers experienced stress during the COVID-19 pandemic due to disruptions in the food supply chain, inadequate water supply for their animals, and economic constraints. These challenges had a detrimental effect on goat productivity, animal health, and farmers' mental well-being. McElrone et al. (2022) discovered that farmers faced elevated stress levels during the pandemic due to housing insecurity, food scarcity, limited access to childcare, and financial constraints. These challenges included securing reliable agricultural workers, implementing safety measures at farms and markets, restricting product outlets and restaurant closures, and sourcing seeds, animal feed, and other supplies (McElrone et al., 2022). The COVID-19 pandemic heightened farmers' anxiety due to fear, worry, and uncertainty (Ladyka et al., 2022; McElrone et al., 2022; Middendorf et al., 2021; Sridhar et al., 2022). . Windon et al. (2016) reported that farmers experienced higher stress during their busy season, often working more than nine hours daily (Windon et al., 2016). Long work hours were associated with occupational imbalance and increased health risk factors. Balancing work and personal life helped reduce stress and improve farmers' quality of life (Windon et al., 2014; 2016). **Purpose and Objectives**: This study aimed to assess relationship between farmers' stress amidst the COVID-19 pandemic and thier demographic variables. Two research objectives guided this study: (1) Describe goat and sheep farmers' stress, including occupational and personal stress, during the COVID-19 pandemic. (2) Determine the relationships between goat and sheep farmers' stress and demographic variables such as age, years in the farm business, work hours during a busy season, and farm size. **Method**: The authors developed a questionnaire based on existing literature to measure farmers' stress. The online questionnaire was sent to the 3000 goat and sheep farmers registered in the University Extension Listserv. We used the technique described by Dillman et al. (2014) to collect online data. After cleaning the data, the response rate was 6.8% (n = 204). **Findings**: The mean and SD for farmer's stress were 3.0±.63 out of 5, occupational stress 3.11±.65, and personal stress 2.80 ± .82, respectively. During the COVID-19 pandemic, work hours during the busy season and farm size exhibited a positive low association with farmers' stress (r = .245 and r = .238, respectively). They predicted 10% of the total variation in farmers' stress.

Recommendations: We propose that extension professionals and public health practitioners learn lessons from the COVID-19 pandemic in case other public health concerns arise. We suggest that future educational programs addressing stress among farmers prioritize specific strategies to reduce occupational stress and cope with uncertainty during health-related outbreaks or other crises. An interesting avenue for further reserach can involve examining other issues related to farmers' financial planning, time management (especially during the busy season), and their relationships with family members.

Keywords: COVID-19 Pandemic, Goat and Sheep Farmers, Farmers' Occupational Stress, Farmers' Personal Stress, Farmers' Demographic

POTATO BIOTIZATION: PHYTOPROTECTION AND GROWTH PROMOTION

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ABSTRACT

Some bacteria of the rhizosphere (PGPR, plant growth promoting rhizobacteria) induce beneficial effects on the growth of the plants and the biocontrol of the pathogenic agents. Our objective consists in studying the capacity of Pseudomonas fluorescens strains in generating beneficial effects on the potato production cycle stages. Methods: The experimental work concerns the tubers and plants biotisation by Pseudomonas fluorescens strains: Tests have been performed with vitroplants and evaluation of phytostimulation of the plants stemming from bacterized potato tubers (IRS, DAS-ELISA). Results: The vitroplants obtained have more vigor and are characterized by a better root development with increasing of their shoots. Also, a good level of root colonization in the vitroculture media was observed. In the experimentation realized with whole plants, considerable increase in growth parameters was noted (Stems Number and Height, stems fresh and dry weight, roots length, fresh and dry weights of the roots) and in production parameters (stolons and tubers number, tubers fresh and dry weights). In the second experiment where soil variability was used (three variants), we noted that the consequences of the bacterisation, while generating beneficial effects of phytostimulation, are better in the unfavorable conditions: case of soils cultivated frequently with potato. The tests of induction of the systemic resistance despite the presence of the virus (artificial inoculation) have shown that the bacterisation led considerable inhibitions in the expression of the studied viral infection (PVY)

Keywords: Pseudomonas fluorescens, PGPR, Biotisation, Potato, Vitroplants, IRS

RESEARCH ON CONVENTIONAL WHEAT CULTIVATION TECHNOLOGY, INCLUDING SOIL TILLAGE AND PHASED FERTILIZATION, APPLIED TO THREE WHEAT VARIETIES UNDER NON-IRRIGATED CONDITIONS, IN THE PEDOCLIMATIC CONDITIONS OF GĂLBINAȘI, BUZĂU COUNTY, DURING THE 2023-2024 AGRICULTURAL YEAR

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ABSTRACT

This study evaluated the agronomic and qualitative performance of three winter wheat varieties (Katarina, Biharia, Apache) under rainfed conditions in Gălbinași, Buzău County, Romania (2023–2024). A 45ha field trial applied conventional tillage and phased fertilization (control, two-phase, three-phase). Fertilization significantly influenced plant density and kernel weight ($p < 0.05$), with a moderate yield correlation ($R^2 = 0.58$). Katarina showed the highest yield (7711.4 kg/ha) and grain quality. Results recommend phased nitrogen fertilization to improve yield and grain quality under drought stress.

Keywords: soil tillage, fertilization, wheat, drought, climate change

YPOLOGY ASSESSMENT OF DAIRY CATTLE PRODUCTION IN THE MAJOR PRODUCTIVE REGION OF TUNISIA

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ABSTRACT

The study aimed to identify dairy systems related to purebred cattle in Tunisia and their effects on milk production and quality. A survey of 102 breeders across 17 governorates focused on feeding practices and milk parameters. Principal Component Analysis (PCA) revealed three farm groups: Group I (51% of farms) relies on rainfed systems with limited forage; Group II (26%) employs mixed irrigation with moderate forage; and Group III (23%) uses irrigation, featuring larger farms and diverse diets. Significant differences were observed among groups in terms of farm size, cow numbers, and diet composition ($P<0.0001$). Results showed that Group III produced the highest daily milk yield (21.59 kg), while Group I had the lowest (16.45 kg). Fat content exceeded the national average in all groups, with Group III showing the highest at 38.2 g/L. Protein levels also surpassed average values, particularly in Group III (30 g/L). Group II had the highest urea content (44.81 mg/dL), indicating dietary imbalances. Overall, the analysis distinguished dairy farms by agricultural systems, with irrigated farms demonstrating superior milk production and quality for purebred cattle

Keywords: Dairy cattle farms, cropping system, typology, performances, Tunisia.

EFFECT OF JASMONIC AND SALICYLIC ACIDS ON CONTROLLING OLIVE FRUIT FLY, FRUIT QUALITY, AND OIL IN OLIVE PLANTS

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ABSTRACT

This study investigated the efficacy of foliar applications of jasmonic acid (JA) and salicylic acid (SA) in controlling the olive fruit fly, Bactrocera oleae, and improving fruit quality in Kalamata and Amigdalifolia olive varieties. Conducted in 2021-2022 at an olive research station in Rudbar County, Guilan Province, Iran, the study used a factorial, completely randomized block design with JA (1 and 2 mg/L) and SA (1 and 2 mM) treatments, compared to a control. Results showed that both acids, particularly at higher concentrations, reduced egg-laying and larval growth, leading to decreased pest populations. Higher doses also significantly improved fruit quality by increasing weight, volume, and flesh density, and enhancing oil composition (fatty acids, phenols, chlorophyll, and carotenoids). The findings suggest that optimized JA and SA applications can be an effective tool within integrated pest management (IPM) strategies for mitigating olive fruit fly damage in orchards.

Keywords: Jasmonic Acid, Olive fruit fly, Salicylic Acid

POTENTIALITIES OF SPIRULINA PLATENSIS AS BIOSTIMULANT TO MITIGATE SALINITY STRESS IN HORDEUM VULGARE L.

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ABSTRACT

Salinity is one of the major abiotic constraint that significantly impairs plant growth, crop yield and food security. Biostimulants as an eco-friendly alternative play a crucial role in sustainable agriculture. In the present work, we investigated the potent effect of Spirulina platensis aqueous extract as biostimulant to mitigate the adverse effects of salinity in Hordeum vulgare L. Seed priming with different concentrations of Spirulina platensis extracts (SE 10%, 20%, 30%, 40%, 60% and 80%) were used to enhance seeds germination, length of radical and hypocotyl. The optimal concentration (40%) will be chosen for the remainder of the study. It is noteworthy that SE seed priming significantly improved H. vulgare germination performance, growth parameters and water content. At the same time, priming seeds with SE reduced oxidative stress biomarkers such as lipid peroxidation and hydrogen peroxide content. This positive effect contributed to a significant induction of antioxidant machinery, including enzymatic (GPX, CAT and SOD) and non enzymatic (PPT, TCT, TFC) systems. Enzymes in relation with secondary metabolite pathway are enhanced using SE in comparison with unprimed plants. These findings highlight that seed priming with Spirulina extract can enhance plant resilience to environmental stresses such as salinity. The Blue-green microalgae S. platensis can be used as potential biostimulant in modern horticulture and smart agriculture. All these benefits are attributed to the richness of marine algae with bioactive contents such as phenolics, proteins, carbohydrates, vitamins, and phytohormones.

Keywords: Hordeum vulgare; Salinity; Seed priming; Spirulina platensis.

RECYCLING OF SEEDS AND KERNELS FROM DIFFERENT FRUIT TREES BY GERMINATION

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ABSTRACT

The experiment was conducted in the Development and Valorisation of Plant Genetic Resources Laboratory (DVRP) at the Constantine-1- Brothers Mentouri University in the Biopole Chaabet Ersas during the 2023-2024 academic year. The study was based on the reuse of plant seeds through germination, with the aim of recycling them reducing food waste and creating from them a new individuals vigor then their parents, using them as ornamentals plant and if we are sure from their parent we can use them as a rootstock. It was founded on the germination four different seeds and kernels coming from different types of fruit trees: Mandarin (Citrus ruticulata Blanco.), Olive (Olea europaea L.) and Peach (Prunus persica (L.) Batsch.) and for Sweet cherry (Prunus avium L.) we used two varieties: one local (Lambert) and the other from China (Royal), The seed germination rate was calculated and some biometric measurements (length, width and weight of seeds and kernels) were taken before and after imbibition. Mandarin seeds are outperformed in terms of germination rate, which was estimated to 43.33%, where Lambert variety germinate percentage is 17.77%; otherwise, none of the Olive, Peach and Royal (Sweet cherry) kernels are germinate. The length, width and weight of seeds in the post-imbibition treatment were greater than in the pre-imbibition treatment for all the species. Test analysis showed a highly significant difference between the five species studied. The same analysis proved a difference between the two treatments, where the treatment after imbibition it always placed in first group, meaning that it had the strongest effect on the germination of this seeds and kernels.

Keywords: Recycling, Citrus ruticulata Blanco., Olea europaea L., Prunus persica (L.) Batsch., Prunus avium L., Germination.

LIGHT-EMITTING DIODE LIGHT QUALITY INFLUENCES GERMINATION, GROWTH AND BIOCHEMICAL INDICES OF ARNEBIA EUCHROMA

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ABSTRACT

Arnebia euchroma (is locally known as Hava Chobeh) is a native plant of Iran and has a valuable place in traditional Iranian medicine. A. euchroma is used to treat many problems such as inflammation, joint pain, uterine infections, fungal and bacterial infections, and wound healing and burns. One of the limitations in cultivating this valuable plant is its low germination percentage and uneven germination. In recent years, the use of LED light sources has increased the germination of medicinal plants. Therefore, in this study, LED light treatments were used to improve the germination and growth characteristics of the A. euchroma plant. The present study was conducted at the Faculty of Agriculture and Natural Resources, University of Mohaghegh Ardabili (IRAN) in 2025. The experiment was conducted in a completely randomized design with 4 treatments and 4 replications. Four light treatments were used as follows: 100% white light, 100% blue light, 100% red light, and a combination of blue and red light (50:50). Germination indices (germination percentage and germination rate), morphological (seedling dry weight, root length, and stem length), and biochemical (photosynthetic pigments, total carbohydrates, and total protein) were examined. The findings indicated that red light enhanced various germination and growth metrics of the A. euchroma plant. When analyzing the biochemical traits of 30-day-old seedlings of the A. euchroma plant, it was observed that combining blue and red light significantly elevated the levels of photosynthetic pigments, total carbohydrates, and total protein. Therefore, the use of red LED during seedling stages was considered an effective treatment to improve germination and growth characteristics. Additionally, according to the findings, the A. euchroma plant exhibited different reactions to light wavelengths during later growth stages, with the blue and red-light combination promoting higher rates of photosynthesis and increasing carbohydrate and protein levels.

Keywords: Germination percentage, Germination rate, Photosynthetic pigments, Total carbohydrates, Total protein

ASSESSING THE EFFECTS OF CLIMATE PATTERNS ON CEREAL CROP PRODUCTION IN THE FES-MEKNES REGION OF MOROCCO

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ABSTRACT

The impact of climate change on cereal production is a growing concern, particularly in Morocco, where agriculture contributes 15% to the national GDP and employs 40% of the workforce. This study examines the effects of precipitation and temperature variations on the production of durum wheat, soft wheat, and barley in the Fes-Meknes region, the country's most productive area, using climate data from the Moder-Era Retrospective analysis for Research and Applications-version 2 (MERRA-2), and agricultural data from the Moroccan High Commission for Planning (HCP). We employed regression models to identify and quantify trends over time, assessing the direction and significance of observed patterns. We first compare the variation in cereal production between two main periods: period P1 from 1994-2000 before the implementation of the Maroc Plan Vert (PMV) program, and period P2 from 2009–2020 after the PMV. We assess the annual production of each of the three cereal types across both periods and find that, from P1 to P2, durum wheat, soft wheat, and barley production increased by 17%, 45%, and 22%, respectively. This directly reflects the results of strategies adopted within the PMV and highlights the crucial role of irrigation in improving cereal production. Our findings further indicate that, on average, rainfall increased by 4.9 mm/year from 1994 to 2020, while temperature variations were negligible. The correlation analysis for three key sub-seasonal periods: S1 (October–December), S2 (January–May), and S3 (the full growing season) during P1, shows that precipitation during S2 has a more significant impact than S1, with correlation coefficients increasing from 38% to 64% for durum wheat, from 30% to 52% for soft wheat, and from 39% to 50% for barley. This trend is further supported by p-values: Durum Wheat (S1 = 0.22, S2 = 0), Soft Wheat (S1 = 0.41, S2 = 0.04), and Barley (S1 = 0.12, S2 = 0.02), underscoring the crucial role of mid-season precipitation in cereal production. Moreover, our analysis concludes that interannual variation in rainfall affects production more than the absolute rainfall amount. To sustain cereal production amid climate change, priority should be given to enhancing irrigation infrastructure and training farmers in adaptive techniques, such as using biofertilizers, and ultimately extending the cropping area.

Keywords: Cereal Production; Seasonal Precipitation; Fes-Meknes

HIGHER MUSHROOMS AS A POTENTIAL SOURCE FOR DEVELOPMENT OF BIOPREPARATIONS WITH ANTIOXIDANT, ANTIMICROBIAL AND PHYTOTOXIC PROPERTIES FOR AGRICULTURAL NEEDS

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ABSTRACT

Higher fungal extracts exhibit significant antibacterial, antifungal, antiviral activities. Besides, they are a good source of various biologically active natural compounds such as alkaloids, terpenoids, phenolic compounds, flavonoids and many others with many valuable properties. Macrofungi involved in different types of relationships with plants produce substances with phytoprotective properties. This substances can be divided into 4 groups: (i) antimicrobial compounds that inhibit various phytopathogens (including bacteria and fungi); (ii) compounds with phytohormonal activity; (iii) antioxidant substances that regulate stress responses in plants and (iv) substances to control weeds (phytotoxins with potential herbicidal effect). Recently, many studies address an antimicrobial potential and phytostimulation properties of the higher mushrooms. Only limited literature reviews and research relate to the phytotoxic properties of macromycetes in spite of the fact that uncontrolled usage of pesticides has led to the development of weed resistance against agrochemicals. In this regard, searching for macromycetes of different systematic groups which synthesize a complex of bioactive substances with antimicrobial, antioxidant, phytotoxic and phytostimulating properties to control plant diseases and weeds is an extremely urgent problem of great scientific, practical and social importance. The search for the biodiversity of mushrooms and the creation of a collection of higher fungi, have great economic potential to search for organisms with new industrial applications that will lead to new products. Our previous research give the reason to expect that mycelium of Hericium and Inonotus higher mushrooms may contain active compounds that can suppress the growth of phytopathogenic fungi, bacteria, and weeds, including those resistant to existing commercial pesticides. Due to presence in the fungal mycelium and culture fluid of various compounds with different biological activity, these higher mushrooms can be considered as possible producers of substances with phytoprotective properties.

Keywords: higher mushrooms, phytotoxicity, phytostimulation, fungicidal and antibacterial properties

STUDY OF THE NEUROBEHAVIORAL TOXICITY OF THYMUS MUNBYANUS ON EPHESTIA KUEHNIELLA

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ABSTRACT

In the context of integrated pest management for stored product pests, plant-derived essential oils are increasingly considered as natural alternatives to synthetic insecticides. This study focuses on the neurotoxic effects of the essential oil of Thymus munbyanus on Ephestia kuehniella, a widespread lepidopteran pest. The objective was to evaluate the impact of this oil on two key physiological parameters: adult locomotor activity and acetylcholinesterase (AChE) activity, an essential enzyme of the nervous system. Bioassays were conducted via fumigation by exposing insects to two concentrations of the essential oil corresponding to the LC25 and LC50, previously determined in preliminary experiments. Behavioral observations revealed a significant impairment of locomotion, manifested by decreased motor activity, coordination disorders, and progressive immobilization, especially pronounced at LC50. These effects reflect a disruption of the central nervous system. Moreover, biochemical assays showed a marked inhibition of AChE activity in treated insects, proportional to the concentration applied. This enzymatic activity decrease suggests a neurotoxic mode of action involving interference with cholinergic transmission, which could explain the observed motor deficits. These results confirm the biological efficacy of T. munbyanus essential oil and highlight its potential as a natural insecticidal agent. It could be integrated into sustainable management strategies for pest populations. Further studies are needed to identify the active compounds responsible for these effects and to assess their safety on non-target organisms and the environment.

Keywords: Thymus munbyanus, Ephestia kuehniella, Fumigation, AChE, Mobility

BOLTING IN SPINACH; GENETIC AND ENVIRONMENTAL FACTORS

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ABSTRACT

Bolting in spinach is an undesirable physiological process in which the plant suddenly transitions from the leaf formation period to the flowering period. This process leads to economic losses by negatively affecting leaf yield and market quality. The bolting process is determined by genetic predisposition and environmental conditions. Genetically, some spinach varieties are more resistant to bolting than others. This highlights the role of genes regulating flowering in bolting-related genes such as Flowering Locus T, Leafy (LFY) and Suppressor of overexpression of co1 (SOC1). These loci controlling bolting are directly or indirectly stimulated under specific environmental and endogenous conditions and initiate flowering by generating a series of internal signals. Environmental factors that accelerate bolting include long day length (photoperiod), high temperatures, and gibberellin, an endogenous hormones and key factor of spinach bolting-related genes. Additionally, environmental stresses, such as nutrient imbalance and water stress, can trigger this process. Understanding these factors is important for developing bolting-tolerant genotypes through breeding studies and for achieving sustainable production. In addition to cultural measures, such as selecting an appropriate sowing time, using late-bolting varieties, and managing temperature and light, controlling bolting in spinach requires a holistic approach that includes genetic selection and carefully managing environmental conditions. This review examines the mechanisms related to genetic and environmental factors that trigger bolting and provides a perspective on research and development trends and application prospects in this field.

Keywords: Bolting, climate change, high temperature, spinach

ENDOPHYTIC BACTERIA FROM ECHIUM AMOENUM FISCH & MEY. AS A NEW ELICITOR OF PHENOLIC BIOSYNTHESIS

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ABSTRACT

The Echium amoenum Fisch & Mey., as a native plant of Iran, has unique properties in traditional Iranian medicine. E. amoenum is rich in numerous phytochemical compounds such as rosmarinic acid, anthocyanidins, and flavonoids that are utilized as a new source of materials in different industries such as drug, food, and cosmetic. These bioactive compounds are used for treatment of many infectious and fungal diseases such as herpes, oral infections, colds, pneumonia, congestion, coughs and stress. Microorganisms can interact with plants and play a significant role to produce plants with high nutritional value. Recently, the isolation of endophyte bacteria from some medicinal plants and their application as an elicitor, has attracted the attention of researchers. Hence, in this study, a novel strain of endophytic bacterium Bacillus amyloliquefaciens was isolated from the E. amoenum plants. After that, the elicitation effects of autoclaved bacteria were investigated on phenolic production of E. amoenum plant in vitro. Based on the results, total phenolic content and total flavonoid content were positively increased under the influence of different concentrations of bacterial extract. The results also showed that Bacillus amyloliquefaciens extract can be used as a new elicitor for the biosynthesis of phenolic compounds in future research.

Keywords: Bacillus amyloliquefaciens, Flavonoid, Interaction, Microorganism, Phenol

BIOCHAR IMPROVES SALT TOLERANCE IN RICE BY LIMITING APOPLASTIC SODIUM TRANSPORT AND PROMOTING SUBERIN BIOSYNTHESIS

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ABSTRACT

Saltwater intrusion poses a serious environmental threat to rice cultivation by impairing growth and increasing sodium (Na^+) toxicity. This study aimed to evaluate the effect of rice husk biochar on rice growth, Na^+ accumulation, and the underlying mechanisms of salt stress mitigation. Fourteen-day-old Phitsanulok 2 rice seedlings were grown in pots containing saline soil, with or without 30% (w/w) rice husk biochar, and subjected to 8 dS/m saltwater for 7 days. Shoot dry weight and tiller number were recorded, while root tissues were analyzed for the expression of Na^+ transporter (OsCNGC1) and suberin biosynthesis (CYP86A9) genes. To assess apoplastic (bypass) flow, seedlings were transferred to 0.2 mM trisodium-8-hydroxy-1,3,6-pyrenetrisulphonic acid (PTS) and 50 mM NaCl solution for 7 days. Saltwater intrusion significantly reduced shoot dry weight and tiller number, while biochar amendment improved these parameters by 99% and 56%, respectively. Na^+ accumulation in shoots increased under salt stress, but was significantly reduced with biochar. Bypass flow of water and Na^+ was elevated by salt stress and effectively suppressed by biochar. Gene expression analysis revealed low levels of OsCNGC1 in all treatments, while CYP86A9 was significantly upregulated in biochar-treated roots. These findings suggest that rice husk biochar alleviates saltwater intrusion stress by reducing Na^+ uptake through suppression of bypass flow and enhanced suberin-related barrier formation in roots.

Keywords: Seawater intrusion, bypass flow, salinity, climate change, food security

TOWARDS A SUSTAINABLE FUTURE: CITROBACTER FREUNDII AF-56, A CLIMATE-SMART ENDOPHYTIC MICROBE FOR REDUCING CHEMICAL USE AND ENVIRONMENTAL IMPACT

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ABSTRACT

Intensified agricultural practices have led to soil degradation, compromising ecosystem services and human health. To address this, microbial inoculants have emerged as a promising strategy. This study isolated and characterized a potent plant root-associated beneficial bacterium, Citrobacter freundii AF-56, from soil of a completely unexplored area of subdivision Dhirkot, AJK. AF-56 exhibited multiple plant growth-promoting traits, including IAA production (22.67µgmL-1), nitrogenase activity (31.68µgmL-1), and phosphorus solubilization (41.4µgmL-1) showing significant decrease in pH (from 7 to 4.74) due to the production of oxalic acid, malic acid and gluconic acid. It also demonstrated metabolic diversity, antibiotic resistance, and antagonistic activity against Fusarium oxysporum. Inoculation with AF-56 significantly enhanced sunflower growth in hydroponic, sterilized soil, and field conditions along with yield, and oil content. Moreover, AF-56 was able to colonize sunflower roots forming a biofilm like structure; documented through yfp-labelling by confocal laser scanning microscopy as well as through immunogold labeling coupled with transmission electron microscope. This study highlights the potential of Citrobacter freundii AF-56 as a biofertilizer candidate, offering a sustainable solution to enhance sunflower yield while reducing chemical fertilizer application and mitigating pollution crises. The findings of this study contribute to the development of eco-friendly agricultural practices.

Keywords: Microbial Inoculants, N2 Fixation, Colonization potential, Sustainable Development

MORPHOLOGICAL AND DECORATIVE EVALUATION OF NEW, PROMISING GLADIOLUS VARIETIES

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ABSTRACT

The aim of the study was to established the decorative value of different gladiolus varieties under Bulgarian conditions, grown outdoors. The experiments were carried out in the Experimental Field of the Department of Horticulture at the Agricultural University-Plovdiv. The study was conducted with the gladiolus varieties Fado, Oasis and Amsterdam. The corms were planted in mid-March according to the 10 x 10 cm scheme. All agrotechnological practices for normal plant development were applied. The mass, height and diameter of the corms of the individual varieties were recorded. The phenophases of sprouting, appearance of the peduncle, beginning and end of flowering were monitored. The height and diameter of the stem, the number of leaves and the leaf area, the number of developed and undeveloped flowers, the diameter of the flower were studied. The productivity from per cut flower was recorded. It was found that the Amsterdam variety has the earliest germination, the phenophase of the beginning of flowering begins later, but it has the longest duration of flowering and forms the largest corm. The leaf area and the number of leaves, as well as the height of the stem were with the highest values in this variety. At the same time, the number of undeveloped flowers in it is the lowest, and the diameter of the flower is the largest and reaches 8 cm. It is also characterized by the highest productivity, approximately 70% more than other varieties. For the conditions of Bulgaria when growing gladiolus in open areas, the use of the Amsterdam variety is recommended.

Keywords: peduncle, flower diameter, corms, leaf area

VIABILITY AND VIGOUR OF CARROT (DAUCUS CAROTA L.) SEEDS IN DIFFERENT FERTILIZATION REGIMES

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ABSTRACT

The main goal of the present study is to establish the vital indicators and vigour of carrot seeds depending on the application of different fertilization regimes during seed production. Three levels of NPK were studied, as follows: N – 0, 50, 70, 90 kg.ha-1, P – 0, 90, 140, 190 kg.ha-1 and K – 0, 100, 150, 200 kg.ha-1, applied once and twice. The germination energy, laboratory and field germination, the growth vigor index of the seeds, as well as the beginning of the germination phases and deviations from the normal development of the seedlings were determined. The highest germination energy, laboratory and field germination were found with a once fertilization with N90P90K200, as well as with N90P90K200, N50P190K100 applied twice. Once fertilization with N50P90K100 and N90P190K200 increases the seeds vigoir, while at the other term of application this was observed with N90P90K100 and N90P90K200. It has been established that different fertilization regimes have an impact on the begining of the phases of seed germination, as well as on deviations from the normal development of seedlings.

Keywords: vigour, germination, seedlings, phases of sprouting, sprout deviation

ALLELOPATHIC POTENTIAL OF MARIGOLD EXTRACT IN THE CONTROL OF WEEDS IN TOMATO CROP

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ABSTRACT

The most common method of controlling weeds in agricultural production is chemical. However, due to the negative impact of chemical herbicides on the environment and human health, the use of allelopathy as an environmentally friendly approach to weed control is increasingly being used. Some medicinal plants such as marigold have allelopathic effects against weeds and their extracts can be used to control weeds in crops. Also, it is well known that marigold have good compatibility with tomato crops. The aim of this study was to evaluate the effect of applying marigold extract on weed control in tomato crop. The experiment was conducted during the growing season of 2024 under field conditions and was set up according to the design of a randomized block system with four replications. During the vegetable season, foliar spray with 5% water extract of marigold was applied three times. In addition to the marigold extract, weeds were once removed by hand hoeing during the season. The number of weed plants and weed species were monitored compared to the control at the and of experiment, in the phase of fully maturity. The results showed that in the treatment with applied marigold extract the average number of weed plants per replication was 5/m2 and the number of weed species in all replications was 7, while in the control treatment the number of weed plants was 8/m2 and the number of weed species was 9. The number of weed plants and weed species decreased by 37.5% and 22.2% compared to the control when marigold extract was applied. The results of this study indicate that the application of marigold extract was effective in weed control which is reflected on reducing the number of weeds, as well as the number of weed species in tomato crop. **Acknowledgment:** This work was supported by the Ministry of Science, Technological Development and Innovation Republic of Serbia under Contracts No. 451-03-136/2025-03/200010, 451-03-136/2025-03/200216, 451-03-136/2025-03/200214 and 451-03-137/2025-03/200116.

Keyworss: Tomato, Marigold extract, Allelopathy, Weed control

TOXIC EFFECTS OF BACILLUS THURINGIENSIS VAR. KURSTAKI (VAR.SEROTYPE:H-7) ON THE THIRD INSTAR LARVAE OF ARCHIPS ROSANA (LINNAEUS, 1758) (LEPIDOPTERA: TORTRICIDAE)

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ABSTRACT

The European leafroller Archips rosana (Linnaeus, 1758) (Lepidoptera: Tortricidae) is one of the most important fruit pests worldwide. The larvae feed on the curled leaves of various fruit plants and especially damage the shoots and buds. Chemical pesticides, which have been used unconsciously and excessively for many years, have caused resistance to develop in pests and have made it difficult to control pest populations in agricultural areas. In this study, we aimed to examine the effects of the bioinsecticide, whose active ingredient is Bacillus thuringiensis kurstaki (var. serotype:H-7) (BIOBIT WP 16000 µg/mg) on 3rd instar larvae of A. rosana. Bacillus thuringiensis kurstaki (Btk) is a group of bacteria used as a biological control agent against butterflies and moths. Btk is one of the most effective biological insecticides against harmful lepidopteran larvae and has very little effect on non-target species. B. thuringiensis parasporal crystal (produces Cry, Cyt and Vip during sporulation or germination) is a protein-producing spore-forming bacterium. The crystal proteins bind to specific receptors in the gut of the target insects. The activated toxins cause the gut wall to break down. The study was prepared using the standard leaf disk bioassay method under laboratory conditions. The 3rd instar larval stages of A. rosana were treated with the agriculturally recommended application concentration and diluted (1.101/2, 1.10-1, 1.10-2, 1.10-3) concentrations of Btk to determine the lethal concentration (LC10,LC50 and LC90). The LC10 concentrations of Btk were 853.241 µg/ml (207.235-1213.839), 93.566 µg/ml (29.987-173.261), 22.980 µg/ml (7.372-46.718), 17.489 µg/ml (8.122-36.874) (24, 48, 72 and 96 hours), respectively. LC50 concentrations were found to be 3088.652 µg/ml (2043.943-21806.048), 795.704 µg/ml (522.850-1275.300), 286.838 µg/ml (174,639-458.394), 77.976 µg/ml (51.403-114.608) (24, 48, 72 and 96 hours), respectively. LC90 concentrations were found to be 11180.634 µg/ml (4604.361-1715137.666), 6766.841 µg/ml (3368.560-25403.631), 3580.342 µg/ml (1864.997-9977.345), 347.663 µg/ml (236.572-727.000) (24, 48, 72 and 96 hours), respectively. The use of biological agents, such as Btk, which produce insecticidal proteins, is an alternative to traditional insecticides for controlling pest populations. The results of the study indicate that the Btk strain is a promising biological agent for the integrated pest management of A. rosana in Türkiye.

Keywords: Bacillus thuringiensis kurstaki, Archips, Tortricidae, LC50, LC90

INTEGRATED CONTROL OF THE CODLING MOTH (CARPOCAPSA POMONELLA) IN THE KORCA REGION

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ABSTRACT

Carpocapsa pomonella is the most dangerous and frequent pest of apple crops. The demange is caused by worms that feed on fruit. This pest is present and causes damage in other crops as well as pears, quince, and walnuts. In our country, it has found favorable conditions for the development of its life cycle, giving two to three generations per season. This study aims to monitor the codling moth population in Pirg, Korca during 2024. The monitoring was carried out in an apple orchard of the Starking variety with a surface area of (1,000 m2) where traps with sexual pheromones were used for both generations. The traps was placed inside the tree crown. The progress of catching codling moth butterflies for the first generation was carried out for the period 15 May - 5 June, where the maximum point was on 25 May with 8 butterflies. While the progress of capturing butterflies for the second generation was realized in the period 2 July - 9 September, and the maximum capture point was on 19 July with 9 butterflies. The results helped in the early detection of this pest and determining the optimal period for intervention with protective measures, contributing to the more sustainable management of this pest.

Keywords: Codling moth, Carpocapsa pomonella, monitoring, traps, management

MONITORING OF THE GREENHOUSE WHITEFLY (TRIALEURODES VAPORARIORUM) IN THE LUSHNJA DISTRICT

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ABSTRACT

The Whitefly is a highly polyphagous pest capable of surviving on over 250 plant species belonging to 84 different families. This pest primarily affects vegetable crops, particularly tomato, eggplant, pepper, bean, potato, and zucchini, but also ornamental plants. Adult whiteflies are typically found on the tips of the shoots and on the undersides of young leaves, where they lay their eggs. The study was conducted in 2024 in the village of Hysgjokaj, Lushnje, in a 0.1 Ha greenhouse cultivated with tomatoes, cultivar Lidia 1 & 2. Yellow sticky traps were used to monitor the pest, placed both inside the greenhouse and in its surrounding perimeter. The trap was placed at a height of 20 cm above the vegetative canopy of the plant and was adjusted accordingly as the plant increased in height. Population dynamics recorded two peaks: the first on April 30 with 102 whiteflies, and the second on May 28 with 124 whiteflies. These population peaks corresponded with rising temperatures and the emergence of new generations of the greenhouse whitefly. Furthermore, the monitoring revealed the presence and spread of Trialeurodes vaporariorum, posing a threat to vegetable crops. The implementation of integrated pest management (IPM) measures is necessary to reduce whitefly infestations and prevent further spread.

Keywords: The greenhouse whitefly, Trialeurodes vaporariorum, monitoring, maximum population density , cultivar Lidia

PHYTOREMEDIATION OF MERCURY CONTAMINATION: MECHANISMS, HYPER-ACCUMULATOR PLANTS, AND FUTURE PROSPECTS

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ABSTRACT

Mercury (Hg) contamination is a significant environmental and public health concern, recognized as one of the ten most toxic substances by the World Health Organization. Its widespread release into the environment, primarily from anthropogenic sources such as coal combustion, poses severe risks to ecosystems and human populations. As mercury persists in the environment and bioaccumulates, conventional remediation methods are often costly and ineffective. In recent years, phytoremediation, the use of plants to mitigate environmental contaminants, has emerged as a promising alternative for mercury remediation. This study explores the role of phytoremediation in addressing Hg contamination, focusing on the mechanisms by which plants absorb, translocate, and accumulate mercury. It examines the physiological and molecular processes involved in plant tolerance to high mercury concentrations, emphasizing the importance of hyper-accumulator plant species. These species exhibit specialized adaptations, including passive mechanisms that limit mercury uptake and antioxidant responses to mitigate oxidative damage. The study further explores the genetic and biochemical pathways that enable these plants to thrive in mercury-contaminated environments, highlighting the "elemental defense" hypothesis, which suggests that metal accumulation may provide a competitive advantage against herbivores and pathogens. It also discusses the factors that influence the efficiency of phytoremediation, such as soil characteristics, pH, microbial activity, and the role of chemical-assisted techniques in enhancing plant performance. Additionally, it addresses the potential environmental and economic benefits of phytoremediation, including the commercialization of post-phytoremediation biomass through techniques like phyto-mining. Finally, the article concludes by identifying future research directions, including genetic mapping for metal tolerance, improving biomass disposal methods, and integrating phytoremediation with other remediation strategies for large-scale applications. Overall, phytoremediation represents a sustainable and innovative solution for mitigating mercury pollution, with the potential for widespread implementation in environmental management. **Acknowledgment:** This work has received funding support from the European Union's Horizon Europe research and innovation program under the Marie Skłodowska Curie Grant Agreement No. 101126655, and the Scientific and Technological Research Council of Turkiye under the scope of Agreement No. 123C459.

Keywords: Mercury contamination, Phytoremediation, Hyper-accumulator plants, Metal tolerance mechanisms, Environmental remediation

EFFECT OF SOME ELICITORS ON TAXOL PRODUCTION IN HAZELNUT CELL SUSPENSION CULTURE

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ABSTRACT

Hazelnut cell suspension culture is an effective method for the production of secondary metabolites and increased productivity in biochemical and biotechnological research. This technology allows for precise control of growth conditions, reduced costs, and mass production of pharmaceutical compounds such as Taxol. The present study was conducted to investigate the effects of methyl jasmonate and H2O2 on the levels of secondary metabolites of hazelnut during hazelnut cell suspension culture. Treatments included methyl jasmonate at four concentrations of 100, 150, 250 and 350 mg/L and hydrogen peroxide at concentrations of 0.5 and 1 ml/L along with the control treatment. After the experiment, traits such as fresh weight, dry weight, total phenol and flavonoid content and taxol were determined. The results showed that the use of methyl jasmonate and H2O2 had a significant effect on the amount of metabolites studied in hazelnut cell suspension. The use of medium concentration of methyl jasmonate had a better effect on the content of total phenols and flavonoids than different concentrations of H2O2. The content of phenol (14.88 mg/g dry weight) and total flavonoids (2.65 mg/g dry weight) was observed in cell suspension samples treated with methyl jasmonate at a concentration of 250 ppm. The results also showed that the highest amount of taxol (308.79 ppm) was observed in samples treated with H2O2 at a concentration of 0.5 ml.

Keywords: Taxol, plant growth regulator, cell suspension, Corylus avellana L.

AGROECOLOGICAL PRACTICES AND FARMING SYSTEM DIVERSITY IN MOROCCAN PERI-URBAN ZONES: INSIGHTS FROM THE CASABLANCA METROPOLIS

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ABSTRACT

In Morocco, the rapid expansion of urban areas is significantly reshaping peri-urban landscapes, generating major impacts on land use, food systems, and rural livelihoods. This study investigates the diversity of farming systems and the integration of agroecological practices in the peri-urban zones of the Casablanca metropolis. Through stratified sampling and field surveys, we collected data on land tenure, production orientation, irrigation methods, and sustainability strategies. The results reveal a mosaic of farming typologies, ranging from subsistence-based mixed crop-livestock systems to specialized, market-oriented units. Key agroecological practices include crop rotation, organic fertilization through composting, and the adoption of water-saving irrigation techniques. While these strategies offer environmental and agronomic benefits, farmers continue to face structural constraints such as land fragmentation, aging infrastructure, and limited technical support or extension services. The study underscores the role of agroecological intensification as a lever for sustainable transitions in peri-urban agriculture. It also calls for supportive public policies that facilitate secure land tenure, knowledge dissemination, and the development of inclusive innovation ecosystems tailored to urbanizing regions.

Keywords: Agroecology, peri-urban agriculture, farming system diversity, land-use dynamics, sustainable intensification

IMPROVEMENT OF EMPLOYABILITY IN AGRICULTURAL COMPANIES THROUGH MENTORSHIP-BASED PRACTICAL TRAINING

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ABSTRACT

The Faculty of Agriculture at Goce Delcev University – Stip has successfully implemented a mentorship-based student practical training program in collaboration with agricultural companies. This initiative, supported by Palladium International LLC Skopje - Increasing Market Employability (IME) initiative and E4E@mk, aimed to strengthen the link between academia and agribusiness by providing practical training for students. Key activities included tailored training sessions for mentors, organization of several "Meet Your Potential Employer" events, and facilitation of practical learning experiences for the students in agricultural companies. Through active partnership between the Faculty of Agriculture and 10 agricultural companies, 14 students were sent for an internship. A total of 16 mentors from both the university and agri-companies were trained and certified for mentors in practical training of students, thus ensuring high-quality mentorship experience. Students benefited from practical learning opportunities and direct engagement with potential employers. Remarkably, some students secured full-time employment following their internships. However, challenges remain, including the need for policy reforms to institutionalize internship programs, motivation for companies to participate, and a structured approach to train future mentors in companies. This initiative highlights the necessity of embedding mentorship-based internships in agricultural higher education to bridge the skills gap between theoretical knowledge and demands of the labor market. Future efforts should focus on expanding collaboration between faculties and companies, continuous training of mentors and policy development to ensure long-term development of agriculture as sector.

Keywords: higher education, agribusiness, students, mentors, practical training

THE INTERPLAY OF MICROBIAL PROCESSES AND MANAGEMENT IN SOIL METHANE CONTROL

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ABSTRACT

Net methane flux from soil is governed by the dynamic interplay between its microbial generation (methanogenesis) by archaea in anoxic zones and its consumption (methanotrophy) by bacteria in oxic environments. The overall emission rate is modulated by key environmental variables, including soil water content, temperature, and substrate levels. This review synthesizes current literature to explore the microbial mechanisms underpinning the soil methane cycle and examines how these processes are influenced by agricultural management practices. We evaluate the efficacy of various interventions, from water and fertilizer management to the application of bacterial inoculants, in mitigating methane release from agroecosystems. A central conclusion from this synthesis is that management strategies focusing on a single factor are frequently inadequate for achieving long-term, sustainable emission reductions. Consequently, this study highlights the superior potential of integrated, site-specific systems that combine multiple approaches—such as optimized irrigation, balanced nutrient supply, and bio-interventions—to synergistically suppress methanogenesis and enhance methane oxidation. Preserving microbial diversity and understanding the complex interactions between agronomic practices are identified as crucial for strengthening the soil's capacity as a methane sink. This synthesis underscores the necessity of adopting holistic, microbiome-centered approaches for developing the next generation of greenhouse gas mitigation solutions in agriculture.

Keywords: Methane Emissions, Soil Microbial Diversity, Methanogenic Archaea, Methanotrophic Bacteria

DETECTION OF CYT2 GENE IN BACILLUS THURINGIENSIS ISOLATES WITH ACTIVITY AGAINST WIREWORMS

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ABSTRACT

In the pursuit of biologically acceptable solutions for controlling pests that attack economically important crops and cause significant yield losses, it is essential to identify novel bacterial isolates that are both effective and environmentally sustainable. Such approaches contribute not only to pest management but also to the preservation of the environment and the advancement of sustainable agriculture. Bacillus thuringiensis (Bt) is a well-established entomopathogenic bacterium known for synthesizing a diverse range of insecticidal proteins, including Cyt toxins. These toxins become active in the insect midgut, although their precise mode of action has not yet been fully elucidated. To explore potential biocontrol strategies against wireworms (Agriotes lineatus larvae), this study aimed to detect the presence of the cyt2 gene in soil-derived Bt isolates previously shown to exhibit insecticidal activity against wireworms in in vitro assays. The working hypothesis was that the presence of the cyt2 gene may be associated with the observed larvicidal effects. Six Bt isolates were screened for the cyt2 gene using conventional PCR with specific DNA primers: cyt2gral-F (ATTACAAATTGCAAATGGTATTCC) and cyt2gral-R (TTTCAACATCCACAGTAATTTCAAATGC). PCR amplification yielded products of the expected length (355 bp), which were confirmed via agarose gel electrophoresis. Among the tested isolates, only BHC2.4—previously shown to induce over 60% mortality in A. lineatus larvae—tested positive for the cyt2 gene. These findings suggest a possible correlation between the presence of cyt2 gene and insecticidal activity against wireworms. Therefore, the cyt2 gene may serve as a useful molecular marker for the preliminary screening and selection of promising Bt isolates for further bioefficacy testing. **Funding:** This research was funded by the Ministry of Science, Technological Development and Innovations of the Republic of Serbia, contract Nos. 451-03-136/2025-03/200011, 451-03-136/2025-03/200214 and by the Science Fund of the Republic of Serbia, GRANT No. 10815, The necessity of healthy crops: Development of a multifunctional bacterial inoculant for the biological protection of cereals - BioHealCrop.

Keywords: Bacillus thuringiensis, cyt2 gene, wireworms, Agriotes lineatus, biological control, sustainable agriculture, soil bacteria, PCR screening

REDEDGE SPECTRAL SENSITIVITY FOR DISTINGUISHING VIRAL STRESS IN POTATO CROPS USING UAV-BASED MULTISPECTRAL IMAGERY

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ABSTRACT

The early detection of viral diseases in crops is critical for yield protection in precision agriculture. This study investigates the spectral behavior of the red-edge spectral region in identifying crop stress caused by viral infections in potato leaves using UAV-based multispectral data. Imagery was collected with a MicaSense RedEdge-M sensor over potato plots with confirmed viral infections. Spectral profiles of healthy and diseased leaves were analyzed to identify the wavelength regions showing the most pronounced separability. Results revealed that reflectance differences peaked within the red-edge range (around 710–730 nm), outperforming traditional red and near-infrared bands in differentiating physiological stress. Vegetation indices derived from this region, including NDRE and CI-RedEdge, were particularly effective in enhancing the visibility of subtle changes in canopy condition. This highlights the diagnostic importance of narrow-band red-edge reflectance in early-stage disease detection and supports its integration into precision agriculture workflows for crop health monitoring.

Keywords: Red-edge, spectral separability, potato virus, NDRE, CI-RedEdge, UAV, precision agriculture

IDENTIFICATION OF ISOLATED FUSARIUM WILT PATHOGENS FROM KIRKAĞAÇ MELONS

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ABSTRACT

Turkish Kırkağaç type melon is one of most grown melon in Turkiye because of its well-known taste. The Kırkağaç melon cultivars have several threats during their production including soil borne fungal diseases. Fusarium oxysporum fsp. melonis (FOM) is a soil borne fungal pathogen causing serious wilting, necrosis on plant leaves than plants deaths occurring. The aims of this study is to isolate the Fusarium wilt pathogens from infected Kırkağaç melon plants. For the isolation of Fusarium pathogens, infected Kırkağaç melon plants are collected either field or greenhouse growing areas with guided-statistical sampling method. The 100 samples collected are brought to laboratory, their infected root and stems are surfaced-sterilized and placed on Potato Dextrose Agar (PDA). Fungal colonies are sub-cultured and purified on PDA then they are identified with pathogenicity tests and light microscopy. There are four races (0, 1, 2, and 1.2) defined based on their phenotypic reactions with our melon accessions. The FOM race 1.2 is the most virulent and yield-limiting race found with causing severe wilting and deaths on infected melon plants. The other three races are less virulent than race 1.2 resulting several yellowing, necrosis and wilting on melon cultivars. The identified four races of FOM are long-term stored in cryotubes for further breeding, marker assisted selection and biotechnology studies.

Keywords: Kırkağaç Melon, Fusarium oxysporum fsp. melonis, Races

RESILIENCE OF BARLEY MANAGED UNDER CONSERVATION AGRICULTURE BY USE OF PHENOLIC AS STRESS BIO-INDICATOR IN TUNISIAN SEMI-ARID

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ABSTRACT

Conservation agriculture (CA) appears to be a resilient practice to climate change that mitigates yield losses due to rainfall variability and temperature rises that characterized the semi-arid climate last decades. Two barley varieties ('Ardhaoui', and 'Manel') were grown under CA vs. conventional agriculture (Co) with two sowing dates (normal and late) and two water regimes (rainfed and irrigated) to test its resilience to thermo-hydric stress when conducted under CA. During the 2020-2021growing season, a severe water deficit occurred during grain filling. A climatic characterization of the site of the study over a 24-year period, confirmed the tendency to climate change, with temperatures have risen by 0.16°C/year over the last decade. The study demonstrated the efficiency of CA in enhancing biological and grain yields of barley by 26 and 29% respectively, suggesting a better valorization of rainfall. Although, the biennial rotation favored biomass, which under late date (heat stress) was more affected than grain yield (32% vs. 24%). Essentially under water stress conditions, the local variety 'Ardhaoui' showed better yields than the improved variety 'Manel'. In addition, stress indices revealed that CA and supplemental irrigation mitigated the effect of thermo-hydric stresses. 'Ardhaoui' was the most tolerant variety. Phenol analysis often confirmed these results, hence the relevance of using them as a water stress bioindicators. CA, in semi-arid conditions, is a resilient cropping method and should be recommended to enhance the expression of local varieties potential and mitigate the effects of thermo-hydric stresses resulting from climate change.

Keywords: Barley, Conservation Agriculture, Phenolics, Resilience, Thermo-hydric stress

NEUROTOXIC EFFECTS OF PREIMAGINAL EXPOSURE TO SPIROMESIFEN IN DROSOPHILA MELANOGASTER

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ABSTRACT

In modern agriculture, insecticides play a crucial role in managing pest populations and ensuring crop productivity. However, their use often comes at an ecological cost, as these chemicals may unintentionally affect non-target organisms, including beneficial species such as pollinators, natural enemies, and decomposers. Insecticides can interfere with fundamental biological processes such as metabolism, reproduction, development, and particularly the functioning of the nervous system, leading to potential long-term ecological imbalances. Spiromesifen is a tetronic acid derivative insecticide and acaricide primarily used to control sap-sucking pests like whiteflies and mites. Its mode of action involves inhibiting lipid biosynthesis, which compromises energy storage and utilization in insects. Although spiromesifen is often regarded as having a relatively favorable environmental profile compared to older, broad-spectrum insecticides, increasing evidence suggests that it may still pose risks to non-target arthropods. In this study, we investigated the sublethal effects of spiromesifen on a non-target model organism, Drosophila melanogaster, through a pre-imaginal exposure approach. Eggs were deposited on a nutritive medium containing spiromesifen at concentrations of 2.5 and 5 µg/g, while a control group was maintained under identical conditions without the insecticide. Upon adult emergence, we assessed the impact on two key parameters: acetylcholinesterase (AChE) activity, an essential enzyme involved in cholinergic neurotransmission, and locomotor activity, which serves as a behavioral indicator of neuromuscular health. Our findings reveal a significant inhibition of AChE activity in individuals exposed to both concentrations of spiromesifen, indicating a potential neurotoxic effect. Moreover, treated flies exhibited a dose-dependent reduction in locomotor performance, further supporting the hypothesis of nervous system impairment. These alterations, observed at early developmental stages and persisting into adulthood, suggest that even sublethal exposure to spiromesifen can have lasting physiological and behavioral consequences.

Keywords: Spiromesifen, Drosophila melanogaster, Acetylcholinesterase, Mobility

STUDY OF THE TECHNOLOGICAL CHARACTERISTICS OF THE WHITE WINE VARIETIES TAMYANKA, SLAVA AND DRUZHBA, GROWN IN THE KYUSTENDIL REGION (BULGARIA)

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ABSTRACT

The study of the technological characteristics of the white varieties Tamyanka, Slava and Druzhba in the Kyustendil region was carried out during four consecutive harvests (2021 – 2024). The climatic factors in the growing region were monitored annually for the period of the study. The grapes were harvested upon reaching optimal maturity for each variety. It was found that the sugar content in the grapes depended on the varietal specifics and the weather conditions of the year. The variety with the best sugar accumulation and the earliest grape harvest was Tamyanka. The lowest sugars and titratable acidity were found in the Druzhba variety. The classical scheme for the production of white dry wines was applied for processing and vinification of the grapes. The obtained experimental wines had a chemical composition without deviations from the normal ranges of the studied indicators. The alcohol concentration was in line with the sugar accumulation in the grapes per variety and harvest. The Tamyanka samples had the highest extract content and titratable acidity. The quantity of phenolic compounds in the wines of the studied varieties was similar. Their sensory characteristics corresponded to the varietal features. In the organoleptic analysis, the samples with the highest tasting ratings were the Tamyanka variety, followed by Slava, and the lowest rated were those of the Druzhba variety.

Keywords: Tamyanka, Slava, Druzhba, grapes, wine, chemical composition, sensory characteristics

STUDY OF THE POSSIBILITIES FOR PRODUCING WHITE WINE FROM THE MISKET VRACHANSKI AND MISKET KAYLASHKI VARIETIES, GROWN ORGANICALLY AND CONVENTIONALLY

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ABSTRACT

Over four consecutive harvests (2017-2020), the possibilities for organic cultivation of the Misket Vrachanski (susceptible) and Misket Kaylashki (resistant) varieties were studied in the region of Pleven, Central Northern Bulgaria. Two variants were set in the experimental vineyards – with conventional and with organic methods of plant protection against the diseases downy mildew (Plasmopara viticola) and powdery mildew (Oidium, tuckeri). In both varieties, the damage to the leaves and clusters from the observed diseases was higher in the organic cultivation but that did not have a negative impact on the quantity and quality of the grape harvest. Misket Vrachanski showed greater susceptibility to downy mildew and powdery mildew in both cultivation practices. In Misket Kaylashki, the damage index was minimal. No significant difference was found in the rates of the studied indicators of the chemical composition of grapes from the organic and conventional cultivation. The differences due to the varietal specifics were more significant. The Misket Kaylashki variety exhibited higher sugar accumulation rates and titratable acidity in both variants. In the Misket Vrachanski wines, the conventional samples had higher extract and titratable acids, while the organic ones contained more total phenols. In the Misket Kaylashki wines, from both investigated variants, the amount of total extract, titratable acidity and phenolic components was similar, with the sugar-free extract being higher in the conventional samples. The organoleptic qualities of the experimental wines Misket Vrachanski and Misket Kaylashki, from the organic and conventional variants, were close, therefore the differences in their tasting ratings were insignificant.

Keywords: Misket Vrachanski, Misket Kaylashki, organic and conventional cultivation, grapes, white wine, chemical composition, tasting evaluation

DIFFERENTIATION OF NEW COMMON WINTER WHEAT VARIETIES TO DIFFERENT TYPES OF ABIOTIC STRESS RELEASED IN DOBRUDZHA AGRICULTURAL INSTITUTE, BULGARIA

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ABSTRACT

The areas with cereal crops occupy the largest portion of the arable land in Bulgaria. In the recent years, serious technological solutions and mulifunctional production systems have been introduced. They are the result not only from the increasingly higher competence of the Bulgarian farmers and modernization of the agricultural machines and equipment but also from the distribution of new breeding achievements. Due to the difficult-to-predict consequences from the climatic changes, the risks of achieving efficient production are increasing and we are witnessing deteriorated environment, disturbed biodiversity, unstable yields, and variable level of quality indices. Dobrudzha Agricultural Institute is situated in the largest grain production region of Bulgaria. In the recent years, a risk factor is the durable drought during different stages of the phenological development. The aim of this investigation was to differentiate the developed common winter wheat cultivars according to different types of abiotic stress. The investigation was carried out during 2021 – 2024 and encompassed three vegetative growth seasons with different combinations of the meteorological factors allowing for good differentiation. The experiment was designed in two replications, the size of the harvest plot being 15 m2. The sowing norm was 550 germinating seeds per 1 m2. The previous crop was grain pea. At the beginning of February, nutrition with 0.06 t/ha active matter of nitrogen was done. Seventeen cultivars developed through different stages of the DAI breeding program were evaluated. The parameters duration of the period to heading from 1st January, plant height and yield and its structure were analyzed. The results were compared to the established levels for frost and drought resistance under laboratory conditions. Cultivars Indzhe, Yulita and Boil were with good tolerance to drought at the early stages, while the tolerance of cultivars Andronia and Shibil was lower. High grain yields under water deficiency during the reproductive period were obtained from Fedora, Fani and Merilin. Cultivars Pchelina, Lazarka, Merylin, Shibil, Chudomira and Zara were with a high level of frost resistance, showing adaptability to sudden variation in meteorological factors during the autumn-winter periods, provoking injury.

Keywords: Abiotic stress, Productivity, Winter wheat

APPLICATION OF ADAMS-BASHFORTH-MOULTON METHOD IN PREDICTING VEGETABLE PRODUCTION IN ALBANIA

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ABSTRACT

The aim of this research is to provide information about estimating and predicting the vegetable production in Albania until the year 2029 with the hope that the government and stakeholders can design more targeted distribution and investment strategies for more effective agricultural production planning. We have applied the Adams-Bashforth-Moulton method in Verhulst growth model. This method is a multistep method which consists of Adams-Bashforth method as predictor and Adams-Moulton method as corrector. Using vegetable production data for the period 1998-2024 obtained from the Institute of Statistics in Albania, the model was initialized using the fourth-order Runge-Kutta method to generate four initial values which were then substituted into the fourth-order Adams-Bashforth predictor equation. The Adams-Moulton method can provide a fairly accurate solution and is completed iteratively. Calculations and comparisons of predicted and actual data of vegetable production are done using Matlab and Excel software packages for the Verhulst growth model and numerical method in the study. The simulation results show that every year the amount of production increases and for the period 1998-2024 using both Verhulst model and numerical method we have coefficient of determination=0.98 and correlation coefficient=0.99. These results show that Verhulst model and Adams-Bashforth-Moulton method can be used to describe and predict the vegetable production in Albania. This research can serve as a foundation for more effective agricultural production planning and supply chain optimization in Albania.

Keywords: Adams-Bashforth-Moulton-method, Vegetable production, Fourth-order Runge-Kutta method, Numerical method, Verhulst model.

BIOLOGICAL EFFICACY OF THE CLIC PRO HERBICIDE IN GRAPEVINE NURSERY

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ABSTRACT

The experimental work was carried out during the period 2021 – 2024 at the Institute of Viticulture and Enology, Pleven (43.42°N 24.62°E and 140 m altitude). Treatment with the Click Pro herbicide (50 g/l mesotrione + 326 g/l terbuthylazine) at doses of 0.180; 0.230 l/da and 0.250 l/da was performed immediately after the cuttings were pricked into the nursery. The species composition and density of weeds (pcs/m2) were recorded using the quantitative method in dynamics. The structure of the weed association defined it as typically row. Late spring weeds predominated (Amaranthus blitoides L., Portulaca oleracea L., Solanum nigrum L., Xantium strumarium L., etc.). The perennials were represented by three species – Convolvulus arvensis L., Cynodon dactylon (L.) Pers., Sorghum halepense (L.) Pers. Irrespective of the dose, Click Pro exhibited high efficacy against annual species common in the grapevine nursery and successfully controlled their density in the treated plots.

Keywords: weeds, grapevine nursery ,herbicide, efficacy

COMPENSATING FOR NEGATIVE HERBICIDAL EFFECTS IN GRAPEVINE NURSERY THROUGH BIOSTIMULANTS

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ABSTRACT

To assess the opportunities for overcoming growth depression caused by the phytotoxic response to some herbicides in grapevine nursery, the products Panamin suspension and Panatop alga max were tested. Cuttings of the Plevenski Favorit variety, grafted onto the Berlandieri x Riparia selection Oppenheim 4 (SO4) rootstock, were used. The Click Pro herbicide (50 g/l mesotrione + 326 g/l terbuthylazine) was applied once in the soil, immediately after the cuttings were pricked into the beds. The treatment was carried out at a dose of 0.230 l/da, leading to a well-marked growth depression. Thirty, forty, fifty and sixty days later, the cuttings were sprayed with Panamin suspension (doses of 0.2 and 0.3 l/da) and Panatop alga max (dose of 0.15 l/da). Monitoring the dynamics of the shoot growth confirmed the compensatory effect of both biostimulants, with Panatop alga max being significantly stronger. The positive effect of the application of Panamin suspension (dose of 0.3 l/da) and Panatop alga max was well outlined in the yield of standard rooted vines and the increase in the diameter of their shoots.

Keywords: grapevine, planting material, herbicides, phytotoxicity, biostimulants

RESPONSE OF INTERSPECIFIC SUNFLOWER FORMS TO PEG-MEDIATED WATER STRESS

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ABSTRACT

The response of five sunflower genotypes with different origins to drought stress at the germination and seedling stages was investigated using polyethylene glycol (PEG 6000) as a drought simulator under laboratory conditions. Normal treatment and two levels of osmotic stress were monitored. Germination percentage, root length, shoot length, root to shoot length ratio, and depression were determined for the studied genotypes, represented by three replications to evaluate the response of sunflower variety Favorit, cultivated hybrid Baikal, two interspecific hybrids and accession GT-E-006 of H. argophyllus under normal and simulated drought stress treatments. Plant height for all studied hybrids decreased with increasing water stress. Studied interspecific hybrids showed similar responses at osmotic potentials of both-0.6 MPa (10% PEG) and -1.62 MPa (20% PEG). They performed better and were classified as drought tolerant. The cultivated sunflower hybrid Baikal showed medium tolerance and variety Favorit was sensitive. The variation among studied genotypes was found to be a reliable indicator to screen the drought tolerant genotypes at primary growth stage.

Keywords: interspecific hybrid, Helianthus argophyllus, PEG

ASCOCHYTA BLIGHT IN LENTIL PRODUCTION: HISTORICAL ORIGINS, BIOLOGY OF Ascochyta lentis, ECONOMIC IMPACTS, AND MANAGEMENT STRATEGIES

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ABSTRACT

Agricultural production began approximately 10,000–12,000 years ago in the Fertile Crescent—covering modern-day Iraq, Syria, Lebanon, Israel, Kuwait, Jordan, western Iran, and Turkey's Southeastern Anatolia Region. Early agricultural activities started with a few essential crops known as "Founder Crops," including wheat, barley, lentil, pea, chickpea, and bitter vetch, which were domesticated in the early phases of cultivation. Globally, legumes are the second most cultivated crop group after cereals. According to FAO (2023), global lentil production is around 7 million tons, while Turkey produced approximately 474,000 tons in the same year. Biotic and abiotic factors significantly affect crop diversity, yield, and quality. Among biotic factors, plant pathogens are major contributors to yield losses. Ascochyta blight, caused by Ascochyta lentis (teleomorph: Didymella lentis), is a serious disease affecting lentil (Lens culinaris Medik.) cultivation. First reported in Canada in 1978, it causes major yield losses, particularly under cool and humid conditions that favor pathogen development. This airborne disease spreads through rain and wind and infects above-ground organs such as leaves, stems, and pods, leading to reduced photosynthesis, defoliation, pod drop, and stem breakage. Yield losses due to Ascochyta spp. may reach 50–100%, depending on infection severity and varietal susceptibility. To ensure sustainable lentil production, effective management strategies are essential. Key methods include cultural practices, chemical control, resistant varieties, early warning systems, and integrated disease management. Crop rotation and burying infected residues reduce inoculum levels, while optimal sowing density, spacing, and timing help lower disease risk by minimizing humidity around plants. Fungicide application, especially during flowering, remains crucial; however, overuse may lead to resistance. Therefore, correct selection, timing, and dosage are essential. Using resistant cultivars is a cost-effective and sustainable method, though pathogen variability necessitates continuous breeding efforts. Early warning systems based on temperature (>15°C) and leaf wetness duration (>12 hours) can predict outbreaks with 90% accuracy. Integrated approaches combining cultural practices, resistant cultivars, biological control, and early warnings can reduce fungicide use by up to 40% while preserving yield. Moreover, CRISPR/Cas9 offers promising advances for gene editing and rapid breeding, potentially revolutionizing disease resistance strategies. In conclusion, due to its severe impact on yield, managing Ascochyta blight requires integrated approaches rather than relying on a single method. Combining cultural, chemical, and genetic resistance strategies is vital for sustainable lentil production.

Keywords: Ascochyta blight, integrated disease management, lentil diseases, plant pathogen, sustainable agriculture

MICRONUTRIENT CONTENT OF AGRICULTURAL SOILS IN ISTANBUL PROVINCE

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ABSTRACT

This study was conducted to determine the microelement content of agricultural areas in Istanbul Province. Surface soil sampling (0-20 cm) was carried out from agricultural areas according to a 2.5 × 2.5 km grid system, and a total of 196 samples were collected. Distribution maps for microelement (iron, copper, zinc, manganese, boron) content were created using Geographic Information Systems (GIS). According to the analysis results, 10% of the soils in Istanbul Province are classified as low, 7% as medium, and 83% as very high in terms of extractable iron content. In terms of extractable copper content, 59% are classified as medium and 41% as high. When classified according to extractable zinc content, 35% is low, 51% is medium, and 14% is high. When classified according to extractable manganese content, 100% of Istanbul Province soils fall into the high category in terms of manganese content. When classified according to extractable boron content, 2% of the soils fall into the very low category, 63% into the medium category, and 2% into the very high category. In these areas, where production has been carried out for many years using the same crop rotation system, attention should be paid to the micro-nutrient element contents when establishing fertilisation programmes to ensure the sustainability of the soils.

Keywords: Istanbul, agricultural soils, micronutrient, GIS

ADDED VALUE OF CEREALS FOR HUMAN NUTRITION

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ABSTRACT

Cereals are an important part of human nutrition due to their content of macronutrients, such as starch, protein, and lipids. However, the content of micronutrients in these primary food raw materials of plant origin is also important, including substances with antioxidant effects, vitamins, and mineral elements. Due to the lifestyle of the human population, the development and use of so-called functional foods is gaining increasing popularity. These are foods that provide the consumer not only with a source of energy and nutrients, but also with health benefits. Cereals with a certain added value are very suitable material for designing functional foods. These can be oat grains with a modified composition of polysaccharides or fatty acids, which were obtained by classical breeding. They are also wheat with an unconventional grain color due to the presence of anthocyanins and the like. Added value of cereals can also be obtained by sprouting the grain.

Keywords: cereals, nutrition, functional foods, germination

ACKNOWLEDGEMENT: The Slovak Research and Development Agency supported this research under contract no. APVV-23-0375.

HORTICULTURAL PRACTICES IN POT CULTIVATION OF RHODODENDRON SPECIES: A CASE FROM TURKEY

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ABSTRACT

Rhododendron species, known for their striking flowers and foliage, are widely cultivated in temperate climates and are valued for their ornamental appeal. Pot cultivation of shrub- or tree-form Rhododendrons offers significant advantages for urban ornamental horticulture, particularly in limited spaces. Despite their aesthetic qualities, successful pot cultivation of Rhododendron species requires careful management due to their preference for acidic soil conditions and sensitivity to environmental stressors. In recent years, pot cultivation of Rhododendrons has gained popularity in Europe, as well as in parts of Asia and North America. However, there is currently no established commercial production in Turkey. This study examines selected horticultural practices related to the pot cultivation of Rhododendron species naturally occurring in Turkey, with a focus on propagation, microbial biostimulant application, and the use of pruning and growth regulators. Additionally, the study highlights the commercial potential of Rhododendrons and their suitability for balcony, terrace, and municipal landscape applications. Recommendations are also provided for future research and commercialization strategies.

Keywords: Woody ornamental plants, Adaptation, Propagation, PGRs, Microbial inoculants

EFFECTS OF CHEMICAL AND ORGANOMINERAL FERTILIZERS ON MORPHOLOGICAL CHARACTERISTICS AND YIELD

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ABSTRACT

Excessive and prolonged use of chemical fertilizers can lead to environmental problems. Organomineral fertilizers contain plant nutrients found in chemical fertilizers and organic matter from humic-fulvic and compost sources. The organic substances in organomineral fertilizers have significant physical, chemical, and biological benefits for the sustainability of soil fertility. The research was carried out in the experimental areas of Eskişehir Osmangazi University Faculty of Agriculture in 2022 and 2024. The aim of the study is to investigate the effects of using different doses of organomineral fertilizers and chemical fertilizers on the morphological characters and yield of beans. The experimental design was randomized complete block design with four replications. In the research, 15-15-15 chemical fertilizer and 12-12-12 organomineral fertilizer were applied at 0, 3, 6, 9, and 12 kg da^{-1} doses. The highest plant height was obtained from 12 kg da^{-1} chemical fertilizer plots. The highest number of branches was obtained from 9 kg da^{-1} organomineral fertilizer plots, and 12 kg da-1 chemical fertilizer plots were included in the same statistical group. 12 kg da-1 organomineral fertilizer showed the best results for yield. When yield is considered; soils are poor in terms of organic matter in Türkiye. Organomineral fertilizers containing organic matter can be an alternative to chemical fertilizers. Expanding the use of organomineral fertilizers will also provide benefits for sustainable agriculture by ensuring the protection of soils.

Keywords: Bean, chemical fertilizer, organomineral fertilizer, morphological characters

EFFECT OF FARMING SYSTEMS ON THE QUALITY OF TRITORDEUM UNDER SLOVAK CONDITIONS

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ABSTRACT

Tritordeum (× Tritordeum martini A. Pujadas) is a hexaploid cereal developed through hybridization between wild barley and durum wheat. The aim of this study was to evaluate the impact of organic and conventional farming systems on the plant health, yield performance, and grain quality of various tritordeum genotypes under Slovak conditions. During the 2023/2024 growing season, seven tritordeum genotypes (Aucan, Bulel, Coique, HT2003, HT2008, HT2009, HT2202) and a control winter wheat variety (PS Dobromila) were tested at the Borovce locality. In the organic system, tritordeum stands were sparser and shorter, with plant heights ranging from 54.6 cm (Aucan) to 70.0 cm (Bulel), compared to 71.1–91.0 cm in the conventional system. Lodging occurred only in the conventional system, especially in genotypes Bulel and HT-2003. Grain yields in the organic system ranged from 0.99 to 2.27 t/ha (compared to 5.98 t/ha for wheat), and from 2.76 to 4.92 t/ha in the conventional system (wheat: 6.45 t/ha). Organic plots were significantly affected by common vole (Microtus arvalis) damage, contributing to yield reduction. Genotype HT-2003 showed the best plant health in both systems, whereas HT-2202 was the most susceptible to diseases, with strong powdery mildew (score 8) and glume blotch (score 9) infection in the conventional system. Coique achieved the highest grain quality regardless of the farming system. Thousand kernel weight and test weight were higher in the organic system. Test weight in conventional plots ranged from 62.8 kg/hl (HT-2008) to 68.1 kg/hl (Bulel), while in organic plots it ranged from 72.3 kg/hl (HT-2009) to 79.2 kg/hl (Aucan). Protein content and wet gluten content were generally higher in the conventional system; however, most tritordeum genotypes outperformed wheat even in organic conditions. For example, protein content in HT-2003 reached 13.9% in conventional plots compared to 15.1% in wheat. Although tritordeum flours had lower baking strength than wheat, they contained higher amounts of dietary fiber, lipids, and protein, and less starch. Despite lower loaf volumes, tritordeum-based bakery products were rated highly in sensory evaluation—especially in terms of crumb structure, color, and taste. These findings suggest that tritordeum has promising potential as a nutritionally rich alternative cereal crop, suitable for both organic and conventional farming systems, even though its yields under Slovak conditions are approximately half of those achieved with wheat. The Slovak Research and Development Agency supported this research under contract no. APVV-23-0375.

Keywords: tritordeum, yield, farming systems, quality, nutrition

REASONS FOR THE UNDERDEVELOPMENT OF CANOLA IN TÜRKİYE

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ABSTRACT

Rapeseed (Brassica napus L.), a member of the Brassicaceae family, is a strategic oilseed crop with a high oil content (35-50%) and low saturated fat content. Globally, rapeseed is considered one of the primary raw materials for biodiesel production. In addition, it contributes significantly to agricultural ecosystems as animal feed, a forage plant for bees, and a crop used in rotation systems. Despite Türkiye's favourable climate and soil conditions for rapeseed cultivation, its production has not reached the desired levels. Currently, approximately 50% of Türkiye's vegetable oil deficit is met through imports, highlighting the urgency of expanding rapeseed production as it has the potential to help close this gap. In the past, the cultivation of rapeseed was prohibited due to its high erucic acid and glucosinolate content, which led to a persistent negative perception among farmers. Although double-zero (canola) varieties have since been developed, this negative perception remains. In irrigated areas, alternative crops tend to offer higher returns, whereas in rainfed areas, farmers' adherence to traditional practices reduces rapeseed preference. Moreover, insufficient support premiums and rising raw material costs have diminished the economic appeal of biodiesel. The lack of purchase guarantees, insufficient contract farming practices, and challenges in storage further exacerbate marketing problems. Farmers' lack of knowledge about rapeseed and loyalty to conventional crops hinder the adoption of this alternative crop. Technical challenges such as bird damage, non-uniform ripening at harvest, and the additional cost associated with the use of hybrid seeds also limit production. These issues prevent rapeseed from fully realizing its potential in Türkiye's agricultural sector.

Keywords: Rapeseed, Canola, Agricultural ecosystems, Biodiesel, Erucic acid, Alternative crops

ANTI-NUTRITIONAL SUBSTANCES CONTAINED IN RAPESEED

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ABSTRACT

Rapeseed (Brassica napus L.) is a significant oilseed crop due to its high oil content (33–50%) and low saturated fat levels. It is widely used in biodiesel production, the food industry, and animal feed, but must be handled carefully because of its content of anti-nutritional compounds. Historically, rapeseed oil was used for lighting, soap production, and machinery lubrication. However, due to the health risks associated with compounds such as erucic acid and glucosinolates, its cultivation and use were temporarily banned in Türkiye in the 1980s. The development of double-zero (low erucic acid and low glucosinolate) varieties led to the lifting of the ban, and these varieties - commonly referred to as "canola"- became suitable for food production. Erucic acid, when consumed in high quantities, can lead to serious health issues including accumulation in cardiac muscle, myocardial lipidosis, anemia, constipation, vision impairment, and an increased risk of lung cancer. Glucosinolates, sulfur- and nitrogen-containing metabolites, play a role in plant defense however it can cause thyroid, liver and kidney problems in animals if present in high amounts in the rapeseed meal. Phytate (phytic acid), the storage form of phosphorus, reduces mineral absorption in non-ruminant animals and may lead to nutritional deficiencies. Nitrate accumulation, which increases with excessive nitrogen fertilization, is associated with health risks in humans such as cancer, dementia, and goiter. Although rapeseed is a strategic crop with low input costs and rotation advantages, the management of its antinutrients factor is critical in production and consumption.

Keywords: Rapeseed, Anti-nutritional, Erucid acid, Glucosinolate, Phytate, Nitrate

CHARACTERIZATION AND DIFFERENTIATION OF FEMALE SUNFLOWER LINES THROUGH CHANGE OF THE NDVI INDEX

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ABSTRACT

The requirements of the market, the high frequency and intensity of the limiting factors under environment of changeable climate impose the necessity to make flexible decisions developing adaptable varieties and hybrid crops. The introduction of digital technologies in agriculture allows generating an extensive database, which provides higher efficiency and contributes to preservation of the natural resources. Dobrudzha Agricultural Institute is the only sunflower breeding center in Bulgaria. Research work is focused on the use of heterosis by developing, studying and stabilizing self-pollinated lines, testing of experimental hybrids, and production of seeds from parental components of registered hybrids. Their successful realization depends primarily on the efficiency in the breeding of the parental components. The aim of this study was to characterize and differentiate female sunflower lines through a change in the normalized difference vegetation index (NDVI). The variation in the meteorological conditions over the years of the investigation was specific. The onset of the respective phenological stages is directly related to a combination of meteorological factors. The earliest dates of flowering onset were in the stressful year 2024 (45 days on the average). One of the most important economic characteristics and a key moment for the hybrid seed production is the duration of the time from beginning to end of flowering, which can vary from 12 to 22 days. The earliest maturing line was 1017A (109 days), while the rest of the lines reached maturity within 115 – 116 days. With the exception of the head diameter, where the genotypic differences were more expressed, the effect of the year conditions was significant, but at different statistical levels. Lowest was the differentiation according to oil content in seed. The followed dynamics of the change of the normalized difference vegetation index over phenological phases revealed variation within 0.22 – 0.85. The peak was at budding stage, but the differences over years were significant at different levels. The established correlations allowed for indirect assessment of the physiological status of the lines, which is a prerequisite for higher efficiency of the breeding process. The results were specific and the optimization of the activities requires final agronomic observations on the combined effect of the types of stress. Mother line 3607A was with the highest mean productivity and a stable level of oil content in seed.

Keywords: sunflower breeding, Normalized Difference Vegetation Index (NDVI), physiological status.

THE SPONTANEOUS FLORA OF CITRUS ORCHARDS IN THE BOUNAMOUSSA PLAIN (EL TARF, NORTHEASTERN ALGERIA)

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ABSTRACT

The study conducted in the Bounamoussa plain of El Tarf Province (northeastern Algeria) on the inventory of weeds in citrus orchards was carried out during a cropping campaign from February to June 2025 through a systematic-subjective sampling which affected 6 investigation sites. After identification, the floristic richness amounts to 72 species divided into 8 monocotyledonous species belonging to the Poaceae family and 64 dicotyledonous species belonging to 25 families, the most abundant of which are Asteraceae, Fabaceae, Brassicaceae and Apiaceae. The dominant vegetative type is that of Annuals with 46 species; the dominant biological type is that of Therophytes with 50 species on the other hand the dominant chorological type is that of the Mediterranean element. The assessment of the harmfulness of orchard weeds by the partial harmfulness index (PHI) with a relative frequency greater than or equal to 10% revealed two highly harmful weeds considered to be moderately abundant with a wide ecological range: Oxalis pes-caprae L. and Ecballium elaterium (L.) A. Rich.

Keywords: Weeds, citrus orchards, Bounamoussa plains, El Tarf, Algeria.

EVALUATION OF DROUGHT AND HERBICIDE STRESS IN GLYPHOSATE-RESISTANT AND SENSITIVE HORSEWEED (ERIGERON CANADENSIS L.) BIOTYPES USING NORMALIZED DIFFERENCE VEGETATION INDEX

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ABSTRACT

Weeds are among the most significant biological agents in many agricultural systems, adversely affecting both crop yield and quality. Although chemical weed management is widely recommended as a component of integrated weed management strategies, its improper use can lead to serious side effects, such as herbicide drift. Total herbicides applied in orchards or non-agricultural fields to control weeds may move from the applied fields to adjacent agricultural fields, sometimes the fields that were grown with medicinal and aromatic crops such as fennel (*Foeniculum vulgare* Mill.). This study aimed to assess the adverse effects of sub-lethal doses (12.5%, 6.25%, 3.125%, and 1% of the recommended rates) of glyphosate isopropylamine salt (1440 g a.i. ha^{-1}) and flazasulfuron (50 g a.i. ha^{-1}) on fennel under controlled climate room conditions. Herbicides were applied to fennel seedlings at the 4-true-leaf stage and maintained in a climate room with a 16 h/8 h photoperiod and day/night temperatures of 24/20 °C. Plant responses were evaluated 21 days after treatment. Glyphosate caused a 9.12–53.2% reduction in fennel growth, while flazasulfuron resulted in up to a 62.67% decrease in dry biomass, depending on the dose.

Keywords: Glyphosate, flazasulfuron, fennel, *Foeniculum vulgare*, drift

SMART MATURITY MONITORING IN OLIVE ORCHARDS: USING VIS/NIR TOOLS FOR OPTIMAL HARVEST INTERVAL. CASE STUDY IN ALBANIA

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ABSTRACT

Determining olive harvest maturity is essential for optimizing yield quality and enhancing economic returns, particularly for cultivars designated for extra-virgin olive oil production. This study presents an integration of non-destructive methods into standard maturity assessment protocols, signifying a substantial advancement for agricultural producers and oil processors. This research specifically examines the Albanian olive cultivar 'Kalinjot' and the well-known Italian Leccino. It evaluates the effectiveness and practical implications of non-destructive technologies, namely the Color Index (CI) and the Index of Absorbance Difference (IAD), using Vis/NIR devices (DA-Meter[X] and Kiwi-Meter[X]). These methodologies facilitate rapid, in situ evaluations of fruit ripeness without inflicting tissue damage, thereby offering a reliable and cost-effective framework for continuous monitoring throughout the ripening process. Statistical analyses indicate strong correlations between the non-destructive indicators (IAD, CI) and critical oil quality metrics, including oil content and polyphenol concentration. The results empower producers to identify the optimal harvest window, particularly during mid to late October for 'Kalinjot' cultivar and two weeks earlier for Leccino, thus mitigating the resource demands associated with laboratory-based destructive analyses. For olive oil processors, these advancements contribute to better planning of harvest and milling workflows, reducing the over-ripening risk and improving consistency in product quality and classification. The adoption of non-destructive methodologies represents a significant evolution toward precision agriculture within olive cultivation, enhancing traceability, sustainability, and competitive positioning in the olive oil sector.

Keywords: Keywords: non-destructive methods, olive ripeness, harvest timing, IAD, olive oil quality.

PHYSIOLOGICAL EFFECTS OF LOW AND HIGH TEMPERATURE STRESS ON CORN WITH MYCORRHIZAL SYMBIOSIS

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ABSTRACT

In recent years, various methods have been investigated to counteract the negative effects of global climate change that limit corn cultivation. A number of studies have demonstrated the beneficial impacts of mycorrhizal inoculation on the resilience of corn plants when confronted with high or low temperatures. This study examined the alterations in chlorophyll content, leaf water content, turgor loss, membrane durability index, and leaf protein content of corn plants treated with mycorrhiza under low and high temperature stress. The study variants consisted of applications of five different mycorrhizae (M0, M1, M2, M3, and M4), seven temperatures (5°C, 10°C, 15°C, 25°C, 35°C, 40°C, and 45°C), and one corn variety (PL472) with three replications. The chlorophyll content, leaf water content, turgor, and protein content of maize plants without mycorrhiza (M0) and those treated with different mycorrhiza types decreased under stress. Membrane integrity remained at similar levels across all treatments, indicating minimal membrane damage in the plants. The results of study indicated that the application of mycorrhizae contributed to the preservation of plant parameters such as chlorophyll content, water content, and turgor.

Keywords: chlorophyll content; water content; leaf protein content; membrane durability

LINES OF SUNFLOWER, WITH IMPROVED BIOCHEMICAL PROFILE, OBTAINED AS A RESULT OF INTERSPECIFIC HYBRIDIZATION BETWEEN CULTIVATED SUNFLOWER (HELIANTHUS ANNUUS L.) AND PERENNIAL SPECIES (HELIANTHUS GIGANTEUS GT-– M-030) VIA EMBRYOCULTIVATION

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ABSTRACT

Interspecific hybridization was done between cultivated sunflower H. annuus L. and the perennial species H. giganteus, accession M-030. The embryocultivation method was used for successful performance of the crosses. Crosses were realized between this species and sterile line HA-300. Different morphological characters were investigated. As a result of self-pollination and selection, hybrid materials in both F1 and F2 were obtained, and in advanced generations as well. Morphological, phenological and biochemical studies were carried out. Biochemical and phytopathological studies have been conducted. Some of the progenies have a higher oil and protein content in the seeds and a diverse fatty acid and amino acid composition of the oil and protein contained in the seeds. The protein in the new lines produced exceeding parental forms with 2.4% to 9.4%. There is also an increase in some essential amino acids - lysine, valine, cysteine, and methionine. The selected lines are midle sensitive to phoma and phomopsis. The resistance to downy mildew varies from 67% to 75%, but they do not carry any resistance to the pathogen of the broomrape.

Keywords: sunflower, Helianthus annuus, Helianthus giganteus, desease resistance, embryoculture, protein, amino acids

ORGANIC OILSEED RAPE CULTIVATION - PROBLEMS AND SOLUTIONS IN PROTECTION

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ABSTRACT

The organic cultivation of oilseed rape (Brassica napus L.) presents unique crop protection challenges due to the ban on synthetic pesticides and fertilisers. Field experiments were carried out where plant health was assessed and the main pest and disease problems of winter oilseed rape were identified. Biological seed dresing was made before sowing, two cultivars were used. During cultivation the focus was on observations of the pest beetles - Phyllotreta spp., Meligethes aeneus, cabbage stem weevil and cabbage seed weevil, also cabbage leaf midge (Dasineura napi). The incidence of the main pathogens on stem and pods - Leptosphaeria maculans, Sclerotinia sclerotiorum, Alternaria brassicae - was evaluated in relation to application of biological plant protection products. Yield and plant health and development were assessed in relation to different strategies tested.

Keywords: insect pests, diseases, Bacillus subtilis, Beaveria bassiana, spinosad, yield

CORRELATION DEPENDENCIES OF STRUCTURAL ELEMENTS OF NEW SUNFLOWER HYBRIDS

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ABSTRACT

When creating new oilseed sunflower hybrids with good indicators, high productivity, it is necessary to study the relationships between the individual traits, when selecting the parental lines. The study was conducted in an experimental plot in 2021-2023 at the Dobrudzha Agricultural Institute - General Toshevo on a leached chernozem soil type with sixteen experimental oilseed sunflower hybrids. The hybrid combinations included in the study were obtained by crossing four selected maternal sterile lines: 217A, 813A, 2008A, 2003A with four paternal lines restoring fertility - 88R, 89R, 97R, 138R. The aim of the present study is to establish the relationships between the individual traits related to seed yield. During the study period, the following phenophases were recorded in the parental lines and sunflower hybrids: (emergence, budding, flowering period, technical maturity). The influence of the period of the individual phenophases on the studied indicators was also studied. Through correlation analysis of the studied indicators in the hybrid combinations, a positive correlation dependence was obtained between seed yield and some of its structural elements (number of seeds per plant, mass of 1000 seeds, plant height, leaf area, number of leaves). A direct positive effect was found between the number of seeds per plant and the mass of 1000 seeds (r=0.891), seed yield and % oil (r=0.521). An unproven negative correlation was obtained between % oil and the mass of 1000 seeds (r=-0.621). The established positive correlation values of the duration of the individual phenophases between the individual traits can serve in the selection process when creating genotypes with appropriate quality and characteristics. The study found that the period of the individual phenophases significantly affects the individual traits.An important direction in the breeding of oilseed sunflower around the world is the pollination of parental lines and obtaining stable hybrids with good genetic potential for yield, with a balanced plant architecture, which in turn guarantees the better ability of the hybrids to adapt to the specific conditions of the region in which they are grown. When creating a diverse starting material in the sunflower breeding program, it is necessary to study the elements related to phenotypic manifestations and components related to yield. With the help of correlation analysis, the study aims to establish the relationships between the individual quantitative indicators characterizing the plant, as they change to varying degrees under the influence of the environment. With the help of correlation analysis, the relationship between the period of the individual phenophases with the studied quantitative and qualitative indicators in parental lines and hybrid combinations was established and assessed.

Keywords: experimental hybrids, productivity, parental lines, correlation

EVALUATION OF SUGAR, ORGANIC ACID, AND AROMA PROFILE IN BITTER MELON (MOMORDICA CHARANTIA L.)

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ABSTRACT

Medicinal plants have played an important role in the treatment of diseases for thousands of years and continue to be a fundamental resource for the pharmaceutical industry today. Secondary metabolites synthesized by plants, such as alkaloids, tannins, flavonoids, and phenolic compounds, are known for their therapeutic effects and are widely used in traditional medicine. In particular, traditional medical systems in countries such as China, India, Japan, and Thailand are largely based on these plants. In this context, bitter melon (Momordica charantia L.) of the Cucurbitaceae family stands out not only for its medicinal properties but also for its use as an ornamental plant. With its climbing habit, lobed leaves, and bright yellow flowers blooming throughout the summer, it is valued as a decorative plant in landscape design. This species is an annual climber that grows in tropical and subtropical regions and is notable for its rich content of vitamins (C, A, B complex), minerals (iron, calcium, phosphorus, potassium, zinc, magnesium), and β-carotene. In this study, the biochemical components and volatile organic compounds (VOCs) of bitter melon fruits grown under the ecological conditions of Adana were determined. The analyses included sugars, organic acids, total phenolic compounds, antioxidant capacity (DPPH) and the volatile compound profile using GC-MS. Glucose (367.53 mg/100 g FW) and fructose (229.43 mg/100 g FW) were identified as the dominant sugars, while succinic acid (221.43 mg/100 g FW) and citric acid (55.78 mg/100 g FW) were the predominant organic acids. The ascorbic acid content was 10.50 mg/100 g FW, total phenolic content was 47.54 mg GAE/100 g FW, and antioxidant capacity was measured as 24.09% DPPH inhibition. Volatile compound analysis revealed that esters (48.18%), alcohols (34.59%), and aldehydes (4.43%) were the most abundant groups. Among the most prominent compounds were ethyl acetate (23.91%), ethanol (11.80%), 5-(hydroxymethyl)-2-furfural (3.39%), benzeneethanol (9.01%), and 2,3-dihydro-3,5-dihydroxy-6-methyl-4H-pyran-4-one (5.36%). These compounds contribute to the characteristic aroma and potential biological activities of the fruit. In conclusion, studies have shown that Momordica charantia possesses antidiabetic, anticancer, antioxidant, and antimicrobial properties. Its fruits, leaves, and seeds are traditionally used in medicine due to active compounds such as charantin, polypeptide-p (a plant insulin-like compound), and steroidal saponins. Furthermore, bitter melon is also regarded as a dual-purpose plant, serving as an ornamental climber in landscape designs: it can be cultivated in pots on balconies or on trellises and arbors in gardens, offering both medicinal and aesthetic value. Under Adana's ecological conditions, bitter melon fruit exhibits a rich biochemical and volatile profile, making it a promising candidate as a functional food, natural aroma source, and ornamental plant with pharmacological and landscape significance.

Keywords: Functional food, GC-MS, Organic acids, Ornamental plant, Sugars, Volatile compounds

THYME SPECIES ARE POTENT GROUND COVERING LANDSCAPING PLANTS

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ABSTRACT

This study examines drought tolerance and ornamental potential of 4 native thyme (Thymus kotschyanus, T. fedtschenkoi, T. daenensis and T. pubescens) and 2 commonly planted (T. sepyllum and T. vulgaris) species in landscaping as ground cover plants. Drought tolerance of the species were evaluated over 3 years in a strip plot experiment. Results showed that under drought stress condition the highest peroxidase (POD), superoxide dismutase (SOD) and ascorbate peroxidase (APX) enzymes activities in leaf samples and root/shoot ratio was observed T. kotschyanus, T. daenensis, and T. vulgaris. Among the species T. sepyllum, T. kotschyanus and T. daenensis showed lower electrolyte leakage (EL) and the highest electrolyte leakage were shown in T. vulgaris (might be due to smaller leaf size). The total chlorophyll content of T. sepyllum was statistically higher than other species. Under mild drought stress the highest proline content belonged to T. kotschyanus and T. sepyllum, whereas under severe drought condition proline content of T. vulgaris and T. sepyllum were higher than other species. The lowest stress susceptibly index (SSI) with respect to chlorophyll content and shoot fresh weight were observed in T. kotschyanus and T. vulgaris, respectively. When the plant did not irrigate at all, all species survived drought stress condition except T. sepyllum, but all species lost their ornamental potential considerably. Overall, all studied thyme species showed valuable ornamental characteristic but T. kotschyanus, T. sepyllum, T. vulgaris and T. daenensis because of their good ornamental potential and with higher drought tolerance, could be used in landscaping programs.

Keywords: electrolyte leakage, landscaping, native plants, proline, visual assessment

DETERMINATION OF BIODEGREDATION POTENTIAL OF BENEFICIAL BACTERIA IN SOME PESTICIDE; IN VITRO

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ABSTRACT

In this study, the degradation of commonly used pesticide active ingredients in agricultural production Lambda-cyhalothrin, Malathion, Pyridaben, Acetamiprid, Abamectin, and Formetanate by beneficial bacteria under laboratory conditions was investigated. The bacterial isolates used in the study were Enterobacter cloacae (ZE-2), Bacillus cereus (ZE-7), Acinetobacter calcoaceticus (ZE-13), Enterobacter aerogenes (ZE-5), and Bacillus megaterium (SA-7). These isolates had been previously obtained from pepper cultivation fields and vermicompost, and were identified using various bacteriological tests and MALDI-TOF-MS analyses. In the first stage of the study, it was tested whether the selected active ingredients had any inhibitory effect on the bacterial species. Nutrient Agar (NA) medium was used in this part. The media were autoclaved at 121 °C for 20 minutes, cooled to 40 °C, and the active ingredients were added at the application doses recommended by the manufacturer. Approximately 15 ml of the prepared medium was poured into 90 mm diameter Petri dishes. As a control, media without any active ingredients were used, and bacterial inoculation was carried out on the solidified media. Bacterial suspensions prepared at a concentration of 1×10^8 cells/ml were pipetted (100 µl) onto the media and spread using sterile glass rods. After 24 hours of incubation, bacterial growth on the Petri dishes was observed. According to the results, Malathion and Acetamiprid, which did not have adverse effects on bacterial growth, were selected for the second phase of the study. In this phase, each Erlenmeyer flask containing 90 ml of Nutrient Broth was supplemented with the recommended application doses of the pesticides. Subsequently, 1 ml of bacterial suspension (1×10^8 cells/ml) was inoculated into each flask, and the cultures were incubated at room temperature in a shaker at 150 rpm for 7 days. Media containing pesticides but no bacteria served as positive controls, while media without any pesticides or bacterial inoculation served as negative controls. At the end of the incubation period, 5 ml of medium was taken from each Erlenmeyer flask and mixed with 5 ml of acetonitrile in 15 ml Falcon tubes. The tubes were centrifuged at 5000 rpm for 10 minutes, and 2 ml of the supernatant was transferred to glass vials. The extracted samples were then analyzed using an LC-MS/MS (Liquid Chromatography Tandem Mass Spectrometry) system to determine pesticide degradation. According to the analysis results, E. cloacae (ZE-2) showed promising results in the degredation of Acetamiprid. However, other bacteria were not observed to degrade the active ingredients. The study was conducted in vitro, and is thought to provide an infrastructure for future product-based studies.

Keywords: Biodegredation, Pesticide, LC-MS/MS, bacteria, in vitro

CHANGES IN SUGAR, ORGANIC ACID, AND VOLATILE COMPOUND PROFILES OF PERSIMMON (DIOSPYROS KAKI L.) FRUITS HARVESTED AT DIFFERENT MATURITY STAGES

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ABSTRACT

Persimmon (Diospyros kaki L.), originally from China and widely cultivated throughout East Asia, has recently gained popularity in several Mediterranean countries, including Türkiye. This study was conducted to determine the optimum harvest time by evaluating the biochemical and aromatic changes in persimmons at different maturity stages. The research was carried out in a commercial orchard in the Dareski hamlet of the Toroslar district, Mersin Province, focusing on the commonly grown 'Hachia' cultivar. Fruits were harvested at seven-day intervals beginning in the last week of October and analyzed at two distinct maturity stages: unripe and fully ripe. Sugar analysis revealed that glucose and fructose were the predominant sugars in both stages, with significantly higher levels in ripe fruits (8.93 and 9.16 mg/100g, respectively) compared to unripe ones (6.56 and 7.21 mg/100g). Total sugar content increased from 13,867 to 18,248 mg/100g, along with an increase in soluble solid content (SSC) from 14.45% to 19.4%. In terms of organic acids, malic acid was dominant in unripe fruits (22,43 mg/100g), whereas succinic acid significantly increased in ripe fruits (38,27 mg/100g). Citric and ascorbic acid contents also varied notably between the two stages, and titratable acidity rose from 0.86% to 1.14% during ripening. Volatile compound profiling revealed clear maturity-dependent differences. Aldehyde and acids compounds were more abundant in ripe fruits (37.76% and 44.34%), contributing to a richer and more intense aroma, while alcohols and terpenes predominated in unripe fruits (17.44% and 44.98%, respectively), with linalool, nerol, and limonene as major contributors. These findings confirm that the biochemical and aromatic profiles of persimmons are strongly influenced by the maturity stage, which has important implications for flavor development, postharvest quality, and market value. Despite increasing interest among consumers and producers, persimmon production in Türkiye is still limited due to challenges in storage and marketing. The study suggests that harvesting after the second ripening stage may improve product quality and commercial potential under the Mediterranean climate of Mersin.

Keywords: Persimmon, Maturity stage, Sugars, Organic acids, Volatile compounds.

A SUSTAINABLE APPROACH FOR THE DEVELOPMENT OF THE ALGERIAN OLIVE SECTOR

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ABSTRACT

Agriculture plays a vital role in the economic development of countries. This sector impacts the three pillars of sustainable development: the economic, social, and environmental aspects. Agriculture in less developed countries (LDC) must be recognised as a key factor and given the attention it deserves by public authorities, investors, and innovators to sustainable and environmentally friendly agricultural practices. As a result, Algerian authorities have introduced a new agricultural policy supported by modernisation programmes for the agricultural sector, including the PNDA (2000), the PNDAR (2005) and the PRAR (2009). Among the new policies, Algeria prioritises the development of its olive sector, with the aim of modernising it to improve its competitiveness and sustainability and establishing it as a key pillar of agricultural growth. This focus is based on the fact that olive cultivation and production are significant drivers of local economic development. The growing global demand for olives and olive oil, driven by their unique flavour and health benefits, highlights their strategic importance for producing countries. Around three-quarters of the world's olive trees are located in the Mediterranean basin. In fact, global statistics show that most olive oil production is concentrated in Mediterranean countries, including Spain, Portugal, Italy, Greece, Turkey, Tunisia, and Morocco, which collectively account for more than 90% of the world's output. Our work focusses on developing an understanding of the olive-growing sector worldwide, with a special emphasis on Algeria, and its role in improving the living conditions of rural populations. We will examine the current status of this sector by analysing the production and consumption of both table olives and olive oil. In addition, we will highlight the economic, social and environmental impacts associated with this activity, while proposing sustainable solutions to support and improve this crucial sector that plays a significant role in the development of Algeria’s economy.

Keywords: Olive-growing sector, Algeria, Olive oil, Sustainable development, Agriculture, Economic development.

MINT IN AQUAPONICS: OPPORTUNITIES FOR INTEGRATED PRODUCTION OF MEDICINAL PLANTS

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ABSTRACT

Sustainable agriculture is one of the key priorities of modern agricultural science, especially in the context of climate change, water resource scarcity, and the need for environmentally friendly production of food and raw materials. In this regard, aquaponics has emerged as an innovative technology that combines recirculating aquaculture with hydroponic plant cultivation in a closed-loop system. In this system, water enriched with nutrients from fish farming is used to nourish plants, which in turn purify the water and return it to the fish tank. This creates a biologically balanced environment that minimizes waste and resource consumption. Initially, aquaponic systems focused primarily on crops such as lettuce, basil, and tomatoes. However, in recent years, there has been growing interest in integrating aromatic and medicinal plants with high added value, even with relatively low yields. Among these, mint (Mentha spp.) stands out for its high adaptability, rapid growth, resilience, and broad application across various industries—from food and beverage to pharmaceuticals and cosmetics. This article aims to explore the possibilities of cultivating mint in aquaponic environments, summarizing recent research, technological aspects, and practical advantages of this approach. The focus is on the potential of mint as part of sustainable agricultural systems.

Keywords: aquaponics, Mentha, sustainable production, medicinal plants

TOWARDS NUTRITIONALLY ENHANCED MAIZE: A MOLECULAR APPROACH

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ABSTRACT

Increasing the nutritional value of maize represents an important goal in the field of genetics and plant breeding, with a direct impact on food security and public health. In order to improve maize quality, we evaluated genotypes of maize at the level of three important loci: opaque2 (o2), lycopene ε-cyclase (lcyE) and crtRB. Three SSR markers were used to confirm that the opaque-2 (o2) allele was present in various genotypes of maize: analysis using marker phi057 showed that 11 of the genotypes were homozygous (o2o2) and 23 were heterozygous (O2o2); marker umc1066 revealed that 27 of the genotypes had QPM-type genotypes; only one QPM-specific polymorphism was detected by analysis with marker Phi112. Similarly, the functional markers lcyE-5′TE and crtRB1-3′TE were used to evaluate the lycopene ε cyclase and crtRB1 loci in order to identify allelic variants associated with increased β-carotene content. The favorable crtRB1 allele (~543 bp) was identified in five genotypes while for the lcyE the unfavorable allele (~300 bp) was present in all genotypes. These results highlight the potential of local maize germplasm for biofortification in breeding programs targeting nutritional improvement.

Keywords: maize; Quality Protein Maize (QPM); genetic diversity; opaque2; functional markers

CONSERVED MOTIFS IDENTIFICATION OF THIONIN PROTEIN OF TWENTY-SIX PLANTS SPECIES

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ABSTRACT

Thionins are an ancient family of plant-derived antimicrobial peptides, where their activity is dependent not only on their overall structure, but also on the presence of highly conserved sequence motifs. These motifs have been conserved through wide taxa and suggest strong evolutionary pressure to maintain critical domains possibly involved in membrane disruption and pathogen recognition. While the biological roles of thionins are well studied, there are few studies investigating molecular explanations for motif conservation. An exploration of these conserved elements would afford a better understanding of the structure-function correlation of thionins and their significance in adaptation in plant defense systems. In this study, a total of twenty-six thionin proteins sequences of plants family belonging to different orders were retrieved from NCBI with FASTA format. Amino acids sequence patterns were created using MEME (Multiple Em for Motif Elicitation; version 5.5.8) and MAST (Motif Alignment and Search Tool; version 5.5.8) programs on http://meme-suite.org. The program was designed to report the 10 most robust motifs of 10 to 30 width Amino acids, occurring zero or once per sequence, with detection spanning between 2 to 600 sites among proteins belonging to plants family. Based on the results, motif 1 (30aa, E-value= 9.9e-165) and motif 3 (19aa, E-value= 8.3e-064) obtained as the most common motifs, which were shared 24 plant species.

Motif 1: PDVHEYCKLGCASSVCGNJSTLQNSDASEI
Motif 3: MEVKSVIMCVLILGLVLGQ

These common conserved motifs among different plants' species confirmed thionin protein functional similarities.

Keywords: Thionin protein; Bioinformatics; Conserved motifs; Plants

BIOINFORMATICS STRUCTURAL ANALYSIS OF THIONIN PROTEIN IN SIX PLANT SPECIES OF BRASSICALES

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ABSTRACT

Thionins are a family of small proteins exclusive to higher plants. These proteins typically consist of 45-48 amino acids, with 6–8 cysteine residues that form 3-4 disulfide bonds. They include phoratoxins and viscotoxins. Alpha- and beta- thionins are related to each other while gamma thionins, despite having a superficially similar structure, belong to a distinct category of proteins now identified as plant defensins. In this examination, the thionin protein reference sequences (RefSeq) from various plant species within the Brassicales order, including Brassica napus, Brassica rapa, Raphanus sativus, Eutrema salsugineum and Capsella rubella were obtained from the National Center for Biotechnology Information (NCBI) in FASTA format. Structural analyses of thionin protein were performed using online tools available on the EXPASY website. Primary and secondary structures of thionin proteins for each Brassicales species were estimated using ProtParam and SOPMA, respectively. The tertiary structure prediction and visualization of thionin were performed by PHYRE2 server. Thionin protein in all Plants ranged from 115 to 134 amino acids in length. The theoretical isoelectric points and molecular weight were calculated at a range of 5.36-8.75 and 12196.93-1431872 Da, respectively. A High aliphatic index suggested that thionin exhibit structural stability in Brassicales plant samples. The GRAVY values of this protein designated thionins are generally membrane-associated (hydrophobic) proteins in nature, except for Arabidopsis thaliana, which is globular (hydrophilic protein). The Instability index analysis revealed thionins in Brassica rapa and Capsella rubella were stable, whereas those in other Brassicales samples were classified as unstable. SOPMA analysis showed that alpha helices and random coils were the dominant secondary structural elements while extended strands were occasionally distributed in the proteins. Tertiary structure predictions using PHYRE2 indicated significant structural diversity among plant thionins, highlighting their varied configurations.

Keywords: Brasicales; ProtParam, SOPMA; Structural analysis; Thionin

STUDY OF SOME PHYSICAL AND CHEMICAL PARAMETERS IN THE PLANT-GRAPE-WINE RELATIONSHIP IN THE VINEYARD PLANTATIONS IN DOBROGEA REGION

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ABSTRACT

In the vine and grapes there are a series of chemical components that are transmitted after fermentation to the wine. In the present study, the aim was to determine and predict the evolution of these physico -chemical parameters by using modern analysis techniques and technologies available, tracking the evolution of these parameters on the plant-grape-wine relationship being carried out by means of high-performance physico -chemical analysis devices. In the technology of transforming grapes into wine, alcoholic fermentation, maceration on the lees and malolactic fermentation are of great importance. The quality of the wine depends largely on how these processes are stimulated, activated, slowed down, interrupted or even avoided, as is sometimes the case with the last two. Knowing the variation of some physical and chemical parameters during alcoholic fermentation facilitates the theoretical understanding of some phenomena that take place during maceration-fermentation, relating to: the multiplication (multiplication) of yeasts , the dynamics of sugar metabolism by yeasts , the evolution of compounds responsible for the color of red wines, the ionization of the main acids present in the must, the total content of dissolved substances, the electrical conductivity, the balance of oxidation -reduction processes, the insolubilization of tartaric compounds.

Keywords: wine quality, physical-chemical parameters, plant – grape – wine relationship, winemaking technologies

BARRIERS IN ACCEPTING THAT SOCIAL-INNOVATION CAN BE ADDED TO TRADITIONAL KNOWLEDGE FOR RURAL AREAS IN THE EASTERN EUROPEAN COUNTRIES

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ABSTRACT

Traditional knowledge (TK) is very often related to indigenous and local communities and having a long history of more than one century. However, today it is well established that indigenous knowledge (IK) is related to indigenous local communities (ILC). Thus, TK should be related to local communities. In this regard, the remote rural communities all over the globe still preserve for more than one century TK related also to agriculture such as: seeds preservation and selection, agricultural practices, connectivity between agricultural practices and religious beliefs and cultural values, the preservation and sustainable use of wildlife and the general connectivity with nature. Based on these logical assumptions TK can be defined as being related to wildlife, agricultural practices and rural life. Today, at the highest political agenda circular economy is teaching us how to preserve our resources in the best ways. Based on our experience we realized how difficult it should be for our countries to respond to the objectives of a circular economy political agenda in the Eastern European countries. Based on our previous work we identified also knowledge related to nowadays' new definitions such as social -innovation and social entrepreneurship. In the traditional way of organizing the work at the community level we discovered that in remote rural communities exists skills and competencies that can be accessed for further developments. In this regard some examples will be discussed such as the example of honey land related to wild bee collecting honey in North Macedonia, rural cattle herds management in Transylvania, breeding horses in Hungary or pomegranate symbolism in Armenia and Georgia and not only. The main barriers are as following: language barriers, complex definitions to be included into the national regulation, lack of funds to survey and monitor our traditional values for social innovation as well as the adoption of proactive principles in developing our strategies to respond to the needs for circular economy development.

Keywords: traditional knowledge, agricultural practices, social innovation, Eastern European Countries, circular economy

ASSESSMENT OF RESISTANCE TO SOME HERBICIDES OF SUNFLOWER GENOTYPES OF DIFFERENT ORIGINS

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ABSTRACT

The aim of the present study is to determine the response of interspecific hybrid combinations between cultivated sunflower and some accessions of annual wild Helianthus annuus, to herbicides with active substances imazamox and tribenuron methyl, the first from the group of imidazolinones, and the second from the group of sulfonylureas. For obtaining the combinations, five male-sterile lines of cultivated sunflower were used as maternal forms - 217 A, 830A, 3607 A, 4499 A and 10517 A, created at Dobrudzha Agricultural Institute-Gen. Toshevo (DAI-Gen. Toshevo). Six accessions of the annual wild species Helianthus annuus were used as paternal forms - GT-E- 049, GT-E- 081, GT-E -121, GT-E -122, GT-E -126, GT-E- 171 and one accession of the annual wild species Helianthus petiolaris, ssp. petiolaris- GT-E- 022, all stored and maintained in the collection of wild species at the DAI-Gen. Toshevo. The study included 17 hybrid combinations, as well as their paternal forms, which were set in two trials. Each trial was set in two repetitions. The herbicides were applied in three doses - standard, specified by the manufacturer, lower and higher than the standard. The scale of the European Weed Research Society was used to assess resistance to herbicides. A reaction of resistance to the active substance imazamox was reported in seven crosses, and to tribenuron methyl - in nine interspecific hybrids. Two hybrid combinations - 3607 A x GT-E-049 and 10517 A x GT-E-049 showed resistance to both herbicides. They share the same paternal parent - GT-E-049, which was found to carry genes for resistance to both herbicides. Resistance for the indicated crosses was recorded at the three doses of each herbicide applied.

Keywords: Helianthus annuus, sunflower, interspecific hybrid combinations, herbicides, resistance

AIOT-ENABLED PLASMA AGRICULTURE: A SIMULATION ROADMAP FOR DIGITAL AND SCALABLE FARMING

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ABSTRACT

This study presents a simulation-based roadmap for future research in smart agriculture, building on our earlier conceptual work on AIoT-enhanced Plasma Activated Water (PAW) systems. The proposed framework integrates low-cost Wireless Sensor Networks (WSNs) with lightweight Artificial Intelligence (AI) algorithms to simulate control over key operational variables such as PAW exposure time and water pH, without requiring immediate physical deployment. This approach is particularly well in regions with limited experimental infrastructure. Furthermore, a comparative analysis of publicly available PAW datasets and AIoT frameworks applied in other domains is proposed. The aim of this effort is to identify domain-specific gaps and transferable algorithmic models that will facilitate the adaptation of well-known digital tools for use in agriculture. At the same point, we seek to develop open-access templates and simulation-ready datasets to enable the scalable deployment of AIoT–plasma systems. The goal of these resources is to support academic researchers and agricultural practitioners in the prototyping and iterative refinement of smart farming systems, particularly in resource-limited settings. By offering a development framework that is both easily adoptable and digitally testable, this work seeks to promote sustainable farming by facilitating the wider adoption of agricultural technologies. This study advances sustainable agriculture and wider technological accessibility by offering a low-barrier development pathway that can be tested digitally. The proposed roadmap provides a fundamental framework for developing cost-effective, adaptable, and future-ready smart farming systems. It supports global efforts in environmental resilience and digital transformation and provides useful information for academics and farmers interested in the future of intelligent and sustainable agriculture.

Keywords: Artificial Intelligence of Things (AIoT), Plasma Activated Water (PAW), Smart Agriculture, Wireless Sensor Networks (WSNs), Simulation-Based Modeling, Comparative Analysis, Open-Access Datasets, Digital Agriculture, Sustainable Farming

RESPONSE OF FENNEL (FOENICULUM VULGARE MILL.) TO SUB-LETHAL RATES OF GLYPHOSATE AND FLAZASULFURON

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ABSTRACT

Weeds are among the most significant biological agents in many agricultural systems, adversely affecting both crop yield and quality. Although chemical weed management is widely recommended as a component of integrated weed management strategies, its improper use can lead to serious side effects, such as herbicide drift. Total herbicides applied in orchards or non-agricultural fields to control weeds may move from the applied fields to adjacent agricultural fields, sometimes the fields that were grown with medicinal and aromatic crops such as fennel (Foeniculum vulgare Mill.). This study aimed to assess the adverse effects of sub-lethal doses (12.5%, 6.25%, 3.125%, and 1% of the recommended rates) of glyphosate potassium salt (1323 g a.i. ha^{-1}) and flazasulfuron (50 g a.i. ha^{-1}) on fennel under controlled climate room conditions. Herbicides were applied to fennel seedlings at the 4-true-leaf stage and maintained in a climate room with a 16 h/8 h photoperiod and day/night temperatures of 24/20 °C. Plant responses were evaluated 21 days after treatment. Glyphosate caused a 9.12–53.2% reduction in fennel growth, while flazasulfuron resulted in up to a 62.67% decrease in dry biomass, depending on the dose.

Keywords: Glyphosate, flazasulfuron, fennel, Foeniculum vulgare, drift

MOLECULAR MARKER-BASED APPROACHES IN DETERMINING ALMOND GENETIC DIVERSITY: A REVIEW OF RECENT STUDIES

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ABSTRACT

Almond (Prunus dulcis Mill.) is one of the most economically significant nut crops cultivated globally, valued for its high nutritional content and wide adaptability. The species exhibits remarkable genetic diversity across different growing regions, which plays a critical role in breeding programs aimed at enhancing stress tolerance, fruit quality, and yield performance. This review synthesizes recent advances in molecular characterization studies that have employed diverse molecular marker systems to evaluate the genetic variability of almond genotypes. Among these, simple sequence repeat (SSR) markers have emerged as the most reliable and extensively utilized tools due to their high polymorphism, codominant inheritance, reproducibility, and strong discriminatory power. Evidence from previous research indicates that almond genotypes frequently cluster according to their geographical origin and genetic background, providing valuable insights for the development of targeted breeding strategies. Furthermore, molecular data serve as indispensable resources for the conservation of genetic diversity and the identification of promising genotypes for hybridization efforts. Overall, this study underscores the pivotal role of integrating molecular approaches into almond breeding programs to accelerate cultivar development and ensure the sustainable utilization of genetic resources.

Keywords: Almond, Genetic Diversity, Molecular Characterization, Molecular Markers, SSR Markers

CORIANDRUM SATIVUM L.: A REVIEW ON BOTANICAL CHARACTERISTICS AND AGRICULTURAL SIGNIFICANCE

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ABSTRACT

Coriander (Coriandrum sativum L.) is an annual, medicinal and aromatic plant species belonging to the Apiaceae family. Widely used in traditional medicine and the food industry as a spice and flavoring agent, coriander is noted for its anti-inflammatory, antimicrobial, and digestive-regulating properties. Morphologically, coriander grows to a height of 30–60 cm, with a cylindrical and usually branched stem. The lower leaves are petiolate, broad and lobed; the middle leaves are sessile; and the upper leaves are narrower, thread-like, and deeply lobed. The flowers are pink or white, and the fruits are spherical, 3–5 mm in diameter, and rich in essential oils. In Turkey, coriander is primarily cultivated in the Central Anatolia and Mediterranean regions, while globally it is widely grown in countries such as India, Iran, and Mexico. This review aims to examine the medicinal and aromatic uses, botanical characteristics, and current cultivation status of coriander in Turkey and around the world based on recent literature.

Keywords: Coriandrum sativum, medicinal plant, review

USE OF ORGANIC FERTILIZERS AS AN ALTERNATIVE FOR CHEMICAL PRODUCTS IN CURLY LETTUCE PRODUCTION

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ABSTRACT

Lettuce (Lactuca sativa L.) is one of the most consumed vegetables in Turkey and has an economically important place among green leafy vegetables worldwide. Since it is consumed primarily fresh, it has been important to reduce dependence on chemical fertilizers in lettuce production. The aim of this study was to investigate the effects of different types of organic fertilizers on the yield and quality parameters of lettuce plants and determine a potential alternative protocol for chemical fertilizers in lettuce production. The research was conducted in the unheated greenhouse conditions in the autumn period in Bursa, Türkiye. In this study, a commonly cultivated curly lettuce varieties, "Sürpriz and Caipira" were used as plant materials, and foliar applications of three types of organic fertilizers [bat manure (BM), seaweed extract (SWE), vermicompost (VC)] at three different doses (125, 250, and 500 ppm) were tested. In addition, a nitrogen-based chemical fertiliser (CF) was used in accordance with the recommendations of the Ministry of Agriculture and Forestry and a control treatment (C) without any fertilizers was also included. As a result, the highest values for the number of marketable leaves (number plant -1), fresh and dry weight of leaves and heads (g), head and root collar diameters (mm), total chlorophyll content (mg g-1), total soluble solids (Brixº), relative water content (%), and total phenolic compound (mg 100g-1 fresh weight) of leaves were obtained from both SWE and VC fertilizers with the doses of 500 ppm, separately for both varieties. Besides, the leaf colour parameter values (L, a, b, chroma, and hueº) of the leaves also demonstrated that organic fertilizers increased the quality of the leaves more than the CF application. Overall, BM, SWE, and VC fertilizers could be used separately as alternative organic fertilisers for sustainable curly lettuce production.

Keywords: bat manure, Lactuca sativa L. var. crispa, seaweed extract, sustainability, vermicompost

BIOCONTROL ACTIVITY OF TRICHODERMA HARZIANUM AGAINST FUSARIUM CULMORUM CAUSING ROOT AND CROWN ROT IN WHEAT UNDER SALT STRESS CONDITIONS

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ABSTRACT

Fusarium culmorum is a destructive soil-borne fungal pathogen responsible for root and crown rot in wheat (Triticum aestivum), leading to significant yield losses globally in the areas where wheat was cultivated. Biological control agents such as Trichoderma harzianum have shown promising antagonistic effects against F. culmorum under optimal conditions; however, understanding their performance under abiotic stress is also crucial for practical applications. This study aimed to evaluate the antagonistic activity of T. harzianum against a highly virulent F. culmorum isolate under increasing salinity. In the first stage, Potato Dextrose Agar (PDA) medium was amended with 50, 100, and 150 mM NaCl, and dual culture assays were conducted. In these tests, T. harzianum inhibited the mycelial growth of F. culmorum by 40.62%, 40.00%, and 38.75% at 50 mM, 100 mM and 150 mM salt concentrations, respectively, compared to 65% inhibition under non-saline control. In the second stage, wheat seeds co-inoculated with both the pathogen and antagonist were placed on PDA medium containing 50 and 100 mM NaCl. Under these conditions, T. harzianum suppressed F. culmorum colony development around the seeds by 70.64% at 50 mM and 45.16% at 100 mM NaCl. These results indicate that T. harzianum retains significant biocontrol potential under moderate salt stress. It was demonstrated that high salt levels reduced antagonistic activity in dual culture tests, while protective activity increased around the seed at salt concentrations that did not inhibit plant growth. The study presents promising results regarding the potential use of T. harzianum as a biocontrol agent against F. culmorum in wheat cultivation in saline regions.

Keywords: Trichoderma harzianum, salt stress, Fusarium culmorum, antagonistic effect, seed colonization

PROPOLIS AGAINST BOTRYTIS CINEREA: A REVIEW OF STUDIES COMBINING IN VITRO AND IN VIVO TESTS

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ABSTRACT

Botrytis cinerea is a necrotrophic fungal pathogen that is responsible for substantial losses in a wide range of plant species. The detrimental impacts of chemical fungicides on human health and the environment have given increase the interest in alternative control strategies. In this review, the antifungal effects of different propolis extracts on this pathogen were evaluated based on studies that combined in vitro and in vivo tests. The findings of the in vitro experiments demonstrated that propolis extracts have the capacity to inhibit various developmental stages of this pathogenic fungus such as mycelial growth, sporulation, and conidial germination. However, the effectiveness of this inhibition was changed with concentration of the extract and the method of preparation. In this context, it has been demonstrated that extracts prepared based on the use of ethanol at high concentration and sonication method have a stronger antifungal effect. In vivo test demonstrated that the treatment of propolis to the fruits of plants including strawberries, grapes, blueberries and tomatoes led to a reduction in both the disease incidence and infection area by the pathogen, although this effect exhibited the variability with plant species, the application method and dosage. Consequently, while propolis reveals considerable antifungal potential against B. cinerea, additional researches are required on the standardization of extracts, the optimization of doses, the determination of application timing and in vivo tests on different plant species to increase its applicability in agricultural practices.

Keywords: Botrytis cinerea, propolis extract, antifungal effect, in vitro and in vivo tests

EFFECTS OF FOLIAR MINERAL TREATMENTS ON PHYSIOLOGICAL PERFORMANCE AND BERRY QUALITY OF 'RODITIS' GRAPEVINES (VITIS VINIFERA L.)

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ABSTRACT

Rising temperatures and heatwaves, are more frequent due to the climate change, posing a significant threat to viticulture by adversely affecting grapevine growth, productivity, and grape quality. Consequently, there is an urgent need for eco-friendly and sustainable strategies to enhance grapevine tolerance under high-temperature conditions. The aim of the study was to evaluate the effects of foliar applications of zeolite and attapoulgite on the 'Roditis' cultivar grown under Mediterranean conditions. An open-field experiment was conducted in Central Greece using a randomized complete block design with three treatments (control, zeolite, and attapoulgite) and five replications. The chemically inert mineral particles were applied as foliar sprays at a concentration of 4% (w/v), with three applications throughout the growing period, beginning at fruit set. Both minerals significantly decreased leaf temperature, although they did not significantly influence physiological parameters. Regarding yield parameters, zeolite and attapoulgite increased the total yield per vine and berry weight. However, the foliar applications did not significantly affect the number of clusters per vine, cluster weight, cluster density, and the number of berries per cluster. Cluster width decreased by foliar applications, while cluster length increased with attapoulgite application. Berry width remained unaffected, while zeolite treatment led to increased beery length. Additionally, both treatments significantly reduced relative skin mass. In terms of grape quality traits, zeolite decreased total acidity (TA), and increased must pH and total soluble solids (TSS), while attapoulgite application had no significant effect on these parameters. In conclusion, foliar applications of zeolite and attapoulgite represent a promising, sustainable strategy for mitigating the negative impacts of high temperatures. By lowering leaf temperature and increasing yield, these treatments enhance grapevine resilience to heat stress. **Funding:** "This research was funded by Rural Development Programme (RDP) of Greece 2014-2020. CCI (Character Code Identifying): 2014GR06RDNP001".

Keywords: climate change, zeolite, attapoulgite, leaf temperature, photosynthesis, yield

INFLUENCE OF SOIL TILLAGES AND CROP ROTATION ON THE EVOLUTION OF MAIZE CROP IN SOUTHERN ROMANIA

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ABSTRACT

Optimizing the nutritional space in maize cultivation contributes to achieving high and sustainable yields. This goal is reached through the application of efficient technological practices, such as selecting well-adapted hybrids, proper water and nutrient management, crop rotation, pest, disease, and weed control, as well as appropriate planting technologies. Crop rotations of 4 - 6 years, especially with the inclusion of legumes, support agroecosystem balance by improving soil structure and fertility. Soil tillage methods, applied alternately (chisel + disc / autumn plowing + disc), bring benefits in terms of soil health and crop productivity. Optimal row spacing, such as 70 cm for maize, reduces competition for essential resources - water, nutrients, light - and supports vigorous plant development. Flexible sowing time selection, based on climatic conditions, is essential for protecting crops and maximizing the efficiency of nutritional space utilization.

Keywords: maize, soil tillages, crop rotation, sowing time

RECENT ADVANCES IN ALMOND MICROPROPAGATION AND FUTURE PERSPECTIVES

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ABSTRACT

Almond (Prunus dulcis Mill.) is an important nut crop widely cultivated worldwide due to its high nutritional value and significant economic importance. However, conventional propagation methods are often constrained by slow production cycles, low rooting efficiency, and a high risk of disease transmission. Micropropagation has emerged as an effective biotechnological approach that enables the rapid production of genetically uniform, disease-free, and high-quality plant material. This review synthesizes the literature on micropropagation protocols developed for almond and almond–peach hybrid rootstocks, evaluating in detail the effects of explant type, culture medium composition, plant growth regulators, sterilization methods, and culture conditions on propagation success. Findings indicate that cytokinins (BA, TDZ) and auxins (IBA) play critical roles in the micropropagation process, although genotype-specific responses significantly influence success rates. Moreover, optimization of factors such as light regime, carbohydrate sources, and plant growth regulator concentrations is essential for achieving high propagation efficiency. This review highlights the need for further research to establish standardized, genotype-adapted, and high-efficiency micropropagation protocols for almond, aiming to enhance commercial propagation practices and genetic resource conservation.

Keywords: Auxins, cytokinins, genotypic effect, micropropagation, plant growth regulators, Prunus dulcis

BIOSTIMULANT POTENTIAL OF PLANT EXTRACTS IN ENHANCING PLANT TOLERANCE TO ABIOTIC STRESSES: A REVIEW

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ABSTRACT

Abiotic stresses such as drought, salinity, extreme temperatures, and heavy metal toxicity significantly limit plant growth and agricultural productivity. In response to these challenges, plant-based biostimulants have gained increasing attention as sustainable tools to enhance crop resilience. Rich in bioactive compounds such as phenols, flavonoids, and sterols, they play a key role as natural biostimulants in enhancing plant tolerance to abiotic stresses. Unlike fertilizers and pesticides, these extracts do not supply nutrients directly but activate plant biological processes to improve resilience under adverse conditions such as drought, salinity, extreme temperatures, and heavy metal contamination. Their mode of action involves several mechanisms, including regulation of stress-related gene expression, strengthening of antioxidant defense systems, and optimization of nutrient uptake and photosynthetic efficiency. Various types of plant extracts, derived from seaweed or medicinal plants, have demonstrated effectiveness against these environmental stresses. For instance, under salt stress, these extracts improve germination, stimulate root growth, and reduce toxic ion accumulation. Under water stress, they promote water regulation within plant tissues, activate antioxidant enzymes, and increase plant resilience. This review compiles and analyzes recent research on the use of plant extracts as biostimulants to promote plant germination and growth under abiotic stress, focusing on their effects against four major types of environmental stress. By highlighting the mechanisms through which these extracts improve plant tolerance, this review emphasizes the growing interest in integrating them into bio-fertilization strategies. Their application in agricultural systems represents a sustainable and ecological approach to improving crop productivity while mitigating the impact of abiotic stresses, paving the way for more resilient and environmentally friendly agricultural practices.

Keywords: Biostimulants, drought, heavy metals, plant extracts, salinity, stress tolerance, sustainable agriculture, temperature.

VARIATION IN PHENOLIC AND PROLINE CONTENT OF ECLIPTA PROSTRATA INFLUENCED BY ARBUSCULAR MYCORRHIZAL FUNGI AND DIFFERENT SAND/PEAT SUBSTRATE RATIOS"

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ABSTRACT

Arbuscular mycorrhizal fungi (AMF) form a key symbiotic association with plant roots, enhancing nutrient uptake, stress tolerance, and influencing plant growth regulators. While AMF have been studied for their effects on medicinal plants, little is known about their impact on Eclipta prostrata, a medicinal plant widely used in Asian traditional medicine. This study aims to evaluate the effects of AMF inoculation and nutrient conditions on the growth, phenolic and proline content, and root colonization of E. prostrata. Six different sand/peat ratios (from 0/100 to 100/0, v/v) were used to evaluate the growth and biochemical responses of Eclipta prostrata. The substrates were autoclaved, and arbuscular mycorrhizal fungi (AMF) treatment involved adding 15 g of commercial Symbivit[X] (containing six Glomus species) to the pots. A sterilized AMF mixture was used for control plants. Seeds of E. prostrata were surface sterilized, germinated on Petri dishes, and transplanted into pots after seven days. Plants were grown for 7–8 weeks in a controlled environment chamber (24/28°C, 60% RH, 16h light/8h dark). Each treatment included 10 biological replicates. Total phenolic content was measured using the Folin–Ciocalteu method, and proline content was determined with the acid ninhydrin assay following Bates (1973). Data were statistically analyzed using two-way ANOVA and Tukey's post hoc test. The experiment was indicated the best ratio of sand and peat to be expected for applying on a large scale with the purpose of commercial inocula development is 60% sand and 40% peat. - The result indicated more about using a commercial product with a diversity of Glomus spp apply for culture medicinal plant in the future.

Keywords: Arbuscular mycorrhizal fungi, Eclipta prostrata, Mycorrhizal inoculation, Sand, Peat

GENERATIVE ADVERSARIAL NETWORKS AND THEIR APPLICATION AREAS IN SMART AGRICULTURE

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ABSTRACT

The rapid advancement of digital transformation in agricultural technologies in recent years has led to a growing emphasis on artificial intelligence (AI)-based approaches. This study systematically examines the applications of Generative Adversarial Network (GAN) models in smart agriculture applications. The potential offered by GAN-based AI solutions in fundamental agricultural activities such as plant breeding, animal husbandry, and soil characterization is highlighted. GAN applications are detailed through current studies in the literature on topics such as plant health detection, weed control, phenotyping, stress tolerance assessment, harvest timing, and product quality analysis, underscoring their significance in enhancing agricultural productivity and promoting sustainable practices. In animal husbandry, GANs are particularly notable for their success in synthetic data generation and classification in areas such as animal health monitoring, behavioral analysis, and image-based growth monitoring. In soil studies, GAN-based models have been shown to produce highly accurate synthesized images for the development of maps of soil structure, moisture content, and nutrient distribution, making significant contributions to precision agriculture applications. Furthermore, strengthening data infrastructure, integrating technological solutions into agricultural systems, increasing interdisciplinary collaborations, creating open-access, high-quality datasets, and developing application-oriented standards will enable more effective use of GAN technologies in agricultural research and applications. Consequently, GANs are positioned to play a pivotal role in the digital transformation of agriculture, and leveraging their capabilities in alignment with sustainable agriculture goals is imperative.

Keywords: Machine learning, Generative adversarial networks, Smart agriculture

SAHARAN AGRICULTURE: FROM TRADITIONAL OASIS SYSTEM TO THE DEVELOPMENT OF A MARKET ECONOMY AND SUSTAINABLE DEVELOPMENT

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ABSTRACT

In this research work, we contribute to the understanding and analysis of Saharan agriculture development. Through bibliographical approaches and field surveys, we analyze the current situation of agriculture in traditional oasis farms and newly established farms developed on suitable agricultural lands. We then present the main components and driving forces of Saharan agriculture. We examine the effects induced by various development programs on existing production systems and on the socio-economic behaviors of farmers. Regarding the liberalization of the agricultural sector and its integration into the market economy, our analysis shows that the state continues to intervene through various support programs and measures. However, observed failures are attributed to inadequate design and poor implementation of some development programs in oasis agricultural environments, as well as internal resistance within oasis communities limiting the impact of investments on the agricultural production sphere. We highlight that state-led development programs offer tangible opportunities to address economic and social challenges, which can only be overcome through partnership with local stakeholders, as technological and financial contributions alone are insufficient for success. The Saharan regions, characterized by the diversity of their physical environment, production systems, social components, efforts to upgrade agricultural operations, and improvements in farmer performance, have enabled us to achieve our study objectives. Despite Saharan agriculture's progressive professionalization and gradual integration into the market economy, it remains dependent on state support and assistance under current conditions.

Keywords: Keywords: Saharan regions, Oasis, market economy, agricultural development, reforms, land tenure, production systems.

STRATEGIC DIAGNOSIS OF THE DATE PALM VALUE CHAIN IN THE WILAYA OF OUARGLA (SOUTHEASTERN ALGERIA)

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ABSTRACT

The development of Saharan agriculture is a national priority in Algeria to meet domestic demand for agricultural products and to export the surplus. The date palm value chain holds a leading position in this agricultural policy. In recent years, it has experienced significant growth across all the southern wilayas of Algeria. This research aims to conduct a strategic diagnosis of this key sector in the wilaya of Ouargla by analyzing its strengths, weaknesses, opportunities, and threats. The study covers all stages of the value chain: production, processing, transformation, transportation, domestic marketing, and exportation. The adopted methodological approach consisted of two phases: an initial analysis of institutional data, followed by field surveys involving local stakeholders. Stakeholder meetings facilitated the development of an operational action plan tailored to the region's specificities. The diagnosis led to the identification of pilot palm groves that could support the modernization of the sector. The final findings strongly suggest the need to enhance resources allocated to local producers in order to improve yields and incomes, thus ensuring the sustainable development of date production in the wilaya of Ouargla

Keywords: Keywords: Strategic diagnosis, date palm value chain, Ouargla, Sahara, Algeria

AN ECO-FRIENDLY TECHNIQUE FOR ENHANCING CARROT SEED QUALITY: PRIMING AND DRYING TREATMENTS USING SEAWEED EXTRACT

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ABSTRACT

Seed priming is a pre-sowing technique that improves the performance of seeds and seedling quality allowing faster and uniform germination and seedling emergence. Seed priming is a pre-sowing treatment technique. This study was conducted to examine the effects of priming and drying treatments using Ecklonia maxima seaweed extract on seed quality during germination and early seedling stage in two Nantes-type carrot (Daucus carota L.) cultivars. Carrot seeds were continuously aerated in seaweed extract solutions at various concentrations (0, 250, 500, 1000, 1500, and 2000 ppm) for 24 hours at 16°C. Untreated seeds were evaluated as control. Following the priming treatments, seeds were divided into two groups: one group was subjected to germination tests immediately after surface drying (P+SD), while the other group was further dried until reaching their original moisture content (P+DB) before germination tests. Results of the study were evaluated in terms of seed viability [normal germination rate (NGR)], germination performance parameters [mean germination time (MGT), germination index (GI), seedling vigor index (SVI)], and drying-related traits [root dry weight, shoot dry weight, total dry weight]. The results indicated that the most effective treatments for physiological enhancement of carrot seeds were 1000 ppm P+SD and P+DB. The outcomes of the study also demonstrated that it is possible to improve seed quality without the use of chemical fertilizers at the early seedling stage for sustainable agricultural practices. Priming treatments using seaweed extract solutions could be suggested to provide an environmentally friendly and practical contribution to seed and seedling industries.

Keywords: Daucus carota L., Ecklonia maxima, normal germination rate, seed vigour

THE INFLUENCE OF AGROFORESTRY CURTAINS ON THE PRODUCTION OF AUTUMN CEREALS, IN THE CLIMATIC CHANGES CONDITIONS FROM BRAILA PLAIN, ROMANIA

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ABSTRACT

Under the current climate changes in the Braila Plain, Romania, with soil drought and increased scorching during spring, the most suitable crops are autumn straw cereals, which efficiently capitalize on winter moisture. The paper presents the experimental results obtained in demonstration plots of wheat, barley and triticale under the pedoclimatic conditions of the Braila Plain, Romania, in the years 2024 and 2025, and the influence of agroforestry curtains on them. The pedoclimatic conditions of the two agricultural years, 2023 – 2024 and 2024 – 2025, the agrochemical soil analyses, the biometrics of the wheat, barley and triticale genotypes, as well as the productions obtained are presented. The statistical processing of the experimental data was carried out using the ANOVA and correlation tests, in order to make recommendations for farmers in the area of interest. These results were possible through the implementation of the research project ADER 1.2.2., entitled "Establishment of agroforestry curtains and the study of their influence on the anti-erosion protection and evapotranspiration of agricultural crops", which is being implemented between 2023 and 2026, being funded by the Ministry of Agriculture and Rural Development, Bucharest, Romania.

Keywords: Wheat, Barley, Triticale, Yield performance, Agroforestry curtains, Climatic changes

STUDIES ON THE IMPROVEMENT OF SALINE SOILS IN COMPLEX AGRICULTURAL EXPERIMENTS WITH SALINITY-TOLERANT SPECIES, GREEN CROPS AND DIFFERENT TYPES OF FERTILIZERS

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ABSTRACT

The physicochemical properties of the soil influence the aerohydric regime of the soils, the development of the root system of crop plants and the absorption of mineral elements necessary for their physiological growth and development processes. In Romania, alkaline soils cover around 500-600 thousand hectares, which must be improved through various methods and technologies to bring them into the range necessary for the favorable growth and development of crop plants. The paper presents experimental results from a complex project to remediate saline soils through the use of amendments, fertilizers, green crops and salinity-tolerant species, ADER 20.1.3., entitled "Measures and recommendations for reducing the risk of soil salinization and erosion under the influence of climate change" which is being implemented between 2023 and 2026, being funded by the Ministry of Agriculture and Rural Development, Bucharest, Romania. The results showed that the effectiveness of amendments increases with the application of a complex of agropedoamelioration measures to improve the physical, chemical and biological properties of the soil, respectively with the use of green crops and crop rotation with salinity-tolerant species.

Keywords: Saline soils, Salinity tolerant species, Green crops, Fertilizers, Soil fertility, Climatic changes

BOTANICAL NEMATICIDES: A SUSTAINABLE APPROACH FOR CROP PROTECTION

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ABSTRACT

The extensive application of plant protection products in contemporary agriculture has resulted in significant risks and detrimental effects on both human health and the environment. This has created a demand for natural alternatives to harmful chemical pesticides, thereby encouraging the exploration of the chemical diversity present in plant resources. The objective of this study is to minimize the reliance on synthetic chemicals and to develop biopesticides derived from aqueous extracts of various plants native to Algeria, specifically Thymus algeriensis, Origanum floribondum (Lamiaceae), and Ruta graveolens (Rutaceae) for their future application in the agroecological safeguarding of crops. Similarly, we evaluated in vitro the biocidal (or nematicidal) efficacy of the tested extracts on root-knot nematodes of the genus Meloidogyne, a devastating parasite on vegetable crops worldwide and locally. The larvae of the species Meloidogynes incognita were placed in different foliar dilutions (50% and 100%). The percentage of nematode mortality was assessed after 48 hours of exposure to the different plant substances. The findings indicated that the plant extracts evaluated were extremely effective as nematicides, resulting in mortality rates reaching as high as 100% among the juveniles of this parasite. This research demonstrated that these botanical extracts possess a significant nematicidal effect. These pesticidal plants present a promising alternative to synthetic nematicides.

Keywords: Biopesticide, plant extract, mortality, Meloidogyne incognita

SOME CULTURAL STRATEGIES DEVELOPED FOR DROUGHT CONDITIONS IN FRUIT SPECIES

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ABSTRACT

Drought stress, which leads to reversible or irreversible responses by plants, may occur due to limited water in the living environment (physical drought), or it may occur due to insufficient water intake by the plant due to freezing and mineral deficiency or excess (physiological drought). When plants are exposed to stress factors, they can develop responses such as avoidance, tolerance and adaptation to ensure efficient water use. Plants that grow in periodically or permanently arid environments such as deserts and steppes have developed responses such as escape, avoidance and resistance to stress factors. In such plant species, irreversible adaptations to stress factors occur. On the other hand, plant species called mesophytes, which survive in more humid environmental conditions than xerophytes, have developed different reversible responses to drought stress. With decreasing cell growth, shoot and root growth decrease. With decreases in polysaccharide and protein synthesis, cell wall synthesis decreases. In such plants, stomata close in response to stress, resulting in a decrease in transpiration and photosynthesis. The general issues addressed in fruit species breeding include improving fruit quality, increasing yield, growth habitus, thornlessness, adaptation, resistance to diseases and pests, flowering and fruiting criteria, fruit maturation, and variety breeding for market needs. In recent years, research on resistance to abiotic stress factors such as drought and salinity has increased. Some cultural precautions and approaches that can provide short- and long-term solutions for drought-resistant plant cultivation include the following: (i) Physiological-morphological adaptation studies for changing conditions (pot trials-field conditions-in vitro trials), (ii) Changes in the cultivation methods of cultivated plants, (iii) Changes in irrigation systems and methods, (iv) External applications that prevent/reduce transpiration (antitranspirant precaution), (v) Resistant varieties/cultivars obtained via classical breeding methods, (vi) The use of biotechnological methods to shorten the breeding process and elucidate drought mechanisms, (vii) Approaches such as taking precautions with the help of modelling and preliminary prediction studies. Because plants respond to drought in different ways, a complex and challenging process awaits plant breeders and growers. To date, traditional breeding methods such as introduction, hybridization, and selection have been used to increase the productivity and stress resistance of fruit varieties. However, these breeding approaches have yielded little success. On the other hand, some cultural practices, which offer only partial solutions, have been employed in fruit-growing areas. In the future, more effective cultural practices are needed for the cultivation of fruit varieties under changing climatic conditions. However, physiological and biochemical research is still needed to understand the mechanisms by which plants respond to drought stress. Furthermore, projects that combine molecular approaches (genomics, transcriptomics, metabolomics, gene transfer, gene editing, etc.) with classical plant breeding methods (such as selection and hybridization) are needed. In addition to these expectations, artificial intelligence-supported smart agriculture applications must be integrated into cultivation practices.

Keywords: Fruit species, Drought, Cultural strategies

VERTICAL FARMING: MEASURING AWARENESS AND WILLINGNESS TO PAY AMONG ALBANIAN UNIVERSITY STUDENTS

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ABSTRACT

Agriculture remains a main component of Albania's economy, yet it is constrained by structural issues such as small, fragmented landholdings, limited access to technology, and outdated irrigation systems. This situation has increased interest in innovations like vertical farming (VF), which enables year-round and high-density cultivation with minimal water use and no pesticides. Understanding student perceptions is critical, as young people often hold positive attitudes toward sustainable agriculture. We surveyed 204 university students to assess VF awareness, sustainability values, health concerns, sensory perceptions and willingness to pay (WTP) for VF produce. Attitudes were measured with Likert scales and text-highlighting tasks and WTP was estimated via a payment-card contingent valuation scenario. A logistic regression was used to identify socio-demographic predictors of WTP. Text-highlighting data showed that students approached the evaluation of VF systematically, frequently highlighting innovative aspects such as year-round cultivation and increased yields as "likes," while expressing concerns about energy use, health implications and premium prices as "dislikes." Descriptive analysis of Likert scale responses revealed moderate agreement with positive statements. The majority of students indicated that they would be ready to pay an additional 1–10% for items cultivated in VF. Additionally, logistic regression analysis revealed that health and promotional related factors significantly increased WTP. On the other hand, being female or a Ph.D. student decreased it. Students studying agricultural science also showed notable greater support for VF. Overall, Albanian students have the potential to drive sustainable agricultural innovation by adopting VF.

Keywords: sustainable agriculture, attitudes, students, Albania

ASSESSMENT OF THE AGRONOMIC POTENTIAL OF PHACELIA TANACETIFOLIA DEPENDING ON SOWING TIME AND SPACING

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ABSTRACT

This study investigates the effects of climatic conditions, sowing time, and row spacing on the growth and productivity of phacelia (Phacelia tanacetifolia), a fast-growing annual melliferous plant used in organic farming as green manure, over two experimental years (2024 and 2025). Meteorological data revealed that 2024 was characterized by higher temperatures and reduced precipitation during the March–July period, which negatively impacted plant development and yield. In contrast, 2025 presented more favorable climatic conditions, supporting improved growth. Results indicated that the first sowing time (S1) consistently led to more vigorous and uniform plant growth, with plant heights exceeding 94 cm and a higher number of inflorescences, particularly at a row spacing of 35 cm. High average plant height was also recorded at 35 cm spacing combined with the second sowing time (S2), while the greatest seed yield (254 kg/ha) was achieved in the first sowing time at 25 cm spacing. Across experimental variants, the number of inflorescences per plant varied slightly, averaging six. The year 2025 outperformed 2024 in all measured parameters, demonstrating that favorable climatic conditions — specifically adequate precipitation and moderate temperatures — are essential for achieving optimal phacelia production. Choosing the optimal sowing time and spacing maximizes the agronomic value of the species Phacelia tanacetifolia.

Keywords: Phacelia tanacetifolia, plant heigh, number of inflorescences, sowing time

VARIABILITY OF QUALITY PARAMETERS OF TUBERS IN DIFFERENT ROMANIAN POTATO VARIETIES

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ABSTRACT

Under the same soil and climate conditions and cultivation technology, in 2024, at INCDCSZ Brașov, twelve potato varieties developed through the institute's breeding program were evaluated for dry matter (DM), protein, and ash content to assess genetic variability and quality traits. These varieties were analyzed for their dry matter content using the oven-drying method, crude protein using the Kjeldahl method, and ash content using the incineration method. Dry matter showed low variability (CV = 7.07%), ranging from 16.68% to 21.29%, indicating stability across cultivars. Protein content varied significantly (CV = 16.13%) from 1.79% to 2.95%, highlighting potential for nutritional improvement, while ash content showed moderate variability (CV = 13.56%), ranging from 0.90% to 1.39%. Correlation analysis revealed a weak positive relationship between DM and protein (r = 0.14), a moderate correlation between protein and ash (r = 0.47), and negligible correlation between DM and ash (r = 0.04). Cluster analysis based on quality indices demonstrated substantial diversity among genotypes, with Azaria identified as an independent cultivar due to its highest dry matter, medium protein, and low ash contents. Genotypes generally grouped in pairs, with two notable clusters of three cultivars each: one cluster with Castrum, Asinaria, and Sevastia exhibiting similar dry matter values, and another with Sarmis, Cezarina, and Brasovia characterized by low dry matter and ash contents. This variability is essential for selecting the appropriate cultivars according to the intended use: consumption, processing, or fodder.

Keywords: potato variety, dry matter, crude protein, ash

EMERGENCE AND MANAGEMENT STRATEGIES OF ECHINOCHLOA WALTERI (PURSH) A.HELLER

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ABSTRACT

Echinochloa walteri (Pursh) A.Heller (Walter's barnyardgrass) is an increasingly problematic weed species in California's water-seeded rice production systems. A century of water-seeded rice cultivation without crop rotation has favored the proliferation of semiaquatic, herbicide-resistant grass species such as Echinochloa crus-galli, E. oryzoides, and E. phyllopogon, along with competitive sedges and broadleaf weeds. Weed infestations comprising grasses, sedges, and broadleaves have been reported to cause up to 85% yield loss when total weed coverage exceeds 60%. Although cultural practices—such as the use of certified weed-free seed, high seeding rates, proper water management, and levee and canal maintenance—are critical components of weed management, chemical control remains the foundation of current programs in California rice systems. The emergence of E. walteri presents new challenges to these systems due to its competitive growth and variable response to herbicides. Greenhouse experiments were conducted at the University of California, Davis during the 2024–2025 seasons to evaluate the efficacy of preemergence and postemergence herbicides on E. walteri. Preemergence applications of pyraclonil at 300 g a.i. ha–1 and tetflupyrolimet at 125 g ha–1 inhibited 100% of seed germination, while thiobencarb at 3,923 g ha–1, benzobicyclon/halosulfuron-methyl at 303/65 g ha–1, and clomazone at 672 g ha–1 reduced germination by 90%, 75%, and 50%, respectively. Postemergence herbicide application studies were arranged in a randomized complete block design (RCBD) with four replications, consisting of pots containing approximately five E. walteri plants each, and treated at the ~10 cm tall growth stage. Experiments were repeated twice to confirm the results. Postemergence applications of cyhalofop-butyl at 312 g ha–1, propanil at 5,604 g ha–1, and bispyribac-sodium at 38 g ha–1 resulted in less than 50% control of emerged plants, indicating limited efficacy of these foliar-applied herbicides. These findings underscore the need to incorporate E. walteri into integrated weed management strategies, emphasizing accurate species identification, herbicide diversification, and season-long control to mitigate its potential impact on rice production systems.

Keywords: California rice, Walter's barnyardgrass, weed control

THE INFLUENCE OF THE WEATHER CONDITIONS ON THE MAIN COLEOPTERAN SOIL PESTS' OCCURRENCE AND DYNAMIC IN MAIZE CROPS FROM SOUTHERN ROMANIA

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ABSTRACT

Nowadays climate changes have significant impacts on maize crops and their associated insect pests. Direct impacts are expected on pests' occurence, behaviour, reproduction, development and survival. In the southern area of Romania maize crops are mainly affected by drought and also by the attack of some dangerous coleopteran species such as *Tanymecus dilaticollis*, *Opatrum sabulosum* and various wireworms species that can compromise crops, on large areas. An extensive pest survey in maize crops under field conditions has been performed in 2024, in 4 experimental farms belonging to four research institution representative for the southern Romania conditions. The paper presents and compare the influence of recorded meteorological conditions in spring and summer on the main soil pests occurence and dynamics in the analyzed areas. Increased temperature and low soil moisture were the most important environmental factors influencing the soil pest population occurence and dynamics in spring and corespondingly increased the maize crop losses.

Keywords: Maize, coleopteran soil pests, climate change impact, soil pest occurrence and dynamic, Southern Romania

LEGAL ISSUES FACED BY FARMERS AND AWARENESS OF AGRICULTURAL LAW IN THE TRAKYA REGION

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ABSTRACT

This study aims to determine farmers' level of legal knowledge, the legal issues they encounter, and their needs for legal support in the provinces of Tekirdağ, Edirne, and Kırklareli. The research was conducted using a face-to-face survey method with 270 farmers. The average age of the farmers was 50.3 years, and their education level was predominantly (44.8%) at the primary school level. According to the findings, 79.7% of the farmers expressed a desire to gain more knowledge about agricultural law, while 84.4% believed that legal training programs for farmers would be beneficial. Furthermore, 39.36% of farmers stated difficulty in keeping track of legal regulations concerning their agricultural enterprises. Regarding the most significant legal issues encountered, 22.4% of farmers identified problems related to the marketing and trade of agricultural products, 21.9% cited inheritance or transfer procedures, and 17.9% reported legal barriers related to grants, incentives, and subsidies. The results of the study reveal that awareness of agricultural law in the region is limited, and that farmers require both informational and advisory support in legal processes. It is therefore recommended that educational programs prioritize key topics such as the legal framework of support programs, inheritance law, land ownership, and marketing legislation.

Keywords: farmer training, rural development, agricultural legislation, legal literacy

THE IMPACT OF LOCATIONS AND VARIETIES ON QUALITY PARAMETERS OF PEANUT

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ABSTRACT

Peanuts are grown in more than a hundred countries, with Asia and Africa accounting for over 95% of the global cultivation area. As a key crop for oil, food, and animal feed, peanuts are highly nutritious—their kernels are packed with fats, protein, minerals, vitamins, and antioxidants. They also contain beneficial bioactive compounds like resveratrol, tocopherol, and arginine, which contribute to health benefits, earning them recognition as a functional food. The present study aimed to determine some quality parameters of peanut grown in two locations (Şırnak and Osmaniye) using four peanut varieties (Masal, NC-7, Halisbey, and Rigel) under main season conditions. Field experiments were conducted in a randomized complete block design with three replications. The oil and protein contents, as well as oil quality parameters such as fatty acid composition, oleic/linoleic acid ratio, and iodine value, were investigated. The results of the study showed that all characteristics except oil content were statistically significant ($p < 0.05$) in terms of variety. In terms of location, oleic acid, palmitic acid, and stearic acid were found to be significant ($p < 0.05$). The maximum oil content (53.07%) was observed in Masal, which also stood out with the highest oleic acid content (77.39%). Besides, it had a higher oleic/linoleic acid value (11.58) than the other varieties. For protein content, Halisbey had the highest value, with 22.17%. As a result, it was concluded that the Masal variety, which has high oleic/linoleic acid and low iodine value, that provides a long shelf life, could be recommended.

Keywords: Fatty acid compositions, Locations, Oil content, Protein content

EFFECTS OF SILVER NANOPARTICLES ON WHEAT: CONTRASTING RESPONSES AT DIFFERENT DEVELOPMENTAL STAGES

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ABSTRACT

It is well established that silver nanoparticles (AgNPs), owing to their high specific surface area (up to 100 $m^2 \cdot g^{-1}$), exhibit a set of unique physicochemical and biological properties distinct from those of bulk silver. The antibacterial, fungistatic, and antiviral activities of AgNPs have been extensively characterized. These antimicrobial properties led to broad use of AgNPs in therapies for diseases of the skin and mucous membranes. The effects of AgNPs on higher plants are a comparatively new field of study. Over the past decades, AgNPs have been shown to modulate numerous intracellular processes in plant tissues, which, in turn, manifest as macroscopic changes. However, the published experimental studies remain highly contradictory: while some studies report phytostimulating effects—such as enhanced photosynthesis, increased growth, and higher yields – others describe inhibitory effects. Based on a comprehensive analysis of experimental reports, we hypothesized that one of the principal factors governing the direction and magnitude of AgNPs action on plants is the developmental stage at which the exposure occurs. To test this hypothesis, we performed laboratory experiments on wheat seedlings and field trials on mature plants. AgNP dispersions were prepared by chemical reduction of silver nitrate with sodium borohydride. To ensure colloidal stability of the dispersions, sodium lauryl sulfate (SLS) and sodium amphopolycarboxyglycinate (APCG) were used as stabilizers. The minimal silver to stabilizer mass ratios were established using spectrophotometric stability criteria; the ratios were found as 1 to 8 for SLS and 1 to 4 for APCG. The resulting dispersions were characterized by transmission electron microscopy (TEM) and dynamic light scattering (DLS). AgNPs stabilized with APCG exhibited smaller particle sizes (d = 10.4±4.9 nm) relative to SLS-stabilized AgNPs (d = 21.9±9.1 nm), with lower hydrodynamic diameters (79.1±3.1 nm and 120.2±3.8 nm, correspondingly). The SLS-based dispersion consisted predominantly of aggregates of multiple nanoparticles of varying morphology, indicative of undesired coagulation. Furthermore, a decrease and red shift of the plasmon peak were recorded over time. The observed colloidal instability of the SLS-stabilized system is plausibly associated with its lower magnitude ζ-potential (−22.2 mV) compared with −42.6 mV for the APCG-based dispersion, as determined by DLS. In the biological assays, AgNPs dispersions at concentrations of 1–100 $mg \cdot L^{-1}$ were applied. In the laboratory experiments, root and shoot length and total seedling mass were measured. In the field trials, plant height, plant stand density, and integral yield metrics were assessed. It was found that, during germination in AgNP dispersions, seedling growth parameters remained essentially unchanged at low nanoparticle concentrations and decreased markedly at silver concentrations of 25 $mg \cdot L^{-1}$ and higher. In case of APCG-based dispersions, a weak phytostimulation at low doses was observed. By contrast, in field trials on adult wheat plants, a positive effect was observed. The increase in stem height and plant stand density were accompanied by an increase in yield.

The most favorable outcome corresponded to foliar applications of an AgNP dispersion at 1 mg·L^{-1} done twice (the yield increased by approximately 6.5% relative to the control), whereas further increases in concentration did not confer additional yield growth. To elucidate the basis of the observed bidirectional effects, activities of enzymes associated with redox homeostasis in plant tissues were assayed. In seedlings, low AgNPs doses enhanced peroxidase, catalase, and polyphenol oxidase activities, whereas high doses (up to 100 mg·L^{-1}) led to a pronounced decline. In mature plants, repeated low-dose foliar treatments amplified the enzymatic response, which was consistent with the observed stimulation of morphological parameters and yield, and indicated dose- and stage-dependent modulation of antioxidant plant defense pathways. The study was conducted under the state assignment of Lomonosov Moscow State University, project no. 121031300092-6.

Keywords: silver nanoparticles, wheat, developmental stages, antioxidant enzymes, foliar application, seedling growth, yield.

CIRCULAR ECONOMY IN AGRICULTURE: A TRANSFORMATIVE MODEL FOR A SUSTAINABLE FUTURE

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ABSTRACT

Since the Industrial Revolution, the dominant linear economy model, based on the "take-make-use-dispose" approach, has caused excessive consumption of natural resources and environmental degradation. In line with sustainable development goals, the circular economy model, which emphasizes minimizing waste and utilizing resources within closed loops, has gained importance. The aim of this study is to examine the applicability of circular economy principles in the agricultural sector through global and national policy examples. Conducted using a qualitative research method, the study analyzed national and international academic sources, policy documents, and best practice examples. The European Union Circular Economy Action Plan, selected practices from Chile, China, and Scotland, as well as Turkey's Zero Waste Action Plan were evaluated. The findings were assessed within the framework of a SWOT analysis, highlighting strengths, weaknesses, opportunities, and threats. The analysis reveals that circular economy applications in agriculture hold potential for increasing water and energy efficiency, reducing pesticide and chemical fertilizer use, converting organic waste into compost and biogas, and adopting circular design approaches in agricultural products. Global examples emphasize the critical role of policy support and stakeholder collaboration in the transformation process. In Turkey, raising awareness, enhancing infrastructure investments, promoting technological innovation, and strengthening regulatory compliance are necessary. In conclusion, transitioning to a circular economy model is a strategic imperative for conserving natural resources, ensuring food security, enhancing economic resilience, and combating climate change.

Keywords: Circular economy, agriculture, sustainability, resource efficiency, waste management, SWOT analysis

POTENTIAL OF TRICHODERMA SPP. IN THE BIOLOGICAL CONTROL OF WEEDS

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ABSTRACT

Weeds are among the major pests causing yield loss in agricultural production. This situation has led to the intensive use of herbicides. However, herbicide application poses significant risks in terms of environmental pollution, resistance development, and human health. In this regard, the need for environmentally friendly, sustainable, and integrated plant protection strategies is steadily increasing. Trichoderma species are naturally occurring filamentous fungi in the soil with a high reproduction rate. These species, which are widely used in agriculture, possess multiple biological functions such as promoting plant growth, providing biocontrol against pathogenic organisms, and improving soil health. Recent studies have shown that certain Trichoderma isolates can suppress weed seed germination, inhibit root development, and trigger oxidative stress responses. These effects are generally associated with the secondary metabolites, cell wall-degrading enzymes, and competitive colonization capabilities produced by Trichoderma. Some of the compounds and enzymes released by Trichoderma can prevent weed seed germination, slow down or completely halt the growth of young seedlings. Such effects may occur through various mechanisms, including the disruption of cell structures and the inhibition of nutrient and water uptake. Several studies have demonstrated that species such as Trichoderma harzianum and T. viride can significantly suppress the growth of weeds like Amaranthus spp., Chenopodium spp., and Phalaris sp. Moreover, Trichoderma species can rapidly spread in the soil, competing with weeds in the rhizosphere and limiting their habitat. For these reasons, in recent years, Trichoderma species have been considered not only as agents against plant diseases but also as environmentally friendly biological agents for weed control.

Keywords: Trichoderma spp, Weed management, Sustainable agriculture, Biological control

DIFFERENTIATING CHRONIC KIDNEY DISEASE TYPES USING PHYSICOCHEMICAL PARAMETERS IN AGRICULTURAL AREAS THROUGH EXPLAINABLE MACHINE LEARNING

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ABSTRACT

Chronic kidney disease (CKD) has become a serious public health concern in many agricultural regions. CKD of unknown etiology (CKDu) poses particular challenges in areas affected by soil and water contamination. Environmental factors, such as soil physicochemical properties and the presence of specific chemical compounds, are increasingly recognized as potential contributors to disease risk. This study presents an interpretable machine learning framework to distinguish CKDu from CKD using soil parameters collected from agricultural fields. The dataset includes geographic coordinates (X, Y), disease type, soil type, and seven physicochemical properties: pH, electrical conductivity (EC), fluoride, hardness, phosphate, sulfate, and bicarbonate (HCO_3^-).The best overall performance was achieved by the Gradient Boosting model combined with the SMOTE-Tomek resampling technique, attaining a weighted F1-score of 0.85. This configuration outperformed all other tested models and resampling strategies across evaluation metrics, including accuracy, macro F1-score, macro precision, and macro recall, demonstrating both strong predictive capability and effectiveness in addressing class imbalance. Model interpretability was achieved through SHapley Additive exPlanations (SHAP) analysis. Results indicated that the soil type Reddish brown earth, low humid had the most substantial positive contribution to predicting CKDu, followed by higher EC values and specific patterns in sulphate and hardness levels. Additional soil types and spatial coordinates (X, Y) also influenced predictions, albeit to a lesser extent. These findings highlight the interplay between soil characteristics and CKD types, providing evidence-based guidance for environmental health monitoring. The proposed approach illustrates the potential of integrating explainable artificial intelligence with predictive modeling to improve early diagnosis of CKD types in agricultural communities. By delivering actionable insights for soil and water quality management, it supports targeted public health interventions and sustainable agricultural practices.

Keywords: Chronic kidney disease, Physicochemical parameters, Agricultural soil analysis, Predictive modeling, Explainable machine learning

EFFECTIVENESS OF MECHANICAL PRECISION WEED CONTROL IN ORGANICALLY GROWN WINTER SPELT WHEAT

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ABSTRACT

Weed competition and non-adequate nutrient supply restricts organic spelt wheat production. To control weeds modern machines were used: spring tined harrow and camera guided hoe weeding. To overcome nutrient scarcity soybean was used as previous crop, and additionally organic nitrogen fertilizer was applied in the rate of 50 kg N per ha. The study was conducted in 2024-2025 in organic farm in central Poland, at the village of Kołodziejewo, (N:51°42’35’’, E:18°02’03’’). The experiment was established on medium-heavy soil. In the topsoil (0-30cm) the pH was 7.7, and plant available phosphorus content was medium and potassium content was low - 46.8 mg kg-1 and 96.3 mg kg-1, respectively. In the plots with intensive weed control the first pass was almost the same as in classical weed control method (the difference was replacement of tined weeder by precision spring tined weeder), used in 3-leaf development phase (BBCH 12-15). The second weed control was done with the use of rotary weeder (BBCH 20-25), followed by camera guided precision hoe (BBCH 24-29), followed by rotary weeder at the end of the tillering phase (BBCH 26 - 29), and again by rotary weeder at the beginning of shooting phase (BBCH 30-33). The use of modern weeding machinery reduced weed infestation by ca. 90% and reduced crop lodging. Careful and intensive mechanical weeding resulted in high yields of winter spelt wheat. In classical weed control scheme spelt yielded almost 5 t of dehulled grain per ha, and in the object with precision weeding yields were ca. 20% higher.

Keywords: Organic farming, winter spelt, weed infestation, mechanical weeding, precision weed control, yields

STUDIES ON THE EFFECT OF MANIPULATION OF ORCHARD GROUNDS ON WASPS

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ABSTRACT

There have been needs more studies on pollination and pollinators since the negative effects of the global change has been noticed. Wasps are generally considered harmful insects although they are good pollinators. Companion plants were planted in cherry and peach orchards to determine wasp species. Nineteen wasp species were determined belongs to the Hymenoptera order. The number of wasp species and their populations increased in companion plants sown areas comparing to bare ground of orchards. In addition, insecticide applications caused the decreases on wasp populations. Studies should be continued with integration of weed and insect control measures.

Keywords: Wasp, Orchard, Peach, Pollinator, Weed

EVALUATION OF FUNGICIDE EFFICACY AGAINST NEOSCYTALIDIUM DIMIDIATUM UNDER ELEVATED TEMPERATURE AND CO_2 CONDITIONS

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ABSTRACT

Climate change, characterised by rising temperatures and increasing CO_2 levels, has a significant impact on the incidence and severity of plant diseases and complicates disease management strategies. In Türkiye, Neoscytalidium dimidiatum is a major threat to apricot production, causing branch dieback, bark lesions and ultimately tree death. In this study, the efficacy of various chemical and biological fungicides against this pathogen was evaluated using in vitro assays and an apple bioassay. Four different phytotron conditions were used to assess the effect of elevated temperature and CO_2 levels on fungicide performance: 400, 600, 800 and 1000 ppm CO_2 at temperatures between 26-30°C. Trifloxystrobin, thiophanate-methyl and cyprodinil + fludioxonil based fungicides showed the highest inhibitory effects on mycelial growth in vitro. While phosphorous acid and copper-based fungicides were ineffective in vitro, all fungicides tested significantly reduced disease development compared to the control under all phytotron conditions. However, increased CO_2 levels resulted in larger lesion areas and caused variability in fungicide performance depending on environmental conditions. The results indicate that climate change may alter not only disease dynamics but also the efficacy of current chemical control measures. These results highlight the importance of incorporating environmental factors into future plant disease management strategies to ensure sustainable crop protection under changing climatic conditions.

Keywords: Neoscytalidium dimidiatum, climate change, elevated CO_2, fungicide efficacy, apricot

DEVELOPING A NEW TECHNOLOGY FOR WATER TREATMENT USING NANOTECHNOLOGY-MAGNETIZATION TO ENHANCE IRRIGATION EFFICIENCY AND AGRICULTURAL PRODUCTION IN ARAB COUNTRIES: ARICA23_711

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ABSTRACT

The Arab Research & Innovation Co-Funded Alliances is one of the programs of the executive plan of the Federation of Arab Scientific Research Councils. It is an initiative for multilateral Arab cooperation in the field of scientific research and innovation. ARICA23_711 is one of the selected projects coordinated by Tunisia (ISSTE-Carthage University) and includes five teams from different Arab countries (Tunisia, Egypt, Morocco, Algeria, and Saudi Arabia). The theme focuses on 'New technology for water treatment using nanotechnology-magnetization to enhance irrigation efficiency and agricultural production in Arab countries'. This project has led to the publication of several articles and a patent. Among the studies carried out an innovative and eco-friendly approach to water treatment through the green synthesis of magnetite (Fe3O4) nanoparticles using Moringa oleifera leaf powder extract. SEM, XRD, and FTIR characterized the synthesized nanoparticles. SEM analysis showed an average particle size of approximately 70 nm. XRD confirmed the anatase crystalline phase, and FTIR revealed the presence of Fe-O, O-H bonds, along with organic functional groups derived from the plant extract. The integration of Fe3O4nanoparticles with a magnetic device (nanotechnology/magnetization coupling) significantly enhanced the physico-chemical quality of well water, achieving up to 88% reduction in salinity and 30% decrease in sodium concentration under optimal conditions (70 mg/L, 90 min, 175 rpm). Agricultural assessment of treated water demonstrated considerable improvements in seed germination and plant growth. The germination rate increased by 80.95%, and stem and leaf lengths were enhanced by 23% and 38%, respectively, compared to untreated water. These findings emphasize the potential of nanotechnology, particularly when coupled with magnetic treatment, as a novel, sustainable, and efficient solution for water remediation and agricultural reuse.

Keywords: Water, Agriculture, nanoparticles, Magnetic.

MACHINE LEARNING FOR THE STUDY AND MONITORING OF WATER INFILTRATION

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ABSTRACT

Machine learning can illustrate a prediction method through intelligent models. In this context, this study highlighted campaigns of experimental measurements of soil infiltration under the same climatic conditions. On the other hand, the implementation of this last database was validated to estimate the infiltration of the soil, with the bayesian networks, showing the compaction degree as a function of time and the different soil-related parameters following the passages of tractors, and tillage. This work is a combination between studying water infiltration in agricultural soils using learning machine and the Bayesian statistical method to build an effective estimation. The experimental study carried out on sandy soil texture showed the decrease of the infiltration according to the weight of the machine and the number of passages of the tractors. The soil is much more compressible and the infiltration of water in the plot studied decreases during the passage of tractors. However, the number of passes (two successive passes) reduces the infiltration rate between 19% and 25% compared to infiltration at the level of tilled soils. Thus, estimation by Bayesian networks (BN) showed an effective prediction model. The prediction of soil infiltration by the Bayesian network recorded a high probability of slow soil infiltration in the surface layer not exceeding 25 cm.

Keywords: Water; Soil infiltration; Machine learning

EFFECT OF MAGNETIC INTENSITY ON TREATED IRRIGATION WATER AND SEED GERMINATION

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ABSTRACT

Given the increasing pressure on water resources from overexploitation, pollution and mismanagement, innovative solutions are urgently needed. This study examines the potential of magnetic treatment to improve the quality of different types of water (distilled, tap and well water) and promote barley seed germination. Three magnetic field strengths (0.29 T, 0.33 T and 1 T) were applied to water samples with exposure times of 15, 30 and 45 minutes. Results showed that magnetic treatment altered the pH and electrical conductivity of the water, and significantly improved germination rates. Barley seeds irrigated with magnetized water achieved a germination rate of 39%. Vegetative growth was also improved, with stem length increasing by 23% and leaf length by 38%. These improvements were confirmed by statistical analysis (R2 = 90%).

Keywords: Water treatment; germination seed; Agriculture

SPRAYABLE BIOPOLYMERS WITH MULTIPLE BENEFITS FOR AGRICULTURE

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ABSTRACT

Implementation of effective weed control strategies for crop production is critical as the presence of the weeds in the crop fields compete for resources (light interception, water, nutrients, etc.), reduce the crop yield and cause quality loss and harvest difficulties. The use of effective sprayable bio-based polymer (BBP) mulch formulations which are derived from non-edible and renewable waste materials can be an innovative potential solution for suppressing weeds in major cropping systems while enhancing soil health and agricultural productivity in an environmentally friendly means and eliminate or limit the use of conventional petroleum-based plastics in agricultural operations. BBP formulations are applied as sprayable liquid mulches which form degradable polymers (bioplastics) once they dry. These thin polymers layer on the soil surface can have potential to suppress weed growth, improve soil health and increase crop growth and yield. In this presentation, preparation of BBPs by utilization of low value materials (e.g., low-grade woody biomass, poultry feathers and spent mushroom substrate) will be discussed. The findings suggest that bioplastics developed are completely degradable to safe and non-toxic end products at a reasonable time. Data collected from one-time application of BBP formulations on soybean cropped field plots are very promising. The impact of BBP on soil water status, soil temperature, weed suppression, soil organic matter content, soil nitrogen and crop yield will be discussed in the presentation.

Keywords: Bioplastics, agriculture, mulch, soil health, weed, soybean, crop yield.

AGRICULTURAL WATER MANAGEMENT TECHNOLOGIES

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ABSTRACT

To achieve impact for water resources conservation and enhancing and agricultural crop water productivity (CWP) per unit of input for meeting the food, fiber, feed, fuel, finance and farmstead (6Fs) needs of rapidly increasing world's population, societies must find innovative ways to enable transfer of research- and science-based data, knowledge, information, technology and strategies for adoption in agricultural production fields. This presentation will share historical perspectives of evolution of agriculture and agricultural water management and present a modern era agricultural water management network, its objectives and functions in achieving large scale impacts to enhance water resources management. The Agricultural Water Management Network (AWMN) was established in 2005 to integrate science, research and education/outreach principles in producers' practices to help them to make better-informed decisions, conserve water and energy resources, reduce CO2 emission, and enhance CWP. Extensive data and information on Network's process, progress, and qualitative and quantitative impacts will be presented.

Keywords: Agricultural water management, history, technology.

STUDY OF THE DRYING KINETICS OF APPLE, BANANA AND GRAPE

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ABSTRACT

Food conservation is a key issue in Morocco, as agricultural production is concentrated over a few periods of the year, and food must then be preserved so that it is available for the rest of the year. Drying is one of the oldest and most widely used conservation techniques in the food industry. It extends the shelf life of products by reducing their water content, thus limiting microbial growth and enzymatic reactions. This method also offers advantages in terms of reducing the weight and volume of food, facilitating its storage and transport. The drying process generally involves three main stages: the heating phase, the constant speed drying phase, and the decreasing speed drying phase. For fruit drying, the final humidity of the fruit must be 5%. We studied the drying kinetics at different temperatures applied to three food products: grapes, apples, and bananas. These foods were chosen due to their diversity in terms of composition, texture, and initial moisture content. The objective of this study is to determine and analyze the drying kinetics curves of these products, to understand the physicochemical phenomena that occur during the drying process, and to identify the key parameters influencing the process, particularly the drying temperature. In addition, sensory analysis performed during the drying process allows us to identify the final moisture content to be achieved without compromising product quality.

Keywords: conservation, quality, apple, grape, banana, drying, kinetic

EXPERIMENTAL DETERMINATION OF SORPTION ISOTHERMS OF PARSLEY (PETROSELINUM HORTENSE VAR. FOLIOSUM) FOR ITS DRYING AND CONSERVATION

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ABSTRACT

Drying is a food conservation method that involves removing water, thereby slowing the growth of bacteria, yeasts, and molds. Determining sorption isotherms is an essential step and a preferred way to understand and determine the final water content to be achieved in order to optimize product storage and drying conditions. At equilibrium, the relationship between water activity (aw) and water content (Xeq) of a material can be graphically represented by a curve called sorption isotherm Xeq=f(aw). Determining the sorption isotherm of a food product is very important for its preservation. In this work, the moisture adsorption isotherm of a parsley variety (Petroselinum hortense var. foliosum) which is the most abundant and consumed in Morocco is determined experimentally at different temperatures which are 30, 40, 50 and 60 °C by the static gravimetric method based on saturated saline solutions prepared with MgCl2, Mg(NO3), NaCl, LiCl, NaBr, KCl and BaCl2. For modeling and predicting the hygroscopic behavior of foods during storage or drying, numerous mathematical models have been described in the literature to describe the water adsorption isotherms of foods. The GAB (Guggenheim-Anderson-de Boer) equation is the most widely used model. The GAB equation is chosen to describe the sorption isotherm of parsley. From the experimental data, the parameters of the GAB model are calculated using a numerical solution of nonlinear equations based on the least squares method and the quasi-Newton-Raphson optimization method.

Keywords: adsorption, isotherm, drying, conservation, parsley, modeling

HYDROSMART: A RESEARCH-GRADE STATION FOR HYDROPONIC SOLUTIONS DESIGN

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ABSTRACT

With the increase in demand for food production, combined with the scarcity of water and lack of availability of acres of fertile land in many regions like in Qatar, the difficulties and higher costs with traditional farming become apparent. Hydroponics offer a more sustainable alternative for such scenarios. However, current hydroponic systems usually suffer from inefficiencies regarding resource usage, especially with water and nutrients. These often lead to high operational costs and reduced sustainability, limiting the potential for widespread implementation of hydroponics, especially in regions where resources are scarce. In addition, the existing hydroponic farms utilize secret and fixed plant-recipes for growing specific crop. These recipes are limited by the operational conditions, specifically temperature, humidity, and lighting conditions, and may or may not function in all given operating conditions. The presented work in this paper addresses this problem by developing an advanced hydroponic system which empowers researchers to monitor and control every aspect of plant growth in real-time. This could enable researchers to develop new recipes, more resilient parametric conditions for plant growth for a given environment, and develop newer combinations of plant growth. By integrating various sensors and having a website which allows authorized users to monitor plant health conditions by having the ability to make adjustments. The autonomy of this system stems from the computer vision aspect of the design which periodically takes photos of the plants and using AI-based techniques gives insights related to the overall growth of the plants for research and production purposes. The system's web-based interface provides complete autonomy and the ability for remote adjustments by the user, further enhancing the system's flexibility and accessibility. The interface also features frequent data storage and updates, alongside specific data visualization techniques to graphically represent trends, which enables researchers to track their progress and monitor the effectiveness of their experiments. To make the system more sustainable and affordable, maximizing efficiency is critical. This is achieved by utilizing resources more effectively and minimizing any potential waste. By automating nutrient delivery based on sensor data the hydroponic system ensures that plants continuously receive the right amount of nutrients. This approach helps lower costs and makes the system eco-friendlier, supporting water conservation efforts, especially in arid regions. The computer vision models achieved high accuracy where the mean average precision of 99.70% and mean IoU of 92.93%, while the YOLOv11-CLS classifier reached up to 97.77% accuracy on nutrient deficiency detection. Most notably, the unit achieved control over the RGB lights allowing users to input their desired configuration from an easy-to-use dashboard and the changes being reflected on the hydroponics system.

All in all, this work aims to offer a comprehensive and sustainable solution to optimize plant growth. By incorporating real time monitoring, automation, and AI-based decision-making, the system provides researchers with the tools needed to experiment and refine plant growth processes while minimizing resource usage. The novel aspects of the design being autonomous action, continuous sensor and actuator monitoring, lighting control for a huge set of possible color combinations, AI-based vision feedback for plant health monitoring, and web interface for remote access. It is strongly believed that this design will help researchers develop newer recipes in much shorter time and will be able to produce better crops with increased yield.

Keywords: Hydroponic Research, AI-based Automation, Computer Vision, Web-based control

TECHNO-ECONOMIC EVALUATION AND CONCEPTUAL DESIGN OF A DUAL-COMPARTMENT NUTRIENT MIST BIOREACTOR SYSTEM FOR SCALABLE AMF BIOFERTILIZER PRODUCTION

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ABSTRACT

The cost-effectiveness of industrial-scale production of arbuscular mycorrhizal fungi (AMF) biofertilizers using nutrient mist bioreactors (NMBs) compared to traditional soil-based methods remains a critical question for advancing sustainable agriculture. This study evaluates a scalable, two-phase NMB system employing Agrobacterium rhizogenes-transformed root cultures, designed to spatially and temporally separate root biomass propagation and AMF colonization within a dual-compartment mesh matrix that closely mimics natural rhizosphere interactions to optimize symbiotic development. Downstream processing integrates lyophilization and formulation steps to produce stable biofertilizer products tailored for Moroccan agricultural contexts. Economic analysis reveals a highly profitable model, with a unit production cost of 500 MAD per bag, a payback period under five months, and a return on investment exceeding 260%. Implementation of this innovative bioreactor system demonstrates great promise for scalable, cost-effective AMF biofertilizer production. However, to unlock its full potential, key challenges must be addressed—particularly the labor-intensive AMF performance testing and effective management of root senescence, which currently limit process consistency and scale-up. Additionally, regulatory ambiguities in Morocco regarding transformed root cultures create barriers to commercialization. Overcoming these bottlenecks through automation, real-time monitoring, and proactive policy engagement will be essential to fully realize the environmental and economic benefits of this technology.

Keywords: AMF biofertilizer; Techno-economic; conceptual design; mist bioreactor

A WEARABLE 3D-GLOVE SYSTEM FOR HYPERSPECTRAL AND CONTACT IMAGING OF ROOT AND RHIZOSPHERE MICROBIOMES : A CONCEPTUAL DESIGN

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ABSTRACT

Monitoring root systems and their associated rhizosphere microbiomes is critical for advancing sustainable agriculture and understanding plant-microbe interactions. Traditional microrhizotron systems rely on rigid transparent tubes and fixed cameras, which restrict flexibility and often limit imaging angles. We propose two novel wearable glove-based designs that address these limitations by enabling non-destructive, in situ root and microbial rhizosphere detection with enhanced mobility and spectral sensing capabilities. The first design integrates a 360° hyperspectral camera controlled by miniaturized geared stepper motors mounted on a wearable glove, allowing dynamic panoramic imaging around root zones. The second design employs Contact Image Sensors (CIS) embedded along the glove's palm and fingers for high-resolution, direct-contact scanning of root surfaces and biofilms. This conceptual design paper presents the architecture, components, expected functionality, and potential agricultural and research applications of these gloves. We also discuss their complementary phenotypic differences, limitations, and future prototyping plans.

Keywords: 3D-Glove System; Root and Rhizosphere Microbiomes

FUNCTIONALIZATION OF RAW BIOMASS WITH MAGNESIUM OXIDE : SYNTHESIS AND CHARACTERIZATION

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ABSTRACT

In this work, we introduce a novel modification of lignocellulosic biomass derived from apricot kernel shells, utilizing composite activation with KI/KOH and functionalization with a tolerant material, specifically Magnesium Oxide (MgO). The resulting materials unmodified apricot kernel shells Raw biomass (RB), modified apricot kernel shells actived biomass (RB-A), and doped apricot kernel shells active and functionalized biomass (RB-AF) were characterized through various techniques, including infrared spectroscopy (FTIR), scanning electron microscopy with energy-dispersive X-ray spectroscopy (SEM-EDX), thermogravimetric analysis (TGA), X-ray diffraction (XRD), and point of zero charge (pHpzc). The performance and specific capacity of these adsorbents were assessed in batch adsorption experiments using basic fuchsine dye (BF). Results indicated that just 90 minutes and 0.1 g of RB-AF or RB-A could remove 93% and 91% of basic fuchsine, respectively, from aqueous solutions at a concentration of 20 mg/L in a 100 ml volume. Both RB-A and RB-AF adsorbents demonstrated the ability to be reused for up to five cycles before their efficiency dropped below 50%, requiring only a drying process at 105°C for 4 hours instead of extensive regeneration. The adsorption process was further analyzed under various conditions, including contact time; initial adsorbent dose, initial dye concentration, initial pH, and temperature. Kinetic studies revealed that the pseudo-second-order model provided a better fit than the pseudo-first-order and intraparticle diffusion models. Additionally, the equilibrium adsorption data for BF were best represented by the Langmuir isotherm, outperforming the Freundlich and Temkin isotherms.

Keywords: Characterization, Raw biomass, Functionalization, Dye, Adsorption, Apricot Kernel shells

DETERMINING THE PROPERTIES OF ORGANIC FERTILIZERS FOR DEM MODELLING: EXPERIMENTAL ASSESSMENT AND CALIBRATION

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ABSTRACT

The increasing demand for sustainable agricultural practices has spurred global interest in organic fertilizers due to their reduced environmental impact and reliance on renewable resources. However, these materials often exhibit suboptimal physical and mechanical properties, particularly in their commonly used cylindrical forms, which can hinder efficient handling, storage, transport, and uniform field application. This study investigates novel spherical granulated organic fertilizers to evaluate whether their geometry enhances distribution performance compared to conventional shapes. Experimental measurements of the static and dynamic angles of repose were conducted for five distinct types of organic granular fertilizers. These empirical results were subsequently employed to inform and calibrate Discrete Element Method (DEM) simulations, enabling accurate modelling of bulk material behavior. DEM-based approaches offer a cost-effective alternative to labor-intensive physical trials, allowing for detailed analysis and optimization of fertilizer properties to enhance spreading uniformity and minimize mechanical degradation during handling. The findings of this study support the advancement of sustainable fertilizer application practices in modern agriculture through improved material design and predictive modelling.

Keywords: Granular organic fertilizers, fertilizer properties calibration, DEM simulation

EFFECTS OF NANOPARTICLES ON MORPHOLOGICAL CHARACTERISTICS AND SECONDARY METABOLITE PRODUCTION OF SNAPDRAGON FLOWERS

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ABSTRACT

Antirrhinum majus is a perennial plant belonging to the Scrophulariaceae family. This study was conducted to investigate the effects of different concentration (0, 50, 100, and 150 µM) of chitosan-coated iron oxide nanoparticles (chitosan coated IONPs) and silver nanoparticles (0, 50, 100, and 150 mg/L-1) (AgNPs) on morphological traits and secondary metabolites of snapdragon plant under greenhouse conditions. The experiment was designed as a factorial arrangement within a completely randomized design with four replications. The evaluated traits was stem diameter, bud diameter, fresh weight of aerial parts, number of lateral branches, chlorophyll content, total sugars, flavonoids, and antioxidant capacity (DPPH). Analysis of variance revealed that nanoparticles significantly ($p < 0.01$) affected fresh weight of aerial parts, stem diameter, and number of lateral branches, while the effect on bud diameter was significant at the 5% probability level. Additionally, the interaction effects of nanoparticles on total sugars, flavonoids, and DPPH were significant at the rate of 1% level. The highest fresh weight of aerial parts and number of lateral branches were observed in the treatment with 100 µM chitosan-coated iron oxide nanoparticles and 50 mg/L silver nanoparticles, whereas the maximum levels of total sugars, flavonoids, and antioxidant capacity were recorded with 150 mg/L silver nanoparticles and 150 µM chitosan-coated iron oxide nanoparticles. These findings underscore the potential of nanotechnology in enhancing the growth, quality, and antioxidant properties of snapdragon. The observed increase in secondary metabolites at higher concentrations may be linked to the stimulation of biosynthetic pathways and mitigation of oxidative stress. Future research is recommended to focus on optimizing nanoparticle concentrations, assessing long-term effects, and elucidating the molecular mechanisms underlying these impacts to promote sustainable agricultural productivity.

Keywords: Antioxidant, Iron oxide, Nanoparticles, secondary metabolites.

TURNING REAL-WORLD MAIZE SEED PRODUCTION RESULTS INTO DECISION-MAKING INFORMATION WITH REMOTE SENSING AND DYNAMIC VEGETATIVE INDICES

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ABSTRACT

Seed production is a key step of successful maize production and the substance of seed business. Maize seed production is organized in a way in which four to six rows of female inbred lines are planted and detasseled, separated by two to four rows of pollen-shedding male inbred line. Fields are usually separated by the buffer zones with no maize. Additionally, since the inbred lines are used, extensive watering and high-inputs are required, pushing the input to output ratio of agricultural production of this type extremely high. Due to these reasons, extensive monitoring of seed productions is required to ensure profitability. Satellite remote sensing provides high amounts of data with temporal dynamics at nearly no cost. However, static traits relying on mean values at certain timepoints are used by most of state-of-the-art solutions. The objective of our research was to investigate how the traits utilizing the temporal dimension of remote sensing data can benefit the decision-making process. The yields of 71 full-scale maize seed production fields from Southwestern Turkey were harvested and measured between 2021 and 2024 with industrial weighting scale at TK Tohum seed processing facility in Altınova, Balıkesir before and after shelling and the moisture was estimated in five replicates with Perkin Elmer InfraMatic 8800 Grain Analyzer. The multispectral Sentinel-2 satellite imagery was download based on polygons in a batch process combining Google Earth Engine and Python library 'requests'. Totally 22 vegetation indices were calculated utilizing visual, near infrared and short-wave infrared channels. Polygon-based mean values at 30, 45, 60, 75, 90, 105 and 120 days after planting (DAP) were considered static traits, while area under curve (AUC) integrals of 45-day windows were considered dynamic traits. Partial least squares models were trained and calibrated using a 5-fold cross validation. Models showed that grain yield can be more effectively predicted by dynamic traits compared to the static ones. Most predictive AUC was from 30 to 75 DAP (r=0.58, p

Keywords: maize seed production, management, remote sensing, data-driven, satellite

FROM SOIL TO SURVIVAL: PGPB-TRIGGERED DEFENSE AND ADAPTATION IN PLANTS

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ABSTRACT

Plants and beneficial soil bacteria engage in dynamic and reciprocal interactions that influence plant development, nutrient acquisition, and stress resilience. Among these, plant growth-promoting bacteria (PGPB) have garnered considerable attention due to their ability to support plant health through a range of biochemical and physiological mechanisms. These bacteria produce a variety of bioactive compounds that enhance plant stress tolerance, improve nutrient availability, and offer protection against phytopathogens. PGPB influence plant performance through both direct and indirect mechanisms. Direct pathways include the biosynthesis of phytohormones (such as indole-3-acetic acid), solubilization of essential nutrients like phosphate, zinc, and potassium, ammonia production, and atmospheric nitrogen fixation. Indirectly, they contribute by secreting siderophores, lytic enzymes, hydrogen cyanide, and antibiotics, which suppress harmful microorganisms and enhance plant immunity. These functional traits position PGPB as valuable components in sustainable agriculture, especially for the development of bioformulants including biofertilizers, biopesticides, and biofungicides. Such alternatives reduce dependency on chemical inputs and contribute to environmentally responsible crop management. Nonetheless, despite the expanding repertoire of beneficial strains, the practical implementation of PGPB in agriculture remains challenging. Factors such as microbial survival, strain specificity, plant-microbiome compatibility, and fluctuating environmental conditions can influence their efficacy in field applications. This review explores recent advances in understanding PGPB-mediated plant adaptations to abiotic and biotic stressors, with emphasis on molecular mechanisms, signaling pathways, and metabolite production. It also discusses formulation strategies and delivery systems designed to maximize their stability and performance. Ultimately, leveraging PGPB potential requires a deeper integration of microbiology, plant physiology, and environmental science to ensure their consistent and scalable use in sustainable agricultural systems.

Keywords: Plant Growth-Promoting Bacteria, stress tolerance, sustainable agriculture, biocontrol

TOXIC DIALOGUES: HERBICIDES, MICROBIAL VOICES, AND THE ECOSYSTEM'S RESPONSE

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ABSTRACT

Herbicides, long heralded as precise tools in agricultural management, leave behind echoes that reverberate through the most intimate layers of ecological networks. This study explores how herbicidal interventions—especially those involving compounds like glyphosate—silently alter microbial communities that anchor essential ecosystem functions. These non-target effects begin at the microscopic scale, where shifts in soil microbiome composition interrupt vital processes such as nutrient cycling, rhizosphere signaling, and plant–soil feedback mechanisms. Framed through a microbiome-centric lens, we present a synthesis of recent studies alongside conceptual models illustrating how herbicide residues serve not only as chemical stressors, but as agents that restructure the metabolic dialogues among microbes and their hosts. Alterations in microbial diversity and function affect plant vitality, reduce resilience to biotic and abiotic stresses, and cascade upward to influence animal performance, herbivory dynamics, and pollination success. As herbicides disrupt these finely tuned interdependencies, we observe potential tipping points that may reshape ecosystem trajectories and even influence microbial and host evolution. More than collateral damage, microbial responses to herbicidal exposure represent a silent rebellion—one with the power to mediate or magnify ecological instability. We advocate for integrative strategies that acknowledge microbiome health as a central criterion in agrochemical risk assessments. Understanding these subterranean symphonies is essential for mitigating the long-term consequences of anthropogenic disturbance and for crafting sustainable, microbe-conscious stewardship of ecosystems.

Keywords: microbiome, herbicides, soil microbial networks, environmental resilience, agrochemical impact, microbe-mediated risk

TECHNICAL AND ECONOMIC ANALYSIS OF THE SOLAR ENERGY SYSTEM DESIGNED FOR EDIRNE PROVINCE AGRICULTURAL RESEARCH INSTITUTE BUILDING IN THE CASE OF ROOF AND FACADE APPLICATION

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ABSTRACT

Solar energy is considered a sustainable resource due to its infinite availability, safety, and the fact that it does not emit greenhouse gases into the atmosphere. Numerous academic studies have been conducted on photovoltaic (PV) panels used in electricity generation from solar energy. While rooftop installations are the most common applications in buildings, interest in alternative installations such as balcony railings, terrace shading systems, and facade cladding is increasing due to various constraints and site specific conditions. In high rise buildings in particular, limited roof space or an unfavorable roof orientation makes PV facade applications a viable alternative. However, for such applications, accurately modeling the solar energy conversion system and conducting thorough technical and economic analyses are of critical importance. Therefore, before installation, the system should be modeled to analyze investment cost, energy efficiency, and payback period. One of the most commonly used software tools for modeling and simulating solar energy systems is PV*Sol. In this study, a 75 kW self consumption solar energy system was designed and analyzed using PV*Sol software, based on the location data of the Agricultural Research Institute Building in Edirne, Turkey. Two scenarios were evaluated: installation on the South facing roof and on the South facing facade of the building. The results show that for both applications, the total investment cost is ₺2,235,600. The payback period is 7.9 years for the rooftop installation and extends to 8.5 years for the facade application. Additionally, it was determined that the rooftop system would prevent approximately 49.244 kg of CO_2 emissions annually.

Keywords: Energy, Solar Energy, PV*Sol Software, PV Panel, Sustainability

SMALL PARTICLES, BIG IMPACT: THE ROLE OF NANOFERTILIZERS IN IMPROVING FOOD QUALITY

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ABSTRACT

Modern agriculture is increasingly challenged by soil degradation, reduced crop productivity, and the growing global demand for high-quality, nutrient-rich, and safe food. In recent years, nanofertilizers have emerged as a promising innovation in sustainable farming, offering enhanced nutrient delivery, reduced environmental impact, and potential improvements in food quality. This review paper aims to explore the current scientific understanding of how nanofertilizers influence various dimensions of food quality, including nutritional composition, sensory characteristics (such as taste, texture, and appearance), and overall safety for human consumption. Nanomaterials used in fertilizer formulations possess unique physicochemical properties, including high surface-area-to-volume ratio and controlled-release capabilities. These characteristics allow for more efficient absorption of essential macro- and micronutrients by crops, leading to increased concentrations of beneficial compounds such as vitamins, minerals, amino acids, and antioxidants in edible plant parts. In some studies, nanofertilizers have also been shown to enhance shelf life and reduce the accumulation of potentially harmful substances like heavy metals and pesticide residues. However, while the advantages are noteworthy, concerns remain regarding the possible toxicity of nanoparticles, their bioaccumulation, and long-term impacts on human health and ecosystems. The lack of standardized testing protocols and regulatory oversight further complicates the evaluation of risks versus benefits. A balanced and science-based approach is essential for assessing the viability of nanofertilizers in food production. Further interdisciplinary research is needed to develop safe application strategies, understand the interactions between nanomaterials and plant systems, and ensure that advances in agricultural nanotechnology contribute positively to both food security and public health.

Keywords: Nanofertilizers, food quality, nanotechnology, nutrient uptake, plant nutrition.

THE EVALUATION OF AGRICULTURAL DROUGHT IN COASTAL AND INTERIOR REGIONS BASED ON DROUGHT INDICES

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ABSTRACT

Agricultural activities constitutes one of the most crucial components of the life cycle. Hence, ensuring efficient and continuous agricultural production is of critical importance. Currently, shifting climate change has led to significant changes in precipitation regimes, both in quantity and seasonal distribution. This situation dynamically affects the water requirements essential for agricultural practices. Conducting drought analyses for agricultural regions is directly related to water management in the agricultural sector. In drought analyses, the Standardized Precipitation Index (SPI) method, frequently preferred in both literature and practice, is a highly effective approach for assessing drought conditions in regions over the short and medium term. In this study, precipitation data from two meteorological stations located along the coastline and in the inland regions of the Western Black Sea were used to perform a drought analysis based on the SPI method. Among these two stations, Akçakoca station is situated along the coastline, while Düzce station is located in the inland area. The analysis, using precipitation data from 2000 to 2023, produced three-month period SPI values, which are frequently used in agricultural drought assessments. A drought classification was then performed based on the obtained precipitation indices. Thus, recent drought patterns have been identified. Drought variations due to the locations between the two selected regions, one inland and the other along the coastline, have been highlighted.

Keywords: Drought, Agricultural, SPI, Climate

THE ROLE OF HOBBY GARDENS IN ADVANCING SUSTAINABLE URBAN AGRICULTURE

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ABSTRACT

Rapid urbanization in recent years has weakened the connection between individuals and nature and distanced urban residents from food production processes. This study aims to examine the contributions of hobby gardens to the sustainability of urban agriculture in its social, economic, and environmental dimensions and to offer recommendations for local governments' policy development processes. The study is based on an examination of various academic articles, reports, and field research published in recent years. The data obtained through the literature review were evaluated within the framework of general trends, and their social, environmental, and economic contributions were summarized under main themes. Hobby gardens are observed to strengthen community ties, contribute to an increase in agricultural knowledge and skills, and provide positive effects on individuals' mental health. Furthermore, positive impacts such as increasing green spaces in urban areas, supporting ecological balance, and offering an alternative production model that enhances food security have been frequently reported. Hobby gardens stand out as an important tool for the development of sustainable urban agriculture. It is recommended that local governments support these areas with projects focused on education and social interaction and develop regulations that will popularize urban agriculture. These practices will contribute to the construction of sustainable and resilient cities by strengthening individuals' connection with nature.

Keywords: Urban farming, Sustainability, Hobby gardening, Community gardens, Food security

OPTIMISATION OF AGRICULTURAL AND ENERGY EFFICIENCY THROUGH SELECTIVE SPECTRAL UTILISATION

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ABSTRACT

Sustainable agriculture requires the simultaneous and efficient use of natural energy resources, i.e., solar energy. Agrivoltaic (AV) systems offer integrative solutions to enable both agricultural cultivation and photovoltaic (PV) energy generation to occur within the same physical space. This study reviews spectrum-controlled PV technologies, in which the solar spectrum is selectively managed. Particular emphasis is placed on semi-transparent materials—such as perovskite, organic, and thin-film based PV cells—evaluating their optical transmittance, spectral absorption, and quantum efficiency properties of these structures. Furthermore, the compromise between the photosynthetically active radiation requirements of plants and the spectral response of PV materials is analyzed based on application examples reported in the literature. The article classifies the available technologies for optimizing both agricultural yield and energy conversion efficiency in spectrum-selective AV systems, highlighting their benefits and limitations. Finally, potential areas of future development, open research questions, and opportunities for interdisciplinary collaboration are discussed.

Keywords: Agrivoltaic Systems, Spectral Selectivity, Semi-Transparent Solar Cells, Quantum Efficiency, Agriculture-Energy Integration

IDENTIFICATION OF THERMAL CHARACTERISTICS OF SOUTH SULAWESI COFFEE SKIN AS A BIOPOLYMER MATERIAL

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ABSTRACT

An abundant agro-industrial byproduct, coffee husk waste holds promise as a sustainable biopolymer precursor to bolster food security, green energy, and circular-economy initiatives. Typically discarded or relegated to low-value compost were sourced from two major varieties (Arabica and Robusta) in South Sulawesi, processed by wet (fully washed) and natural methods. After cleaning and milling to 100 μm, samples were conditioned to constant moisture and analyzed by differential scanning calorimetry (DSC) to determine key thermal parameters: glass transition (Tg), melting onset/offset (Tm,onset/Tm,offset), crystallization temperature (Tc), enthalpy of melting/crystallization (ΔHm/ΔHc), and specific heat capacity (Cp). Testing employed 5 mg samples heated to 150 °C at 10 °C/min, while moisture content and bulk density were assessed by thermogravimetry and standard volumetric methods, respectively. Robusta husk processed naturally from Bantaeng exhibited the lowest Cp (137.6 $J \cdot g^{-1} \cdot °C^{-1}$) with Tm,onset/Tm,offset of 42.6 °C/144.0 °C. In contrast, fully washed Arabica husk from Bantaeng showed the highest Cp (148.9 $J \cdot g^{-1} \cdot °C^{-1}$) and elevated melting temperatures (48.2 °C/148.0 °C). The greatest crystallization and melting enthalpies occurred in Robusta husk processed naturally from Bantaeng (ΔHc = 302.2 $J \cdot g^{-1}$; ΔHm = 295.8 $J \cdot g^{-1}$), indicating apparent crystallinity. These variations reflect the influence of botanical variety and processing on thermal stability, which is critical for downstream polymer formation and processing. Overall, the pronounced thermal resilience and modifiable heat capacity of coffee husk underscore their viability as eco-friendly raw materials for biodegradable plastics and functional composites. By valorizing an abundant agro-industrial byproduct, this approach supports sustainable material innovation and contributes to waste-to-wealth strategies in coffee-producing regions.

Keywords: coffee husk, thermal characteristic, biopolymer, differential scanning calorimetry, waste

ASSESSING THE POTENTIAL OF COFFEE FERMENTATION BY-PRODUCTS THROUGH COLOR METRICS IN OHMIC HEATING-BASED PROCESSING

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ABSTRACT

Ohmic heating-based fermentation employing a semi-carbonic maceration approach has recently emerged as an innovative method for coffee processing, wherein whole coffee cherries are fermented without prior separation of the skin and pulp. In addition to modifying the characteristics of the coffee beans, this technique may facilitate the extraction of bioactive compounds, such as anthocyanins, from the fruit skin into the surrounding liquid medium. This study represents an initial investigation into the influence of processing conditions on the colorimetric properties of the resulting by-product solution, with a focus on its potential as a source of anthocyanins. Fermentations were conducted at 31 °C and 35 °C for 36 hours, with data collected every 4 hours. Color parameters (L*, a*, b* value) and pH were measured and used to calculate color difference (ΔE), chroma variation (ΔC), and hue angle. Results indicated perceptible color changes beginning at 16 hours, characterized by a decrease in L* value, increases in ΔC and ΔE, and a hue angle shift from the dark green to the red region. Concurrently, the pH of the solution decreased, suggesting enhanced anthocyanin stability under acidic conditions. These findings provide evidence of anthocyanin extraction during fermentation and support further investigation into the characterization and valorization of bioactive compounds in fermentation by-products.

Keywords: arabica, semi-carbonic maceration, extraction, agricultural waste

EXPLORATORY FACTOR ANALYSİS OF FRUİT FARMERS' ECO-FRİENDLY AGRİCULTURAL TECHNİQUES APPLİCATİONS İN TERMS OF SUSTAİNABLE AGRİCULTURE-ENVİRONMENT RELATİONS: EVİDENCE FROM EĞİRDİR LAKE İN TURKEY

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ABSTRACT

The agricultural sector today faces multidimensional threats such as climate change, depletion of natural resources, environmental pollution, and biodiversity loss. This necessitates the widespread adoption of environmentally friendly practices, particularly in input-intensive agricultural systems such as fruit growing. The Lake Eğirdir basin, located in Türkiye's Western Mediterranean Region, serves as a notable example in this regard. Lake Eğirdir, Turkey's fourth largest freshwater source, is both a drinking water reservoir and the center of the region's agricultural activities, based on apple and cherry production. However, the increased use of pesticides and chemical fertilizers leads to deterioration of water quality in the lake ecosystem, posing a significant risk to environmental sustainability. This study examined the level of adoption of environmentally friendly agricultural techniques by fruit farmers around Lake Eğirdir using factor analysis. The Cronbach's alpha value for a 24-item scale, based on data obtained from 135 producers, was found to be 0.733. As a result of the factor analysis, eight main factors were revealed that explain 64.72% of the total variance: Factor (1) Sustainable Soil and Pest Management; Factor (2) Controlled Input Use; Factor (3) Sustainable and Traceable Agricultural Practices; Factor (4) Conscious Approach to Input and Product Processes; Factor (5) Conscious Weed Control; Factor (6) Ecological Sensitivity in Agricultural Practices; Factor (7) Environmental Awareness and Access to Information; Factor (8) Conscious and Controlled Agricultural Production. The results obtained reveal that sustainability and ecological awareness are also important determinants in farmers' agricultural activities. They also emphasize the necessity of disseminating an environmentally sensitive production approach for the protection of Lake Eğirdir.

Keywords: Sustainable agriculture, environmentally friendly practices, fruit growing, Lake Eğirdir

MODERN TECHNOLOGICAL APPLICATIONS FOR SUSTAINABLE TURF MANAGEMENT SYSTEMS

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ABSTRACT

Turfgrass is the predominant vegetation cover in many urban landscapes, including athletic fields, institutional and residential lawns, parks, and golf courses. Maintaining these areas requires continuous management of mowing, irrigation, fertilization, and pest control to sustain quality and functionality. Traditional practices, often based on visual inspection or fixed schedules, can result in inefficient input use, increased costs, and negative environmental impacts. Technology-enhanced turfgrass management addresses spatial and temporal variability through site-specific data collection, georeferenced mapping, and targeted applications. A wide range of sensing technologies have been successfully implemented for this purpose. Near-infrared spectroscopy (NIRS), hyperspectral cameras, multispectral cameras, color measurement systems, spectroradiometers, thermal cameras, and some other optical sensors cover wavelengths from visible to thermal and have been applied to nutrient deficiency assessment, weed, disease and pest detection, irrigation scheduling, and site-specific cultivation. Site-specific turfgrass management can be implemented in two main ways: sensor-based applications, which use real-time measurements to guide immediate actions, and map-based applications, which rely on georeferenced data to create spatial variability maps for subsequent targeted inputs. Remote sensing platforms range from handheld devices to UAV-mounted multispectral, hyperspectral, and thermal cameras, enabling early detection of stress, disease, and nutrient deficiencies. Electromagnetic induction (EMI) for electrical conductivity (EC) mapping correlates strongly with soil moisture, turfgrass vigor (NDVI), and compaction, allowing for the delineation of management zones. Variable-rate irrigation (VRI) systems, integrating soil moisture probes and valve-in-head sprinklers, deliver water only where and when required. Recent advances in machine learning (ML) and artificial intelligence (AI) have further improved the precision, automation, and accessibility of these applications. ML-driven decision support for VRI has been shown to reduce runoff by over 70%. Deep convolutional neural networks (DCNNs) have demonstrated more than 99% accuracy in weed detection for spot spraying, achieved 0.80–0.90 accuracy in dollar spot disease identification, and delivered high detection metrics using YOLO-based see-and-spray systems. ML-based turfgrass growth prediction models can reach R^2 values up to 0.74 for site-specific nitrogen requirement estimation, enabling reduced fertilizer use compared to conventional decision methods while maintaining turfgrass quality. Large-scale research programs are now integrating UAV and robotic sensing platforms with AI-powered decision-support tools to optimize irrigation, nutrient management, and pest control in real time. These developments highlight a transition from standalone sensing to interconnected, intelligent turfgrass management systems, delivering measurable gains in efficiency, sustainability, and cost-effectiveness. This evolution demonstrates how decades of sensor-based applications now converge with advanced AI solutions, offering new opportunities for sustainable turfgrass system management.

Keywords: Turfgrass management, Variable-rate application, Machine learning, Sustainability, Proximal sensing systems

EFFECT OF MAGNETIC FIELD INTENSITY ON WATER TREATMENT

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ABSTRACT

Water is an essential but limited resource in Tunisia, threatened by salinity and climatic conditions. Magnetic water treatment is emerging as a promising ecological solution to improve saline water quality and agricultural productivity. This study evaluates the effect of different magnetic fields on irrigation water and the growth of sensitive crops such as tomato and radish. The results of this study showed a progressive increase in pH, a reduction in electrical conductivity, reflecting a decrease in salinity, as well as a decrease in surface tension and water hardness via the decrease in Ca^{2+} and Mg^{2+} ion concentrations. Magnetic treatment had a marked positive effect on seed germination. Radish seeds and tomato seeds showed the best germination rates with the M2(0.5T) and M3(0.35T) devices.

Keywords: Water; Treatment; Agriculture

PRACTICES ENHANCING ANDROGENESIS EFFICIENCY IN EGGPLANT (SOLANUM MELONGENA L.) ANTHER CULTURE

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ABSTRACT

Eggplant (Solanum melongena L.) is an agriculturally and economically significant vegetable species belonging to the Solanaceae family, with extensive cultivation areas both globally and in Turkey. The development of haploid embryos through anther culture in economically important crops such as eggplant represents a crucial step in modern plant breeding and genetic research. Among haploidization techniques, androgenesis-based anther culture is considered the most practical and efficient method for eggplant, enabling the rapid production of doubled haploid (DH) lines that are essential for hybrid breeding programs (Mulyana et al., 2023; Vural et al., 2019). Numerous factors influence the success of androgenesis in eggplant. Cold pretreatment (4°C for 3–7 days) and heat shock applications (32–35°C) have been shown to stimulate microspore embryogenesis by inducing stress responses that reprogram microspores toward sporophytic development. Additionally, the composition of the culture medium plays a critical role in embryo induction. The synergistic use of maltose, silver nitrate ($AgNO_3$), and activated charcoal has been demonstrated to significantly enhance embryogenic responses and embryo formation (Ellialtıoğlu et al., 2012; Dumas de Vaulx & Chambonnet, 1982). Genotype is another key determinant of androgenic efficiency. Cultivars such as Kemer, Halep Karası, Mustang F1, and Provita F1 have shown superior embryogenic potential under optimized culture conditions. The developmental stage of the microspores at the time of anther excision is also crucial; the late uninucleate to early binucleate stages are considered optimal for embryogenesis, as morphological characteristics of flower buds at these stages directly influence the success of in vitro regeneration (Calabuig-Serna et al., 2020). Recent advances in doubled haploid technology have led to the refinement of anther culture protocols, with modified versions of the DDV method yielding significantly higher embryo and plantlet production rates. Comparative studies have highlighted the importance of protocol customization based on genotype and environmental conditions, offering promising alternatives to conventional breeding approaches (Mir et al., 2021; Mulyana et al., 2023). This review synthesizes current strategies aimed at improving androgenesis efficiency in eggplant anther cultures, focusing on stress pretreatments, medium composition, and genotype selection. By integrating recent findings and technological innovations, it provides a comprehensive framework for future research and practical applications in eggplant breeding.

Keywords: Solanum melongena L., anther culture, androgenesis, in vitro, double habloid

DEVELOPMENT OF MIDWAY BREEDING MATERIALS RESISTANT TO POWDERY MILDEW (LEVEILLULA TAURICA) IN PEPPER

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ABSTRACT

Peppers are among the most significant vegetable crops in our country and worldwide in terms of cultivation area, production, and trade. Peppers (**Capsicum annuum** L.), which are produced throughout the year, are under constant pressure from various pathogens. Recently emerging biotic and abiotic conditions caused by viruses, bacteria, and fungi have limited pepper production. Among these, **Leveillua taurica**, the causative agent of powdery mildew, is an obligate biotrophic pathogen that causes significant infections worldwide and leads to yield losses (Braun U., 2012). For the fungus to be effective, the optimum humidity must be 60-70%, and the temperature must be up to 27°C. Poor air circulation in pepper production areas facilitates the spread of the disease (Babadoost, M., 2011). This study aims to reduce pesticide use and minimize its impact on the environment and human health by developing powdery mildew-resistant varieties or midway materials. In this study, powdery mildew resistance tests were conducted on plants grown in a climate-controlled, high-tech greenhouse at Enza Zaden A.Ş.'s R&D station in Turkey. Infection was induced using the conidia direct brushing method and the conidia suspension spraying method. In this study carried out between 2023 and 2025, a total of 1 resistant (HV12) and 2 susceptible capia (EZK1 and EZK2), 2 susceptible demre (EZD1 and EZD2), 2 susceptible Charleston (EZÇ1 and EZÇ2), 2 susceptible white Hungarian block pepper (EZB1 and EZB2) genotypes belonging to Enza Zaden company, which have high adaptation and combination abilities and are superior in terms of quality and yield, were used. Tolerance was transferred to these susceptible genotypes using the Backcross Method. As a result of Chi-Square tests and molecular-level analyses conducted on the BC5F1 generation, the following superior genotypes were identified, which are still heterozygous but exhibit superior morphological characteristics: 3 from the EZK1 genotype, 2 from the EZK2 genotype, 1 from the EZD1 genotype, 3 from the EZD2 genotype, 2 from the EZÇ1 genotype, 1 from the EZÇ2 genotype, 2 from the EZB1 genotype, and 1 from the EZB2 genotype were selected. A total of 15 promising heterozygous genotypes exhibiting desirable agronomic traits were selected for self-pollination. These genotypes are under further evaluation for the development of stable homozygous tolerance cultivars suitable for commercial use.

Keywords: Pepper, powdery mildew, bioassay test, marker, plant breeding.

FACTORS AFFECTING FRESHWATER FISH REPRODUCTION CARASSIN CARASSIUS) IN THE HAMMAM DEBAGH DAM (GUELMA, ALGERIA)

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ABSTRACT

In Algeria, freshwater fish have a wide geographical distribution. This extends throughout the north, center and south of the country, occupying various environments, their situation is worrying because they are threatened in their majority. Indeed, given the complexity of the hydro-systems of this country and the multiplicity of anthropogenic disturbances on the one hand, and the difficult climatic conditions (reduction in rainfall, rising temperatures) on the other hand, have led to the increasing fragmentation of environments, the demographic isolation of populations and probably to a loss of diversity and demographic imbalances (Lounaci, 2012). Carassius carassius population is characterized by isometric allometry in females. Temporal analysis of the numerical distribution of the sexes shows a sex ratio in favor of females during all months of the study. The overall sex ratio is in favor of females (0.05:1), with a dominance of females was observed in the size categories between 19-22 cm. However, the study of the spawning period shows that male and female crucian carp reproduce in March and May. The HRS study evolves in the opposite direction to that of the GRS for both females and males. Temporal variations of the condition coefficient K in both sexes showed fluctuations during the study period.

Keywords: Carassius carassius; biology; Hammam Debagh dam; Guelma; Algeria

GREEN BIOCATALYSIS WITH MICROBIAL PROTEASES: UNLOCKING THE POTENTIAL OF KERATINOUS AGRI-FOOD RESIDUES FOR FISH FEED PRODUCTION

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ABSTRACT

Notably, several serine peptidases have been successfully isolated, purified, and biochemically characterized from Bacillus species such as B. licheniformis (Beg and Gupta, 2003), B. pumilus CBS (Jaouadi et al., 2008), and B. subtilis (Pillai and Archana, 2008), thereby laying a robust foundation for ongoing advancements in microbial enzymology. Building upon this groundwork, the present study extends our previous investigations on the purification and functional characterization of microbial proteases (Benkiar et al., 2013; Boulkour et al., 2015; Hadjidj et al., 2018; Hamiche et al., 2019; Rahem et al., 2020), with a particular emphasis on the sustainable valorization of agri-food co-products. In this framework, we investigated the bioconversion of shrimp processing residues and poultry feathers—two abundant keratin- and chitin-rich biomass sources—into nutrient-enhanced fish feed formulations. These substrates were subjected to enzymatic hydrolysis mediated by specific bacterial proteases, resulting in hydrolysates enriched with essential amino acids and bioactive peptides. This strategy not only exemplifies an efficient biotechnological valorization route for Metapenaeus monoceros shell by-products and poultry feathers but also underscores their potential as reservoirs of bioactive molecules with prospective biomedical relevance. Moreover, we assessed the antioxidant activity and enzymatic inhibitory potential (e.g., ACE and DPP-IV inhibition) of the resulting protein hydrolysates. Enzymatic hydrolysis was performed using two highly purified serine alkaline proteases—one derived from Anoxybacillus kamchatkensis strain M1V and the other from Aeribacillus pallidus strain VP3. The results highlight the dual functionality of the generated hydrolysates, positioning them as promising candidates for both functional feed development and the formulation of sustainable bioactive ingredients for industrial and biomedical applications.

Keywords: Microbial proteases, agri-food interests, potential applications, fish feed

CURRENT STATUS OF SOME FISHERY COOPERATIVES IN GIRESUN (EASTERN BLACK SEA REGION) AND SOCIO-DEMOGRAPHIC CHARACTERISTICS OF ARTISANAL FISHERMEN

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ABSTRACT

In Giresun, one of the important fishing cities of the Black Sea with a total coastline of 122 km, the fishing gears used intensively in small-scale fishing are gillnet and trammel net and various hand lines. With these, fish species such as whiting, horse mackerel, anchovy, red mullet, garfish and bluefish are mainly caught. In addition, trout production is also abundant in the pools along the rivers in the region. The present study was conducted in the central district of Giresun with the objective of ascertaining the present status of fishery cooperatives and certain socio-demographic characteristics of fishermen, in addition to the problems with which they are confronted. The present study was conducted in the fishing ports of S.S. Giresun Fishery Cooperative, S.S. Üçkayalar Fishery Cooperative and S.S. Aksu District Fishery Cooperatives between October 2023 and April 2024. Thirty-two fishermen were interviewed in person. The participants were boat owners who were members of cooperatives in the ports. The status of fishery cooperatives in the region was determined, as were the regional fisheries and problems.

Keywords: Small-scale fisheries, Marketing, Cooperative, Eastern Black Sea

FISH SPECIES SETTLING ON THE ARTIFICIAL REEF MODEL CREATED FROM FALLEN CONCRETE SUPPORTS OF WATER INTAKE PIPES IN THE SEA AT ANTALYA, KONYAALTI

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ABSTRACT

At Konyaaltı Beach in Antalya, HDPE pipes were laid from the shore extending approximately 400 meters into the sea to intake seawater. Concrete support was used to weigh down these pipes. Many of these supports fell due to storms during the winter, which caused the pipes to move and shift. During our scuba dives in the area, the fallen concrete supports were retrieved and used to create two artificial reef prototypes at depths of 20 and 21 meters. This study aims to identify the fish species that have settled on these artificial reef prototypes. The fish that have settled on the artificial reefs belong to the families Holocentridae, Serranidae, Scorpaenidae, Siganidae, and Monacanthidae. Our research shows that Red Sea migrants dominate the fish families and species observed on the artificial reefs.

Keywords: Fish, reef, prototype, pipe

SUSTAINABILITY ASSESSMENT OF OPEN AND CLOSED SYSTEMS IN MICROALGAE CULTIVATION: A REVIEW

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ABSTRACT

Microalgae are attracting interest in many sectors, particularly agriculture, energy, environment, food, medicine, and cosmetics, due to their high biomass production capacity and ability to grow in various environments. Environmental, economic, and social sustainability of products derived from microalgae is one of the most discussed topics today. The cultivation system for microalgae is the most important factor influencing their long-term viability. Microalgae are typically grown in two systems: open ponds and closed systems, also known as photobioreactors. Open systems, like open raceway ponds, natural lakes, and lagoons, have direct contact with the atmosphere and are generally simpler. In contrast, photobioreactors are closed systems that produce microalgae under controlled conditions. In this study, a review of the literature was used to compare the life cycle environmental sustainability of these two microalgae cultivation systems. The study examined studies regarding microalgae cultivation and life cycle sustainability that have been published since 2017. The studies calculated environmental impact categories like carbon footprint, acidification, and ecotoxicity using the life cycle analysis method for environmental sustainability. It has been noted that indicators of economic sustainability, like production and capital costs, are employed to measure economic sustainability. Nevertheless, there aren't any studies in the literature that examine the social sustainability of microalgae cultivation systems. The findings indicate that while open-system microalgae production offers greater economic benefits, it is less environmentally sustainable. The primary causes of this are the high risk of contamination and evaporation resulting from these systems' contact with the environment. Although product yield is low in these systems, more resilient species can typically be cultivated. Because closed systems produce microalgae under more controlled conditions and have a higher biomass yield, they have been found to be more beneficial for environmental sustainability. However, because of setup capital and operating costs, microalgae production in these systems is more costly. The studies reviewed revealed that production scale and climatic conditions are important criteria. As therefore, there are studies in the literature comparing the viability of microalgae cultivation in open and closed systems under specific climatic conditions. To summarize, both open and closed systems for microalgae cultivation have benefits and drawbacks in terms of environmental and economic sustainability. As a result, rather than selecting a single system, working with hybrid systems and focusing on operational conditions to local needs and resources should be viewed as the key to microalgae sustainability.

Keywords: Microalgae, cultivation system, photobioreactors, life cycle assessment, economic sustainability

EFFECT OF TEMPERATURE AND PHOTOSYNTHETIC ACTIVITY ON METABOLISM AND FOOD INTAKE IN RED TILAPIA

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ABSTRACT

One of the primary freshwater species utilized in aquaculture is tilapia. Due to its great temperature tolerance and ease of growing, this species was brought to Algeria in 2000 and has since spread throughout the country, especially in the Saharan regions. Although tilapia are known to withstand high temperatures and are regarded by aquaculture specialists as a good species for fish farming in the Sahara, their mortality rates grow as summer temperatures climb. We kept juvenile red tilapia in five glass aquariums in a greenhouse to further examine the impact of light and temperature on their feeding habits and overall health during the summer. Three feedings per day at a rate of 6% body weight were given to the fry. Artificial feed was placed in aquarium 1, artificial feed was placed in aquariums two and three, no feed was placed in aquarium four, and no fish or feed was placed in aquarium five. Four times a day, at 9:00, 11:00, 13:00, and 15:00, temperature changes were recorded using a thermometer and a field multiparameter device (HANA brand). The HANA multiparameter instrument was also used to detect turbidity, salinity, conductivity, and pH. Ammonia, suspended particles, orthophosphates, nitrates, and nitrites were all examined in the lab. We recorded temperature spikes accompanied by feeding cessation and high mortality rates, reaching 100% in aquariums exposed to light, which also showed high chlorophyll and nitrogen compound concentrations. Salt concentrations in these conditions exceeded the recommended limits for tilapia farming. We recommend that aquaculture practitioners keep tilapia in shaded areas to reduce photosynthetic activity and regularly renew the water to lower organic matter load and temperature.

Keywords: Tilapia, Aquaculture, Temperature, Photosynthesis, Chlorophyll

TEMPORAL VARIABILITY OF POTENTIALLY HARMFUL PHYTOPLANKTON IN A MEDITERRANEAN COASTAL LAGOON

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ABSTRACT

Observations from two distinct monitoring periods in the Butrinti Lagoon (Saranda) show that the potentially toxic phytoplankton community is consistently dominated by Pseudo-nitzschia spp., a diatom genus containing species capable of producing domoic acid—a potent neurotoxin responsible for amnesic shellfish poisoning. In the earlier dataset, 2018 Pseudo-nitzschia spp. reached an average abundance of about 322,181 cells/L, with an extreme bloom peak exceeding 5 million cells/L, in January indicating episodic proliferation under favorable environmental conditions. In the later dataset 2024, the maximum recorded concentration was lower (291,060 cells/L in February) and extreme peaks were less frequent, suggesting possible changes in environmental conditions or bloom dynamics. Other potentially toxic species were present in both periods but in much lower numbers. The earlier data recorded Alexandrium pseudogonyaulax, Alexandrium minutum, Karenia spp., and Gonyaulax spinifera, with peak values ranging from hundreds to a few thousand cells/L, mostly in June and July. In the later data, Prorocentrum minimum was the only other species detected, with a maximum of 560 cells/L. While the toxicity of P. minimum remains under discussion, its presence warrants continued surveillance. These results verify that Pseudo-nitzschia spp. is still the leading noxious algal taxon in the lagoon, although the size of the blooms could be declining. The continued presence of elevated winter and autumn abundances emphasizes lingering ecological threats to shellfish stocks and marine diversity. Ongoing, long-term surveillance is essential for characterizing seasonal patterns, identifying emerging noxious taxa, and ensuring the ecological integrity of the lagoon.

Keywords: potentially toxic phytoplankton, Pseudo-nitzschia spp., harmful algal blooms, Butrinti Lagoon, domoic acid, Prorocentrum minimum, Alexandrium, Karenia, Gonyaulax.

CHARACTERIZATION of ARTEMIA FROM EL BAHIRA LAKE AND STRESS RESPONSE

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ABSTRACT

The brine shrimp Artemia are small aquatic anostracan crustaceans that inhabit hypersaline waters with extreme conditions. The hatching quality of Artemia cysts is an important key in aquaculture because it affects the nutritional value and timing of nauplii production, which are used as live feed for fish and crustacean larvae. Also, it is important to assess the response of Artemia cultured under stressful conditions. The study was carried out on samples taken from El Bahira Lake (province of Setif, Algeria). The purification of Artemia cysts was carried out by treatment with concentrated brine, sieving, treatment with distilled water and drying. To assess the hatching quality, a quantity of Artemia cysts is incubated in seawater with a salinity of 35 PSU, at a temperature of 28°C, a pH of 8, under continuous lighting (2000 lux), and aeration. The parameters studied to assess hatching quality are hatching rate and efficiency. Nauplii were cultured under standard conditions and in an environment enriched with acetamiprid. The hatching quality obtained show that the Artemia of El Bahira Lake has a hatching rate varied between 74.11% for normal cysts and 86.61% for decapsulated cysts and the hatching efficiency oscillated between 1955.56 nauplii.g-1 for normal cysts and 1955.56 nauplii.g-1 for decapsulated cysts. Decapsulation improves hatching quality, especially for cysts that have little energy. A significant difference in growth rate was observed between two culture. After 7 days of culture, the growth rate of Artemia individuals cultured in standard conditions was more important with values of 0.15 mm/Day unlike the individuals cultured under stressful conditions of acetamiprid (0.3 mm/Day). After 15 days of culture, the survival rate was higher in individuals cultered under standard conditions (86%) compared to individuals cultured under stress conditions of acetamiprid (9%). The El Bahira population has an acceptable hatching quality similar to that of Algerian Artemia populations. The culture was performed to assess the safety or danger of disruptors such as acetamiprid, which can cause damage or interfere with the entire biological process. This chemical disrupts the natural populations and directly affects the survival and size of organisms

Keywords: Crustacean larvae; Efficiency; Fish; Hatching quality; Survival rate.

DETERMINATION OF CHLOROPHYLL CONTENT IN MAIZE AND BEANS (2M+1B) SOWN AT DIFFERENT RATES IN THE SAME ROW

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ABSTRACT

The aim of this study was to determine the effect of intercropping maize and beans on changes in chlorophyll content and yield. Plots were set up with two maize seeds followed by one bean seed in a row. Four irrigation levels were applied to the plants. The control treatment (S100) was defined as the treatment where the plants' water requirements were supplied in entirety. The treatments with 20% (S80), 40% (S60), and 60% (S40) water deficits were defined as the deficit irrigation treatments. The chlorophyll content values of the plants were as follows: in maize, S100: 50.85, S80: 49.85, S60: 48.10, S40: 46.35; while in beans, it was measured as S100: 39.95, S80: 40.80, S60: 38.70, S40: 38.30. The highest chlorophyll content was determined in maize for S100 and in beans for S80. The average total green forage yield was determined as S100: 9951, S80: 9102, S60: 8325, S40: 7927 kg da^{-1}.

Keywords: intercropping, deficit irrigation, forage yield, evapotranspiration

PROTECTIVE EFFECT OF POLLEN SEEDS AGAINST THE IMMUNOTOXICITY OF ETHYLENE GLYCOL MONOMETHYL ETHER IN MALE WISTAR RATS

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ABSTRACT

For thousands of years, humans have used plants found in nature to treat and cure illnesses. These plants may provide a vital source of new compounds potentially useful in the development of effective therapies to combat a variety of health problems. This study consists of evaluating the protective effect of pollen grains on the immunity of male Wistar rats after exposure to EGME (Ethylen Glycol Monomethyl Ether). 32 adult male rats were divided into four equal groups: control group (T), positive control group (T+): received 300mg/kg bw of the aqueous extract of pollen grains, group (E): treated with one dose of EGME (500mg/kg bw) diluted in distilled water and group (T++E): treated with the combination of EGME and the aqueous extract of pollen grains. Rats were treated by gavage for 4 weeks. The results indicate that treatment with EGME led to a significant increase in the number of white blood cells, lymphocytes, eosinophils and granulocytes compared to the control groups, positive control and the group treated with EGME combined with the extract. watery pollen grains.

Keywords: EGME, Immunotoxicity, Pollen grains, wistar rats

RETROSPECTIVE ANALYSIS OF HYDATID CYST IN THE WILAYA OF SKIKDA: PREVALENCE AND EPIDEMIOLOGICAL TRENDS

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ABSTRACT

Hydatid cyst is a parasitic disease caused by Echinococcus granulosus, a parasite that lives in the intestines of dogs, wolves, and foxes, which serve as its definitive hosts. This disease affects many wild and domestic animals, including cattle, sheep, goats, and humans. This parasite is widespread in several countries, including Algeria. Our retrospective study aims to assess the epidemiological status of hydatid cysts in the Skikda province by analyzing infection rates in cattle, sheep, and goats, as well as the evolution of prevalence and the associated economic losses over a six-year period (2017-2022). The results revealed a prevalence rate of 4.57% in cattle, 5.4% in sheep, and 0.14% in goats. The average infection intensity was estimated at 1.84% in cattle, 1.87% in sheep, and 0.78% in goats. Regarding economic losses, the total annual weight of infected and condemned organs was 16,581.5 kg in cattle and 1,650.6 kg in sheep. In goats, the economic impact could not be fully assessed due to the rarity of their slaughter in abattoirs.

Keywords: Hydatid cyst , Echinococcus granulosus, Parasitic disease, Zoonosis , Definitive hosts.

EFFECT OF CROSSING OVER DISTRIBUTION IN GENOME ON THE POWER OF QTL CONTINUITY EFFECT

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ABSTRACT

In this study, to assess the effect of Crossing-over on QTL continuity effect, various scenarios of heritability and marker densities were examine. Data was simulated using QMSim software. The simulated population consist of 100 unrelated animals (50 males and 50 females) as effective size of the base population. To cause a linkage disequilibrium between sites, 50 generations were randomly mated. In all generations, the number of animals was constant and no restrictions were consider on the number of offspring per parent pair. In the generations 50 to 80 (validat population), the number of animals was considered 2000, which there were 500 male and 1500 female. Best individuals in each generation were mated to create next generation. Then the individuals with the highest EBV were select and those who had the lowest EBV value were excluded. For animals in generations 50 to 80, a phenotypic value was simulate. Therefore, these animals have both phenotypic and genotypic record. In all 50 to 80 generations, the evaluation and selection of animals for non-phenotypic young animals was done and assumed that the animals were be evaluated and selected before they reach to the age of production. For simulating the genome, a chromosome with length of 101 CM and a QTL with different number of 500, 1000 and 1500 markers, was simulate. In addition, different heritability values were consider at 0.1, 0.3 and 0.5 for the tests. Each experiment was repeated for 10 times, and then the average of replications was calculated. The results show that as the number of markers increases, the breeding value and the effect of QTLs also increases. It can be conclude that whatever the number of markers were increase, the distance between them were reduce. Therefore, the probability of crossing-over occurrence between them is less and the probability of finding the effect of QTL after 30 generations will increas and vice versa. In the meanwhile, the heritability value plays an important role in the severity of the effect of the number of markers on the effect of QTL and breeding value.

Keywords: Simulation, Marker, Linkage disequilibrium, Crossing-over, QTL

PARASITIC INFESTATION IN PASSERINES IN THE FORESTS OF NORTHEASTERN ALGERIA

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ABSTRACT

Parasite infestations in passerines in forest environments are a crucial area of study for understanding the complex ecological dynamics that govern these ecosystems. Passerines, a diverse group of birds, represent approximately 60% of the world's avian species and play an essential role in forest ecosystems as insectivorous pollinators and seed dispersal agents. Their abundant and diverse presence is often considered an indicator of the health and biodiversity of a given forest environment. However, these birds are not immune to parasitic infestations, which can have serious consequences on their physiology, behavior, and survival. Parasites can weaken passerines, making them more vulnerable to predators and disease, and in some cases, lead to population declines or even local extinctions. In this context, this study conducted in 2024 in the Brabtia and Ain Khiar suberaries, examines parasitic infestation in passerines in the forest environments of El Kala National Park. The captured birds were weighed and measured, and blood was taken to produce smears for examination under a microscope. This study examined the abundance and prevalence of blood parasites passerines in two separate cork oak forests. We identified a diversity of blood parasites, including Trypanosoma, Haemoproteus, Leucocytozoon, and Plasmodium, highlighting complex parasitic interactions influenced by specific environmental factors. Morphometric analyses show that these parasites affect the fitness and health of passerines, influencing their survival and reproduction. Understanding the impact of these parasitic infestations is therefore crucial for biodiversity conservation and the sustainable management of forest ecosystems.

Keywords: passerines, hemoparasite, Algeria, conservation, parasitic transmission

EFFECTS OF PROBIOTIC SUPPLEMENTATION ON GROWTH PERFORMANCE OF HOLSTEIN CALVES

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ABSTRACT

Neonatal calf rearing is a crucial phase in dairy farming that directly affects the lifetime productivity and economic viability of dairy operations. During this period, calves face several challenges, such as diarrhea, reduced growth, and immature immune function. Due to concerns regarding antibiotic overuse and its consequences (such as antimicrobial resistance), probiotics have emerged as promising alternatives for enhancing calf performance. This study aimed to investigate the effects of different levels of Bioleance probiotic supplementation on the growth performance, feed intake, skeletal development, and feed conversion ratio (FCR) in Holstein calves during the pre-weaning phase. A total of 40 newborn Holstein calves (20 males and 20 females; average birth weight 39 kg) were randomly assigned to four treatment groups (n=10 per group) for 75 days. The groups included: Control (no probiotic), 1.5 g/day Bioleance probiotic in milk, 3 g/day Bioleance probiotic in milk, 4.5 g/day Bioleance probiotic in milk. All calves were managed under the same conditions at a commercial dairy farm in East Azerbaijan, Iran. Daily feed intake, body weight gain, FCR, dry matter digestibility, and skeletal growth were measured throughout the experiment. Calves receiving 3 g/day probiotic showed a significant increase in dry matter and organic matter intake compared to the control group. Moreover, body length significantly improved in the 3 g group. Feed efficiency was negatively affected at the highest probiotic dose (4.5 g/day), suggesting reduced FCR performance at excessive supplementation levels. Dry matter digestibility and average daily gain (ADG) improved significantly in probiotic-fed groups, particularly at the 3 g dose. The results highlight that moderate probiotic supplementation (3 g/day) can significantly enhance feed intake and skeletal development in pre-weaning calves, while higher doses may not yield additional benefits and could impair feed efficiency. This study supports the strategic use of probiotics as a sustainable, antibiotic-free approach to boost growth performance and reduce health challenges in neonatal calves.

Keywords: Probiotics, Holstein calves, Growth performance, Feed intake, Feed conversion ratio

INFLUENCE OF PROBIOTIC SUPPLEMENTATION ON BLOOD PARAMETERS AND DIARRHEA INCIDENCE IN HOLSTEIN CALVES

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ABSTRACT

Pre-weaning calves are particularly susceptible to gastrointestinal diseases, especially diarrhea, due to an underdeveloped immune system and unstable gut microbiota. Probiotics have shown promise in modulating gut health, supporting immune function, and reducing diarrhea incidence without the drawbacks of antibiotic use. The present study aimed to evaluate the effects of Bioleance probiotic supplementation on serum biochemical indices, immune-related blood markers, fecal microbiota, and diarrhea incidence in neonatal Holstein calves. A randomized controlled trial was conducted on 40 Holstein calves (equal numbers of males and females) over 75 days. Calves were assigned to four dietary treatments: Control (no probiotic), 1.5 g/day Bioleance probiotic, 3 g/day, 4.5 g/day. Blood samples were collected periodically to measure glucose, cholesterol, triglycerides, urea, creatinine, albumin, total protein, AST, ALT, MDA, TAC, and BHBA. Additionally, fecal samples were analyzed for populations of Escherichia coli, Clostridium, and Lactobacillus species. Diarrhea scoring was recorded daily. Supplementation with 3 g/day probiotic significantly increased serum glucose and cholesterol levels, indicating improved energy metabolism and gut function. Furthermore, this dosage led to a marked reduction in diarrhea frequency and fecal Clostridium counts, without significantly affecting E. coli or Lactobacillus populations. The highest dose (4.5 g/day) did not result in further improvements and showed a slight decline in feed efficiency. Probiotic supplementation, particularly at 3 g/day, effectively improved blood metabolic markers and reduced the occurrence of diarrhea in pre-weaning Holstein calves. These findings suggest that optimal dosing is critical for achieving health benefits without compromising nutrient efficiency. This study contributes to the growing body of evidence supporting probiotics as safe, effective alternatives to antibiotics in neonatal calf health management.

Keywords: Probiotics, Holstein calves, Blood metabolites, Diarrhea incidence

EVALUATION OF NUTRITIONAL VALUE OF GREEN AND BLACK TEA WASTES USING GAS PRODUCTION TECHNIQUE FOR RUMINANT FEEDING

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ABSTRACT

This study evaluated the nutritional potential of green and black tea wastes in ruminant feeding, with the goal of reducing agricultural waste and environmental pollution. Tea processing residues, typically discarded in large volumes, were analyzed for their chemical composition, including crude protein, fiber, ash, and phenolic compounds. Using in vitro gas production technique, fermentation kinetics and energy parameters such as metabolizable energy (ME), net energy for lactation (NEL), and digestibility were estimated. Results showed that green tea waste had higher fiber and phenolic contents, while black tea waste contained more ash and had higher energy value. Gas production was highest for black tea waste and lowest for alfalfa. The estimated gas production potential was 284.2, 294.0, and 261.9 ml/g DM for green tea, black tea, and alfalfa, respectively. Although the gas production rate did not differ significantly, black tea waste yielded higher ME and NEL values. Green tea waste exhibited the highest organic matter digestibility. The presence of high tannin content, particularly in green tea waste, likely reduced gas production by inhibiting rumen microbial activity. However, such phenolic compounds can reduce methane emissions and improve feed efficiency. Compared to previous studies, some differences were observed in nutrient composition and gas production results, which may be attributed to factors such as harvest time, processing method, plant species, and storage conditions. Nonetheless, both tea wastes demonstrated greater nutritional value than alfalfa hay. In conclusion, green and black tea wastes offer significant potential as alternative feed sources for ruminants, especially during feed shortages or when alfalfa prices are high. Their inclusion in livestock diets not only reduces feed costs but also contributes to waste management and environmental protection. Strategic utilization of tea wastes represents a step toward sustainable livestock feeding and environmentally responsible agriculture.

Keywords: agricultural waste, chemical composition, Green and black tea waste, Ruminants' nutrition

IMPACT OF SPINOSAD IN DROSOPHILA MELANOGASTER (DIPTERA): DELAYED TOXIC EFFECTS ON TWO SUCCESSIVE GENERATIONS

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ABSTRACT

Spinosad, pesticide derived from fermentation of bacteria (Saccharopolyspora spinosa) is recommended in pest managment programs due to its high efficiency; nevertheless, its compatibility with the non-target organisms remains controversial and development of resistance was noted. Therefore, this investigation aims to assess the impact of Spinosad in Drosophila melanogaster, a non-target species and biological model widely used in toxicology. Spinosad effects were evaluated over two successive generations in order to highligth a possible remanence of this product. Spinosad was administered by topical application on the last larval stage of D. melanogaster at predetermined dose (288.12 ng) corresponding to 50% of pupal ecdysis inhibition (ID50). Delayed effects of Spinosad were evaluated on the larvae, pupae and adult stages during two successive generations (G0 and G1). Conventional biomarkers of detoxification (Glutathione-S-Transferases or GSTs) and oxidative stress (Catalase or CAT) were measured used spectrophotometric analysis. Results showed that Spinosad induced an increase of GSTs specific activity compared to control in G0 and G1 for all developmental stages. Catalase specific activity shows also significant increase in all stages of the G0 but only in larvae and pupae of the G1. The drop of catalase specific activity and recovery of physiological norms in adults of the next generation (G1) could be explained by a stronger detoxification process noted in G1. This remanence must be considered in integrated pest managment programs; consequently, an effective rotation strategy could prevent or delay the manifestation of resistance

Keywords: Drosophila melanogaster, Spinosad, delayed effect, detoxification, oxidative stress

EFFECT OF LASALOCID ON THE RUMEN ECOSYSTEM AND FERMENTATION PARAMETERS IN GHEZEL SHEEP

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ABSTRACT

Feed additives such as ionophores, although not considered direct nutrients, play a significant role in improving animal health, enhancing productivity, and reducing production costs. Ionophores have unique molecular structures that alter the rumen microbial population and improve fermentation efficiency. Lasalocid, first identified in 1951, is a commonly used ionophore that reduces energy metabolism in Gram-positive bacteria, thereby suppressing their growth and improving production efficiency. By reducing methane production and increasing propionate levels, lasalocid enhances feed efficiency and promotes better energy retention in the animal's body. Furthermore, it inhibits proteolytic bacteria in the rumen, preventing amino acid deamination and consequently lowering ammonia production. This study was conducted to evaluate the effects of different levels of lasalocid on rumen pH, volatile fatty acids (VFAs), ammonia nitrogen, and other ruminal parameters in Ghezel sheep. This study was conducted using sixteen adult male Ghezel sheep with an average body weight of 46±6 kg. The animals were randomly assigned to four treatment groups, each receiving a diet containing one of four levels of lasalocid (20, 25, 30, or 35 mg/kg of dry matter). All diets were formulated based on NRC (1985) guidelines and consisted of alfalfa hay, corn grain, barley grain, soybean meal, and limestone. The forage-to-concentrate ratio in the diets was 40:60. On day 21 of the experiment, rumen fluid was collected at 2 and 4 hours after the morning feeding. The parameters measured included ruminal pH, methylene blue reduction time, sedimentation and flotation time, total volatile fatty acids (VFA), and ammonia nitrogen concentration. Data were analyzed using a completely randomized design (CRD) and SAS software. he results showed that increasing levels of lasalocid had no significant effect on ruminal pH. Similarly, sedimentation and flotation time, methylene blue reduction time, and total volatile fatty acid concentrations were not significantly affected by the treatments. In contrast, ruminal ammonia nitrogen concentration significantly decreased as lasalocid levels increased. The highest ammonia concentration was observed in the group receiving 20 ppm, and the lowest in the group receiving 35 ppm ($P<0.05$). This reduction indicates decreased activity of proteolytic bacteria in the rumen, which may lead to an increase in the amount of undegraded dietary protein passing to the small intestine. Overall, supplementation of lasalocid up to 35 mg/kg of dietary dry matter had no negative effects on the rumen ecosystem and may enhance protein utilization efficiency by reducing ammonia nitrogen levels in the rumen.

Keywords: Lasalocid, Rumen Fermentation, Ammonia Nitrogen, Ionophore, Ghezel Sheep

INTERRELATIONSHIP BETWEEN ADRENAL AND GONADAL ACTIVITY IN OULED DJELLAL LAMBS REARED IN ARID ZONES

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ABSTRACT

The aim of our study was to analyse the adrenocortical-gonadal interrelationship in Ouled Djellal lambs living in arid zones. Four lambs reared in the experimental station at El-Meniaa (Algeria) and exposed to natural climatic variations were used. Blood samples were collected by jugular venipuncture every 15 days from 1 to 6 months of age. Plasma cortisol and androgens were measured by radioimmunoassay. The results show a negative correlation between plasma cortisol and androgens. From 1 to 4 months of age, plasma cortisol concentration is high (4 and 24.9 ng/ml) while plasma androgen concentration is low (0.1 and 0.4 ng/ml). From 4 to 6 months of age, plasma androgen concentration gradually increases while plasma cortisol concentration decreases. In conclusion, the profile of comparative evolution suggests a probable antagonist action of adrenocortical activity on the gonads.

Keywords: Ouled Djellal lamb, Cortisol, Androgen, Arid zones.

STUDY OF INTESTINAL PARASITES AND BACTERIAL TRANSPORT OF NOCTURNAL AND DIURNAL RAPTORS LIVING IN CAPTIVITY AT THE JARDIN D'ESSAI EL HAMMA (ALGIERS, ALGERIA)

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ABSTRACT

Les parasites sont considérés comme l'une des causes de mortalité chez les oiseaux, en particulier les oiseaux sauvages, en raison d'un manque de surveillance sanitaire. Notre travail s'est basé sur une étude coprologique des excréments de rapaces vivants en captivité au zoo d'El Hamma sur une période de trois mois, de septembre à novembre 2023. Nous avons utilisé la méthode de flottation pour identifier les parasites intestinaux. Et nous avons étudié le transport de bactéries dans les excréments dans le but d'isoler Eschrichia, Salmonella et Clostridia. Sur 61 échantillons collectés, nous avons identifié deux espèces parasites appartenant à la classe des Nematoda (Trichuris) et à la classe des Cestoda (non identifiés). Les deux types de parasites représentent chacun 50 % du nombre total de parasites qui infestent les rapaces JDH. La prévalence totale est de 22,22 %. Il est rare chez les deux parasites. Les résultats obtenus nous permettent de confirmer l'impact d'un bon suivi sanitaire en captivité sur la réduction de l'infestation parasitaire des rapaces. Les résultats de la microbiologie ont permis d'identifier plusieurs colonies suspectées d'E. coli, Salmonella. Une souche de Shigella a été identifiée et 12 souches d'entérobactéries ont été identifiées. L'antibiogramme montre une résistance de toutes les souches d'E. coli et de Salmonella. 3 colonies de Clostridia sont observées chez la buse sauvage, 1 chez le faucon et l'aigle royal. Les entérobactéries sont les plus abondantes (42,9 %) et les plus dominantes (100 %). Les rapaces qui vivent dans le zoo du jardin d'essai de Hamma sont bien entretenus et les vétérinaires prennent bien soin de leur bien-être, afin de réduire les maladies et de faire léviter les mortalités.

Keywords: Raptors, zoo, parasites, Bacteria, Garden of the Hamma.

WALKING THE LAST MILES ON THE LONG ROAD TO DEVELOP IMPORTANT GENETIC MARKERS FOR ESR2 GENE POLYMORPHISM ANALYSIS OF LITTER SIZE PREDICATION IN SHEEP: 5 YEARS OF EXPERIENCE FROM FARM TO LABORATORY WORK

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ABSTRACT

It has long been recognized that the economic productivity of well-managed sheep farms largely depends on litter size (LS). The field of sheep breeding has made considerable advancements through the integration of quantitative genetics and molecular genetics. Today, because of advancements in technological innovations like GWAS and high-throughput sequencing, it is feasible to identify the specific DNA mutations that affect LS. Researchers have identified prospective genes to further explore the phenotypic variance in LS. These genes include members of the TGFβ superfamily (GDF9, BMP15, BMPRIB, BMP2, and BMP7), Zona Pellucida 3 glyoprotein gene, NR5A1, GPR54, KISS1R/GPR54, B4GALNT2, MMP2, and POU1F1.The current report represents a significant breakthrough in this field through the innovative integration of in silico modeling, in vitro molecular assays, in vivo microscopic observations, and on-farm phenotypic recording. The study is divided into two phases: The first phase focuses on LS prediction in sheep using in silico modeling and pathway approaches based on approximately 40 publications and 92 identified genes. The second phase of the study aims to validate a potential marker for the sheep ESR2 gene, which can be used for predicting LS. This validation involved PCR sequencing to confirm the T/C polymorphism of the 5' untranslated region ESR2 gene across four different sheep groups, following an extensive review and in silico modeling. To further strengthen the evidence for the genotype classes, we conducted comprehensive examinations of the ovarian anatomy, microscopic monitoring, and comprehensive records of ewe lambing performance.

Keywords: Genetic architecture, Litter size, ESR2 gene, The follicular phase

EFFECT OF SUPPLEMENTATION OF DAIRY COWS IN MID-LACTATION WITH HYDROPONIC BARLEY ON MILK PRODUCTION PERFORMANCE

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ABSTRACT

This study examined the effect of supplementation of Normande dairy cows in mid-lactation on milk production performance. Six three-parous cows with an average live weight of 717 ± 34 kg were assigned to this experiment. During the first four months of lactation, the cows received the same total mixed ration (TMR). In mid-lactation, all cows were supplemented with 8 kg of hydroponic barley per cow per day. Supplementing dairy cows with hydroponic barley fodder during the three-month experiment resulted in a significant improvement in milk production. During this period, milk production increased from 20.67 to 24.33 liters per day, an improvement of 3.66 liters/day, or a rate of 17.71%. Additionally, feed efficiency increased by 7.3%, from 1.06 to 1.14. The experimental's milk had higher average fat and protein concentrations according to the physicochemical composition. The measured values ranged from 32.21 to 34.87 g/kg for protein and from 40.13 to 42.49 g/kg for fat. This study highlights the potential of hydroponic barley as an innovative solution to address feed shortages in intensive livestock production, particularly in small-scale, soilless operations.

Keywords: Algeria, Dairy cow, Feeding, Fodder, hydroponic barley, Supplement.

AN OBSERVATION ON AN ANOMALY IN THE *SCE* SETA DISRUPTING BILATERAL SYMMETRY IN *TYCHEROBIUS IZMIRENSIS* AKYOL & KOÇ (ACARIFORMES: CAMEROBIIDAE)

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ABSTRACT

This study reports the first morphological variation observed in the setae sce on the idiosoma of *Tycherobius izmirensis* (Acariformes: Camerobiidae), a mite species known from Türkiye. Among the 90 examined female specimens of the species, the anomaly was detected in only one specimen, in which the right sce was found to be shorter and structurally simpler than that of the one on the left side. This variation is considered as a rare structural anomaly that disrupts the species' bilateral symmetry. It is evaluated that this observed morphological deviation may have resulted from a random developmental disturbance and could be included within the category of fluctuating asymmetry.

Keywords: Acari, anomaly, asymmetry, dorsal seta, morphology, Raphignathoidea

Acknowledgement: This study was supported by the Scientific and Technological Research Council of Türkiye (TÜBİTAK) under project number 121Z986. I would like to thank TÜBİTAK for its support.

EFFECT OF INCORPORATION OF PHYTASE INTO A FEED ENRICHED WITH ACID OILS ON GROWTH PERFORMANCE OF BROILER CHICKEN

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ABSTRACT

Acidic vegetable oils are widely used in broiler feed. These oils, derived from the processing of sunflower seeds, are rich in unsaturated fatty acids and offer an alternative to animal fat sources. They can be used as an energy source, improve digestion, and support growth and meat production. Furthermore, the use of phytases in animal feed improves the efficiency of animal feed, particularly by releasing phosphorus from cereals and other plant foods. Relatively recent research has shown that phytases can increase the digestibility of amino acids and energy. To this end, we studied, during a 54 days rearing cycle on 140 unsexed broiler chicks of the Arbor Acres strain, the effects of the addition of phytase (500 FTU) in a sub-phosphorus deficient diet containing 5% acidic oil of vegetable origin on growth performance, feed intake and feed conversion ratio. The results of this trial demonstrated the effectiveness of phytase and acid oil in increasing weight (+8.48%, $p<0.001$) during a breeding cycle. The results of the feed conversion index were also marked by an improvement in this parameter, particularly during growth (-7.83%, 2) and compared to finishing (-4.72%, 1.41).

Keywords: Broiler chicken, phytase, acid oil, increasing weight, consumption index.

EFFECTS OF GINGER POWDER SUPPLEMENTATION IN WHEAT-BASED DIETS ON SERUM AND EGG YOLK CHOLESTEROL AND ANTIOXIDANT INDICES IN POST-MOLT LAYING HENS

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ABSTRACT

Introduction: Ginger (Zingiber officinale) is the underground rhizome of a plant from the Zingiberaceae family, widely used as a spice globally. Ginger extract exhibits antioxidant activity, notably scavenging superoxide anions and hydroxyl radicals [5]. The primary pungent constituents of ginger are gingerols, which can convert to shogaol, zingerone, and paradol. While zingerone and shogaol are present in small amounts in fresh ginger, they increase significantly in stored products. A limited number of studies have explored ginger's effects on lipid metabolism in animals and humans. Results indicate that ginger significantly reduces plasma cholesterol levels in animals [2]. Sharma et al. [11] confirmed its hypolipidemic properties, and Ahmed et al. [1] demonstrated ginger's efficacy in counteracting oxidative stress induced by malathion in mice by reducing lipid peroxidation and restoring antioxidant enzyme activities. Synthetic antioxidants such as BHT, TBHQ, and BHA are being phased out due to potential health hazards, including hepatic enzyme disruption and carcinogenesis [7]. Therefore, natural alternatives like ginger may be valuable. Given its antioxidant and cholesterol-lowering properties, ginger inclusion in wheat-based diets may improve antioxidant indices in serum and egg and reduce cholesterol content. **Materials and Methods**: A total of 96 post-molt Hy-Line W-36 laying hens (76 weeks old) were randomly allocated to three dietary treatments with four replicates of eight hens each. Treatments included: 1) Control wheat–soy diet; 2) Diet + 1% ginger powder; 3) Diet + 2% ginger powder. Diets were isoenergetic (2630 kcal/kg ME) and isonitrogenous (16% CP), formulated per Hy-Line W-36 guidelines. Ginger powder replaced equivalent bran to maintain consistent diet composition. Birds had ad libitum access to feed and water throughout the 8-week trial (2 × 28-day periods), following a 1-week adaptation. Serum total cholesterol and antioxidant capacity were assessed using a photometric method with a RAL Clima 617 device (Spain). Lipid peroxidation in serum and yolk was measured by TBARS assay based on malondialdehyde (MDA) content [3]. Yolk cholesterol was determined according to the method of Pasin et al. [8]. **Results and Discussion:** Ginger significantly reduced yolk weight at both inclusion levels, though the treatment effect was not dose-dependent. Yolk percentage was not significantly affected. However, both 1% and 2% ginger significantly decreased serum and yolk cholesterol compared to the control ($p < 0.05$), with the 2% group showing the greatest reduction. Specifically, yolk cholesterol dropped by 42 mg/100 g, and serum cholesterol decreased by 29 mg/dL in the 2% group. These findings align with earlier reports demonstrating ginger's cholesterol-lowering effects [2, 11]. One potential mechanism involves reduced intestinal reabsorption of bile cholesterol, as suggested by earlier rodent studies [12]. Ginger may also promote cholesterol binding with bile acids and hinder micelle formation [6]. While egg yolk cholesterol is primarily synthesized in the liver and transferred to follicles via lipoproteins, and its correlation with plasma cholesterol is weak [4], reduced yolk weight observed in this study may partially explain the lowered yolk cholesterol.

However, Han et al. [4] noted an inverse relationship between yolk size and cholesterol concentration, implying that the hypocholesterolemic effect of ginger may stem from reduced fat absorption. The result shows the effects of dietary ginger on MDA levels in serum and yolk, and total serum antioxidant capacity. MDA levels in both serum and yolk declined significantly with increasing ginger levels, particularly at 2% ($p < 0.05$). **Conclusion:** In conclusion, dietary inclusion of ginger powder improved serum and egg antioxidant status and significantly reduced yolk and serum cholesterol in post-molt laying hens. These effects position ginger as a promising natural alternative to synthetic antioxidants in poultry nutrition

Keywords: Antioxidant- Cholesterol - Egg - ginger root - Malondialdehyde

EFFECT OF PROPOLIS WITH DIFFERENT LEVELS OF ENZYME IN WHEAT-BASED DIET ON SERUM AND YOLK CHOLESTEROL AND OXIDATION INDEX IN LAYER HENS

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ABSTRACT

Introduction: The growing demand for natural feed additives in poultry nutrition is driven by concerns over the side effects and residues associated with synthetic compounds. Among these natural additives, bee propolis has garnered significant attention due to its wide-ranging biological properties.Typically, propolis contains 45–55% resins (rich in flavonoids), 25–35% wax and fatty acids, 10% essential oils, 5% pollen, and 5% other organic compounds, vitamins, and minerals.The pharmacological effects of propolis are largely attributed to its high flavonoid content, which includes quercetin, flavones, isoflavones, anthocyanins, catechins, and their derivatives. These compounds are known for their strong antioxidant, anti-inflammatory, antibacterial, antifungal, antiviral, and even anticancer properties. Notably, the antioxidant capacity of propolis has been reported to surpass that of vitamin C. Antioxidants are essential in neutralizing free radicals and preventing lipid peroxidation in biological systems. Given the potential health risks of synthetic antioxidants—such as liver enzyme disruption and carcinogenic effects—there is increasing interest in natural alternatives like propolis for improving poultry health and egg quality. **Materials and Methods:** A total of 192 W-36 laying hens (76 weeks old) post-molt were randomly allocated into a 3×2 factorial arrangement with four replicates per treatment.The basal diet was wheat-based (69% wheat), formulated to meet NRC requirements (16% crude protein and 2630 kcal/kg ME), and divided into two groups: with or without 500 g/ton propolis. Each of these was further split into three enzyme levels: 0, 250, or 500 g/ton xylanase. The experimental period consisted of a 7-day adaptation phase followed by two 28-day feeding phases. Blood samples were collected to measure serum cholesterol, MDA and TAC. Yolk cholesterol was determined based on the method of Pasin et al., while lipid peroxidation was assessed via the thiobarbituric acid (TBA) test, quantifying MDA as described by Galbert et al. **Results and Discussion:** Dietary inclusion of bee propolis significantly reduced both serum and yolk cholesterol concentrations ($p<0.01$). Yolk cholesterol decreased by 19 mg/100 g, and serum cholesterol declined by 32 mg/dL, indicating a hypocholesterolemic effect of propolis. These findings align with previous reports suggesting propolis reduces plasma cholesterol and triglycerides, likely through downregulation of hepatic HMG-CoA reductase and modulation of lipid metabolism gene expression. Although the addition of xylanase enzyme slightly increased serum and yolk cholesterol levels, the changes were not statistically significant. This effect may be due to enhanced digestion of non-starch polysaccharides, improving bile salt recycling and fat absorption. Propolis supplementation also significantly decreased MDA concentrations in both serum and yolk ($p<0.01$), indicating reduced lipid peroxidation. Concurrently, TAC levels in serum increased significantly ($p<0.05$), demonstrating improved antioxidant status. These results support earlier studies showing that dietary propolis enhances antioxidant enzyme activities (TAC, SOD) and reduces oxidative damage in laying hens.

Propolis appears to act by scavenging reactive oxygen species (ROS), protecting membrane lipids from peroxidation, and activating key antioxidant enzymes such as Cu/Zn superoxide dismutase. The effect of enzyme supplementation alone on MDA levels was not significant, though TAC was positively influenced, with the highest value observed at the highest enzyme dose. Interaction effects between enzyme and propolis supplementation were significant for serum and yolk cholesterol and TAC, but not for MDA. This suggests a synergistic effect in modulating lipid metabolism and antioxidant responses when both additives are combined. **Conclusion:** Overall, the inclusion of bee propolis in wheat-based diets for laying hens effectively enhanced antioxidant status and reduced lipid peroxidation and cholesterol levels in serum and egg yolk. These effects contribute to improved egg quality and potentially better bird health. The findings indicate that propolis can serve as a viable natural alternative to synthetic antioxidants in poultry nutrition, especially when combined strategically with feed enzymes.

Keywords: Antioxidant- Cholesterol - Egg - Propolis - MDA

SEASONAL HISTOMORPHOMETRIC CHANGES OF THE ADRENAL CORTEX IN D'MAN RAMS REARED IN ARID LANDS

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ABSTRACT

Mammals living in arid regions constitute good experimental models for studying the mechanisms developed to ensure their survival under harsh environmental conditions. These animals can respond to external factors through variations in their adrenocortical activity. The objective of our study is to highlight the effects of exogenous factors, namely daylight and seasonal photoperiod, on the structure of the adrenal cortex. For this purpose, an investigation was conducted on adult D'man rams reared in the sheepfold of the experimental station of El-Meniaa (30° 34' N, 02° 52' E), exposed to natural temperature and light conditions. The study of the adrenal cortex is based on a histo-morphometric technique performed on adrenal glands fixed in aqueous Bouin's solution, allowing measurements of tissue thickness as well as cellular and nuclear areas. The adrenal cortex shows morphometric variations throughout the year, characterized by a maximum in summer/spring and a minimum in winter/autumn. From this study, we report the existence of significant correlations between external environmental factors and adrenal structure. Based on these results, it appears that light intensity and photoperiod exert a significant influence on the histological appearance of the adrenal gland

Keywords: Adrenal Cortex, D'man, El-Meniaa, Histo-morphometry, Photoperiod

ASSESSMENT OF PLASMA GSH AS A BIOMARKER OF ANTIOXIDANT STATUS IN LACTATING LOCAL GOATS LIVING IN SEMI-ARID REGION OF M'SILA, ALGERIA

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ABSTRACT

Reduced glutathione (GSH) is one of the main non-enzymatic antioxidants present in animal cells. It plays a key role in neutralizing reactive oxygen species and regenerating other antioxidants such as vitamins C and E. It also protects cellular structures from oxidative damage. The high metabolic demands associated with lactation in small ruminants can disrupt redox balance, making GSH a particularly relevant biomarker for assessing the body's antioxidant response. Studying GSH dynamics during lactation in semi-arid conditions, where environmental stressors increase physiological demands, can provide valuable insight into adaptive mechanisms. In this study, fourteen Arbia goats reared in the semi-sedentary farming systems of the M'Sila region (Algeria) were monitored from day 1 to day 4 postpartum, then weekly from weeks 1 to 10 of lactation. A total of 196 plasma samples were collected and analyzed using Weckbecker and Cory's (1988) colorimetric method, based on the reaction with Ellman's reagent (DTNB) and a spectrophotometric reading at 412 nm. The mean plasma GSH concentrations ranged from 39.3 to 56.8 µmol/L, with marked inter-individual variability. Some goats (e.g., C2, C4) displayed high GSH levels with low standard errors, while others (e.g., C1, C5, C10) showed greater intra-individual variation. Although post hoc comparisons did not reveal specific pairwise distinctions, a significant overall difference was observed across lactation stages (Kruskal-Wallis $p = 0.003$). Strong inter-individual contrasts were noted at the early and mid stages of lactation. This study supports the reliability of longitudinal oxidative stress monitoring and highlights the importance of integrative approaches considering both physiological and environmental factors.

Keywords: Goats, semi-arid region, lactation, oxidative stress, GSH.

ASSESSMENT OF LIPID OXIDATIVE STRESS THROUGH PLASMA MDA LEVELS IN LACTATING LOCAL GOATS REARED UNDER SEMI-ARID CONDITIONS IN M'SILA, ALGERIA

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ABSTRACT

In small ruminants, lactation is a physiologically demanding phase often associated with metabolic imbalance and increased production of reactive oxygen species, potentially leading to oxidative stress. This risk may be amplified in semi-arid environments, where environmental factors can exacerbate oxidative stress. In this context, malondialdehyde (MDA), a terminal product of lipid peroxidation, is a valuable biomarker for assessing oxidative status during lactation. This study examined the levels of MDA in the plasma of 14 local Arbia breed goats raised under a semi-sedentary management system in the M'Sila region of Algeria. Blood samples were collected from day 1 to day 4 postpartum, and then weekly until week 10, totalling 196 plasma samples. MDA levels were quantified using the thiobarbituric acid (TBA) method described by Ohkawa et al. (1979), with a spectrophotometric reading taken at 532 nm. The mean MDA concentrations ranged from 2 to 3 µmol/L, indicating moderate lipid peroxidation. Standard errors were relatively consistent across individuals, reflecting good reproducibility and measurement stability. Overall, both inter- and intra-individual variability remained low, suggesting that oxidative stress levels remained stable throughout the lactation period. Statistical analysis revealed no significant variation in MDA concentrations over time points ($p = 0.5987$). These results suggest that local goats may have a physiological resilience to oxidative stress during lactation, even in challenging semi-arid environments. Further studies that integrate metabolic, endocrine, and environmental factors are needed to improve our understanding of the regulatory mechanisms involved in the redox balance of lactating small ruminants.

Keywords: Goat, semi-arid region, lactation, oxidative stress, MDA.

MORPHOMETRIC STUDY OF EGGS OF TWO SPECIES OF QUAIL COTURNIX JAPONICA AND COTURNIX COTURNIX (AVES, PHASIANIDAE) IN ALGERIA

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ABSTRACT

White meat production is a rapid way of satisfying the need for animal protein, and broiler chickens are the main source of this. Other game species also belong to this important family of phasianidae and are used for food purposes. These include the Japanese quail (Coturnix japonica) and the corn quail (Coturnix coturnix), which is one of the most popular wild game birds hunted in Algeria for both its meat and its eggs. These small birds are fast-growing, highly fertile and produce eggs with therapeutic properties. In order to benefit from all these qualities and performances, our work focused on a study of the external physical characteristics of the eggs of two species of domestic and wild quail. For the domestic quail, the work was carried out on a farm at the Zéralda hunting centre on 13 series of females ranging in age from 3 and a half to 6 and a half months, where 390 eggs were analysed. For the quail, samples were taken from different regions, namely Tiziouzou (coast), Bouira (Tellian atlas), Batna (Tellian high plains), M'sila (steppe high plains) and Djelfa (Saharan atlas). Around thirty eggs were collected per region. The measurements of the eggs of the two quail species (large and small diameter expressed in mm) were recorded at the same time as the weight (g), which made it possible to study the external physical parameters of these eggs by calculating the shell and shape indices, their density and their volume. The results showed that egg weight and measurements varied according to the age of the females, with mean weights of 11.86 g ± 1.21 and measurements of 33.32 mm ± 1.53 and 25.75 mm ± 0.82, respectively. The values of the shell index (0.36±0.03) and the shape index (0.77±0.03) are within the norms and are just as important for egg hatching as density and volume. For quail eggs, the results show high values for weight (12.34±1.17), large diameter (33.26±1.69), small diameter (25.93±1.13) and volume (10.49±0.23) for the Littoral. They are variable for the other regions. The same applies to the shell index, which is 0.37±0.03 for the Littoral and varies between 0.31 and 0.34 depending on the region, from the Tellian Atlas to the Saharan Atlas. This index provides information on the strength of the shell. The success of clutches is also measured by the shape of the eggs. The shape index calculated fluctuates between 0.77 and 0.79. These numbers indicate good wild quail egg shape. Statistical analysis is used and the results will be analysed and presented at a later date.

Keywords: Quail, eggs, physical caracteristics, breeding, wild

COMPARATIVE MORPHOMETRIC ANALYSIS OF THE EGGS OF TWO ALECTORIS SPECIES: THE ENDEMIC BARBARY PARTRIDGE AND THE INTRODUCED CHUKAR PARTRIDGE

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ABSTRACT

A comparative analysis of egg morphometric characteristics from two species of partridge revealed highly significant differences ($P < 0.0001$) in weight (before incubation and before hatching), length, width, volume, density, shell index, and shape index. These findings indicate notable morphological divergences, which may be linked not only to differing reproductive strategies but also to the degree of domestication: Barbary Partridge was recently introduced into farming, while Chukar Partridge is a well-established domesticated breed. This difference in adaptation may influence egg quality and consistency. However, no significant differences were observed in water loss and the weight of unhatched eggs ($P > 0.05$), indicating similar stability during incubation for both species. Correlation analysis showed significant relationships between several egg parameters, particularly between pre-incubation weight and volume, shell index, dimensions (length and width), water loss, and the weight of unhatched eggs ($P < 0.0001$). A significant correlation between density and pre-incubation weight was found in Barbary Partridge but not in Chukar Partridge. In conclusion, although the two species show marked morphological differences probably influenced by their domestication status and adaptation to breeding, their behaviour during incubation remains similar, reflecting functional convergence despite distinct egg structures.

Keywords: Barbary Partridge, Chukar Partridge, Egg morphometry, Linear regression and Adaptation to breeding

COPROSCOPY AND ECTOPARASITES OF BATS IN CHREA NATIONAL PARK (BLIDA - ALGERIA)

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ABSTRACT

During the outings conducted between April and June 2019, we captured 20 bat mice belonging to two different families during the tunnel level Chiffa sector El Hamdania (Chréa national park). The family Rhinolophidae is represented by the species Rhinolophus blasii (Peters, 1866) (18 individuals), the Great horseshoe bat Rhinolophus ferrumequinum (Schreber, 1774) (1 individual), and the species Leisler's Noctule Nyctalus leisleri (Kuhn, 1817) (1 individual) of the Vespertilionidae family. The latter is a new species cited for this region. Coprological analysis of the guanos revealed the existence of three phyla: arthropods, nematodes, and cestodes. Five species of intestinal parasites are reported in 150g of guanos. We noted a strong dominance of eggs and adults of mites of the genus Alabidocarpus sp. with 44.00% (ni = 200 individuals), followed by nematodes Strongylacantha sp. with a number of 118 individuals (AR% = 26.00%), Litomosa (Filaria) sp. with N = 63 individuals (AR% = 14.00%) and a cestode Milina (Hymenolepis) sp. with a number of 11 individuals (AR% = 2.00%). The identification of ectoparasites on the 19 bats of the Rhinolophidae family captured in the site of El Hamdania (Chéra National Park) revealed the presence of 3 species of ectoparasites belonging to the order of Diptera, including the Brachytarsina (Brachytarsina) flavipennis species of the Streblidae family, which dominates with an infestation rate of 66.67%. followed by the Nycteribiidae family with the species Phthiridiuum biarticulatum and Nycteribia schmidlii, with an infection rate of 16.67% each. A new bat fly host is reported for Algeria: Rhinolophus blasii is a new host for Nycteribia schmidlii.

Keywords: Chrea National Park, Bats, Rhinolophidae, Vespertilionidae, Guanos, Endoparasites, Ectoparasites.

STUDY OF RED MEAT CONSUMPTION AND THE PLACE OF GOAT MEAT IN THE KEF REGION

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ABSTRACT

In Tunisia, the red meat sector is predominantly supported by cattle and sheep farming, which are deeply embedded in the country's agricultural systems and consumer habits. In contrast, goat breeding plays only a marginal role in the livestock sector—especially in northern regions—where environmental conditions and traditional dietary preferences have limited its development. Yet, goats are highly adaptable to harsh climates and have significant potential to contribute to food security and rural livelihoods. Despite these advantages, their contribution to red meat production remains both underestimated and underutilized. This study aims to examine red meat consumption patterns in the Kef region, with a particular focus on the goat meat. Research was conducted across four sub-regions: Kef East, Kef West, Sers, and Tejerouine, using a sample of 101 consumers. The findings reveal that although goat meat is consumed throughout the region, its intake remains considerably lower compared to that of sheep and beef. Most respondents were male household heads aged between 35 and 65, emphasizing the predominance of men in family decision-making regarding food consumption. Overall, the frequency of red meat consumption was found to be relatively low. Participants represented a diverse range of socio-professional categories, with farmers accounting for 16%, retirees 13%, and other groups comprising approximately 33%. Consumers cited dietary diversity, nutritional value, and affordability as the primary factors influencing their meat choices. A Principal Component Analysis (PCA), followed by hierarchical clustering, identified two distinct consumer profiles based on preferences and consumption behavior. Despite the potential of the goat-breeding sector, its development in the Kef region remains hindered by entrenched cultural habits and resistance to dietary change. As such, there is a clear need to raise awareness among consumers about the environmental resilience of goat farming and the nutritional benefits of goat meat—particularly in light of growing climatic challenges and the need for more sustainable livestock systems.

Keywords: Red meat, survey, Kef, Goat meat, Consumption.

EFFECTS OF DAILY COOKING OIL CONSUMPTION ON HORMONE PRODUCTION AND OVARIAN STRUCTURE IN PREGNANT RABBITS

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ABSTRACT

Currently, a significant number of women of childbearing age are overweight or obese, which is particularly associated with a high intake of dietary fats. This condition affects negatively maternal health and can lead to serious pregnancy complications, as well as impacting the fetus. Our study aimed to investigate the effects of a high-fat diet, specifically daily consumption of cooking oil, on the ovarian structure of rabbits that have experienced two successive pregnancies. From a total of 25 female rabbits, two groups were formed: a control group (SD) consisting of 10 rabbits that received a standard diet, and a second group (OD) of 15 rabbits that received 2 ml of table oil per day per animal. The rabbits received their respective diets for 15 days prior to breeding, and during two successive pregnancies, which were spaced by 5 days of rest, amounting to a total of 80 days of treatment. Blood and ovarian samples were collected promptly after the second parturition. A lipid profile, including total cholesterol (TC) and triglycerides (TG), as well as hormone assays for FSH, LH, progesterone (P4), and estradiol (E2), were conducted on both the blood and ovarian samples. Additionally, a histological examination of the ovarian tissue was performed using Masson's trichrome staining on 3 µm cross-sections of the ovaries. Our results indicated that the total ovarian cholesterol levels increased in the OD group compared to the control group, while ovarian triglycerides decreased. Additionally, plasma levels of progesterone and luteinizing hormone (LH) were elevated in females from the OD group in comparison to those in the SD control group. Plasma follicle-stimulating hormone (FSH) levels, however, did not change and remained below the detection threshold in comparison with the control group. Histological findings revealed that the OD group exhibited greater collagen impregnation, leading to a denser ovarian cortex. Furthermore, the ovaries contained fewer mature follicles and primordial follicles, but a greater number of primary follicles. Based on our observations, we can conclude that a diet supplemented with cooking oil diet (OD) during pregnancy disrupts follicular maturation and alters ovarian structure by causing collagen deposits. This is associated with changes in progesterone production linked to enriched fatty acids diets.

Keywords: cooking oil, ovary, pregnancy, progesterone, collagen deposits, follicular maturation

IMPACT OF MASTITIS PATHOGENS ON BLOOD ANTIOXIDANT ENZYMES IN TRANSITION DAIRY COWS

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ABSTRACT

Dairy cows in early postpartum experience significant metabolic stress that increases their susceptibility to mastitis. This study examined the correlation between mastitis pathogens and the activity of superoxide dismutase (SOD) and glutathione peroxidase (GPX) in blood serum. Over a two-year study, udder health and antioxidant enzyme activity were assessed across three physiological periods, from the 21st day before calving up to the 42nd day of lactation. During the trial period, each cow in lactation was observed daily for clinical signs of mastitis. Categorisation of the observed population was done following screening for mastitis using udder clinical examination, the California Mastitis Test, and bacteriological culturing. The measurement of the SOD and GPX activity in blood serum was done with spectrophotometric assays expressed as mU/mg protein. Mastitis pathogens were isolated from 43.83% of udder quarters with milk secretion disorder, and the dominantly isolated microorganisms were grouped as contagious: Streptococcus agalactiae (19.14%) and Staphylococcus aureus (6.17%) or environmental: Enterococcus spp. (8.02%), Pseudomonas aeruginosa (7.41%), Escherichia coli (1.85%) and Aspergillus niger (1.23%). The results indicated that contagious mastitis pathogens had a statistically significant influence on the SOD and GPX activity in the blood serum of transition dairy cows. The relationship between oxidative stress, anti-oxidative enzymes, and mastitis in dairy cows underscores the importance of managing oxidative levels to enhance udder health and prevent mastitis.

Keywords: dairy cows, antioxidative enzymes, mastitis

ASSESSMENT OF HABITAT HEALTH IN ÇARDAK LAGOON USING CARCINUS AESTUARII NARDO, 1847 AS A BIOINDICATOR

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ABSTRACT

Carcinus aestuarii Nardo, 1847 is a portunid crab species native to the Mediterranean Sea. It is commonly found in lagoon systems and is considered a potential bioindicator due to its biological responses to environmental pressures. This study analysed C. aestuarii individuals living in different benthic habitats (sand, mud, rock and macroalgae) in Çardak Lagoon, based on morphological and behavioural indicators (e.g. shell change, chela loss and habitat selection). A total of 632 individuals were collected from eight stations during fieldwork conducted between May 2024 and April 2025, and the condition of their shells and the presence of regeneration were recorded for each individual. The findings showed that 67% of individuals in the moulting phase were found in muddy and algal habitats, while the claw loss rate in sandy and rocky habitats increased to 45%. The highest number of individuals (n = 230) was recorded at BS6 station, which has fine sediment with a high organic matter content. The highest shell change rate (21%) was observed at BS1 station, which is muddy and low-energy. The direct effect of habitat structure on crab life strategies (molting, defence and reproduction) was statistically significant (p

Keywords: Carcinus aestuarii, lagoon ecosystems, habitat health, bioindicator, molting, Çardak Lagoon

AGE AND BODY SIZE OF THE BULGARIAN BENT-TOED GECKO, MEDIODATYLUS DANILEWSKII (STRAUCH, 1887) IN A TURKISH POPULATION

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ABSTRACT

In this research, skeletochronology was applied to determine the mean age, longevity, and the relationship between age and body size in a lowland population (Ballıkaya) of the Crimean Gecko, Mediodactylus danilewskii from the Karacabey district in Bursa, Türkiye. The mean age and snout-vent length (SVL) in this population were calculated as 4.30 years and 38.22 mm, respectively (4.47 years and 37.47 mm for females; 4.17 years and 38.85 mm for males). A statistically positive correlation was observed between age and SVL in both sexes. Age estimates ranged from 3 to 5 years in males and 3 to 7 years in females, with one subadult female estimated to be 2 years old. All individuals reached sexual maturity at the age of 3 years. The potential reproductive lifespan was estimated to be 2 years in males and 4 years in females. Although females had slightly higher mean age and SVL values, the differences between sexes were not statistically significant (Mann-Whitney U tests, $p > 0.05$ for both). The sexual size dimorphism index (SSD = 0.030) indicated a slight female-biased trend. Spearman's correlation analysis confirmed a strong positive relationship between body size and age in both males ($r = 0.730$, $p = 0.02$) and females ($r = 0.858$, $p < 0.001$). This study represents the first report on age-related data of Mediodactylus danilewskii.

Keywords: LAG; longevity; SVL; age at maturity; Karacabey

THE EFFECT OF ENERGY STATUS INDICATORS ON OVARIAN REACTIVATION AND POSTPARTUM CYCLE RESUMPTION IN DAIRY COWS

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ABSTRACT

The objective of this study is to evaluate the impact of energy status indicators on ovarian reactivation and postpartum cycle resumption. In addition, through this study, we attempted to implement "GARDIAN" dairy herd management software. Fifty multiparous Montbéliarde cows belonging to two farms in the Tizi-Ouzou province were the subject of this study. Three thousand four hundred and fifty dosages concerning eighteen metabolites were carried out at a private laboratory. Non-esterified fatty acids (NEFA) and beta-hydroxybutyrate (BHB) were measured at the Reproduction Biotechnology Laboratory of the Institute of Veterinary Sciences of Blida. Ovarian recovery was assessed by measuring progesterone and 17-β-estradiol. The cows were divided into two categories: those that had ovarian recovery without ovulation with an estradiol level greater than 20 pg/ml and very low progesterone values less than 1 ng/ml, and the category of cows that had ovarian recovery with ovulation. BHB levels were very high in both categories of cows, sometimes exceeding 1 mmol/ml, and NEFA levels were very high in cows without ovulation (NEFA > 0.7 mml/l), indicating the onset of subclinical ketosis in response to the negative energy balance after parturition, whereas the values were within the usual values in cows that had ovulated (NEFA < 0.7 mmol/l), indicating the cessation of fat mobilization. To conclude this study, which aims to monitor ovarian recovery and cyclicity in the postpartum period and to evaluate the effect of a negative energy balance on the reproductive performance of dairy cows, we limit ourselves to reporting that the results obtained in the farms studied are only a general reflection of the poor breeding management and the random conditions that characterize the breeding system in Algeria, which generates prolonged stress. It is important to understand the multiple risk factors and to put in place measures to immediately put the cow back into breeding to avoid infertility in dairy cattle farming.

Keywords: energy balance, NEFA, ketosis, ovarian recovery, cyclicity, infertility

EFFECT OF FEED IMBALANCE ON REPRODUCTIVE PARAMETERS OF DAIRY COWS ON FOUR FARMS IN THE TIZI-OUZOU REGION

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ABSTRACT

The aim of this study was to assess the effect of feed imbalance on the reproductive parameters of cows in production. A total of 120 dairy cows belonging to 4 farms located in the Tizi-Ouzou region were monitored over a period of 7 months. These cows were housed in tie-stall housing. The energy and nitrogen levels of the rations distributed were estimated based on the nutritional value of the various feeds comprising the daily ration distributed, as well as the type of concentrate supplemented. Thus, an estimate of the intakes of the basic and total rations was compared with the requirements of the different categories of females in the herds of the four farms. The effect of these intakes on the animals was assessed in terms of body condition score and reproductive parameters. This study revealed that the rationing implemented on the four farms was unbalanced and did not take into account either the production level or the physiological condition and stage of the female. Statistical analysis of the recorded data revealed intervals between calving and calving ranging from 380 to 400 days and between calving and insemination varying between 78 and 130 days, with a first insemination success rate ranging from 20 to 62% and a high repeat breeder rate ranging from 15 to 40%, depending on the farm monitored. An average fertility index of 2.12 to 2.20. All the results obtained show a low production level on the monitored farms, likely explained in part by the nutritional imbalance in the rations distributed.

Keywords: dairy cow, feed, production, reproduction, fertility, insemination

COMPARATIVE CHROMOSOMES AND CHROMOSOME PAINTING ANALYSIS OF A THREATENED SPECIES : THE BARBARY SHEEP AMMOTRAGUS LERVIA

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ABSTRACT

The Barbary sheep Ammotragus lervia belong to the Bovidae family. This species is threatened with extinction and listed as vulnerable on the red list established in 2023 by the International Union for Conservation of Nature (IUCN). The distribution of this animal is now limited to a few mountainous regions in the semi-arid bioclimatic zone of the Saharan Atlas and Tassili. Several reasons are behind this decline, including hunting and poaching, the influence of long periods of drought and the installation of heavy infrastructure. This species has been the subject of few genetic studies. To describe the genome of this species, we cultured lymphocytes from the blood of adult animals. We established then high-resolution **GTG** banded- karyotypes after blocking the cell cycle with excess thymidine to synchronize divisions and obtain elongated chromosomes in prometaphase. Afterwards, we performed chromosomes painting using cattle whole chromosome painting probes **BTA1** and **BTA3** on Ammotragus's chromosomes. The similar regions are highlighted and reveal possible chromosomal rearrangements that may have taken place during evolution.

Keywords: Barbary sheep, endangered species, karyotypes, comparative mapping, chromosomes painting

PRELIMINARY STUDY: EVALUATION OF THE EFFECTS OF BLACK CUMIN SEED POWDER SUPPLEMENTATION ON SPERM PARAMETERS IN JAPANESE QUAIL

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ABSTRACT

The objective of our study is to evaluate the effect of dietary supplementation with Nigella sativa seed powder on microscopic sperm parameters in the vas deferens of adult Japanese quail (Coturnix japonica). The experiment was conducted at the Cynegetic Center of Zeralda under controlled breeding conditions. One-week-old quails were divided into two groups: a control group receiving a standard diet and an experimental group receiving a diet supplemented with 2% Nigella seed powder. At 10 weeks of age, after the quails were sacrificed, seminal fluid was collected from the vas deferens for semen analysis. Sperm vitality and morphology were assessed using the CASA (Computer-Assisted Sperm Analysis) system. The results show that the percentage of live sperm is higher in the experimental group than in the control group, with a statistically non-significant difference (22.45%; $p > 0.05$). The number of morphologically normal spermatozoa in the control group was higher than in the experimental group, with a statistically non-significant difference (8.57%; $p > 0.05$). In conclusion, the effect of dietary supplementation with black cumin seed powder on sperm parameters leads to a slight improvement in sperm viability.

Keywords: Japanese quail; Nigella sativa; vas deferens; sperm parameters

THERAPEUTIC EFFECT OF SWEET MARJORAM (ORIGANUM MAJORANA) ON HYPERANDROGENISM IN MUS MUSCULUS MICE

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ABSTRACT

Polycystic ovary syndrome (PCOS) is a chronic reproductive disorder with a poorly understood etiology. Phytotherapy presents a promising alternative treatment due to its bioactive compounds, particularly those found in sweet marjoram (Origanum majorana). This study aims to investigate the therapeutic effects of Origanum majorana on alleviating PCOS symptoms experimentally induced by testosterone enanthate. Thirty female Mus musculus mice were divided into three groups: control, PCOS-induced, and PCOS-induced treated with marjoram. Our results indicate that PCOS induction led to several abnormalities, including weight gain, ovarian hypertrophy, and uterine horn enlargement. The LH/FSH ratio increased, accompanied by the absence of the estrous cycle and enhanced follicular development without maturation. Lipid and carbohydrate profiles were also elevated. Treatment with marjoram extract in PCOS-induced mice significantly improved symptoms, including weight stabilization, normalization of ovarian and uterine horn weights, and a reduction in the LH/FSH ratio. The number of antral and preantral follicles decreased, with the reappearance of mature Graafian follicles, and estrous cyclicity resumed. However, metabolic profiles were not significantly restored. These findings suggest that marjoram plays a beneficial role in ameliorating PCOS symptoms and could be considered a promising therapeutic option for managing polycystic ovary syndrome.

Keywords: Polycystic ovary syndrome (PCOS), Hyperandrogenism, Origanum majorana, Mus musculus.

RETROSPECTIVE STUDY OF BOVINE TUBERCULOSIS IN A PROVINCE OF EASTERN ALGERIA, REPORT FROM 2016-2025

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ABSTRACT

Bovine tuberculosis, caused by Mycobacterium bovis, is a well-known zoonotic disease which affects cattle world-wide. A major disease due to the socio-economic and public health problems it causes, it negatively impacts international trade in animals and animal products. In this work, we were able to access, through information collected from veterinary inspections (Report of the years 2016-2025) in a province located in the far east of Algeria, namely the region of Tebessa, to the official declarations established by private and state veterinarians.The aim was to gain a fairly accurate picture of the prevalence of bovine tuberculosis in the province of Tebessa. The results showed an estimated prevalence of 0.74%. The highest infection rate was recorded in 2017 (3.65%), and among the animals that tested positive, the number of females (72%) was higher than that of males (28%).subjects over five years old were the most affected (70%) and when comparing the results obtained according to the breeds studied, local breeds seemed to be more resistant to the disease (22%) compared to crossbred breeds (24%) and imported breeds (54%).In parallel, reports of human cases of tuberculosis established during the same years of study were provided to us by the prevention department of the Tebessa region. This revealed an estimated prevalence rate of 10.06%, statistical analyses did not reveal a significant difference between affected men and women ($p>0.05$).The economic losses caused by this disease and the cost of human treatment make this disease remain important, therefore, inspection, screening and prophylaxis techniques are important.

Keywords: Bovine Tuberculosis- Mycobacterium tuberculosis-zoonosis- Esatern Algeria

TREATING PSORIASIS WITH MEDICAL LEECHES

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ABSTRACT

The medicinal leech is an invertebrate organism that belongs to the phylum Annelida. It is characterized by its flexible body, segmented into symmetrical rings, which gives it a unique ability to move and attach. This organism lives in moist environments such as swamps and feeds on blood thanks to two strong suckers that help it adhere to the skin and extract blood. During this process, it secretes saliva rich in biologically active substances, most notably "hirudin" and "eglins," which possess anticoagulant and anti-inflammatory properties. This has given the leech significant medical importance and it has been used since ancient times to treat many diseases, especially chronic skin conditions such as psoriasis. Psoriasis is a chronic inflammatory skin disease resulting from immune system disorders that lead to an abnormal acceleration in the growth of keratinocyte skin cells. Studies have shown that the medicinal leech effectively contributes to improving blood circulation in affected areas, helps regenerate tissue, and regulates immune system activity, which positively reflects on the appearance of the skin and alleviates the severity of symptoms. Our applied study on some psoriasis patients showed good results, as a noticeable improvement was observed from the first treatment session. Despite these benefits, the use of medicinal leeches is advised against in cases of severe anemia, due to their reliance on blood extraction during therapy.

Keywords: Annelida, medicinal leech, therapy, psoriasis

EXPLORING THE FACTORS INFLUENCING AVIAN SPERM QUALITY

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ABSTRACT

The poultry industry is widely recognised for its economic importance and crucial role in human nutrition, providing high-quality protein at a relatively low price, mainly through the production of eggs and meat. This is considered to be the result of effective and successful reproduction. Avian reproductive efficiency is generally assessed by estimating the reproductive potential of females, notably by measuring fertility rate, hatching rate and viability rate. However, one of the main factors limiting the maximum hatching rate is the male's fertility. ''A breeding cock is thus responsible for the fertilization of 1,000 to 2,000 eggs in natural reproduction, and 5,000 eggs or more in the case of artificial insemination''. Therefore, the study of male reproductive potential, sperm parameters, and characteristics is fundamental for the selection of breeding males and the regular monitoring of their reproductive performance. It is also essential for reproductive biotechnologies, such as artificial insemination and sperm cryopreservation, which require high-quality sperm. This helps to preserve avian genetic diversity, which is crucial for adapting to environmental changes and diseases. This review discusses the factors most likely to influence reproductive performance and sperm quality in males: such as the impact of age on sperm quality: where a correlation was found between them, particularly in terms of viability and the percentage of abnormal sperm; the effect of diet: represented by dietary supplementation of 0.45 mg selenium-enriched yeast improved sperm quality and reproductive performance of aged broiler breeder roosters; vitamin E as a natural antioxidant that can improve semen quality and fertility, as well as olive oil dietary supplementation that could be an interesting alternative to enhance rooster sperm quality particularly in aged individuals. In addition to other environmental factors such as temperature on fluctuating fertility. This approach will contribute to research aimed at finding ways to improve sperm quality and consequently, optimize fertility and production.

Keywords: Avian reproduction; fertility; sperm quality

EFFECTS OF VEGETABLE OILS ON ORGANIC SOLVENT –INDUCED TOXICITY IN WISTAR RATS

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ABSTRACT

The present-day lifestyle behaviors are major factors that adversely influence health and increase susceptibility to diseases. Therefore, Medicinal plants and their essential oils and extracts have been used to a large extent as possible strategies for modulating and reducing the disease risks associated with exposure to toxic chemicals, this study was carried out to investigate the effects of Methanol on blood parameters in female Wistar rats. For this purpose, four groups of rats were formed: Group (T) received distilled water, Group (H) given 2 mL/kg BW of EO's essential oil diluted in corn oil, Group (MTH) treated with 550 mg/kg BW of methanol (MTH) dissolved in distilled water and Group (MEL) which was treated with methanol (4g/kg BW), followed by EEO (2mL/kg BW). The essential oil was extracted from eucalyptus leaves and analyzed (pH, refractive index, Brix index). After 10 days of treatment, blood tests were performed. The results showed that methanol reduced hemoglobin, red blood cells, and hematocrit significantly, indicating a negative impact on the blood. However, rats that received eucalyptus after methanol showed values closer to the normal group, suggesting that eucalyptus oil may help reduce the harmful effects of Methanol minimally. This work shows that Methanol has damaging effects on blood, but that Eucalyptus globulus may have a protective role due to its antioxidant compounds (eucalyptol, α- pinene, and terpineol)

Keywords: Methanol, Eucalyptus globulus, Essential Oil, Wistar Rats, Hematological Disturbances

PRELIMINARY STUDY: EFFECT OF DIETARY SUPPLEMENTATION WITH NIGELLA SEED POWDER ON SERUM CHOLESTEROL CONCENTRATION IN QUAILS

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ABSTRACT

The objective of our study is to evaluate the effect of dietary supplementation with Nigella seed powder on serum cholesterol concentration in males and females quails. Twenty quails were used and divided into two groups. The control group received standard poultry feed and the experimental group received 2% Nigella seed powder supplementation at one day after hatching. Serum cholesterol concentration was evaluated at 42 days of age from blood samples collected during the sacrifice. The assay was performed using the colorimetric enzymatic method by using a spectrophotometer. The results showed that in the control group, serum cholesterol concentration was higher in females than in males, with a statistically nonsignificant difference (20.32%; $p>0.05$). Dietary supplementation of 2% Nigella seed powder caused a statistically nonsignificant decrease (1.36%; $p>0.05$) in males. However, the decrease was statistically significant (37.1%; p

Keywords: Japanese quail, cholesterol, male, female, Nigella seed powder

MORPHOMETRIC CHARACTERIZATION OF THE FRESHWATER CRAB POTAMON ALGERIENSE (DECAPODA: POTAMIDAE) IN THE BENI HAROUN RESERVOIR, ALGERIA

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ABSTRACT

The freshwater crab Potamon algeriense plays a critical ecological role in North African freshwater systems, contributing to the aquatic ecosystem's biodiversity and functioning, yet its morphometric characteristics remain understudied, particularly in anthropogenic-influenced reservoirs like Beni Haroun in Algeria. This study aims to analyze the morphological variations of P. algeriense with a detailed morphometric analysis across different seasons to understand variations in physical traits and also to analyze seasonal and sexual variations in morphometric parameters of this species. A total of 56 crabs were collected during the four seasons. Key morphometric parameters measurements including carapace length (CL), carapace width (CW), chela dimensions' length and width (CHL1, CHW1, CHL2, CHW2), and abdominal measurements length and width (AL, AW) and also each specimen weight were recorded and analyzed by gender and season. Results reveal significant seasonal and sexual dimorphism in morphometric traits indicating clear functional specialization between the sexes: Males consistently exhibited larger carapace, narrower abdomens and well-developed chelipeds traits related to reproductive competition and mate attraction. While females exhibit greater weight and abdominal width, they have broader abdomens adapted for egg carrying and protection. Crabs reached larger sizes and weights in summer and autumn, likely due to favorable resource availability, reproductive cycles, and growth periods, while smaller spring and winter specimens. Within-season morphometric variability further reflects differing growth stages and habitat-driven adaptations, emphasizing the role of environmental conditions in shaping growth patterns. These findings highlight how both intrinsic (gender) and extrinsic (seasonal environmental) factors influence the morphology of P. algeriense. this study provides essential baseline data for understanding its biology and ecology. Such morphometric characterization is vital for monitoring population health and guiding conservation strategies, ensuring the sustainability of the species and its habitat in the face of environmental changes.

Keywords: Potamon algeriense, Freshwater Crab, Morphometric Analysis, Beni Haroun Reservoir, Algeria

A2 MILK: IMPLICATIONS OF GENETIC VARIANTS IN MILK PROTEINS FOR HUMAN HEALTH AND THE DAIRY INDUSTRY

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ABSTRACT

Milk is a fundamental food source for all age groups due to its high nutritional value, particularly its richness in calcium, which plays a crucial role in bone health. However, the effects of milk proteins—especially the β-casein fraction—on human health have become the focus of scientific research in recent years. This review aims to examine the structural differences between the A1 and A2 variants of β-casein, interpret their potential effects on human physiology in light of current scientific evidence, and evaluate the emerging trends related to A2 milk within both health and dairy industry contexts from a holistic perspective. Furthermore, by exploring the potential of A2 milk production in the context of genetic selection and dairy technology, this study aims to provide an integrative outlook that may guide future research and sectoral applications. The β-casein protein is represented by two main genetic variants: A1 and A2. A single amino acid difference between these variants (histidine [X] proline at position 67) leads to the release of peptides with distinct biological activities during digestion. A1 β-casein gives rise to an opioid peptide called beta-casomorphin-7 (BCM-7) during digestion. Various studies have demonstrated that BCM-7 may exert potentially adverse effects on the nervous, digestive, and immune systems. Accordingly, A1 milk consumption has been associated with several health issues, including type 1 diabetes, autism spectrum disorders, cardiovascular diseases, and gastrointestinal disturbances. In contrast, the proline residue present in A2 β-casein largely prevents the formation of BCM-7, thereby reducing these risks. Consequently, A2 milk has emerged as a preferable option for individuals with digestive disorders presenting symptoms similar to lactose intolerance, owing to its improved digestibility. A2 milk is noteworthy not only for its physiological effects but also for its role in the dairy industry. Growing consumer awareness and a shift toward health-focused dietary preferences have increased demand for easily digestible and low-allergenicity products, positioning A2 milk in a niche market. Owing to its high compatibility with conventional dairy processing techniques, A2 milk maintains its functional properties in the production of various dairy products such as yogurt, cheese, and milk powder. Genetic selection and genomic evaluation studies play a critical role in identifying animals with the A2A2 genotype and enhancing production efficiency. In conclusion, genetic variants of β-casein have a decisive impact not only on individual health outcomes but also on the strategic orientation of the dairy industry. A2 milk, with its enhanced digestibility, potential health benefits, and industrial adaptability, is emerging as a scientifically and commercially significant product shaping the future of dairy consumption and production.

Keywords: A2 milk, β-casein, BCM-7, genetic variant, digestive health, dairy industry

ABSTRACT: EVALUATION OF PRODUCTIVITY AND PROTEIN RATE OF HYDROPONIC FORAGE FROM BARLEY AND TRITICALE ASSOCIATED WITH LEGUMES: PRELIMINARY RESULTS.

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ABSTRACT

The overall objective of the current study was to assess the agronomic performance and nutritional quality of hydroponically grown forage crops derived from associations between two cereals (barley and triticale) and two legumes (vetch and clover), over three successive production cycles. In this trial, ten sowing treatments were tested: pure crops (100%) and mixtures (associations with 85/15 and 70/30 cereal-to-legume ratios) harvested uniformly at 9 days. Dry matter (DM) biomass yields were expressed per 300 g of seeds grown in each trays (DMT) (DMP), and per hectare (DMH). Crude protein contents were analyzed in biomass to evaluate protein yield. The trial was conducted according to three successive periods. Statistical analysis was performed using SAS (GLM procedure and Duncan's test, p

Keywords: Hydroponic forage; Barley; Triticale; Vetch; Clover; Cereal–legume association; Dry matter yield; Crude protein; Short-cycle cultivation; Sustainable livestock feeding

ANTIBIOTIC RESIDUE RESEARCH IN MEAT BEEF AND RAW MILK BY THE MICROBIOLOGICAL METHOD IN MÉDÉA (ALGERIA)

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ABSTRACT

Beef meat and raw milk provide many essential nutrients; they must above all be healthy products and free from antibiotic residues, which are dangerous for human health. Our study, whose objective is to search for antibiotic residues in beef and raw milk marketed in Médéa, was carried out on 50 samples of beef meat and 10 samples of raw milk by the reference microbiological method of the four boxes, based on the inhibition of two sensitive bacteria for beef (Bacillus subtilis and Micrococcus luteus) and two sensitive test bacteria for raw milk. The results obtained showed the detection of antibiotic residues in 15 samples of beef (29%) (Beta-lactams and/or tetracyclines (36%), sulfonamides (58%), aminoglycosides (34%) and macrolides and/or Beta-lactams (12%)) and 3 samples of raw milk, (30%) (Beta-lactams and/or tetracyclines (100%), sulfonamides (0%), aminoglycosides and macrolides (0%)).These results call for the systematic control of Meat beef and raw milk to ensure consumer protection.

Keywords: Meat beef, raw milk, antibiotic residues, official microbiological method

RESEARCH OF ANTIBIOTIC RESIDUES IN RAW MILK OF INFORMAL CIRCUIT BY THE DELVOTEST SP NT IN ALGIERS, BLIDA AND TIPAZA (ALGERIA)

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ABSTRACT

Veterinary treatments, mainly antibiotics used for therapeutic or prophylactic purposes in dairy cows, can lead to the presence of antibiotic residues in milk. These residues can pose potential dangers such as allergies, toxicity, or microbial risks to consumers, as well as significant losses to the dairy processing industry. It is essential to detect antibiotic residues in milk to ensure impeccable quality for human consumption, which must be free from any contamination traces. The present study relates to the research of the antibiotic residues in the raw milk of informal circuit by means of Delvotest SP- NT. Our study carried out on 98 samples of raw milk from informal circuit (Algiers (33), Blida (33) and Tipaza (32)). The results revealed antibiotic residues contaminations in 17,17 % of raw milk samples from informal circuit (9.09% positive and 8.08% doubtful) Our results also showed that the rate of raw milk contaminated with antibiotic residues from Blida (21.21% total, with 6.06% positive and 15.15% doubtful) is similar to that recorded in Tipaza (15.15% total, with 9.09% positive and 6.06% doubtful), as well as that in Algiers (15.15% total, with 12.12% positive and 3.03% doubtful). These results call for the systematic control of raw milk from informal circuit to ensure consumer protection.

Keywords: Raw milk, antibiotic residues, informal circuit, Delvotest SP-NT

REPRODUCTIVE EFFICIENCY IN AN ALGERIAN SYNTHETIC RABBIT STRAIN: FOLLICULAR DYNAMICS AND EMBRYONIC SURVIVAL

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ABSTRACT

This study investigates the reproductive efficiency of a synthetic Algerian rabbit strain by analyzing ovulation rates and embryonic survival at 12 days of gestation. Twenty-one females were evaluated post-sacrifice, with quantification of corpora lutea (12.83 ± [SD] per ovary) and viable embryos (9.40 ± [SD], 73.4% survival rate), alongside histomorphometric assessment of follicular development. Results revealed a significant positive correlation (p

Keywords: Keywords : Rabbit ; Follicular ; Embryonic survival ; Synthetic strain; Algeria

LACTATION PERFORMANCE AND METABOLIC CORRELATES IN ALGERIA'S SYNTHETIC RABBIT STRAIN: IMPLICATIONS FOR BREEDING PROGRAMS

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ABSTRACT

This study characterized milk production traits and composition in 30 nulliparous does (4.5 months old) of an Algerian synthetic rabbit strain reared under controlled conditions, while evaluating their relationship with blood cholesterol and triglyceride levels throughout a 21-day lactation period. Does were individually housed, fed ad libitum with breeder pellets, and monitored for body weight, litter weight, and daily feed/water intake. Milk yield was measured by weighing does before and after a single daily nursing (3–5 minutes), with manual milk sampling every other day (without oxytocin). Physicochemical milk analysis was conducted at "Le Fermier" dairy laboratory, and blood samples were collected for biochemical profiling. Results revealed significant variations in milk quantity and composition across lactation weeks, with parallel fluctuations in plasma metabolite levels. The study highlights the utility of blood metabolic parameters as indicators of energy and protein balance in lactating does. These findings contribute to the physiological characterization of this novel synthetic strain, offering insights into lactation-driven metabolic adaptations that influence litter growth.

Keywords: Rabbit, Milk yield, Lactation, Biochemical parameters, Metabolic profile

EFFECTS OF COOLING METHODS OF EGGS AFTER SHORT PERIOD OF INCUBATION DURING LONG STORAGE PERIOD ON HATCHING RESULTS OF LAYERS PARENT STOCK EGGS

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ABSTRACT

The aim of this study was to determine the effects of immediately and intermittent cooled down of eggs after short periods of incubation during egg storage (SPIDES) on egg weight loss, hatchability of fertile eggs (HOF) and embryonic mortality rates. A total of 600 fresh hatching eggs were obtained from 52-weeks-old Bovans white breeder flock and were stored for 28 days. The eggs were randomly divided into three experimental groups: non-SPIDES (NSP); eggs were stored for 28 d constantly without heat treatment; SPIDES1 (S1); eggs were treated with 2 h pre-incubation at 36°C delivered at 6, 12 d and 18 over of 28 d of storage and then the eggs were immediately cooled down; SPIDES2 (S2); eggs were treated with 2 h pre-incubation at 36°C delivered at 6, 12 d and 18 over of 28 d of storage, then were intermittent cooled down. Both SPIDES treatments, improved HOF to 35.48 and 39.54% by lowering early embryo mortalities at 27.70 and 29.35% in S1 and S2 respectively compared to the NSP group with 22.81 and 57.13% in HOF and early mortality, respectively ($P< 0.05$). However, even though there is no significant difference for HOF between S1 and S2 treatments, the HOF in the S2 group was higher (4.06%) than that of the S1 group. As a result, the intermittent cooling method after SPIDES can be effective in improving hatchability and can reduce the detrimental effects of long storage of hatching eggs from older hens.

Keywords: Layer, long egg storage, SPIDES, intermittent and immediately cooling, hatchability, embryonic mortality

EFFECT OF ACIDIFIER (GLOBACID) ON LEVEL OF ENZYME ADDITION IN GROWING QUAIL FED WHEAT BASED DIET

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ABSTRACT

The present study was conducted to investigate the effects of Globacid (Optimum combination of lactic, formic, propionic and acetic acids on a special carrier) and different levels of Rovabio enzyme in wheat based diet on quail chicks performance and immune system function. In this experiment 240 day old Japanese quail chicken (mixed sexes) were randomly assigned to a 2×3 factorial arrangement in a completely randomized design. Factors include 2 level of Globacid (0 and 1000mg per kg) and three levels of enzyme (0, 250 and 500 mg per kg). Each treatment group consisted of 4 replicates of 10 birds. Live weight, daily gain, feed conversion ratio, average feed intake were measured weekly and at the end of the period. After distinguish male and female the separation the sexes in the end of experiment, live weight and daily weight gain was measured for male and female separately. Result show that live weight, weight gain, feed conversion ratio and immune response were improved by adding Globacid to quail diets (P

Keywords: Immune function, Organic acid, Performance, Rovabio

EFFECT OF LACTOFEED PROBIOTICON LEVEL OF ENZYME ADDITION IN GROWING QUAIL FED WHEAT BASED DIET

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ABSTRACT

The present study was conducted to investigate the effects of Lactofeed probiotic and different levels of Rovabio enzyme in wheat based diet on quail chicks performance and immune system function. In this experiment 240 day old Japanese quail chicken (mixed sexes) were randomly assigned to a 2×3 factorial arrangement in a completely randomized design. Factors include 2 level of lactofeed probiotic (0 and 0.30 g/kg) and three levels of enzyme (0, 250 and 500 mg per kg). Each treatment group consisted of 4 replicates of 10 birds. Live weight, daily gain, feed conversion ratio, average feed intake were measured weekly and at the end of the period. After distinguish male and female the separation the sexes in the end of experiment, live weight and daily weight gain was measured for male and female separately. Result show that live weight, weight gain, feed conversion ratio and immune response were improved by adding probiotic to quail diets (P

Keywords: Quail, Wheat, probiotc, Lactofeed, enzyme, Rovabio, performance

BIBLIOMETRIC DECODING OF MILK: GENETICS AND TRENDS IN LIVESTOCK

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ABSTRACT

Milk is a complex and valuable animal food source, providing essential components with diverse biological functions. Globally, milk has been subjected to numerous studies from various perspectives, including yield optimization, component analysis, mechanistic understanding, and quality enhancement. In this study, a comprehensive bibliometric analysis focusing on genetic research related to milk production and composition in some milk-producing animal species (cattle, sheep, goat, buffalo, camel, and donkey) was performed using the articles from the Web of Science database. The keywords searched include milk, milk yield, milk quality, lactation, genetic, heritability*, breeding value*, genomic selection*, and some other related terms. A total of 12.025 publications from the period 1947–June 2025 were analyzed using the bibliometrix package in R, with a focus on citation networks and bibliographic linkages. Approximately 70% of all published studies (8.363 articles) have been published since 2009, demonstrating the continued and increasing interest in dairy research. Over the past 80 years, milk and milk genetics can be divided into two major periods. Between 1947 and 2005, progress was primarily based on traditional breeding methods and fundamental genetic principles, with research utilizing animal models, genetic parameters, heritability, selection indices, breeding values, and beta-lactoglobulin such molecular markers as themes. In the second period, which was shaped after the Next Generation Sequencing-based genomic revolution began in 2006. During this period, motor and basic themes such as SNPs, cattle genomics, heritability, GWAS, and heat stress have become prominent. Additionally, emerging themes such as inbreeding, genetic diversity, and runs of homozygosity (ROH) have gained importance, while niche themes of research have separated into milk yield and animal health, bovine mastitis from other themes. In addition, bibliometric results show that alternative breeds such as Bubalus bubalis (buffalo) and Murrah are beginning to emerge as alternative options for milk production in terms of genetic diversity, sustainability, and climate change. The trends in dairy science show that traditional genetic methods are being integrated with advanced biotechnologies and high-throughput DNA technologies, which continue to shape the future.

Keywords: Milk, dairy, dairy animals, lactation, heritability, bibliometrics

HEAT AND COLD STRESS IN WATER BUFFALOES (BUBALUS BUBALIS): A REVIEW

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ABSTRACT

The direct effect of global warming is climate change and increases in temperature and drought severity are observed due to climate change. This situation increases the negative effects of heat stress on buffaloes rather than cold stress. Although buffaloes have developed a series of adaptation mechanisms against heat and cold stress, their thick skin and low density of hair, as well as their low number of sweat glands, reduce their tolerance to heat stress. This may have a detrimental effect on the welfare and comfort of buffalos, as well as their milk yield, reproductive efficiency and health status, and may also have negative consequences for sustainable production. Therefore, it is important to understand the anatomical, physiological and behavioral responses of buffaloes to heat and cold stress and to discuss production losses in order to reduce the negative effects of global warming and to maintain sustainability. This review aims to understand the responses of buffalos to heat and cold stress and to discuss care, feeding and management strategies that can reduce the effects of heat stress. Due to the effects of global warming, water buffalo grazing grounds, wetlands, and ponds are being negatively impacted by drought. Therefore, systems such as shade, fans and showers should be integrated into the shelters to meet the cooling needs of the buffaloes. Furthermore, in hot regions, a focus on nutritional management should be placed on reducing the severity of heat stress. In the long term, water buffalo resistant to heat stress should be selected.

Keywords: Water buffaloes, Heat stress, Productivity, Health, Physiology, Behavior

EFFECT OF PREGABALIN ON SOCIAL, COGNITIVE BEHAVIOR, SKILLS AND PERSONAL QUALITIES

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ABSTRACT

As Paracelse so aptly put it: "Everything is poison, nothing is poison, it is the dose that makes the poison." This quote underscores a fundamental principle of medicine and the healthcare system in general: there is no clear distinction between a beneficial drug and a deadly poison. In reality, every drug, whether used in doses higher than recommended or for unjustified indications, carries risks. Even when its use is justified and all recommendations are followed, it is never completely safe for the patient. This reality also applies to pregabalin. Pregabalin, originally used to treat specific medical conditions, is now being misused as a recreational drug in Algeria. This misuse of pregabalin can have adverse consequences on individuals' behavior and cognitive abilities. The epidemiological study we conducted at the Intermediate Addiction Care Center (CISA) on 30 patients highlights the adverse effects of pregabalin. The target population included 30 pregabalin users aged 16 to 47. A questionnaire was developed to collect information on the patients' pregabalin consumption habits and general health. The Montreal Cognitive Assessment (MoCA) test was used to assess the patients' cognitive functions. The survey lasted two and a half months, from February 16 to May 2, 2023, at the CISA center. Pregabalin use can cause problems with memory, concentration, danger perception, and even spatial orientation. These side effects can negatively impact cognitive abilities and decision-making in the long term, raising concerns about the prolonged use of this medication. Our results highlight the importance of a thorough evaluation of drugs and their potential adverse effects on behavioral and cognitive aspects.

Keywords: Pregabalin, drug abuse, cognitive abilities, MoCA test, suxual behavior

STUDY ON THE MANAGEMENT, DIAGNOSIS AND EVOLUTION OF ISCHEMIC STROKE IN THE MEDICAL EMERGENCY SERVICE

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ABSTRACT

Ischemic stroke is a condition caused by the blockage or narrowing of blood vessels supplying the brain, leading to reduced blood flow and depriving brain cells of oxygen and essential nutrients. Our research is based on the study of stroke patients treated at Ibn Sina Hospital in Annaba, Algeria. By examining the demographic data, medical history, and length of hospitalization of 186 patients during the three months (June, July, and August) of 2023, potential risk factors were identified. The study revealed a higher prevalence of stroke in older adults, particularly those over 60 years of age. Women were the most affected, representing 53% of cases, while the most common hospital stay for our patients was 24 hours, with a low mortality rate. The main risk factors are high blood pressure, which represents the most important risk factor in our study, followed by diabetes, and a family history of cardiovascular diseases. In conclusion, our study highlights the importance of individual and environmental factors in stroke, recommending preventive measures such as awareness campaigns and regular monitoring to control risk factors.

Keywords: Ischemic stroke, demographic data, medical history, hospital stay

EPIDEMIOLOGICAL STUDY OF CERVICAL CANCER IN THE WILAYA OF EL TAREF REGION IN ALGERIA

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ABSTRACT

Cervical cancer is one of the few human cancers that can be prevented if detected in the early, asymptomatic stages. It is preceded by a precancerous phase that may last several years before the appearance of clinical symptoms, the major sign of which is genital haemorrhage. In Algeria, three thousand new cases of cervical cancer are recorded every year, with four women dying from the disease every day. Its incidence is 9.9 per 100,000, making it the second most common cancer among women. Human papillomavirus (HPV) is the most important causative agent in the pathogenesis of cervical cancer and pre-cancer. The aim of this study was to carry out a retrospective epidemiological survey of 596 patients treated at the Ben M'Hidi cervical cancer screening laboratory, between the years 2019-2020 and the March-April 2021 training period. In this study, the rate of smears was judged to be: of good quality (satisfactory) with a rate of 91.15%, and 8.85% unsatisfactory smears. The results show a proportional increase in the incidence of non-specific inflammation in the three smears, with a rate of 35.89%. And a peak at the first smear of non-specific inflammation with 21.99% .And also Cytological analysis of lesions in women by age group showed that lesions are recorded in all age groups even in the youngest <30 years and a proportional increase in the incidence of low grade in all age classes with a rate of 49.38% ,and a peak corresponding the age class [50-60] years whose percentage was 16.05%.

Keywords: Human papillomavirus, Cervical cancer, Epidemiology

TNF-α–MEDIATED INFLAMMATORY RESPONSE IN THE PREVENTIVE BIOTHERAPY OF ECHINACEA AGAINST TWO-STAGE SKIN CARCINOGENESIS: INSIGHTS FROM HISTOLOGICAL AND MORPHOLOGICAL STUDIES

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ABSTRACT

Squamous cell carcinoma arises from the flat cells of the intermediate layer of the epidermis. The murine model of experimental carcinogenesis closely mimics the human phenotype, making it a valuable tool for studying this pathology. This study investigates the preventive potential of Echinacea, a medicinal plant widely used in traditional medicine for its immunostimulant and antioxidant properties, as a biotherapy against chemically induced skin carcinogenesis in a murine model, using DMBA as the initiator and croton oil as the promoter. Four groups of Swiss albino mice were assigned as follows: a control group; an Echinacea-treated group receiving an oral solution of Echinacea (E); a carcinogenesis group subjected to a chemical carcinogenesis protocol (DMBA); and a combined treatment group simultaneously treated with Echinacea while undergoing the carcinogenesis protocol (DMBA/E). Over a 16-week experimental period, we monitored the development of cutaneous papillomas by assessing latency time and key morphological parameters, including the total number (N), total volume (V), and the V/N ratio. Histopathological examination of skin biopsies, oxidative stress parameters, and TNF-α expression analysis were conducted to evaluate treatment efficacy. Our results revealed that mice subjected to carcinogenesis and simultaneously treated with Echinacea developed significantly fewer and smaller papillomas than those subjected to carcinogenesis alone, with a significantly longer latency time and a lower V/N ratio. Histological analysis of mice subjected to carcinogenesis revealed a high-grade in situ adnexal tumor, characterized by an increased number of follicles. The tumor displayed pronounced cytonuclear atypia, karyomegaly with irregular contours, basophilia, frequent mitoses, and prominent nucleoli. Additionally, inflammatory cell infiltration was observed, correlating with a significant increase in TNF-α expression and oxidative stress parameters, highlighting the role of oxidative imbalance in tumor progression. In contrast, mice treated with Echinacea alongside carcinogenesis developed only mild adnexal hyperplasia, showing a promising therapeutic response in the epidermis, absence of malignancy, and a significant reduction in oxidative stress markers. Interestingly, while TNF-α expression was significantly increased in the DMBA group, an even greater increase was observed in the Echinacea-treated group, correlating with the therapeutic effect.

These results suggest that TNF-α, when highly upregulated in response to treatment, may contribute to tumor suppression rather than progression, probably via its apoptotic effect on tumor cells. These findings reinforce the potential of Echinacea as a preventive strategy against chemical skin carcinogenesis, particularly for individuals at high risk of exposure to environmental carcinogens such as DMBA**.**

Keywords: Biotherapy, Echinacea, Chemical carcinogenesis, DMBA, Croton oil, Adnexal tumor, TNF-α.

ASSESSMENT OF BLOOD INFLAMMATORY SCORES FOR PREDICTING INTRACYTOPLASMIC SPERM INJECTION OUTCOMES IN INFERTILE ALGERIAN WOMEN

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ABSTRACT

Inflammation is a key factor in human reproduction and embryo implantation. This study investigated the potential of systemic inflammatory ratios, platelet-to-lymphocyte ratio (PLR), lymphocyte-to-monocyte ratio (LMR), and neutrophil-to-lymphocyte ratio (NLR), as predictors of intracytoplasmic sperm injection outcomes in infertile Algerian women. A retrospective analysis was conducted on the medical records of 120 women who underwent ICSI treatment at the El Mawloud Fertility Center in Oran, Algeria, between December 2023 and March 2024. Based on treatment results, participants were classified into two groups: those with a positive β-hCG result (n=40) and those with a negative β-hCG result (n=80). Statistical methods included Student's t-test, Mann-Whitney U test, Chi-square test, and Fisher's exact test. Receiver operating characteristic (ROC) curves were employed to determine optimal cutoff values for each ratio. The average age in the β-hCG positive group was 33.00 years (SD=4.77), while it was 34.70 years (SD=5.70) in the β-hCG negative group. Among the clinical parameters assessed, body mass index, oocyte count, and embryo quality showed statistically significant differences between the two groups (p=0.03, p=0.001, p=0.001, respectively). Among the inflammatory markers, only PLR exhibited a significant association with ICSI outcomes (p=0.02). ROC curve analysis identified a PLR threshold of 117.96, with a sensitivity of 0.63 and specificity of 0.58 (p=0.031), suggesting its potential as a predictor of implantation success. Given the role of platelets in inflammatory processes, our findings propose PLR as a promising marker for evaluating ICSI treatment outcomes. However, further prospective studies with larger cohorts are necessary to confirm these findings.

Keywords: Systemic inflammatory scores, NLR, LMR, PLR, ICSI, ART, embryo implantation, female infertility.

CORRELATION BETWEEN BLOOD GLUCOSE AND GLYCATED HEMOGLOBIN LEVELS IN DIABETIC PATIENTS WITH GENETIC HEMOGLOBIN VARIANTS

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ABSTRACT

Diabetes is a complex metabolic disorder characterized by chronic hyperglycemia, the diagnosis of which is made in particular by measuring glycated hemoglobin (HbA1c). Haemoglobinopathies, on the other hand, are serious hereditary conditions with serious consequences for patients and their families. The objective of our study is to try to understand the impact of genetic variants of hemoglobin on the increase or decrease of the HbA1c value in relation to blood glucose to decide on cases of diabetes. This work therefore consists of dosing glycated hemoglobin using the HPLC technique, with identification of variants as well as blood glucose dosing, in order to see if there is a link between the two assays or not in relation to the type of variant. We noted that among these 57 cases, 46 cases had a link between blood glucose levels and the usual HbA1c value compared to 11 cases that did not have a link. So we can say that a priori hemoglobin variants have no direct impact on glycated hemoglobin values in relation to blood glucose, which opens up a perspective to study other parameters.

Keywords: diabetes, glycated hemoglobin, blood glucose, genetic variants.

EVALUATION OF ANTIOXIDANT ACTIVITY OF SEED ORGANIC EXTRACTS OF ANISE (PIMPINELLA ANISUM L.) CULTIVATED IN ALGERIA

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ABSTRACT

Aniseed is an annual important spice and medicinal plant Anise (Pimpinella anisum L.) Species with essences rich in anethole are commercially important as a result of their uses in medicine and diet. The aim of this study is to investigate if the organic extracts have a biological effect as that registered by the extract usually obtained by decoction, infusion, and water maceration of the medicinal plants as well as by their essential oils. The total phenolic content (TPC) of Petroleum ether (EPe), dichloromethane (EDm) and methanol (EMe) extracts of Pimpinella anisum L. seeds was determined by using Folin-Ciocalteu reagent following the method of Agbor et al. (2014). The phenolic compounds of extracts were identified by using High-Performance Liquid Chromatography (HPLC) analysis. The antioxidant activity was checked by Thin-Layer Chromatography (TLC-DPPH) method and measured by DPPH free radical scavenging method. The determination of total phenolic contents demonstrated that methanol was better extraction solvent of these compounds in comparison with petroleum ether, and dichloromethane. The chemical analysis of the organic seed extracts indicated the presence of anisic acid, syringic acid, salicylic acid and rutin. These extracts showed a significant antioxidant activity whose methanol extract had the less value of IC50. The results reaffirm the capacity of Pimpinella anisum L. as naturally antioxidant agent. Thus, the isolation of the active principles is necessary in order to purify them and determine their structure. This is the first report to reveal an important antioxidant property of organic extracts of Algerian cultivated anise.

Keywords: Pimpinella anisum L.; Organic Seed Extracts; Total Phenolic Contents; Antioxidant Property

GREEN BIOSYNTHESIS OF CUO NANOPARTICLES USING SPIRULINA MAXIMA: POTENT ANTIMICROBIAL ACTIVITY AGAINST MULTIDRUG-RESISTANT BACTERIA AND FUNGI

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ABSTRACT

The increasing prevalence of antimicrobial resistance has diminished the efficacy of conventional treatments, necessitating the development of eco-friendly and cost-effective alternatives. Copper oxide (CuO) nanoparticles, synthesized via a green approach using an aqueous extract of Spirulina maxima, emerge as promising candidates due to their unique physicochemical properties and biocompatibility. This study investigates the antimicrobial activity of biosynthesized CuO nanoparticles against drug-resistant bacterial pathogens (Salmonella typhi ATCC 14028, Staphylococcus aureus ATCC 29213) and the fungal pathogen Candida albicans. The nanoparticles underwent characterization through X-ray diffraction (XRD) and Scanning electron microscope (SEM). Antimicrobial efficacy was evaluated via the broth microdilution method, with Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) determined to quantify their effectiveness. Results demonstrated significant antimicrobial activity, with low MIC (62.5 µg/ml) and MBC (125 µg/ml) values against all tested microorganisms, indicating a high sensitivity of the pathogens to the CuO nanoparticles. These findings suggest that CuO nanoparticles synthesized using Spirulina maxima could serve as a sustainable alternative to combat infections caused by multidrug-resistant pathogens, with potential applications in biomedical, agricultural, and environmental fields.

Keywords: CuO nanoparticles, Green Synthesis, Antimicrobial activity, Spirulina maxima, MIC, MBC

ANTIFUNGAL POTENTIAL OF ATLAS CEDAR (CEDRUS ATLANTICA) ESSENTIAL OIL AND FORMULATION INTO A TOPICAL OINTMENT

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ABSTRACT

Belonging to the Pinaceae family, the Atlas cedar (Cedrus atlantica Manetti), an endemic species of the high mountains of Algeria, is rich in essential oils. These oils are being studied for their antifungal activity, and the extraction of their aromatic fraction offers new perspectives in aromatherapy, particularly through the development of galenic preparations for therapeutic purposes. The hydrodistillation process yielded a significant yield of 0.3%. The physicochemical analyses of the extracted essential oil were found to be in accordance with AFNOR standards. Analysis of its chemical composition by gas Chromatography (GC) revealed the presence of sesquiterpene compounds of the himachalene type and ketone compounds represented by atlantones, whose in vitro antimicrobial activity has been proven. The galenic formulation of an ointment based on Atlas cedar essential oil, the purity and storage stability of which have been controlled, aims to enhance its economic, toxicological, and therapeutic benefits, especially as an antifungal agent. This study has proven to be very interesting due to the positive results obtained.

Keywords: Cedrus atlantica Manetti, Essential Oil, Himachalenes, Atlantones, Ointment, Antifungal

STUDY OF THE SUBACUTE TOXICITY OF THE METANOLIC EXTRACT OF RUTA MONTANA L. ON FEMALE ALBINO WISTAR RATS: EFFECT ON THE LIVER

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ABSTRACT

The objective of this study is to evaluate the sub-acute toxicity of the methanol extract from the aerial part of Ruta montana (Fijel) used in traditional medicine in Algeria in female albino wistar rats. The quantitative and qualitative analysis of the raw methanolic extract of Ruta montana L. made it possible to obtain a yield of 9.165%. The sub-acute toxicity study of the methanol extract at a dose of 58 mg / kg body weight in rats for 15 days, recorded no mortality, and showed changes in hematological and biochemical parameters. The treated animals showed a significant increase in body weight compared to the control animals. After the dissection showed a disturbance in the relative mass of the organs. The biochemical parameters of the liver function assessment showed a significant increase in the levels of AST, ALT and PAL. The histological study shows that the hepatocyte lobules architecture is preserved, however blood congestions in the centrolobular veins and necrosis foci are observed, thus confirming the high biochemical parameters related to liver structure. Hematological parameters recorded a significant increase PLT, PCT, GB, CCMH. and a significant decrease in HCT and IDR. In conclusion, these biochemical, histological and hematological parameters confirm the hepatotoxicity of the plant Ruta montana

Keywords: toxicity, subacute, Ruta montana, Liver, Rats

EVALUATION OF THE ANTIOXIDANT ACTIVITY OF DAUCUS CAROTA L. ESSENTIAL OIL FROM EL-TAREF -ALGERIA

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ABSTRACT

Aromatic plants are promising and constitute a great source of natural antioxidants for the food industry. Indeed, the oxidation of lipids in food products not only induces a reduction in the nutritional value of the food, but also has effects recognized as harmful for the consumer and which can be associated with risks of century diseases in humans. The negative effects of synthetic antioxidants encourage their replacement by natural agents. The objective of our study is to promote the Algerian sector specializing in the production of essential oils by highlighting the pharmacological potential of certain essential oils, including Daucus carota L., produced by a unit located in the wilaya of El Taref (El Kala region) called Flor'Est. The antioxidant activity was assessed using the DPPH free radical method. Free radical scavenging activity was measured by mixing 100 µL of each of the methanolic solutions of the tested essential oils at different concentrations with 1300 µL of a methanolic solution of DPPH (0.004%). After a 30-minute incubation period at room temperature, the absorbance was read at 517 nm. The inhibition of the DPPH free radical by ascorbic acid was also analyzed for comparison. Our results show that the antioxidant activity increased with increasing concentrations. It seems that vitamin C (ascorbic acid) is the most effective and powerful antioxidant than the EO studied with a value of 0.0056 mg/ml. The IC50 of Daucus carota L. equal to 14.11 mg/ml. The search for active molecules with low side effects is essential. Such molecules are present in plants that sometimes constitute the only source of treatment for poor populations. This work has revealed the importance of Daucus carota L. species, which deserve an honorable place in Algerian medicine.

Keywords: Daucus carota L., Essential oil, Antioxidant activity

ANTISTAPHYLOCOCCAL STUDY OF THE ESSENTIAL OIL OF MENTHA PULEGIUM L. FROM ALGERIA

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ABSTRACT

Mentha pulegium is from the mint family and is one of the oldest medicinal plants with sedative, analgesic and antiseptic properties especially for the treatment of diabetes. It is found everywhere in Algeria in humid places, commonly called "fliou" is a medicinal plant belonging to the Lamiaceae family. The aerial parts of this plant are traditionally used for their antiseptic, analgesic, expectorant, diuretic, carminative. Infectious diseases which are one of the main causes of global mortality and morbidity. Pharmacological industries have produced number of new-antibiotics in the last three decades, but microbial resistance to these antibiotics has increased because of genetic ability of the bacteria to acquire and transmit the resistance against therapeutic agents. One particular bacterium of concern is methicillin-resistant Staphylococcus aureus (MRSA), which is the most common resistant bacteria in humans. Antibiotic development has been unable to keep up with the rapid evolution of antibiotic-resistant organisms, and there is an urgent need to identify alternative agents to combat this problem. Antimicrobial properties of plant essential oils (EO) have been investigated through several observations and clinical studies which purpose them as potential tools to overcome the microbial drug resistance (MDR) problem. The aim of this research was to study the antibacterial effect of a traditional plant EO, Mentha pulegium L., against clinical isolates of methicillin resistant Staphylococcus aureus (MRSA) through disk diffusion method. The EO showed very effective bactericidal activity towards the majority of the tested bacterial strains with inhibition zone diameters in the range of 16.01 -25.00mm. These results suggest that the essential oil of Mentha pulegium L. may be a useful alternative to antibiotics for the control of the infections caused by Staphylococcus aureus.

Keywords : Mentha pulegium L., Essential oil, Antibacterial activity, Staphylococcus aureus MRSA

SUBACUTE EFFECTS OF RUTA MONTANA PLANT EXTRACT ON RENAL FUNCTION AND STRUCTURE IN ALBINO-WISTAR RATS

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ABSTRACT

The plant Ruta montana called in Algeria «Fijel», is sold at all herbalists and is used in traditional medicine to treat various diseases. The objective of this study is to evaluate the sub-acute toxicity of the methanol extract from the aerial part of Ruta montana on kidney function and structure in albino Wistar animals. The quantitative analysis of the crude methanolic extract of Ruta montana L. showed a yield of 9.165%. The biochemical parameters of the renal function evaluation revealed a significant decrease in creatinine and urea. Hematological parameters showed a significant increase in PLT, PCT, GB, CCMH. and a significant decrease in HCT and IDR DS. the histological sections of treated rats did not differ significantly from the renal sections of control rats. Lesnephrons retained their achitectoral structures, as well as the proximal and distal tubules of treated and control rats.

Keywords: Ruta montana, subacute toxicity, kidney, rat, biochemical parameters

EFFECT OF METHANOLIC CRUDE EXTRACT FROM THE AERIAL PART OF THE PLANT RUTA MONTANA ON REPRODUCTION OF PREGNANT FEMALE RATS

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ABSTRACT

This study evaluated the subacute toxicity of methanolic extract Ruta montana on the pregnant rats pretreated with 38.7149 mg/kg, IP (≈1/30DL50) for 45 days. No adverse clinical signs were observed in pre-treated pregnant rats, during the pretreatment or the gestation period. A normal change in the body weight of the pretreated and control pregnant rats was recorded but not with a significant difference. Macroscopically, no abnormalities were seen in the internal organs or embryos in all rats, and no significant differences were found in all rats. Pretreatment with Ruta montana did not result in fetal death, undevelopment and reduced the number, and weight of fetuses. A slight increase of 8.059% was recorded in the number of embryos, in the female rats pretreated. For the average embryo weight, a slight increase of 3.7946 % was observed in the pretreated rats. No significant differences were recorded in the values of FSH and LH in pregnant pretreated. The values of the different hematological parameters did not record any significant difference between the pregnant rats pre- treated. Observation of histological sections of ovaries pregnant pretreated rats showed the absence of histological abnormalities.

Keywords: Ruta montana, toxicity, embryo, hormones, blood, rat

ACUATE POISONING BY ATRACTYLOSIDE: FATAL CASE OF A CHILD

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ABSTRACT

Atractyloside gummifera L., commonly known as A Glu Thistle (Arabic name: Addâd), is a highly toxic plant endemic to the Mediterranean basin. Poisoning by this plant is mainly due to confusion with an edible plant or to the consumption of its root which contains sweet glue appreciated by children. It is a 7-year-old girl (X.M.), her 5-year-old brother (XK) and their 10-year-old cousin (Y.N.) who were grazing with their sheep in the forest. These children, without any particular pathological history, were presented by their parents to the pediatric emergency room suffering from pain following ingestion Atractyloside gummifera L. **Child X.K. :** The patient was intubated and transferred to intensive care and empirical treatment with N-acetyl-cysteine (NAC) was initiated after taking toxicological samples (Blood and Urine). Liver index values continue to increase, the course being fatal 7 days after ingestion with refractory hyperkalemia and the occurrence of acute pulmonary edema and cerebral edema. **Sister (X.M.) and cousin (Y.N.) :** Remission after normalization of transaminases and disappearance of cytolysis 10 days after ingestion. The toxic effect of this plant lies in the action of two toxic principles, atractyloside (ATR) and carboxyatractyloside (CATR), which are powerful inhibitors of oxidative phosphorylation and the Krebs cycle at the mitochondrial level. The surviving children would therefore have ingested less toxic substance than the deceased child; a smaller quantity of root or a root less rich in toxic principles. Currently, there is no specific treatment to counteract this poisoning. Treatment, which is only symptomatic, is therefore insufficient for subjects who have ingested theoretically lethal amounts of the toxin.

Keywords: Actractyloside, plant, children, poisoning, consumption, N-acetyl-cysteine

CHEMICAL COMPOSITION, ANTIOXIDANT AND ANTICHOLINESTERASE ACTIVITIES OF ALGERIAN INULA CONYZA DC

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ABSTRACT

The phytochemical study of the chloroform and ethyl acetate extracts of Inula conyza DC. identified key constituents such as graveolide, illicic acid, axillarine, axillaroside, and 1,5-di-O-caffeoylquinic acid via NMR analysis. The total polyphenol and flavonoid contents were quantified, with the ethyl acetate extract showing the highest polyphenolic (693.29±5.00 mg GAE/g extract) and flavonoid content (280.17±3.18 mg QE/g extract). The antioxidant capacity of chloroform, ethyl acetate, and n-butanol extracts was evaluated using five complementary methods (DPPH, ABTS, β-Carotene, CUPRAC, and reducing power) and compared to four standards (BHT, BHA, α-tocopherol, and ascorbic acid). Additionally, the anticholinesterase activity was assessed against AChE and BChE enzymes. The ethyl acetate extract demonstrated excellent antioxidant activity in DPPH (IC50: 19.74±0.39 µg/mL), ABTS (IC50: 5.94±0.03 µg/mL), β-Carotene assays (IC50: 1.17±0.01 µg/mL), and excellent reducing capacities in CUPRAC (8.59±0.17 µg/mL) and reducing power assays (11.20±0.69 µg/mL). Additionally, moderate anticholinesterase activity was observed in the chloroform extract, which inhibited BChE with an IC50 of 140.20±1.11 µg/mL. This study highlights the therapeutic potential of Inula conyza as a source of natural antioxidants and neuroprotective agents.

Keywords: Inula conyza DC., antioxidant activity, anticholinesterase activity, phenolic compounds, flavonoids, Algeria

PHYTOCHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY OF VICIA OCHROLEUCA EXTRACTS

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ABSTRACT

The widespread interest in Vicia faba as a food source has drawn attention to the bioactive metabolites present in other Vicia species. However, research on the chemical composition and biological effects of other Vicia species remains limited, with studies focusing on only a few species, such as V. sativa L., V. dadianorum Sommier & Levier, V. caroliniana Walter, and V. faba L. This study represents the first investigation into the chemical composition and activity of Vicia ochroleuca. Phytochemical screening of the n-butanol and chloroform extracts of V. ochroleuca revealed a rich profile of coumarins, flavonoids, tannins, and terpenoids. The antioxidant capacity was evaluated through four different assays: DPPH, ABTS, CUPRAC, and reducing powers. The n-butanol extract exhibited the most potent activity, particularly in the reducing power assay, with an A0.50 value of 4.81 ± 0.10 µg/mL. This high efficacy is attributed to the extract's significant enrichment in total polyphenols (347.24 ± 5.60 µg GAE/mg of extract) and flavonoids (46.24 ± 1.83 µg QE/mg of extract) when compared to the chloroform extract. In conclusion, Vicia ochroleuca has the potential to be developed as a promising source of natural antioxidants, supporting its use in functional foods, nutraceuticals, and health-promoting products.

Keywords: Vicia euchroloca, phytochemical screening, antioxidant activity, polyphenols, flavonoids, n-butanol extract, chloroform extract

FUNGAL CONTAMINATION IN HOSPITAL ENVIRONMENTS

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ABSTRACT

A study was conducted on the evolution of nosocomial fungal infections in relation to hospital hygiene. Samples were collected from the environment of hospitalized patients, both before and after disinfection procedures, in operating rooms, intensive care units, surgical wards, as well as other departments such as internal medicine, maternity, pediatrics, and emergency services at Hospital. Out of 732 analyzed samples, 29.78% were positive for fungal contamination, predominantly before disinfection (23.50%) compared to after (6.28%). Filamentous fungi were the most common (89%), with only 11% being yeast-like fungi. Fungal presence was highest in surgical wards, followed by ICUs and operating rooms. Environmental sources and poor hygiene practices likely contributed to contamination. After disinfection, fungal frequencies dropped significantly, and Candida albicans was no longer detected. These results highlight the need for strict hygiene and preventive measures in hospital environments. t of 732 analyzed samples, 29.78% were positive for fungal contamination, predominantly before disinfection (23.50%) compared to after (6.28%). Filamentous fungi were the most common (89%), with only 11% being yeast-like fungi. Fungal presence was highest in surgical wards, followed by ICUs and operating rooms. Environmental sources and poor hygiene practices likely contributed to contamination. After disinfection, fungal frequencies dropped significantly, and Candida albicans was no longer detected. These results highlight the need for strict hygiene and preventive measures in hospital environments.

Keywords: Nosocomial infection, hospital environment, Fungi

SUBACUTE TOXICITY OF ACETOCHLOR IN MALE RAT : EFFECT ON LIVER METABOLISM

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ABSTRACT

Acetochlor is a widely used herbicide to control weeds. As such, its impact on animal and human health is a major concern for health authorities. 30 adult male rats weighing between 250g and 280g are divided into three groups of 10 animals each. The animals are treated orally with 1/20 LD50 (LD50 = 1063 mg/kg for male rats) and 1/100 LD50 (LD50 = 1063 mg/kg for male rats) for 42 days, The highest dose caused a significant increase in my relative mass of liver with 6% and heart with 19%. The haematological study showed that the 1/20 LD50 resulted in a significant increase in methaemoglobin levels of 171% compared with control rats, and the dose of 1/100 LD50 resulted in a 52% increase. There was a significant increase in the Asat and Alat enzymes with 30% and 38% respectively. Application of the dose (1/100DL50) leads to a significant increase in Alat with only 25%. In the hepatic tissue of rats treated with 1/20 LD50, there was a 24% increase in the level of sulphidrylgroups and a 23% decrease in ATPase activity. In animal treated with 1/20 LD50, the activity of malate dehydrogenase and succinate dehydrogenase decreased significantly by 19% and 54% respectively, while isocitrate dehydrogenase increased by 92%. A significant increase in glucose 6 phosphate dehydrogenase and lactate dehydrogenase activity was established at 184% and 94% respectively. In this way, the energy generated by the Krebs cycle that does not arrive will be compensated by weaker energetic metabolic pathways - the phosphate pentose pathway and glycolysis. In treated male rats, there was significant inhibition of succinate dehydrogenases with 25% and activation of isocitrate dehydrogenase with 74% and LDH with 47%. For the parameters, characterizing the hepatic mitochondria of rats treated with 1/20 LD50 dose of acetochlor, only the rate of globular proteins which decreased by 40 %. In the microsomal fraction, no change was observed in the level of soluble globular proteins of the two groups studied. it can be seen that there is a trend towards elevation of the content cytochrome 450 with 20% and a significant increase in the cytosolic protein rate against a background of a notorious decrease in hepatic biotransformatic activity of the monooxygenasic system (decrease N-demethylation of aminopyrine and p-hydroxylation of aniline) in male rats treated with 1/20 LD50 dose of acetochlor. Histological sections of the liver showed foci of necrosis and centro-lobular blood congestions.

Keywords: Acetochlore, Subacute toxicity, Liver, Metabolism, Rat

FROZEN EMBRYO TRANSFER OUTCOMES IN ALGERIA: BIOCHEMICAL PREGNANCY RATES AND INFLUENCING FACTORS

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ABSTRACT

Evaluating the results of vitrified embryo transfers is a major challenge for improving success rates in medically assisted reproduction (MAP). However, epidemiological profiles and responses to treatment may vary from one population to another. The aim of this study is to describe the epidemiological characteristics of patients receiving vitrified embryo transfers at the El Mawloud MPA center and report the biochemical pregnancy rates obtained. This is a retrospective descriptive study conducted on a cohort of 50 patients who underwent frozen embryo transfer (FET) between July 2, 2020 and February 27, 2025. The data analyzed included maternal age, type and duration of infertility, its etiology, ovarian stimulation protocols, embryonic characteristics (number, stage, quality before/after vitrification), storage duration, and endometrial preparation methods. The primary outcome measure was the biochemical pregnancy rate. The mean age of patients was 35 years, with a predominance of primary infertility and mixed causes. The short agonist protocol was the most frequently used. Vitrification was mostly performed at the blastocyst stage. The achieved biochemical pregnancy rate was 29%. Pregnancies were observed despite variability in embryo storage durations and endometrial preparation methods, highlighting the complexity of factors influencing embryo implantation. This study provides valuable data on FET outcomes in the specific context of the El Mawloud ART Center. The results may contribute to optimizing patient management strategies, particularly in the selection of candidates and protocols. It also underscores the need for larger- scale studies to better understand the determinants of ART success in the Algerian context.

Keywords: Assisted reproduction (ART), frozen embryo transfer (FET), embryo vitrification, biochemical pregnancy, Algeria

VALORIZATION OF ALGERIAN MEDICINAL PLANTS: AN INNOVATIVE BURN-HEALING CREAM BASED ON CUCURBITA PEPO SEED OIL"

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ABSTRACT

Skin burns are among the most common injuries worldwide. They are defined as the destruction of the skin's surface, and in some cases, the underlying tissues, caused by thermal, electrical, chemical, or radiological agents. The severity of a burn varies depending on its depth, extent, and the area affected. This experimental study adopts an approach focused on the valorization of local plant resources through the development of a dermocosmetic healing product formulated with Cucurbita pepo seed oil. This plant, a member of the Cucurbitaceae family, is recognized for its anti-inflammatory, antioxidant, and regenerative properties. The research was conducted between December 2024 and May 2025 in the laboratories of the Faculty of Natural and Life Sciences at Oran 1 University. The objective of the project was to design and produce a dermocosmetic cream intended to promote burn healing, incorporating Cucurbita pepo seed oil, and to assess the efficacy of this oil in the healing process. Two cream formulations with different concentrations were prepared following a standardized protocol. These formulations were subjected to physicochemical and microbiological analyses, as well as in vitro skin irritation tests. An experimental study on Wistar rats was also carried out to evaluate the therapeutic efficacy of the creams over a 14-day period. The results demonstrated good physical stability, absence of skin irritation, no microbial contamination, and a significant improvement in the healing of burn wounds compared to the control group. These findings highlight Cucurbita pepo seed oil as a promising active ingredient in the formulation of therapeutic skincare products for burn treatment, offering a natural, effective, and well-tolerated alternative. Moreover, this project contributes to the promotion of Algerian medicinal plants for applied research and local development.

Keywords: Burns, Phytotherapy, Cucurbita pepo, Dermocosmetic Cream

EPIDEMIOLOGY AND SUSCEPTIBILITY PROFILE OF BLOOD CULTURE ISOLATES IN AN ALGERIAN UNIVERSITY HOSPITAL CENTER (UHC ANNABA)

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ABSTRACT

Bloodstream infections are a significant cause of morbidity and mortality, The antimicrobial therapy for the treatment of bacteremia is often empirical in the first 48 hours and based on the epidemiological knowledge of susceptibility profiles of the most common bacteria causing such infections. The aim of our study is to determine the epidemiological profile and antibiotic resistance patterns of bacteria isolated from blood cultures, in order to optimize empirical antibiotic therapy for bloodstream infections. **Materials and Methods:** A prospective study was conducted over a two-year period (2023–2024), including all bacteria isolated from blood cultures performed in the various departments of the Annaba University Hospital Center. **Results:** During this period, we collected 605 isolates, of which 64% were Gram-negative bacilli and 36% were Gram-positive cocci. The most frequently isolated species were Enterobacteriaceae (47%), with a predominance of Klebsiella pneumoniae (22.5%) and Escherichia coli (7.4%). Acinetobacter baumannii was isolated in 14.8% of cases, and Staphylococcus aureus in 21% of cases. The Enterobacteriaceae exhibited resistance to third-generation cephalosporins in 69% of cases, with an extended-spectrum beta-lactamase (ESBL) phenotype identified in 50% of isolates and carbapenem resistance observed in 13%. Acinetobacter baumannii demonstrated resistance rates of 92% to ceftazidime and 89% to imipenem. For Pseudomonas aeruginosa, resistance to third-generation cephalosporins and imipenem was observed in 33% and 38% of isolates, respectively. Oxacillin resistance among Staphylococcus aureus isolates was 62%. No glycopeptide-resistant strains were detected. **Conclusion:** Regular epidemiological surveillance of blood culture isolates, coupled with ongoing assessment of their antibiotic susceptibility profiles, is essential to inform and optimize empirical antibiotic therapy for bloodstream infections. Such monitoring enables timely adaptation of treatment protocols in response to evolving resistance patterns, thereby improving patient outcomes and supporting antimicrobial stewardship efforts.

Keywords: Epidemiology, bacteremia, blood culture, Multi-Drug resistant bacteria

DIAOGNOSIS OF CUTANEOUS ALTERNARIA CASE IN HUMAN SKIN AND ITS TREATMENT OPTIONS

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ABSTRACT

Introduction: Alternarioses are phaeohyphomycoses that preferentially localize to the skin, primarily affecting immunocompromised individuals. **Observation**: We report a case of cutaneous alternariosis in a 49-year-old male patient, admitted to the dermatology department for a papulo-ulcerative-hemorrhagic plaque on the right knee evolving for 3 months, posing a diagnostic problem. Several courses of antibiotics were prescribed without improvement. A skin biopsy was performed, suggesting purpuric angiodermatitis. The patient had a history of bronchial asthma since adolescence (treatment: corticosteroids + salbutamol), pulmonary tuberculosis in 1996, post-corticosteroid osteoporosis for 3 years (treatment: zoledronic acid), and bilateral cataract. The patient was referred to us for a mycological examination. He presented with bluish-purple papules on the external side of the right knee, with secondary extension, where their confluence forms a patch scattered with ulcerations and superficial weeping erosions, with no history of trauma or insect bites. The diagnosis of alternariosis was retained based on the positivity of direct examinations showcasing mycelial filaments and the presence of multiple colonies of Alternaria sp in the various skin mycological samples. The patient was placed on Itraconazole 200 mg/day with good clinical-biological tolerance and the beginning of healing. **Conclusion:** Cutaneous alternariosis is a rare condition that should be considered in immunocompromised subjects. It poses a differential diagnosis problem with other dermatoses. The mycology laboratory is essential to guide the diagnosis for better patient management.

Keywords: Alternaria, skin biopsy, mycelial filaments, Itraconazole

THE THYMELAEACEAE AND CUPRESSACEAE PLANTS FAMILIES USED AS A TREATMENT OF CUTANEOUS LEISHMANIASIS IN ALGERIA

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ABSTRACT

Algeria is the Mediterranean country most affected by Cutaneous Leishmaniasis, and the second most affected in the world after Afghanistan. This ancient skin disease, caused by Sandfly bites represents a serious public health problem in Algeria. It is endemic especially in the steppes and sub-Saharan areas where the largest outbreaks are located. Various medicinal plants known for their curative effects have been used in medicine since ancient times, the therapeutic use of natural substances against infectious diseases is as old as 4000–5000 B.C. Today, many populations throughout the world use natural medications as an urgent requirement to treat infections and to fill the gap of the unavailability of conventional treatment. In Algeria, particularly in the Biskra region, surveys conducted among the region's populations show the use of medicinal plants as a primary source of treatment before resorting to conventional medications. Of all the plant families used, the Thymelaeaceae and Cupressaceae families are those that offer the best healing results. Indeed, the use of Thymelaea hirsuta L. powder mixed with cade oil extracted from the Juniperus oxycedrus L. plant applied to sandfly bites for about two weeks has shown complete healing with excellent scarring.

Keywords: Cutaneous Leishmaniasis - Algeria- medicinal plants -Thymelaeaceae - Cupressaceae

GINSENOSIDE HAS ANTI-FIBROTIC AND ANTI-NEOVASCULAR EFFECTS IN AGE-RELATED MACULAR DEGENERATION VIA THE REGULATION OF CRYSTALLIN ALPHA B

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ABSTRACT

Purpose: Neovascular age-related macular degeneration (nAMD) causes significant visual impairment due to the decline of macular function in the retina. Current treatments for nAMD face challenges, particularly concerning fibrosis. Red ginseng (Panax ginseng C. A. Meyer) has shown promise in preventing fibrosis under various conditions. In this study, we explored the anti-fibrotic and anti-neovascularization properties of red ginseng water extract (RGWE) and ginseng total saponin (GTS) using nAMD models. **Methods:** C57BL/6N mice underwent three laser-induced choroidal neovascularization (CNV). Following laser photocoagulation, mice received intravitreal, subconjunctival, or oral administration of RGWE. Additionally, the effects of GTS on reducing the CNV area were evaluated. We also investigated RGWE and GTS's impact on vascular endothelial growth factor (VEGF) and α-smooth muscle actin (αSMA) expression in the human retinal pigment epithelial cell line (ARPE-19). Furthermore, ginsenoside binding to crystallin alpha B (Cryab) was examined to understand red ginseng's mechanism. **Results:** Administration of RGWE or GTS significantly reduced laser-induced CNV area in vivo. RGWE was found to decrease the cleaved form of Cryab, a heat shock protein binding to αSMA. Both RGWE and GTS decreased VEGF and αSMA expression in ARPE-19 cells. Furthermore, our study demonstrated a direct interaction between ginsenosides and Cryab. **Conclusions:** These findings suggest that red ginseng may play a role in preventing macular degeneration progression through the regulatory effects of ginsenosides on Cryab function.

Keywords: Ginseng, Age-related macular degeneration, fibrosis, neovascularization, crystallin alpha B

VOLUNTARY ALPHACHLORALOSE POISOINING CONFIRMED BY GAS CHROMATOGRAPHY-MASS SPECTROMETRY: A CASE REPORT

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ABSTRACT

Introduction: Alphachloralose is a potent neurotoxic rodenticide associated with numerous cases of poisoning, both accidental and intentional. Clinically, acute intoxication is characterized by motor hyperexcitability with distinctive myoclonic jerks, often progressing to coma of variable depth depending on the ingested dose. **Case Presentation:** We report the case of a 17-year-old female admitted to the intensive care unit in a comatose state with convulsions and muscarinic symptoms following voluntary ingestion of a significant quantity of an alphachloralose-based rodenticide. To confirm the toxicological cause, a comprehensive screening was conducted using gas chromatography-mass spectrometry (GC-MS, PerkinElmer). **Results and Discussion:** GC-MS analysis confirmed the presence of alphachloralose, along with diazepam and propofol, which were administered as part of symptomatic treatment. No other toxic, pharmaceutical, or illicit substances were detected. Management involved gastric decontamination with activated charcoal and supportive care, including sedation with diazepam and propofol, which explains the presence of these substances in the patient's urine sample. Despite the severe neurological presentation, the patient's condition improved with appropriate treatment. **Conclusion**: GC-MS toxicological analysis provided definitive confirmation of acute alphachloralose poisoning. While the clinical presentation is often severe, with coma as a predominant feature, the prognosis remains favorable in the absence of anoxic complications

Keywords: Alphachloralose, voluntary poisoning, toxicological screening, rodenticide intoxication

CYTOTOXIC EVALUATION OF SELECTED BIOACTIVE METABOLITES FROM INFUNDIBULICYBE GEOTROPA AGAINST HUMAN PROSTATE AND LUNG CANCER CELL LINES

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ABSTRACT

Mushrooms have long been recognized as prolific sources of pharmacologically active natural compounds. Infundibulicybe geotropa (Bull.) Harmaja, an edible mushroom species commonly found in Anatolia, has recently attracted attention due to its diverse secondary metabolites and promising therapeutic potential. Several extracts and purified compounds from this species have shown a range of biological activities. Notably, they exhibited cytotoxic and pro-apoptotic effects on different cancer cell lines. In this study, five purified compounds isolated from the acetone extract of I. geotropa—namely IG.As.3.3 (ergosta-5,22-dienyl-monocosanoate), IG.As.3.4 (ergosta-5,22-dienyl-octanoate), IG.As.3.6 (ergosta-4,6,8(14),22-tetraen-3-one), IG.As.3.11 (myristic acid), and IG.As.3.13 (2,3-dihydroxypropyl oleate) were evaluated for their cytotoxic effects against prostate (LnCap) and lung (H1299) cancer cell lines using the MTT assay. Among these, IG.As.3.3 demonstrated the most potent activity on H1299 cells with an EC_{50} value of 42.33 µg/mL and moderate activity on LnCap cells (EC_{50} = 72.10 µg/mL). IG.As.3.6 exhibited the strongest effect on LnCap cells (EC_{50} = 55.35 µg/mL), while showing moderate activity on H1299 (EC_{50} = 100.55 µg/mL). IG.As.3.4 and IG.As.3.13 showed moderate activity on both cell lines, whereas IG.As.3.11, despite its weak activity on prostate cells, had a notable cytotoxic profile against H1299 cells (EC_{50} = 41.94 µg/mL). Importantly, none of the tested compounds displayed significant toxicity towards a healthy kidney cell line (HEK293), suggesting their selective cytotoxic potential. These findings indicate that selected I. geotropa-derived metabolites possess promising anticancer potential, particularly against lung and prostate cancer cell lines. Further mechanistic and in vivo studies are warranted to elucidate their apoptotic pathways and therapeutic applications. **Acknowledgments:** This study was supported by TUBITAK (The Scientific and Technological Research Council of Türkiye) with Project number TUBITAK1001-121Z551. Cansel ÇAKIR would like to thank the Turkish Higher Education Commission (YÖK) for supporting the YÖK 100/2000 Ph.D. Program.

Keywords: Infundibulicybe geotropa, cytotoxicity, prostate cancer, lung cancer, bioactive metabolites, MTT assay

LIFE-THREATENING PSYCHOTROPIC DRUG OVERDOSE: A CASE OF SEVERE TOXICITY

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ABSTRACT

Tricyclic antidepressant drugs (TCA) are the second widely used drugs after the analgesics, and involve in acute poisoning cases. Case report: we report herein a case of suicide attempt by ingestion of amitriptyline and oxazepam. The case involved a 28-year-old woman admitted to the intensive care unit in a comatose state and the doctor suspected a toxic cause. Three hours after ingestion, biological samples were collected in the emergency room and sent for analysis to our laboratory with instructions to investigate the presence of drugs. Toxicological screening on patient urine and gastric lavage liquid samples were performed with gas chromatography coupled with mass spectrometry (GC-MS). **Results and discussion:** Toxicological analyses by GC-MS were positive for amitriptyline and oxazepam and negative for common drugs of abuse. The method provides an excellent and rapid tool to use in cases of drug poisoning. **Conclusion:** Toxicological analysis by GC-MS confirmed suicide attempt by amitriptyline and oxazepam. In acute poisoning cases, early emergency treatment, obtaining rapid and reliable toxicological laboratory results were considered vitally important in poisoning cases.

Keywords: tricyclic antidepressant, benzodiazepines, suicide attempt, toxicological screening, GC-MS.

A SILENT THREAT TO ENVIRONMENTAL AND PUBLIC HEALTH: HOSPITAL WASTEWATER AS A RESERVOIR FOR CARBAPENEMASE-PRODUCING BACTERIA

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ABSTRACT

Résumé: De nos jours, l'antibiorésistance est un problème majeur de la santé publique mondiale, menaçant l'efficacité des traitements médicaux. Parmi toutes les bactéries multirésistantes, celles qui produisent des carbapénémases présentent un intérêt particulier, car elles relèvent des antibiotiques de dernier recours. Puisque les antibiotiques sont intensivement utilisés à l'hôpital, les établissements de santé servent de grands réservoirs pour ces agents pathogènes. En outre, les effluents hospitaliers mal épurés émettent ces micro-organismes dans l'environnement, facilitant leur dissémination en silence dans les milieux aquatiques. L'objectif de cette recherche est d'identifier des bactéries productrices de carbapénémases dans les eaux usées hospitalières et d'évaluer les risques biologiques de leur dispersion environnementale et sur la santé humaine. **Matériel et Méthodes**: **Site et échantillonnage**; Huit prélèvements ont été réalisés dans différents points de rejet du Centre hospitalier universitaire Annaba (Algérie). **Isolement**: Culture sélective sur milieu MSuperCarba pour l'isolement des bactéries potentiellement productrices de carbapénémases. **Identification**: Identification biochimique à l'aide du système API 20E. **Antibiogrammes**: Test de sensibilité par diffusion de disques à un panel étendu d'antibiotiques (β-lactamines, carbapénèmes, aminoglycosides, fluoroquinolones...). **Carbapénémases**: Détection des enzymes à l'aide du test colorimétrique β-Carba. **Résultats:** Le taux de positivité observé dans cette étude est assez élevé, car 80 % des souches ont été testées positives au test β-Carba (4 sur 5). Les espèces identifiées incluent: Citrobacter freundii, Escherichia coli, Pseudomonas luteola, Chryseobacterium indologenes, Pasteurella pneumotropica De plus, la majorité des souches étaient multi-résistantes, montrant une résistance croisée significative aux carbapénèmes, à la colistine, aux aminoglycosides et aux fluoroquinolones. la présence de ces bactéries multirésistantes dans les effluents favorise leur dispersion après rejet dans l'environnement. les carbapénémases étant souvent codées par des plasmides, cela facilite leur diffusion inter-espèces, notamment au niveau des réseaux hydrographiques, de la faune aquatique ou agricole. **Conclusion**: Les eaux usées hospitalières représentent une menace environnementale silencieuse, servant de réservoir et de vecteur pour des pathogènes multirésistants. Cela souligne l'urgence de la situation et la nécessité d'un suivi étroit des bactéries multi-résistantes dans les environnements hospitaliers dans une perspective One Health, en intégrant santé humaine, santé animale et protection des écosystèmes.

Keywords: Hospital wastewater, multidrug-resistant bacteria, carbapenemase-producing bacteria, antibiotic resistance, One Health, public health

A SILENT THREAT TO ENVIRONMENTAL AND PUBLIC HEALTH: HOSPITAL WASTEWATER AS A RESERVOIR FOR CARBAPENEMASE-PRODUCING BACTERIA

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ABSTRACT

Hospital wastewater (HWW) is recognized as a critical reservoir for pathogens including multidrug-resistant (MDR) bacteria and antibiotic resistance genes (ARGs), contributing to significant environmental and public health challenges. This study investigates the presence and antimicrobial resistance profiles of carbapenemase-producing bacteria in the hospital wastewater of Pont Blanc Hospital, Annaba, Algeria. Using selective culturing on MSuperCarba medium, biochemical identification (API 20E), antibiotic susceptibility testing, and β CARBA enzyme detection, five clinically significant bacterial species were identified: Citrobacter freundii, Pasteurella pneumotropica, Escherichia coli, Pseudomonas luteola, and Chryseobacterium indologenes. The isolates exhibited multidrug resistance to key antibiotic classes including β-lactams, carbapenems, aminoglycosides, fluoroquinolones, sulfonamides, and last-resort antibiotics such as colistin. Carbapenemase production was confirmed in 80% of the isolates that shows the wastewater's role as a reservoir and conduit for the dissemination of high-risk MDR pathogens. The findings underscore the urgent need to improve hospital wastewater treatment processes and strengthen environmental surveillance under the One Health approach to mitigate the silent spread of antimicrobial resistance that affects the human health in a dangerous way.

Keywords: Hospital wastewater, multidrug-resistant bacteria, carbapenemase-producing bacteria, antibiotic resistance, One Health, public health

PROBABILISTIC ASSESSMENT OF FLUORIDE-RELATED HEALTH RISKS IN GROUNDWATER OF THE FELENT STREAM WATERSHED, KUTAHYA

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ABSTRACT

The Felent Stream Basin (Kütahya) constitutes an important hydrological system in the region, with its groundwater resources playing a key role in meeting diverse local demands. This study aimed (1) to investigate the spatial and temporal variations of fluoride concentrations in the groundwaters of Felent Stream Basin and (2) to evaluate the potential implications of these variations for the dental health of the local population. A total of seven sampling stations were established along the watershed, and groundwater samples were collected during both the wet and dry seasons of 2024. Fluoride concentrations were measured using a spectrophotometric method in accordance with standard analytical procedures. The results demonstrated distinct seasonal fluctuations in fluoride levels. The mean fluoride concentration recorded during the dry season was 0.404 mg/L, which was approximately 2 times higher than the mean value observed in the wet season (0.181 mg/L). The overall average across all samples was calculated as 0.295 mg/L. This increase during the dry period is likely due to reduced dilution and enhanced water-rock interaction. According to the average HQ values, the highest potential risk was observed in children (0.27875), followed by teenagers (0.19676), adults (0.15766), and infants (0.03935). In addition, fluoride-related health risks increased across all age groups during the dry season.

Keywords: Felent Stream Basin, Groundwater, Fluoride accumulations

SPATIAL–TEMPORAL VARIATIONS OF FLUORIDE IN SURFACE WATERS OF FELENT STREAM (TÜRKIYE) AND ASSOCIATED HEALTH RISKS

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ABSTRACT

Felent Stream, situated in Kütahya Province, is an important component of the Sakarya River Watershed in Türkiye. This study aimed (1) to investigate the spatial and temporal variations of fluoride concentrations in the surface waters of Felent Stream and (2) to evaluate the potential implications of these variations for the dental health of the local population. A total of seven sampling stations were established along the stream, and surface water samples were collected during both the wet and dry seasons of 2024. Fluoride concentrations were measured using a spectrophotometric method in accordance with standard analytical procedures. The results demonstrated distinct seasonal fluctuations in fluoride levels. The mean fluoride concentration recorded during the dry season was 0.749 mg/L, which was approximately 1.5 times higher than the mean value observed in the wet season (0.521 mg/L). The overall average across all samples was calculated as 0.635 mg/L. This increase during the dry period is likely related to reduced water flow and limited dilution, leading to greater accumulation of fluoride in the aquatic environment. According to the average HQ values, the highest potential risk was observed in children (0.59952), followed by teenagers (0.42319), adults (0.33909), and infants (0.08464). In addition, fluoride-related health risks increased across all age groups during the dry season.

Keywords: Felent Stream, Surface water, Fluoride accumulations

MOLECULAR-LEVEL DETECTION OF CELLULAR RESPONSES USING MACHINE LEARNING-ASSISTED RAMAN SPECTROSCOPY

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ABSTRACT

The rapid, sensitive and specific detection of biochemical alterations induced by pharmacological agents in cancer cells is critical for advancing both fundamental research and translational oncology applications. The present study investigates molecular responses triggered by drug interactions with intracellular signaling pathways using label-free Raman spectroscopy. The technique enabled non-invasive monitoring of changes in biochemical composition, focusing on characteristic vibrational bands associated with proteins, lipids, and nucleic acids. Spectral data were then subjected to further analysis using a range of supervised machine learning algorithms, including support vector machines (SVM), random forest classifiers, and k-nearest neighbors (k-NN), with the aim of classifying drug-induced cellular responses with high accuracy. This integrated approach constitutes a compelling alternative to conventional biomarker-based assays by virtue of the fact that it provides rapid, detailed molecular insights without the necessity of labelling or extensive sample preparation. The findings of this study demonstrate that the integration of Raman spectroscopy with machine learning not only facilitates the early detection of drug effects associated with specific signaling pathways, but also enhances the precision of cellular response profiling. These capabilities are poised to accelerate drug screening processes and support the development of personalized treatment strategies in oncology, ultimately contributing to improved therapeutic outcomes.

Keywords: Raman spectroscopy, machine learning, cellular responses

NEW APPROACHES FOR ARTIFICIAL INTELLIGENCE-ASSISTED RETINOSCOPES

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ABSTRACT

Retinoscopy is a fundamental examination method that has been used for many years in the objective evaluation of refractive errors—such as myopia, hyperopia, and astigmatism—in the fields of ophthalmology and optometry. In recent years, with the digitalization of this technique, innovative tools such as smartphone-assisted systems and the Gimbalscope have gained increasing attention. This study presents a comparative, literature-based analysis of traditional retinoscopy systems, Gimbalscope applications, and artificial intelligence (AI)-based automated analysis approaches. The literature emphasizes the advantages of the Gimbalscope in educational settings, including real-time visualization, low cost, and high portability. Furthermore, AI-based systems have been shown to enhance effectiveness in both education and clinical diagnosis by automating the classification of retinoscopic reflexes. In the next phase of the study, an AI model is planned to be developed to classify retinoscopic reflexes using publicly available datasets. This model aims to bridge theory and practice by proposing a sample system that can be applied particularly in healthcare technologies and optometry education. The proposed approach is expected to enable faster detection of refractive errors and increase access to eye examinations for a broader population.

Keywords: Retinoscopy, Gimbalscope, Refractive Error, Artificial Intelligence, Biomedical Diagnosis

CREATION OF OXYGEN-RELEASING SANDWICH BIOMATERIALS BASED ON POLYVINYL ALCOHOL AND RESEARCH ON THEIR IMPACT ON DIABETES MELLITUS

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ABSTRACT

The chronic illness known as diabetes mellitus is brought on by either insufficient insulin production or inefficient insulin use by the pancreas. There is currently no known cure for this illness, which adversely affects numerous organs, including the blood vessels and nervous system. Using cadaveric pancreatic islets and beta cells inside or on top of a carrier material, tissue engineering seeks to offer a long-term cure. The main issue with these transplants, though, is hypoxia-induced beta cell death. Graft failure and rejection may result from this death. Thus, it is crucial to maintain normoxic conditions (normal oxygen levels) for beta cells in the initial phases following graft transplantation. Although oxygen-releasing biomaterials have been used in the literature to lessen hypoxia-induced pancreatic islet death, their short release durations leave insufficient time for the formation of new blood vessels following transplantation. This project's main objective is to create novel biomaterials that offer sustained oxygen release and prevent hypoxia. Calcium peroxide (CPO) will be utilized for this purpose. When water is present, CPO breaks down gradually to produce H2O2, which breaks down with oxygen to produce water. Long-term oxygen release is made possible by this. The project intends to use Polyvinyl Alcohol (PVA) macromolecules to produce films with different thicknesses. The hydrophobic qualities of PVA will aid in regulating the release of oxygen. Through culture studies and molecular analyses, the impact of these films on the viability and beta cell functions of an immortal human beta cell line, 1.1B4 cells, will be examined. The freeze-thaw method will be used to create 10 mm diameter disks of the PVA-CPO-based sandwich biomaterials that will be developed. These disks will have a mixture of PVA and catalase in the top and bottom layers, and a mixture of PVA and CPO in the middle layer. CPO's presence in the middle layer will lessen its interaction with water, which will cause it to dissolve more slowly and release oxygen over a longer period of time. Under freeze-thaw cycles, the amount of CPO loading, oxygen release durations, and the material's morphology, mechanical characteristics, and swelling will all be examined. In vitro experiments will be carried out on samples that release oxygen for a maximum of 14 days in a hypoxic environment. These tests will investigate the interaction of 1.1B4 beta cells with the PVA-CPO biomaterials and insulin secretion. The goal of this project is to create a graft biomaterial that can treat chronic insulin deficiency in diabetic patients and offer longer-lasting oxygen release than comparable biomaterials found in the literature. Without direct external influence, the material to be developed will generate oxygen in the cell environment, preventing cell death and necrotic areas from forming in the graft center as a result of hypoxia. As a result, pancreatic islet/beta cell transplants will have better treatment outcomes. Furthermore, it is anticipated that this biomaterial will provide a promising solution by analyzing its possible beneficial effects on beta cell function, especially for Type 1 and advanced Type 2 diabetes. These possible effects will be examined using 1.1B4 cells, and the project will only be conducted in vitro.

Keywords: Diabetes, Hypoxia, Polyvinyl Alcohol, Calcium Peroxide, Oxygen Release, Pancreatic Beta Cells

CREATION OF OXYGEN-RELEASING SANDWICH BIOMATERIALS BASED ON POLYVINYL ALCOHOL AND RESEARCH ON THEIR IMPACT ON DIABETES MELLITUS

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ABSTRACT

The chronic illness known as diabetes mellitus is brought on by either insufficient insulin production or inefficient insulin use by the pancreas. There is currently no known cure for this illness, which adversely affects numerous organs, including the blood vessels and nervous system. Using cadaveric pancreatic islets and beta cells inside or on top of a carrier material, tissue engineering seeks to offer a long-term cure. The main issue with these transplants, though, is hypoxia-induced beta cell death. Graft failure and rejection may result from this death. Thus, it is crucial to maintain normoxic conditions (normal oxygen levels) for beta cells in the initial phases following graft transplantation. Although oxygen-releasing biomaterials have been used in the literature to lessen hypoxia-induced pancreatic islet death, their short release durations leave insufficient time for the formation of new blood vessels following transplantation. This project's main objective is to create novel biomaterials that offer sustained oxygen release and prevent hypoxia. Calcium peroxide (CPO) will be utilized for this purpose. When water is present, CPO breaks down gradually to produce H2O2, which breaks down with oxygen to produce water. Long-term oxygen release is made possible by this. The project intends to use Polyvinyl Alcohol (PVA) macromolecules to produce films with different thicknesses. The hydrophobic qualities of PVA will aid in regulating the release of oxygen. Through culture studies and molecular analyses, the impact of these films on the viability and beta cell functions of an immortal human beta cell line, 1.1B4 cells, will be examined. The freeze-thaw method will be used to create 10 mm diameter disks of the PVA-CPO-based sandwich biomaterials that will be developed. These disks will have a mixture of PVA and catalase in the top and bottom layers, and a mixture of PVA and CPO in the middle layer. CPO's presence in the middle layer will lessen its interaction with water, which will cause it to dissolve more slowly and release oxygen over a longer period of time. Under freeze-thaw cycles, the amount of CPO loading, oxygen release durations, and the material's morphology, mechanical characteristics, and swelling will all be examined. In vitro experiments will be carried out on samples that release oxygen for a maximum of 14 days in a hypoxic environment. These tests will investigate the interaction of 1.1B4 beta cells with the PVA-CPO biomaterials and insulin secretion. The goal of this project is to create a graft biomaterial that can treat chronic insulin deficiency in diabetic patients and offer longer-lasting oxygen release than comparable biomaterials found in the literature. Without direct external influence, the material to be developed will generate oxygen in the cell environment, preventing cell death and necrotic areas from forming in the graft center as a result of hypoxia. As a result, pancreatic islet/beta cell transplants will have better treatment outcomes.

Furthermore, it is anticipated that this biomaterial will provide a promising solution by analyzing its possible beneficial effects on beta cell function, especially for Type 1 and advanced Type 2 diabetes. These possible effects will be examined using 1.1B4 cells, and the project will only be conducted in vitro.

Keywords: Diyabet, Hipoksi, Polivinil Alkol, Kalsiyum Peroksit, Oksijen Salım, Pankreas Beta Hücreleri

IMPACT OF MENOPAUSAL STATUS ON THE CLINICAL AND PATHOLOGICAL CHARACTERISTICS OF BREAST CANCER: A RETROSPECTIVE STUDY OF 196 PATIENTS FROM WESTERN ALGERIA

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ABSTRACT

Breast cancer is the most common malignancy affecting women. Several factors influence its development and progression, notably hormonal status. This study aims to evaluate the impact of menopausal status on the clinical, histological, and pathological characteristics of breast cancer. A retrospective study was conducted on 196 patients treated for breast cancer at the Oncology Department of the EHU of Oran, including 80 premenopausal and 116 menopausal women. The data analyzed included sociodemographic parameters, menopausal status, as well as clinical and pathological features, particularly hormone receptor status (ER, PR, HER2). The results of our study showed that the mean age of the women was 52±12.05 years. The predominant histological type was invasive ductal carcinoma, observed in 71.4% of cases. The most common tumor size was stage T2 (41.79%), and the most represented histological grade was grade 2 (58.21%). Regarding the comparison of sociodemographic parameters between the two groups, significant differences were observed in terms of age, marital status, and number of children ($p < 0.05$). However, none of the clinical or pathological parameters showed a significant difference between premenopausal and menopausal women ($p \geq 0.05$). This study highlights that although certain sociodemographic characteristics differ between premenopausal and menopausal women, menopausal status does not appear to significantly influence the clinical and pathological features of breast cancer. Further studies involving a larger number of patients and more in-depth molecular analyses may help to deepen these observations.

Keywords: Breast cancer, Menopausal status, Clinical, pathologica characteristics, Western Algeria

EXTRACTION OF BIOACTIVE LYSOZYME FROM CAMEL MILK WHEY USING SALTING-OUT AND PH PRECIPITATION TECHNIQUES

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ABSTRACT

This study proposes a novel approach for the extraction of bioactive lysozyme from camel milk whey, utilizing a combination of ammonium sulfate salting-out and isoelectric precipitation (phi technique). Fresh camel milk whey was first clarified by centrifugation and subjected to fractional precipitation using ammonium sulfate at 60% saturation to concentrate target proteins. The resulting pellet was redissolved and dialyzed, followed by stepwise acidification to pH 4.5 to selectively precipitate non-lysozyme proteins, taking advantage of lysozyme's high isoelectric point (pI ≈ 10.7), allowing it to remain in solution. This two-step method preserved lysozyme's antimicrobial activity and proved effective for large-scale recovery, yielding approximately 3 grams of partially purified, active lysozyme from 10 liters of acidified camel whey. This approach offers a sustainable and low-cost alternative to chromatography-based methods, suitable for application in regions with abundant camel milk resources. Its simplicity, efficiency, and ability to retain bioactivity make it a promising technique for food, pharmaceutical, and nutraceutical applications.

Keywords: Lysozyme - Camel whey - Bioactive proteins – Protein extraction – Pi precipitation – saltingout

UNVEILING THE PHYTOCHEMICAL PROFILE OF CUCURBITA MAXIMA SEED OIL AND ITS PROMINENT ANTI-INFLAMMATORY, ANTIOXIDANT, AND ANTI-CANCER ACTIVITIES

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ABSTRACT

Chemotherapy today extensively utilizes antineoplastic agents derived from natural sources, including plants. Among these, Cucurbita maxima (pumpkin seeds) served as the focus of this study. Oil was extracted from the seeds using a cold press method, followed by the isolation of unsaponifiable matter through saponification. The physicochemical properties of the oil were determined, and phytochemical characterization was performed, including total polyphenol content, gas chromatography-mass spectrometry (GC-MS) analysis of oil and unsaponifiable matter, and high-performance liquid chromatography (HPLC) analysis for tocopherols and phenolic compounds. The antioxidant activity of the oil was assessed in vitro using total antioxidant capacity, DPPH radical scavenging, and ferric reducing antioxidant power (FRAP) assays. Anti-inflammatory properties were evaluated using RAW 264.7 macrophage cells, while anticancer activity was tested on MCF-7 breast cancer cells. The results revealed an oil acidity of 2.13%, a peroxide value of 2.45 mEq O_2/kg, and a saponification value of 251.65 mg KOH/g. The total polyphenol content was 1.62 ± 0.125 mg GAE/g oil. GC-MS analysis identified linoleic acid (42.77%), oleic acid (31.08%), and palmitic acid (16.52%) as the predominant fatty acids. The oil was rich in tocopherols, particularly δ-tocopherol (55.75 mg/100 g oil), while unsaponifiable matter contained significant amounts of squalene (41.51%) and phytosterols, including stigmastadienol-7,25 and stigmastatrienol-7,22,25 (22.09%). Chlorogenic acid (2.78 µg/g) and luteolin (0.11 µg/g) were the most abundant phenolic compounds. The oil exhibited a total antioxidant capacity of 2.08 mg GAE/g and an IC_{50} of 1.4 mg/mL in the DPPH assay. Cell viability assays demonstrated that the oil and its fractions were non-toxic to healthy cells. However, the unsaponifiable fraction exhibited potent anti-inflammatory activity (IC_{50}: 37.5 µg/mL) and cytotoxic effects against MCF-7 breast cancer cells (IC_{50}: 280 µg/mL), primarily by inducing apoptosis. These findings highlight the therapeutic potential of pumpkin seed oil, attributed to its bioactive compounds, including phenolics, phytosterols, and terpenoids, making it a promising candidate for treating diseases such as breast cancer. **Acknowledgements**: This study was supported by MESRS financial support thanks to P2ES2023-D1P2 project.

Keywords: anti-inflammatory, pumpkin seeds oil, breast cancer, unsaponifiable, cytotoxic

COMPARATIVE ASSESSMENT OF PHENOLIC PROFILES AND BIOLOGICAL ACTIVITIES OF SIX TUNISIAN MEDICINAL PLANTS

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ABSTRACT

Six Tunisian medicinal plants (Myrtus communis L.; Globularia alypum L.; Juniperus phoenicea L.; Rhus tripartita (Ucria) Grande; Lavandula stoechas L.; Pistacia lentiscus L.) were assessed for their phenolic pools analysed by RP-HPLC/UV, antioxidant activities namely total antioxidant capacity, DPPH**.**, FRAP, and β-carotene bleaching as well as for their anti-inflammatory on macrophage RAW 264.7 cell line. A significant variability in phenolic composition and antioxidant capacities between species, were observed. In fact, Myrtus communis L. exhibited the highest phenolic content and composition as well as the best antioxidant capacities as rescued by the lowest IC50 and EC50 values. On other hand, the ability of different species to inhibit nitric oxide production was also assessed using LPS-stimulated RAW 264.7 macrophages. M. communis, R. tripartita and P. lentiscus revealed a compelling ability to restrain LPS-induced NO**.** secretion at concentrations ranging from 10 to 50 µg/mL.. The visualized data were treated by PCA and Bi-plot analysis which highlighted a positive correlation among phenolic pools and antioxidant activities particularly in M. communis. Besides, statistic clustering allowed us to detect a strong contribution of phenol and flavonoid pools with anti-inflammatory effects. Moreover, phytochemical investigation allowed us to depict gallic acid and trans-hydroxycinnamic acid as major phenolic acids in M. communis with respective amounts of 45.59 ± 3.56 and 26.8 ± 4.1 mg/g DR respectively and quercetin as major flavonoid (6.67 ± 0.14 mg/gDR). This work provide evidence for the importance of medicinal species and in particular M. communis as a new source of phenolic compounds with potent anti-inflammatory effects. This work reinforces the notion that phenolic pools largely contribute to the biological activities.

Keywords: Phenolics, RP-HPLC/UV, Antioxidant capacity; anti-inflammatory activity; Tunisian medicinal plants

PHYTOCHEMICAL AND BIOLOGICAL INVESTIGATION OF GARLIC AND ROSEMARY FOR THE DEVELOPMENT OF A PLANT-BASED THERAPEUTIC AGENT

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ABSTRACT

Allium sativum (garlic) and Rosmarinus officinalis (rosemary) are widely recognized for their therapeutic properties in traditional medicine. This study evaluated the pharmacological synergy of their extracts for developing a natural biopharmaceutical. Rosemary essential oil was obtained via hydrodistillation (yield: 0.637%), while garlic was macerated in sesame oil, resulting in a high yield (211.9%). GC-MS analysis identified key bioactive compounds such as camphor, α-pinene, and diallyl disulfide. Biological assays revealed strong antimicrobial activity of rosemary oil, particularly against Staphylococcus aureus and Aspergillus niger. The garlic–rosemary combination enhanced this effect, reducing biofilm formation and microbial resistance (FICI $\leq$ 0.5).The combination also showed potent anti-inflammatory activity, surpassing indomethacin in protein denaturation inhibition. Antioxidant tests (DPPH assay) confirmed higher radical scavenging capacity than vitamin C, with a lower IC_{50} value.No cytotoxic or mutagenic effects were observed, and a protective effect on healthy blood cells was noted. Pharmacokinetic modeling predicted high intestinal absorption and blood-brain barrier permeability for key compounds, supporting their therapeutic relevance. The garlic-rosemary blend exhibits promising antimicrobial, anti-inflammatory, antioxidant, and cytoprotective properties, making it a strong candidate for multifunctional natural drug development.

Keywords: Allium sativum, Rosmarinus officinalis, Synergistic effect, Antimicrobial activity, Natural biopharmaceutical, Pharmacokinetics, Cytoprotection

INFLUENCE OF SYNTHESIS METHODS ON STRUCTURAL AND MORPHOLOGICAL PROPERTIES OF MAGNETITE NANOPARTICLES: A COMPARATIVE STUDY OF PRECIPITATION AND SOLVOTHERMAL TECHNIQUES

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ABSTRACT

Magnetite (Fe_3O_4) nanoparticles**,** particularly when synthesized at the nanoscale, have garnered considerable attention due to their wide-ranging applications across various fields. At this scale, the emergence of novel phenomena such as superparamagnetism and an increased specific surface area confers unique functional properties to the material. These properties are strongly influenced by the morphology, size, and structural arrangement of the nanoparticles. In this study, particular emphasis was placed on investigating the morphology, crystallinity, and purity of magnetite synthesized under varying conditions of temperature, pH, and reaction time, using two distinct methods: chemical precipitation and solvothermal synthesis. Scanning electron microscopy (SEM) analyses revealed that the synthesis technique plays a decisive role in determining both the shape and size of the nanoparticles. Specifically, precipitation methods predominantly yield cubic and hexagonal morphologies, while solvothermal synthesis results in quasi-spherical particles. X-ray diffraction (XRD) and Raman spectroscopy confirmed that the resulting powders were primarily composed of pure magnetite. Nonetheless, a slight oxidation of the precipitated magnetite into maghemite (γ-Fe_2O_3) was detected in some samples.

Keywords: Magnetite, Spinel, Nanoparticles, Magnetic Properties

THERAPEUTIC EFFICACY OF SALVIA ROSMARINUS: HEALING, ANTIBACTERIAL, AND PAIN-RELIEF EFFECTS

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ABSTRACT

This study focused on identifying the major constituents of the essential oil extracted from Salvia rosmarinus Spenn. using hydrodistillation, and on assessing its in vivo wound healing, antinociceptive, and antibacterial activities. The essential oil was found to contain significant amounts of d-camphor, camphene, α-pinene, and eucalyptol. In the in vivo wound healing assays, wounds were induced in mice and treated topically with the essential oil, resulting in a significantly faster healing process and a success rate of 82.6%. The analgesic effect was assessed using the acetic acid-induced writhing test in mice, showing that a 400 mg/kg dose produced a pain inhibition rate of 96.24%. The antibacterial activity was evaluated by the agar diffusion method, revealing strong inhibitory effects against Staphylococcus aureus and Escherichia coli. Taken together, these findings highlight the promising potential of S. rosmarinus essential oil as a natural therapeutic agent for pain relief and wound healing, supporting its development into clinically relevant applications.

Keywords: Salvia rosmarinus, wound healing, in vivo, pain, GC/MS

IN VIVO WOUND HEALING AND IN VITRO ANTI- ANTIOXIDANT ACTIVITY EVALUATION OF COTULA CINEREA

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ABSTRACT

This study aimed to identify the major chemical components of the essential oil extracted from Cotula cinerea and to evaluate its in vivo wound-healing potential. Chemical analysis revealed that thujone, santolina triene, camphor, and 1,8-cineole were the predominant compounds. In a mouse model, topical application of the essential oil significantly accelerated wound closure and tissue regeneration, achieving an efficacy rate of 93.2 ± 0.7%. The oil's antioxidant capacity was also assessed using the ferric reducing antioxidant power (FRAP) assay and the DPPH radical scavenging test, demonstrating its ability to reduce ferric ions and scavenge free radicals. These findings confirm the bioactive potential of Cotula cinerea essential oil and its possible synergistic effects. Overall, Cotula cinerea appears to be a promising natural source of therapeutic compounds for wound healing, offering an alternative to synthetic treatments for future pharmaceutical development.

Keywords: Cotula cinerea; antioxidant, wound healing? DPPH, FRAP

INVOLVEMENT OF SIGNALING PATHWAYS IN SYSTEMIC RESPONSES FOLLOWING NEUROPATHOLOGICAL DISORDERS INDUCED BY KALIOTOXIN FROM ANDROCTONUS SCORPION VENOM

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ABSTRACT

Kaliotoxin (KTX), a specific blocker of potassium channels from Androctonus australis hector venom, exerts neuro and systemic toxic effects due to its binding on the central nervous system. Its use in experimental model could help the understanding of the cellular and molecular mechanisms involved in the neuro and systemic pathological processes related to potassium channel dysfunctions. This study elucidate the mechanism by which intracerebroventricular-administred kaliotoxin is able to induce local and systemic pathophysiological effects. As results, the intracerebroventricular injection of KTX leads to severe structural–functional alterations of various organs via indirect effect involving acetylcholin, catecholamine, serotonin and histamine release. Obtained results suggest that both cholinergic and adrenergic pathways are involved in cardiopulmonary manifestations induced by kaliotoxin. Serotonin and histamine receptors seem to be pharmacological targets involved in neural and systemic inflammatory processes. The findings could improve the role of serotonin and histamine in scorpion venom-induced inflammatory response. It may be useful for the development of specific therapies targeting 5HT and H1 receptors in order to attenuate the immunoinflammatory disturbances that may be encountered in severe cases of scorpion envenoming.

Keywords: Kaliotoxin, Acetylcholine, Catecholamine, Bioactive amines, Immunoinflammatory response, Biochemical disorders

SALVIA ROSMARINUS ESSENTIAL OIL ATTENUATES DEMYELINATION AND NEUROINFLAMMATION IN A MURINE MODEL OF MULTIPLE SCLEROSIS

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ABSTRACT

Medicinal plants, including Salvia Rosmarinus. (rosemary), are widely recognized for their therapeutic properties, particularly in neuroprotection. This study investigates the protective effect of rosemary essential oil (REO) in a cuprizone-induced multiple sclerosis model in male Swiss mice. The animals were divided into three experimental groups: control, cuprizone (CPZ, 300 mg/kg/day by oral gavage for 6 weeks), and CPZ+REO (300 mg/kg of CPZ by oral gavage + 150 mg/kg of REO administered intranasally during the 6th week). Motor performance was assessed using the basket test and the beam walking test. Demyelination was evaluated by immunohistochemistry, and neuroinflammation was assessed by examining astrocyte and microglial activation, as well as myeloperoxidase (MPO) activity. Additionally, the levels of pro- and anti-inflammatory cytokines (TNF-α, IL-18 and IL-10) were quantified by ELISA. The results showed that REO administration significantly improved motor performance, reduced demyelination, attenuated neuroinflammation, and modulated cytokine balance in favor of an anti-inflammatory profile. These findings suggest that rosemary essential oil may represent a promising therapeutic strategy for multiple sclerosis.

Keywords: Salvia Rosmarinus, Multiple Sclerosis, Neuro-inflammation, Demyelination

ANTI-INFLAMMATORY AND ANTIOXIDANT EFFECTS OF SELENIUM IN A MODEL OF LUNG INJURY: RELEVANCE TO IMMUNE AND HISTOLOGICAL ALTERATIONS

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ABSTRACT

Acute lung injury driven by inflammation and oxidative stress contributes to the progression of several chronic respiratory diseases and may create a microenvironment favorable to tumor development. Modulating these pathways is crucial to prevent long-term tissue damage. This study aimed to evaluate the protective effects of selenium, a trace element with known antioxidant properties, in a murine model of lung inflammation. NMRI mice were pre-treated with a selenium-enriched diet for two weeks (0.3 mg/kg). Pulmonary inflammation was then induced by intraperitoneal injection of LPS (5 mg/kg). Biochemical analyses revealed that selenium significantly reduced myeloperoxidase (MPO) activity, indicating decreased neutrophil infiltration. It also lowered nitric oxide (NO) levels, a key mediator of inflammatory and nitrosative stress. In parallel, selenium enhanced antioxidant defenses, as shown by increased catalase activity and elevated glutathione (GSH) content in lung tissue. Furthermore, immunohistochemical analysis of CD3 expression revealed a reduction in T lymphocyte infiltration in selenium-treated mice compared to the LPS-only group. Histological examination confirmed an overall attenuation of inflammatory lesions, with decreased cellular infiltration and preservation of alveolar structure. These findings suggest that selenium exerts anti-inflammatory and antioxidant effects at both molecular and tissue levels and modulates immune cell recruitment. Through its role in redox regulation antioxidant systems, selenium contributes to the biochemical control of oxidative stress and inflammatory damage in lung tissue. Its action may help prevent the cascade of lung injury events that contribute to chronic inflammation and pulmonary carcinogenesis.

Keywords: Selenium, Lung inflammation, Redox biochemistry, Tissue injury, Immunohistochemistry

SOME RADICAL SCAVENGING ACTIVITIES OF OLIGOMERIC PROANTHOCYANIDINS OBTAINED FROM PINUS BRUTIA TEN. BARKS

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ABSTRACT

Pinus brutia Ten. (Turkish pine), widely distributed along the eastern Mediterranean and Aegean coasts, plays a vital ecological role in afforestation projects due to its windbreaking and soil-stabilizing properties. Beyond its ecological functions, P. brutia Ten. also holds significant economic value through its resin, timber, and seeds, which are used in various industries such as construction, furniture, pastry production, and traditional medicine. In recent years, the global emphasis on sustainability and waste valorization has directed attention to the potential applications of forestry by-products. Among these, the bark of Turkish pine—typically considered a waste material—has emerged as a promising source of oligomeric proanthocyanidins (OPCs), polyphenolic compounds known for their potent antioxidant activity. In this study, OPC-rich extracts were obtained from Turkish pine bark through ethanol (PBET) and ethanol-water (PBAS) based extractions. The radical scavenging capacity was evaluated using DPPH and ABTS assays. The results revealed that the OPC extract exhibited strong antioxidant potential, with IC_{50} values of 6.92±0.39 - 8.17±0.56 µg /mL (DPPH) and 6.15±0.54 - 7.20±0.32 µg/mL (ABTS), comparable as better than standard antioxidants such as BHA (19.70±0.25 µg/mL DPPH and 12.80±0.50 µg/mL ABTS) and α-tocopherol (38.70±0.32 µg/mL DPPH and 33.20±0.25 µg/mL ABTS) These findings highlight the significant radical scavenging ability of P. brutia bark extracts, which is attributed to the presence of hydroxyl-rich flavan-3-ol oligomers. This study suggests that Turkish pine bark, an abundant and underutilized forestry residue, may serve as a valuable bioresource in nutraceutical, cosmetic, or pharmaceutical applications. Future research may focus on isolating specific OPC fractions and evaluating their biological activities in vivo. The integration of such natural waste-derived antioxidants into commercial products may contribute to both environmental sustainability and human health.

Keywords: Pinus brutia Ten., Turkish Pine, Bark, Radical scavenging activity

CYTOTOXIC EFFECTS OF OLIGOMERIC PROANTHOCYANIDINS OBTAINED FROM PINUS BRUTIA TEN. BARKS

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ABSTRACT

Pinus brutia Ten., a widely distributed pine species in the Eastern Mediterranean and Aegean regions, is not only ecologically valuable but also a potential source of bioactive compounds such as oligomeric proanthocyanidins (OPCs) found in its bark. This study aimed to evaluate the cytotoxic effects of OPC-rich bark extracts obtained using two different solvent systems (PBET: ethanol and PBAS: ethanol:water) on human lung (A549) and colon (HT-29) cancer cell lines, along with healthy human colon fibroblast cells (CCD18-Co). The cytotoxic activity of the extracts was assessed using the MTT assay. Cells were treated with increasing concentrations of each extract (0–200 µg/mL) and incubated for 72 hours. IC_{50} values were determined based on absorbance measured at 540 nm. According to the results, PBAS exhibited the strongest cytotoxic activity on the HT-29 colon cancer cell line with an IC_{50} of 40.87 ± 0.15 µg/mL, followed by PBET with an IC_{50} of 95.10 ± 0.07 µg/mL. In both extracts, no cytotoxic effect was observed on the healthy CCD18-Co cell line (IC_{50} > 200 µg/mL), indicating selective cytotoxicity toward cancerous cells. These findings suggest that OPCs extracted from P. brutia bark have potential as natural, selective anticancer agents. The ethanol:water extract, in particular, demonstrated more potent cytotoxicity, possibly due to enhanced OPC solubility and bioavailability in a mixed solvent system. This activity can be lead to consider new studies on characterization of the compounds in the extract and further isolation and detection the more active compounds by enrichment studies. Further studies including mechanistic insights and in vivo validation are needed to fully assess their therapeutic potential.

Keywords: Pinus brutia Ten., OPC, HT-29, A549, Cytotoxicity, MTT assay

ANTIOXIDANT ACTIVITIES OF DIFFERENT EXTRACTS OF INONOTUS CUTICULARIS (BULL. EX FR.) KARST. FROM SOUTHWEST ANATOLIA, TURKIYE

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ABSTRACT

Mushrooms are valuable natural sources of antioxidants due to their richness in phenolic compounds, polysaccharides, and other bioactive metabolites. Several species, such as Ganoderma lucidum, Inonotus obliquus, and Trametes hirsuta, have exhibited remarkable antioxidant properties through radical scavenging, reducing power, and metal-chelating activities. These findings underscore the potential of mushrooms as functional food ingredients and natural alternatives in pharmaceutical formulations. Antioxidant mushrooms play a crucial role in reducing oxidative stress caused by free radicals, thereby protecting cellular components and contributing to the prevention of chronic diseases. Research on the biological activity of Inonotus cuticularis is still limited, but interest in its bioactivity and chemical composition has been increasing. In this study, I. cuticularis, which grows naturally in Türkiye and is traditionally consumed as tea, was extracted using solvents of increasing polarity (hexane, ethyl acetate, methanol, and water). The antioxidant activities of the extracts were evaluated using four standard assays: DPPH, ABTS, CUPRAC, and metal-chelating activity. Among the extracts, the water extract exhibited the strongest metal-chelating activity (IC_{50}: 63.25±0.56 µg/mL). Ethyl acetate and methanol extracts showed moderate CUPRAC (IC_{50}: 72.48±0.85 and 85.28±0.52 µg/mL) and ABTS (IC_{50}: 92.58±0.55 and 95.28±0.12 µg/mL) activities, while all extracts displayed weak DPPH activity (IC_{50} > 200 µg/mL). These results suggest that I. cuticularis possesses moderate antioxidant potential, particularly in terms of metal chelation and reducing power. However, further research is needed to optimize its activity and identify its active constituents for pharmaceutical or nutraceutical applications.

Keywords: Inonotus cuticularis, antioxidant activities, DPPH, ABTS, CUPRAC, metal chelate

INTRICATE RELATIONSHIP BETWEEN INFLAMMATION, COAGULATION DISORDERS, AND LUNG CANCER

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ABSTRACT

A modern-day plague, lung cancer, often referred to as bronchial neoplasia, is stigmatized in the medical community and by the general population. Effective biomarkers must thus be found in order to facilitate an early detection of this illness and enhance patient outcomes. In this case, thrombo-inflammatory indicators including D-dimers, cytokines, platelets' count and multiple coagulation factors are useful for diagnosing and tracking the disease. Using specific biomarkers, the primary goal was to assess the significance of these thrombo-inflammatory parameters in pulmonary neoplasia patients' early diagnosis, treatment monitoring, and therapeutic response prediction. The link between thrombosis and lung cancer is intricate and multifaceted. Hypercoagulability may result from the activation of blood coagulation pathways by cancer cells. The coagulation cascade begins when procoagulant factors, including tissue factor, are released. An elevated risk of thrombosis is caused by hypercoagulability. Blood clots can occur as a result of endothelial cell rupture and platelet activation brought on by inflammation, which is triggered by cancer. Blood arteries may physically compress as a result of pulmonary tumors, impairing blood flow and encouraging thrombus development. The capacity of tumors to directly enter blood arteries can damage endothelium and result in clot formation. Cancer cells emit many proinflammatory cytokines and growth factors, including TNF-α and IL-6. These cytokines alter endothelial function and coagulation factors, which might result in a pro-thrombotic condition. By interfering with the coagulation cascade or damaging blood vessels, cancer therapies such as certain chemotherapy drugs and surgical procedures can also raise the risk of thrombosis. These indications are commonly utilized as biomarkers of thrombo-inflammation and are higher in individuals with lung cancer. Lung cancer and thrombosis are the primary causes of one another. Pulmonary embolism is the second most common cause of mortality for cancer patients. Tumor development is linked to the coagulation system being activated. The pathophysiology of lung cancer is quite complicated due to the intricate relationship between inflammation, hemostasis, and lung cancer. However, creating successful plans for the disease's detection, prevention, and treatment requires knowledge of the molecular processes that underlie the connection between thrombo-inflammation and lung cancer. According to preliminary findings, there is a link between lung cancer and persistent thrombo-inflammation, indicating that the former promotes the development of tumors. The intricate processes behind this association emphasize the role that inflammatory chemicals play in the development of tumors. Even though inflammation has both beneficial and detrimental effects on cancer, it is always better to control inflammation than to completely eradicate it. This can be accomplished by controlling the activation of macrophages and focusing on inflammatory cytokines and chemokines.

On top of that, by encouraging an enhancement of the immune response to malignancies, the idea of immunological checkpoints has enormous potential for the treatment of cancer. Lung cancer prevention, detection, and treatment prospects are improved by the investigation of novel, efficacious therapy options made possible by knowledge of these intricate systems. These findings imply that anti-tumor immunological checkpoints and thrombo-inflammation modulation may be used to regulate tumor growth. New treatment options for patients may result from advancements in cancer prevention, diagnosis, and therapy strategies

Keywords: Coagulation disorders, Lung cancer, D-dimers, IL6, TNF alpha, Platelets' count, Endothelial Dysfunction

CYTOTOXIC ACTIVITIES OF DIFFERENT EXTRACTS OF INONOTUS TAMARICIS (PAT.) MAIRE FROM SOUTHWEST ANATOLIA, TURKIYE

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ABSTRACT

Cancer is a disease caused by uncontrolled cell proliferation and abnormal cells that gain the ability to spread to surrounding tissues. According to the 2025 Cancer Statistics, prostate, lung and colorectal cancers are the most common cancers in men, while breast, lung and colorectal cancers are the most common in women, with prostate and breast cancers alone having the highest rates. In recent years, the increase in the incidence of cancer and its tendency to be seen at young ages has attracted attention, while healthy nutrition and natural bioactive compounds, especially medicinal mushrooms (such as Inonotus obliquus, Schizophyllum commune, Trametes versicolor, Grifola frondosa, Ganoderma lucidum, Lentinula edodes, Laetiporus sulphureus, Boletus edulis) have significant potential in the field of cancer prevention and supportive therapy. In this study, it was aimed to investigate the cytotoxic activity of different extracts of Inonotus tamaricis (Pat.) Maire from Southwest Anatolia, Türkiye, against lung and colon cancer cell lines (A549 and HT-29) and healthy fibroblast cell line (CCd18Co). This mushroom is naturally distributed in south west anatolia, non-toxic, consumed as tea and has commercial potential. Extractions of the fungus (hexane, ethyl acetate, methanol and water) were carried out according to increasing polarity respectively, then the cytotoxic activities of the extracts were investigated using MTT method. As a result, ethyl acetate extract of I. tamaricis showed highly selective cytotoxic activity against HT-29 colon cancer cells (IC50: 25.02 µg/mL). In A549 lung cancer cells, IC50 was determined as 150.81 µg/mL. Hexane and water extracts were moderately effective in HT-29 (IC50 ~100 µg/mL), while methanol extract showed weak activity. All extracts showed low toxicity in healthy fibroblast cells (IC50 >100 µg/mL). I. tamaricis shows a promise as a source of bioactive compounds and detailed phytochemical investigations are needed. Future studies on this species may reveal new bioactive metabolites with pharmaceutical potential, especially in colon cancer.

Keywords: Inonotus tamaricis, mushroom, cytotoxic activities, MTT, lung cancer, colon cancer

COAGULATION DISORDERS AND TUBERCULOSIS: CLINICAL OBSERVATIONS, DIAGNOSTIC CHALLENGES, AND EMERGING BIOMARKERS

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ABSTRACT

Tuberculosis (TB) is a chronic infectious disease caused by Mycobacterium tuberculosis, primarily affecting the lungs but also known for its systemic complications. In recent years, growing evidence has linked TB to coagulation disorders, suggesting a significant risk of thrombotic events such as deep vein thrombosis and pulmonary embolism in affected patients. This work explores the multifaceted interactions between the inflammatory response triggered by TB and the hemostatic system, shedding light on how chronic immune activation disrupts coagulation homeostasis. The review focuses on key pathophysiological mechanisms, including cytokine-induced expression of tissue factor, endothelial dysfunction, platelet hyperactivity, and the role of pro-inflammatory mediators such as TNF-α and IL-6. These processes collectively contribute to a hypercoagulable state that may worsen clinical outcomes and complicate the management of TB. In addition to outlining the biological pathways involved, this work discusses clinical observations, diagnostic challenges, and emerging biomarkers of coagulation imbalance in TB patients. Particular attention is given to the relevance of these findings in high-burden settings and among vulnerable populations. Finally, the study reviews current and potential therapeutic strategies aimed at mitigating thrombotic complications, including the use of anticoagulants, corticosteroids, and adjunctive therapies alongside standard anti-tubercular treatment. Understanding the link between coagulation disorders and TB is crucial for improving risk assessment, guiding treatment decisions, and ultimately enhancing patient care.

Keywords: Tuberculosis, Infection, Coagulation, Antibiotics, Cytokines, Anticoagulants

CHEMICAL CHARACTERIZATION OF BIOACTIVE COMPOUNDS OF ALOE VERA LEAF GEL (ALOE BARDADENSIS MILLER)

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ABSTRACT

Context: Aloe vera (Aloe barbadensis Miller) is a succulent and medicinal plant belonging to the Liliaceae family (Asphodelaceae), widely distributed worldwide and is cultivated on a large scale due to its economic value. A mucilaginous gel obtained from leaves plant has long been recognized for its numerous skin health benefits and wound healing properties, which were attributable to its phytochemical composition. Polysaccharides are considered the primary bioactive compounds responsible for most of the gel's therapeutic effects and functional activities. The objective of our study is to provide a comprehensive characterization of the Aloe vera gel properties, essential to understanding its potential use in dermo-pharmaceutical application. **Methods:** The microbiological quality and physicochemical properties of Aloe vera gel freshly extracted by manual hand filleting under sterile conditions were evaluated using standard analytical methods. The ethyl alcohol-insoluble polysaccharides fraction was extracted from Aloe vera gel, purified, and analyzed using FTIR spectroscopy. **Results and interpretation:** The various physicochemical characteristics of fresh Aloe vera gel including pH (4.16), moisture content (99.36%), acidity (0.10), total ash (0.178 %), proteins content (0.014%) and total polysaccharides content (0.21% % of fresh matter gel) were determined. No mesophilic bacteria, lactic aerobic bacteria, yeasts and molds were detected in fresh Aloe vera gel. The acidic pH is a key characteristic that inhibits enzymatic and microbial activity, thereby improving the gel's stability and ensuring its safety. The acidity value reflects the presence of organic acids, with malic acid being a marker of gel freshness. The physicochemical properties evaluation and microbiological analysis showed a good quality of the fresh gel and reflected the optimizing gel extraction and preparation. Spectral bands of FTIR confirmed the presence of acetyl, hydroxyl, and ether functional groups, characteristic of acemannan, which considered the principal bioactive polysaccharide. The spectral signature of this compound particularly its acetyl groups, are crucial for its biological activity and wound healing properties. **Conclusion:** These findings provide insight into the chemical composition and quality indicators of fresh Aloe vera gel. Our study showed its potential as a valuable natural source of bioactive compounds for pharmaceutical application. Further studies may explore its application in clinical formulations and stability under different processing conditions.

Keywords: Aloe vera leaf gel, phytochemical composition, bioactive polysaccharides

POTENTIAL ROLE OF COX2/PGE2 PATHWAY IN BIOCHEMICAL DISORDERS FOLLOWING BRAIN INJURIES INDUCED BY POTASSIUM CHANNELS BLOKERS

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ABSTRACT

Neurotoxins, specific blockers of ionic channels are known to induce signs and symptoms that involve the central nervous system and stimulation of the autonomic system; occasionally they lead to respiratory and heart failure and even death. In this study, the involvement of COX-2/PGE2 pathway in neuroinflammatory response and oxidative balance after experimental intoxination with Androctonus australis hector (Aah) venom neurotoxins injected by intra-cerebro-ventricular route was investigated. Obtained results showed that the neurotoxin binding to the central nervous system lead to severe alterations on structure and function of brain. These alterations were characterized by important neuro-inflammation characterized by an edema-forming and important cell infiltration, associated with hyperleukocytosis and an increase of hemolytic activity of complement. An important pro-inflammatory cytokine (IL-6 and TNFa) release was observed as well an NF-kB overexpression detected by immunohistochimical analysis. Aah venom neurotoxins also induced oxidative stress characterized by an overproduction of free radicals, a massive release of lipid peroxidation metabolites, and an inhibition of catalase activity accompanied with an increase of glutathione level. The deregulation of the COX-2/PGE2 pathway appears to affect the neuro-inflammatory response and cerebral oxidative stress. Indeed, the use of COX-2 inhibitor showed an important decrease of immune-inflammatory and oxidative stress markers accompanied with tissue restoration. **Conclusion:** The PGE2, the main product of COX-2, seems to induce the generation of free radicals and inflammatory mediators responsible of membrane damage in brain. These free radicals participate in oxidative stress and in the cell death of neuron cells. These findings could help to better understand the role of COX-2/PGE2 pathway in neuro-inflammation process which could for help in new therapy using the COX-2 as targets to attenuate the neuroinflammatory disorders induced in neuropathological diseases.

Keywords: Neurotoxins, COX-2/PGE2 pathway, Biochemical disorders, Neuro-immuno-inflammation

PHYSICOCHEMICAL CHARACTERIZATION AND ANTITUMOR ACTIVITY OF AAHII TOXIN-LOADED CHITOSAN NANOPARTICLES TARGETING VOLTAGE-GATED SODIUM CHANNELS IN LUNG ADENOCARCINOMA

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ABSTRACT

Background and Aim: Lung cancer remains one of the leading causes of cancer-related deaths worldwide. Voltage-gated sodium channels (VGSCs) have emerged as key players in tumor progression, including in lung adenocarcinoma. AahII, a scorpion toxin that selectively blocks VGSCs, presents promising antitumor potential but is limited by systemic toxicity. To enhance safety and therapeutic efficacy, AahII was encapsulated in chitosan nanoparticles (AahII-CNPs). **Experimental Approach:** AahII was formulated into chitosan nanoparticles and characterized by dynamic light scattering (DLS), zeta potential measurement, and transmission electron microscopy (TEM) to confirm size, stability, and morphology. AahII-CNPs were administered intranasally in a urethane-induced lung cancer mouse model. The therapeutic effects were assessed by immunohistochemical analysis of proliferation (Ki-67) and anti-apoptotic (Bcl-2) markers. **Key Findings:** Nanoparticles showed a mean size of approximately 298 nm with a positive surface charge, and spherical morphology. Intranasal administration of AahII-CNPs significantly reduced the expression of Ki-67 and Bcl-2 in lung tumor tissues, indicating a strong antiproliferative and pro-apoptotic effect. **Conclusions:** AahII-CNPs demonstrate potential as a safe and effective formulation for targeted lung cancer therapy by inhibiting tumor cell proliferation and promoting apoptosis. These findings support further exploration of VGSC-targeting strategies in cancer treatment.

Keywords: Urethane, Lung adenocarcinoma, Apoptosis, Chitosan nanoparticles

SALICYLIC ACID AS A MECHANISM OF PLANT DETOXIFICATION AGAINST HEAVY METALS

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ABSTRACT

Environmental pollution by toxic agents such as heavy metals continues to pose a serious threat to agricultural sustainability, especially in regions with a history of industrial exploitation and improper extraction of natural resources. The Kalbajar region of Karabakh, previously subjected to uncontrolled mining, serves as a striking example of ecological degradation, where metals such as cadmium, molybdenum, lead, and tungsten accumulate in the soil and aquatic environments. Among these, tungsten stands out due to its chemical stability and bioaccumulative capacity, raising serious concerns about its phytotoxicity, which may ultimately lead to either plant death or human poisoning. Phytohormones, as key components of immune regulation, play a critical role in adaptive and acclimatory processes in plants, thereby enhancing their resistance to various external stressors. In this study, we examined the impact of sodium tungstate (Na_2WO_4) exposure on the early growth stages of cotton (Gossypium hirsutum L.), using the locally adapted genotype "Agdash-3." Additionally, we investigated the protective role of salicylic acid (SA), a phenolic phytohormone known for its involvement in stress signaling and regulation of antioxidant activity. Given the limited data on tungsten-induced stress in cotton, particularly in local cultivars, and the uncertain role of SA under such conditions, the aim of this study was to elucidate the nature of their interaction at the physiological and enzymatic levels. To simulate stress conditions resembling polluted environments, we conducted a hydroponic experiment using a modified Steiner nutrient solution. Cotton seeds were exposed to 0.7 mM Na_2WO_4, either alone or in combination with SA at concentrations of 0.1 mM and 1 mM. One week after sowing, morphological parameters such as root and stem length were assessed. In addition, the activities of key antioxidant enzymes—catalase (CAT), superoxide dismutase (SOD), peroxidase (POD), and polyphenol oxidase (PPO)—were measured to evaluate the degree of oxidative stress and the plant's antioxidative capacity. Exposure to Na_2WO_4 significantly inhibited root and stem growth (by 59–64%) and reduced germination rates (by 7%), indicating a pronounced toxic effect. These findings support the notion that tungsten disrupts early plant development. However, the application of SA, particularly at 1 mM, resulted in considerable improvement in shoot and root growth. The 0.1 mM concentration also showed a positive trend, although to a lesser extent. These observations suggest that SA provides a certain degree of protection, likely by activating internal stress-response mechanisms. At the biochemical level, Na_2WO_4 slightly suppressed the activity of catalase and peroxidase, while it strongly inhibited SOD activity—an enzyme essential for detoxifying reactive oxygen species (ROS). Interestingly, 0.1 mM SA further decreased catalase activity, whereas 1 mM SA partially restored it. The response of SOD was the opposite: moderate SA concentration (0.1 mM) promoted recovery of SOD activity, while the higher dose was less effective.

Peroxidase activity, aside from the individual influence of tungstate, remained relatively stable across all treatments, indicating its secondary role in this stress response. Polyphenol oxidase activity decreased under tungstate exposure but remained stable when SA was applied, suggesting preserved metabolism of phenolic compounds and potentially the maintenance of quinone formation and lignification processes. The overall findings emphasize the complex interaction between heavy metal-induced stress and the salicylic acid-mediated defense response. The "Agdash-3" genotype demonstrated partial recovery under SA treatment, indicating the presence of genotype-specific mechanisms of tolerance. The enzymatic data suggest that SA, at an optimal concentration, contributes to maintaining ROS balance and protecting essential cellular functions during early growth stages. The study also confirmed the active involvement of SA in restoring the plant's morphological parameters, which may serve as a basis for integrating these findings into practical field applications.

Keywords: salicylic acid, tungstate stress, upland cotton (Gossypium hirsutum), antioxidant enzymes, oxidative stress

RESTORATION OF REDOX HOMEOSTASIS BY AAHII-ENCAPSULATED CHITOSAN NANOPARTICLES IN A MURINE MODEL OF LUNG ADENOCARCINOMA

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ABSTRACT

Background and Aim: Oxidative stress plays a crucial role in cancer development by promoting DNA damage, inflammation, and tumor cell survival. In lung adenocarcinoma, redox imbalance contributes to tumor progression. This study aimed to investigate whether AahII toxin, a VGSC blocker derived from Androctonus australis hector venom and encapsulated in chitosan nanoparticles (AahII-CNPs), could restore oxidative balance in a urethane-induced lung cancer model. **Experimental Approach:** AahII was encapsulated in chitosan nanoparticles and characterized using dynamic light scattering (DLS), zeta potential analysis, Fourier-transform infrared (FTIR) spectroscopy, and transmission electron microscopy (TEM) to confirm particle size, charge, and morphology. AahII-CNPs were administered intranasally to mice bearing lung tumors induced by urethane. Oxidative stress markers were assessed in lung tissues, including malondialdehyde (MDA), hydrogen peroxide (H_2O_2), nitric oxide (NO), glutathione (GSH), and catalase activity. **Key Findings:** AahII-CNPs did not simply act as antioxidants but reestablished oxidative parameters to levels comparable to healthy control mice. Both pro-oxidants (MDA, H_2O_2, NO) and compensatory antioxidants (GSH, catalase) were normalized, indicating a restoration of redox homeostasis rather than overcompensation. **Conclusions:** By rebalancing oxidative stress markers, AahII-CNPs appear to limit the contribution of oxidative imbalance to tumor progression. This redox-stabilizing effect supports their potential as a therapeutic strategy targeting oxidative stress in lung cancer.

Keywords: Lung adenocarcinoma, oxidative stress , chitosan nanoparticles, AahII toxin

PHENOLIC PROFILE OF DIFFERENT PARTS OF INULA GRAVEOLENS DETERMINED BY HPLC-DAD

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ABSTRACT

Turkey's diverse geography and climatic conditions contribute to a rich flora, particularly in medicinal and aromatic plants that serve as important sources for pharmaceutical, food, and cosmetic industries. Inula graveolens (Asteraceae) is an annual plant characterized by hairy stems and yellow flowers, widely distributed in the Mediterranean region of Turkey. Traditionally, it has been used in folk medicine for respiratory infections, cough, bronchitis, and urinary tract disorders, yet detailed studies on its chemical composition remain limited. This study aimed to determine the phenolic compound profiles of flower, aerial, and root extracts of I. graveolens using HPLC-DAD analysis. Plant materials were collected, dried, and separately extracted with ethyl acetate, methanol, and water. The resulting extracts were filtered through 0.20 μm membranes and analyzed against 26 phenolic acid standards. In flower extracts, luteolin (11.43 mg/g) and coumarin (8.20 mg/g) were identified as major compounds in ethyl acetate; coumarin (21.65 mg/g) in methanol; and coumarin (11.43 mg/g) in aqueous extracts. In aerial parts, luteolin (14.78 mg/g), quercetin (11.25 mg/g), and trans-cinnamic acid (7.33 mg/g) were major compounds in ethyl acetate; coumarin (18.73 mg/g) and pyrocatechol (7.38 mg/g) in methanol; and coumarin (10.85 mg/g) and pyrocatechol (6.59 mg/g) in aqueous extracts. In roots, luteolin (6.91 mg/g) was predominant in ethyl acetate; rosmarinic acid (5.20 mg/g) and coumarin (4.63 mg/g) in methanol; and pyrocatechol (3.47 mg/g) and coumarin (2.69 mg/g) in aqueous extracts. The findings indicate that Inula graveolens is rich in phenolic compounds, particularly luteolin and coumarin, across different plant parts, with concentrations varying according to the solvent used. The high levels of these phenolics suggest potential antioxidant and pharmacological properties. This comprehensive phenolic profile provides valuable insights into the chemical composition of I. graveolens and serves as a basis for future studies focusing on its bioactive potential and possible applications in pharmaceutical and nutraceutical formulations. This study was supported by the TUBITAK 2209-A Research Project Support Programme for Undergraduate Students (Project No: 1919B012210089).

Keywords: Inula graveolens, phenolic compounds, HPLC-DAD, luteolin, coumarin

EVALUATION OF THE INHIBITORY EFFECT OF 3-AMINO-THIOPHENE-2-CARBOHYDRAZIDE DERIVATIVES ON BOVINE LACTOPEROXIDASE USING IN VITRO APPROACHES

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ABSTRACT

In this study, eighteen new arylidenehydrazide derivatives (1-18) were synthesized starting from 3-amino-thiophene-2-carboxylic acid methyl ester. The inhibitory activities of these compounds against lactoperoxidase (LPO) were evaluated. LPO (EC 1.11.1.7) is a heme-containing peroxidase enzyme present in various exocrine secretions, including bovine milk. It plays a vital role in the innate immune system by catalyzing the hydrogen peroxide-mediated oxidation of halides and pseudohalides, producing antimicrobial agents. The inhibitory potential of the synthesized 3-amino-thiophene-2-carbohydrazide derivatives against bovine milk LPO was investigated using both in vitro spectrophotometric assays. The inhibitors showed Ki values ranging from 0.05 ± 0.009 to 310.79 ± 0.975 nM. Among the series, compound 18 demonstrated the most potent inhibitory effect, acting via a competitive inhibition mechanism. This study provides a foundation for future drug development efforts targeting the LPO enzyme using arylidenehydrazide-based derivatives.

Keywords: Lactoperoxidase, Enzyme, Kinetic, Inhibition, Arylidenehydrazide

THE PIONEERING ROLE OF THROMBOGENIC ANIMAL MODELS IN COAGULOPATHIES INVESTIGATIONS AND THE ASSESSMENT OF NOVEL ANTITHROMBOTIC AGENTS

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ABSTRACT

Thrombogenic animal models are fundamental for investigating the physiological haemostasis, as well as for elucidating the pathophysiological mechanisms of coagulopathies, including thromboembolic conditions which represent the leading cause of mortality worldwide. Furthermore, these models are indispensable for the preclinical examination phase of novel antithrombotic and/or thrombolytic agents. Numerous thrombogenic models have been developed to simulate everal aspects of thrombosis. For instance, chemical models such as the ferric chloride model, in addition to other techniques like the electrolytic Inferior Vena Cava model, mechanical injury and IVC ligation model, which are frequently employed in investigations of cardiovascular disorders. In pharmacological studies, scientists tend to opt for the most minimally invasive and uncomplicated model with the lowest cost. In this regard, the carrageenan-induced mouse tail thrombosis model is one of the most utilised models for testing new antithrombotic agents as was the case for aspirin and heparin during their preclinical stages. In this regard, an evaluation of a new purified peptide, derived from the venom of the Cerastes cerastes, "Cerastokunin" at graduated doses (2, 4 and 6 mg/kg), was conducted in this non-invasive model. This method is uncomplicated, requiring only an intraperitoneal injection of carrageenan into mice. The injection results in the formation of a thrombus, which is visible in the tail vein of the mouse from the first hours following the treatment. Thrombus lengths were measured 24 hours and 48 hours post-treatment with Cerastokunin, the blood clotting time was recorded, and in vitro PT and aPTT times were performed. **The findings** demonstrated an intriguing dose-dependent antithrombotic effect. The in vitro tests revealed a significant prolongation in PT and aPTT times, indicating a strong inhibition of both extrinsic and intrinsic coagulation pathways. **In conclusion**, the thrombogenic model played a crucial role in the biofunctional characterization. Cerastokunin represents a promising candidate for anticoagulant therapy.

Keywords: Thrombogenic, animal models, Cerastokunin, antithrombotic, anticoagulant

RUTIN'S IMPACT ON BRAIN INFLAMMATION IN ALUMINUM-INTOXICATED RATS

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ABSTRACT

Aluminum (Al) toxicity is known to induce neuroinflammation, a key factor in the development of neurodegenerative disorders. This study investigated the potential neuroprotective effects of rutin, a natural flavonoid with anti-inflammatory properties, on brain inflammation in rats exposed to aluminum intoxication. For our experiment, 18 female Wistar rats were divided into 3 groups: the first group served as the Control group, the second group was the Aluminum-intoxicated group, receiving intraperitoneal doses of 60mg/ml of AlCl3 (3 times a week for 45 days). However, animals in the third group received an intraperitoneal dose of aluminum at 60mg/kg and were simultaneously treated with oral administration (gavage) of rutin at a dose of 30mg/kg (5 times a week for a duration of 45 days). Results showed that rutin administration significantly reduced pro-inflammatory cytokine (IL6 et TNFα) and nitric oxide (NO) levels in the brains of aluminum-intoxicated rats compared to the aluminum-intoxicated group, this decrease is about -40.13%, -34.69% and -45.18% respectively. These findings suggest that rutin has potential neuroprotective effects against aluminuminduced neuroinflammation. Rutin's ability to modulate brain inflammation may hold promise for developing therapeutic strategies to target neuroinflammatory disorders associated with aluminum toxicity. In conclusion, rutin shows promise as a potential intervention for alleviating brain inflammation in aluminum-intoxicated rats. Further research is needed to elucidate the underlying mechanisms and explore the long-term effects of rutin administration, providing insights for novel treatments in neuroinflammatory conditions linked to aluminum toxicity.

Keywords: Rutin- Aluminum toxicity – Inflmmation – Brain- Rat

ROLE OF HEMOLYSIS IN THE RENAL DAMAGE INDUCED BY ANDROCTONUS AUSTRALIS HECTOR VENOM

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ABSTRACT

Previous cases of nephropathy induced after a scorpion sting have been reported from the Middle East and North Africa. The mechanism by which scorpion venom injures the kidney remains unclear. Experimental and clinical studies suggest that kidney injury can be due to various causes. It can result from direct nephrotoxicity or renal damage due to inflammation, oxidative stress and hemolysis. In this study, the hemolysis and its involvement in the renal damage induced by Androctonus australis hector (Aah) venom in mice as well as the direct hemolytic activity of this venom were investigated. The obtained results showed that Aah venom induced in vitro and in vivo hemolysis. The in vivo hemolysis was confirmed by an increase in markers of intravascular hemolysis (lactate deshydrogenase, hemoglobin, and bilirubin) and the presence of schistocytes on the blood smear. Intravascular hemolysis was associated with kidney function impairment and severe nephropathological changes, including accumulation of erythrocytes in the interstitial area and tubular cast formation, which are highly nephrotoxic. These renal alterations were accompanied by a neutrophil influx into renal tissue and imbalanced redox status. In conclusion, the present findings suggest that Aah venom is able to induce hemolysis that can result in the release of free hemoglobin to the extracellular space, which activates inflammatory and oxidative processes and promote renal damage.

Keywords: Scorpion venom; Hemolysis; Kidney damage; Inflammation; Oxidative stress

EFFECT ANTI HÉMOLYTIQUE OF ESSENTIAL OIL FROM CITRUS SINENSIS AND CITRUS AURANTIUM

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ABSTRACT

The economic importance of citrus fruits lies in their health benefits, probably attributed to the presence of the phenolic compounds, vitamin C and carotenoids. In this context, we have tried to evaluate the anti-hemolytic activity of essential oil prepared from Citrus sinensis and citrus aurantium. EO was obtained by hydro distillation using a Clevenger type apparatus. The extraction provided yields of 0,26% and 1.66% % respectively. Antihemolytic activity was evaluated on red blood cells in the presence of hydrogen peroxide (H2O2), an oxidizing agent that disrupts the membrane structure. Our results show that Essential oils have a notable protective activity against the lysis of red blood cells at low concentrations. Indeed, the inhibition rates observed reflecting the extract's ability to stabilize the erythrocyte membrane and reduce the release of hemoglobin.the results were noticeable in each of essential oils with a noticeable priority to the essential oil from Citrus sinensis.

Keywords: Hydro distillation, anti-hemolytic activity, red blood cells, Essential oil, Citrus sinensis, citrus aurantium

IN VITRO A-AMYLASE AND A-GLUCOSIDASE INHIBITORY ACTIVITIES OF INULA GRAVEOLENS EXTRACTS

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ABSTRACT

Inula graveolens (L.), an aromatic medicinal plant belonging to the Asteraceae family, is widely distributed in Europe, Africa, and Asia and is commonly found in the Mediterranean region of Türkiye. This endemic species has long been used in folk medicine for the treatment of respiratory tract infections, coughs, colds, and bronchitis. The present study aimed to evaluate the in vitro antidiabetic potential of flower and aerial part extracts of I. graveolens by assessing their inhibitory effects on α-amylase and α-glucosidase enzymes. Plant materials were separated into flowers and aerial parts, dried, powdered, and sequentially extracted with ethyl acetate, methanol, and water. The inhibitory activities of the obtained extracts were determined spectrophotometrically and compared with the standard drug acarbose. At a concentration of 200 µg/mL, ethyl acetate extracts of aerial parts and flowers exhibited $52.86 \pm 0.71\%$ and $45.27 \pm 0.23\%$ inhibition against α-amylase, respectively, while acarbose showed $80.56 \pm 0.52\%$ inhibition at the same concentration. Similarly, the highest inhibition against α-glucosidase was recorded for ethyl acetate extracts of flowers and aerial parts, with $70.20 \pm 0.82\%$ and $75.35 \pm 0.86\%$ inhibition, respectively. These values were higher than that of acarbose ($67.30 \pm 0.45\%$), indicating superior activity. Methanol extracts also demonstrated notable activity, with inhibition rates of $61.63 \pm 0.45\%$ and $58.30 \pm 0.62\%$ for flowers and aerial parts, respectively. These findings highlight that ethyl acetate extracts, particularly from the flower and aerial parts, exhibit remarkable α-glucosidase inhibitory activity, surpassing even the standard drug acarbose. The extracts also showed considerable α-amylase inhibition, following a similar trend. Overall, I. graveolens demonstrates promising potential as a natural source of antidiabetic agents, warranting further bio-guided isolation studies and mechanistic investigations. This study was supported by the TUBITAK 2209-A Research Project Support Programme for Undergraduate Students (Project No: 1919B012210089)

Keywords: Inula graveolens, Asteraceae, α-amylase, α-glucosidase, enzyme inhibition, antidiabetic activity

TOWARD AN INTEGRATED DIAGNOSTIC APPROACH: EXPERIMENTAL LUNG INJURY MODEL INDUCED BY HEAVY METALS (CADMIUM) AND AI-BASED DETECTION OF LUNG CANCER IN HISTOLOGICAL IMAGES

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ABSTRACT

Lung cancer is the leading cause of cancer-related death worldwide, accounting for approximately 1.8 million deaths per year. Histological analysis remains essential for accurate diagnosis and treatment decisions. Artificial intelligence (AI), particularly deep learning, offers promising advancements in improving the detection of cancerous tissue structures in histopathology. This study integrates two approaches. First, we developed an experimental model of lung injury by exposing laboratory animals to cadmium. Histological and biochemical assessments revealed marked pulmonary damage characterized by edema, inflammation, structural disorganization, and increased oxidative stress markers (NO and H_2O_2). This model reflects pathological features observed in human lung diseases and provides a valuable reference for comparative histological analysis. In the second part of the study, we developed a binary image classification system using the MobileNet architecture, pre-trained on ImageNet and fine-tuned through transfer learning, to analyze histological images from patients diagnosed with pulmonary adenocarcinoma. MobileNet enabled high-performance training on a limited dataset of 319 medically validated histological images obtained from the Department of Pathology at Mustapha Hospital (Algiers), including 256 images for training and 63 for validation. The model achieved an accuracy of 99% on the training set and 98% on the validation set, demonstrating strong generalization capacity for medical image classification. In conclusion, the cadmium-induced lung injury model cans constitute a reproducible and relevant system for studying pulmonary histopathology and inflammation. The deep learning approach demonstrated high diagnostic accuracy in distinguishing cancerous tissues. As a perspective, the combination of both approaches, experimental modeling and AI analysis opens promising avenues for developing and validating robust, biologically informed AI tools.

The cadmium model may also serve in future research as a controlled dataset to improve the training, validation in histopathological image interpretation. Further clinical validation is required to ensure reliability and implementation in real-world medical settings.

Keywords: Lung cancer, Histological analysis, Artificial intelligence, Deep learning, Cadmium-Experimental model, Oxidative stress

VALORIZATION OF LAVANDULA ANGUSTIFOLIA DISTILLATION RESIDUES: CHEMICAL CHARACTERIZATION AND ANTIOXIDANT ACTIVITY EVALUATION

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ABSTRACT

This study is part of a plan to valorize the solid residue produced following the hydro-distillation of the fragrant plant Lavandula angustifolia, which is widely cultivated in Morocco. Although the main objective of distillation is the extraction of essential oils, the remaining biomass still contains significant amounts of bioactive substances such as flavonoids and polyphenols, which could serve as valuable natural ingredients for the cosmetic and agri-food sectors. Different extraction techniques (cold maceration and Soxhlet extraction) were applied using a range of solvents, including water, ethanol, methanol, and their hydroalcoholic mixtures (50% ethanol, 50% methanol, and 75% ethanol), in order to evaluate their potential. The total polyphenol content of the extracts was determined using the Folin–Ciocalteu method, while the flavonoid content was measured by aluminum chloride complexation. Antioxidant activity was assessed using the DPPH radical scavenging assay. The results show that hydroalcoholic extracts, particularly those obtained with 50% and 75% ethanol via Soxhlet, yielded the highest amounts of phenolic compounds and demonstrated remarkable antioxidant activity. Soxhlet extraction was more efficient than maceration across all tested solvents. The highest extraction yields were obtained with 50% methanol (46.89%) and 50% ethanol (42.56%) for both fresh and distilled plant materials. Antioxidant activity increased as the concentration increased, reaching a maximum inhibition of 64.90% for fresh extracts and 50.71% for residue extracts. Both were obtained by Soxhlet extraction with 50% ethanol at 96 µg/mL. These findings suggest that lavender residues, often considered waste, can be valorized as a source of natural antioxidant and antimicrobial agents for agri-food applications.

Keywords: Lavandula angustifolia, polyphenols, distillation residues, antioxidant activity

BIOCHEMICAL AND OXIDATIVE CHANGES CAUSED BY AAH II TOXIN ISOLATED FROM ANDROCTONUS AUSTRALIS HECTOR SCORPION VENOM

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ABSTRACT

Many toxins from scorpion venom cause neurotransmitter release by activating the autonomic system. The aim of the present work was to determine biochemical and oxidative disorders produced by the Aah II toxin, the most important toxic protein in the Androctonus australis hector venom, a dangerous species of scorpion in Algeria. Biochemical markers were used to assess cardiac, hepatic and renal dysfunction/injury, 24 hr after envenomation with Aah II toxin. Furthermore, the indicators of inflammation and oxidative stress were examined in several organs. The results of our study show that Aah II toxin administration induced a marked impairment of multi-organ function as evidenced by alteration in metabolic markers of cellular integrity/functionality and oxidative stress. The elevated activities of alanine and aspartate aminotransferases (ALT, AST), alkaline phosphatase (ALP), and creatine kinase (CPK) might indicate liver and other vital organ damage, resulting in the leakage of these enzymes into the bloodstream. The elevation of urea, uric acid, and creatinine levels suggests impairment of kidney function. Oxidative stress is reflected by a pronounced imbalance between elevated Lipid peroxidation product, malondialdehyde (MDA) and decreased levels of endogenous antioxidants such as reduced glutathione (GSH) and catalase (CAT) in all studied tissues. The recruitment of neutrophils in heart, lung, liver, and kidney was confirmed by the increase of myeloperoxidase (MPO) level. These findings indicate that the Aah II binding to its targets, in this case Na^+ channels, may induce a cascade of events that could contribute to the development of multi-organ dysfunction following scorpion envenomation.

Keywords: Aah II toxin, Metabolic markers, Lipid peroxidation product, Antioxydants

IN VITRO INHIBITORY ACTIVITY OF FUNCTIONALIZED IRIDIUM COMPLEXES ON HUMAN CARBONIC ANHYDRASE ISOENZYMES

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ABSTRACT

Carbonic anhydrases (CAs, EC 4.2.1.1) are zinc metalloenzymes that catalyze the reversible hydration of carbon dioxide to bicarbonate and a proton, playing a critical role in various physiological processes. Due to their biomedical relevance, particularly the human carbonic anhydrase isoenzymes I and II (hCA I and hCA II), the development of effective inhibitors has received considerable attention. In this study, a series of novel iridium (III) complexes incorporating 2-phenylimidazo[4,5-f][1,10] phenanthroline ligands with different substituents ($–CH_3$, $–CH(CH_3)_2$, $–OCH_3$, $–C_6H_5$) were synthesized and characterized. The inhibitory effects of these compounds on hCA I and hCA II were evaluated in vitro using the esterase activity assay. The enzymes were purified from human erythrocytes via affinity chromatography. IC_{50} values were determined to assess inhibitory potency. The results revealed that the synthesized iridium complexes exhibit significant inhibitory activity against both hCA I and hCA II, suggesting their potential as novel carbonic anhydrase inhibitors with possible therapeutic applications.

Keywords: Carbonic anhydrases, Inhibition, iridium(III) complexes

ANTIOXIDANT POTENTIAL AND PHYTOCHEMICAL PROFILING OF SALICORNIA EUROPAEA EXTRACTS: A STEP TOWARD SUSTAINABLE MANAGEMENT OF STRESS IN WHEAT CROPS

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ABSTRACT

The growing world population and the steady loss of arable land are putting increased pressure on global food security. In Morocco, wheat (Triticum aestivum L.), a major staple crop, is increasingly affected by abiotic stresses such as salinity, drought, temperature extremes, and heavy metal contamination, leading to significant yield losses. To face these challenges, the use of natural biostimulants derived from stress-tolerant plants offers a promising strategy to enhance crop resilience. Salicornia europaea, a halophytic species naturally adapted to harsh environments, is known to be rich in bioactive compounds such as phenols, flavonoids, and terpenes, which can act as natural antioxidants and support plant defense mechanisms. In this study, the bioactive potential of Salicornia europaea leaf extracts was investigated. Soxhlet extraction was performed using solvents of increasing polarity: hexane, acetone, and ethyl acetate. Extraction yields were determined, and total phenolic content (TPC) and total flavonoid content (TFC) were measured using the Folin-Ciocalteu and aluminum chloride methods. Antioxidant capacity was assessed using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging, 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS), and ferric reducing antioxidant power (FRAP) assays. The hexane extract showed the highest yield (2.55%), while the ethyl acetate extract was richest in phenolics (101.853 mg GAE/g dry extract). Strong antioxidant activities were recorded: the ethyl acetate extract had the lowest EC_{50} value in the DPPH assay (0.15 mg/mL), the acetone extract showed the highest ABTS value (0.296 mmol Trolox/g), and FRAP results confirmed the ethyl acetate extract's strong reducing power (171.625 mg Trolox/g). These findings highlight the strong antioxidant potential of Salicornia europaea extracts, particularly those obtained with ethyl acetate and acetone, and support their

future use as natural candidates for improving plant tolerance to abiotic stresses through eco-friendly agricultural strategies.

Keywords: Abiotic stress, antioxidant activity, natural biostimulants, phenolic compounds, Salicornia europaea

PHYSICOCHEMICAL, BIOCHEMICAL, AND STRUCTURAL ANALYSIS OF SNAIL MUCUS FROM TWO SPECIES: HELIX ASPERSA (FARMED) AND OTALA SP. (WILD)

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ABSTRACT

Le mucus d'escargot est une sécrétion naturelle riche et complexe, largement utilisée dans les secteurs cosmétique, pharmaceutique et biomédical en raison de ses multiples propriétés bioactives. Dans cette étude, une approche comparative a été entreprise entre deux espèces: Helix aspersa, élevée en conditions environnementales contrôlées, et Otala sp **.** , prélevée dans la nature. L'objectif était d'évaluer l'influence des caractéristiques spécifiques à chaque espèce et des conditions environnementales (élevage contrôlé vs habitat naturel) sur la composition biochimique et la qualité globale du mucus. Les analyses physicochimiques ont porté sur des paramètres tels que le pH, la densité, la teneur en humidité et la teneur totale en cendres. Le profil biochimique a été établi par la quantification des protéines, des sucres totaux, des sucres réducteurs et des polyphénols. L'activité antioxydante a été évaluée par dosages DPPH et TAC, qui évaluent le potentiel de piégeage des radicaux. De plus, la teneur en minéraux (Ca, Mg, Zn, etc.) a été déterminée par analyse spectroscopique. La caractérisation structurelle du mucus a été réalisée à l'aide de plusieurs techniques spectroscopiques et analytiques: spectroscopie infrarouge à transformée de Fourier (FTIR), spectroscopie UV-visible, diffraction des rayons X (DRX) et microscopie électronique à balayage (MEB), offrant une vue détaillée des groupes fonctionnels et des caractéristiques morphologiques des deux types de mucus. Les résultats révèlent que les deux échantillons de mucus présentent des profils biochimiques riches, composés de substances naturelles. Cependant, le mucus d'Helix aspersa se distingue par une concentration plus élevée en biomolécules, tandis que celui d'Otala sp. présente une légère augmentation de son activité antioxydante. Ces résultats confirment que l'origine écologique a une influence directe sur la qualité biochimique et fonctionnelle du mucus d'escargot.

Keywords: Snail mucus, Helix aspersa, Otala sp., Physicochemical analysis, Biochemical composition, Antioxidant activity, TAC, DPPH, FTIR, XRD, SEM

GREEN VALORIZATION OF DATE SEED BYPRODUCT: ANTIOXIDANT, ANTI-INFLAMMATORY, AND PHOTOPROTECTIVE POTENTIAL FOR PHARMACEUTICAL APPLICATIONS

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ABSTRACT

Date seeds, an abundant byproduct of Phoenix dactylifera L., present a valuable source of bioactive compounds with significant potential for pharmaceutical applications. In line with principles of sustainable development and green chemistry, this study investigates the antioxidant, anti-inflammatory, and photoprotective properties of date seed waste through environmentally friendly extraction methods to obtain multifunctional ingredients suitable for dermal applications. The total phenolic and flavonoid contents were quantified using spectrophotometric assays. Antioxidant activity was evaluated via DPPH and ABTS radical scavenging methods, while anti-inflammatory potential was assessed through inhibition of protein denaturation. Photoprotective efficacy was estimated in vitro using the Mansur method to calculate the sun protection factor (SPF). The results revealed high levels of phenolics and flavonoids in the date seed extracts, accompanied by significant radical scavenging activity and moderate anti-inflammatory effects. The SPF values indicated promising photoprotective potential, supporting the use of date seed derivatives in dermal pharmaceutical formulations. These findings demonstrate the feasibility of valorizing agricultural waste into functional ingredients for protective skin products, contributing to sustainable innovation in pharmaceutical and life science fields. This work further underscores the potential of converting agro-industrial byproducts into high-value bioactive resources through green extraction technologies. The integration of antioxidant, anti-inflammatory, and photoprotective functionalities supports the development of innovative, naturally derived products aligned with circular economy and eco-design strategies within pharmaceutical and dermatological applications.

Keywords: Phoenix dactylifera L., green extraction, phenolics, antioxidant, anti-inflammatory, photoprotection, SPF, valorization, pharmaceutical innovation

SURVEY ON TWO OLIVE GROVES CULTIVATION MODELS IN KHENCHELA (NORTHEASTERN ALGERIA)

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ABSTRACT

The potential of olive cultivation in Algeria is highly recognized through numerous successive national development programs. Moreover, these expansion matrixes are currently applied across the majority of the territory hampering the climatic conditions of the biggest African country. In the area of Khenchela northeastern Algeria -arid climate and variated topography- two olive groves cultivation models from both north to south regions were selected for an assessment evaluating their susceptibility to climate change as an essential jeopardy to their sustainability. Three major sections are given prominence in the survey: agricultural tenure, ecological and economical aspects. Our findings identified that most affinities are indicated in privatization, plantations age and origin, ecologic and economic criteria, quantity of produced olive oil, transportation and production destination. In opposite, most discrepancies spawns in the type of olive cultivation, plantation density, harvest methods, fertilization application, irrigation systems, process of olive oil production, production quantity, economic costs and quality of products. Those norms present a significant difference in a sole area demonstrate the diversities of olive cultivation technics and production systems.

Keywords: Olive groves, cultivation models, Khenchela, Algerian olive products, affinities and discrepancies

COMPARISON OF DIETS SUPPLEMENTED WITH FISH OIL OR OLIVE OIL ON OXIDATIVE STRESS MARKERS IN CYCLISTS DURING TRAINING

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ABSTRACT

This study was designed to compare changes in markers of oxidative stress in trained male cyclists after dietary supplementation with Omega-3 fish oil contains both docosahexaenoic acid and eicosapentaenoic acid or olive oil. Twenty-four subjects were matched into three groups of eight subjects each. The subjects received respectively for 30 days: placebo (cotrol group), 1.5g of fish oil or 20 ml of extra virgin olive oil. Changes in antioxidant enzyme activities and lipid peroxidation were evaluated. There was a significant increase in malondialdehyde and a decrease in GSH in the serum of subjects of control group. Compared with control and olive oil, fish oil supplementation increased serum superoxide dismutase, catalase and glutathione GSHlevels and decreased MDA serum levels. Fish oil diminished post exercise oxidative damage in trained cyclists by enhancement of Antioxidant Enzymes Activities

Keywords: antioxidants, exercise, phenolic compounds, docosahexaenoic acid, eicosapentaenoic acid.

VALORIZATION OF MEDICINAL AROMATIC PLANTS AND THEIR ANTIMICROBIAL ACTIVITY

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ABSTRACT

Introduction: Lavandula officinalis, commonly known as true lavender or English lavender, is a beloved herb renowned for its enchanting fragrance, striking purple blooms, and versatile applications. This perennial plant, native to the Mediterranean region, has been cherished for centuries for its medicinal, aromatic, and culinary uses Lavandula officinalis is renowned for its numerous health benefits, attributed mainly to its essential oil, which contains compounds like linalool and linalyl acetate. These compounds possess anti-inflammatory, antifungal, and antimicrobial properties. It is also recommended for cold, cough and for diarrhea, as well as respiratory problems (e.g., asthma), fatigue, and convalescence. It is used to moderate depression as well as stress, anxiety, and insomnia. It is known medicinally for its powerful antibacterial, anti-inflammatory, and analgesic properties, particularly for modulating pain and inflammation induced by formalin due to the inhibition of the COX enzymes. It is a plant with various beneficial uses for the human body. Due to the propagation of the resistance phenomenon and the limited number of antibiotics under development, the discovery of new antibacterial agents has become more than essential Several reports have identified a variety of biological and/or pharmacological activities of some specific compounds of the lavender EO and observed that variations in the oil composition were, in general, associated with significant changes in activity, particularly antimicrobial activity The aim of our study is to determine the antibacterial activity of Lavandula officinalis essential oil against several bacterial strains isolated from vaginal infections. **Materiel et methods:** The extraction of essential oil from flowers to Lavandula officinalis flowers was performed by hydrodistillation, yielding approximately 0.38%. The antimicrobial activity of Lavandula officinalis was demonstrated using both the disk diffusion method and the dilution method for four microbial strains (The evaluation of antibacterial activity using the aromatogram method highlighted the antimicrobial potency of the essential oil from Lavandula officinalis flowers against four bacterial strains. **Results and discussion:** The inhibition zone diameter results reveal that the pure essential oil extract of Lavandula officinalis displays varying degrees of antimicrobial activity against Staphylococcus aureus, Staphylococcus spp., Streptococcus spp., and Candida spp. Moreover, the inhibition zones of the pure essential oil (EO) are larger than those of the diluted EO and DMSO. Among the essential oils tested, Lavandula officinalis essential oil shows the most effective activity against all the strains examined. **Conclusion:** In conclusion, our study demonstrates that the essential oil extracted from Lavandula officinalis flowers exhibits significant antibacterial activity against bacterial strains responsible for vaginal infections, including Staphylococcus aureus, Staphylococcus spp., Streptococcus spp., and Candida spp. The pure essential oil showed superior inhibition zones compared to its diluted form, indicating its potent antimicrobial properties.

These findings suggest that Lavandula officinalis essential oil could be a promising natural alternative for treating infections caused by these pathogens. Further research is warranted to isolate, purify, and identify the active compounds responsible for this antimicrobial activity, which could lead to the development of new, effective treatments for vaginal infections.

Keywords: Lavandula officinalis Antimicrobial activity Essential oil Vaginal infections Antibacterial agents

DOSAGE OF POLYPHENOLS, FLAVONOIDS, AND EVALUATION OF THE ANTIBACTERIAL ACTIVITY OF MARRUBIUM VULGARE.L

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ABSTRACT

White horehound (Marrubium vulgare.L) belongs to the Lamiaceae family, is known for its use in traditional medicine for the treatment of several pathologies thanks to its effective components. This study examines the different biological activities of the ethanol extract of the aerial parts as well as the cream of this plant. The extraction yield was (0 .12 %). The dosage of total polyphenols was determined by the colorimetric method using Folin Ciocalteux reagent, the total polyphenol content was estimated at 2.18 mg EAG / g. The), 3 dosage of flavonoids was carried out according to the aluminum chloride method (AlCl the content was estimated at 0.34 mg EQ /g. The evaluation of the antibacterial activity showed that the extract of white horehound has no action against the t ested strains Escherichia coli and Staphylococcus aureus with an inhibitionzone of 7mm and 6mm respectively

Keywords: Marrubium vulgare L, Flavonoid polyphenol, bacterial activity

D- GLUCOSE-INDUCED SENESCENCE IN BV-2 MICROGLIAL CELLS AND THE PROTECTIVE EFFECTS OF BLUEBERRY EXTRACT

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ABSTRACT

Background: Glucose-induced senescence is related to various pathologies including endothelial dysfunction, cardiovascular complications, and diabetic nephropathy. Furthermore, high glucose cellular uptake also triggers mitochondrial damage and apoptosis. However, the role of high glucose-induced cellular aging and apoptosis in brain microglial cells is not fully understood. **Aim:** The present study was conducted to uncover the mechanism of high glucose-induced senescence and apoptosis in brain microglial cells and to evaluate the protective potentials of blueberry extract (BBE). **Materials and Methods:** Brain microglial cells (BV-2) were treated with D-Glucose (25 mM) for two weeks and followed by treatment with BBE (50 mg/ml) for 24h. MTT assay for cell survival, BrdU incorporation assay for cell proliferation, DCFDA staining for RoS estimation, Hoechst/PI double staining for cell death, and western blot for expression analysis of various protein markers were conducted. **Results:** Significant decreases in cell survival and BrdU incorporation were reported in the glucose treatment group compared to the control group. Furthermore, the RoS accumulations were significantly increased in glucose-treated microglial cells compared to control and BBE groups. In addition, increased cell death was observed in the glucose group compared to the control cells. The expression of protein markers; COX2, Caspase-3, p53, FoxA1, and F4/80 were up-regulated, however, the expression of p-AMPK, iNOS, p38-MAPK were down-regulated in the glucose-treated cells compared to the control group. **Conclusion:** Glucose decreased the cell survival and cell proliferation of BV2 microglial cells and induced the cell death, and RoS accumulation as well as up-regulated the pro-apoptotic protein markers. BBE significantly attenuated the effects of glucose and protected the BV2 microglial cells.

Keywords: D-Glucose, BV-2 microglial cells, Cell survival, Apoptosis, RoS, Blue barriers extract

DYNAMIC EXPLORATION OF TESTICULAR ACTIVITY AND LIPID BALANCE IN RESPONSE TO DEXAMETHASONE INJECTION IN BUCKS RAISED IN ARID AREAS

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ABSTRACT

The aim of this work is to demonstrate the effects of dexamethasone (Dex) injection on plasma levels of testosterone, and lipid parameters. The study was conducted on six adult male goats raised at the Béni-Abbés experimental station (30° 07' North Latitude, 2° 10' West Longitude), during reproductive period. Two injections of 3 mg of Dex (75 µg/kg BW) were administered 24 hours apart, followed by a series of blood samples. Hormone assays were performed using TOSOH AIA360 automated analysis kits. Statistical analysis of the results shows specific responses depending on the parameter considered and duration of stimulation. The first injection did not show significant changes, however, the second one resulted in a large and more significant variations of most parameters. Testosterone increases by 602% (p=0.05), regarding lipid profile parameters, decreases were observed after the first and second injections for cholesterol (-20% and -25%), TG (-50% and -52%), and HDL (-36% and -44%). However, increases were observed for LDL (20% and 40%) and for the cholesterol ratio (22% to 37%). These results suggest that dexamethasone exerts a reproductive function-stimulating effect in bucks raised in arid areas by probably modulating lipid metabolism directly and/or through other physiological mechanisms.

Keywords: Dexamethasone, testosterone, lipid parameters, Sahara, bucks

LC-ESI-MS/MS PHYTOCHEMICAL PROFILING, CYTOTOXICITY, ANTIOXIDANT AND ANTIACHOLINESTERASE ACTIVITIES OF ETHYL ACETATE AND N-BUTANOL FRACTIONS OF HYPERICUM EXCTRACT

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ABSTRACT

Using a developed LC-ESI-MS/MS method, the phytochemical quantification of Hypericum's ethyl acetate fraction (EAFHT) and n-butanol fraction (BEHT) was accomplished. According to this approach, which showed the existence of 26 and 16 compounds in these fractions, respectively, quercitrin, epicatechin, isoquercitrin, gentisic acid, quercetin, and chlorogenic acid were the main constituents of the EAFHT in considerably greater quantities than those of the BFHT. The cytotoxic potential of the extract fractions was evaluated using the MTT assay. The n-butanol fraction exhibited mild to moderate anti-proliferatif effect on the cancer cell lines Caco-2, SKOV-3 and T98G, while promoting a proliferative response in the non-cancerous fibroblast line L929. In contrast, the ethyl acetate fraction showed a strongly significant proliferative effect across cell lines with was time and dose dependante, suggesting the presence of bioactive compounds that enhance cell survival or metabolic activity rather than inducing cytotoxicity. The antioxidant activity was evaluated using three methods: DPPH•, ABTS•+ and CUPRAC. In accordance with its highest polyphenolic content and highest concentrations of identified polyphenolics, the EAFHT showed more antioxidant activity than the BEHT. Moreover, the EAFHT (IC50:3.13±0.12 mg/mL) and the BEHT (IC50:5.22±0.74 mg/mL) shown the most highest antioxidant capacity in DPPH test. Furthermore, both of the BFHT (IC50:24.36±0.22mg/mL) and the EAFHT (IC50:16.10±0.51 mg/mL) exhibited a higher BChE inhibitory effect than galantamine which was used as a standard (IC50:46.48±0.18 mg/mL).

Keywords: Hypericum, Phenolic compounds, LC-ESI-MS/MS, cytotoxicity, antioxidant, antiacholinesterase activities

MELANOMACROFAGES IN THE LIVER OF PELOPHYLAX RIDIBUNDUS (PALLAS, 1771); CASE STUDY INDUSTRIALLY CONTAMINATED AREA IN KOSOVO

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ABSTRACT

Amphibian populations worldwide are at risk of extinction due to increasing industrial activity causing contamination of their natural habitats. Melanomacrophages in liver represent a very useful immunological parameter to evaluate the effect of industrial pollution of amphibians, since these cells represent cells of the immune system capable of phagocytosis, playing an important role in protecting the organism from environmental xenobiotics. In this study, we analyzed the differences between localities and seasonal changes in the relative volume and number of melanomacrophages in the liver of the swamp frog Pelophylax ridibundus (Pallas, 1771). A total of 150 individuals were collected for this study, from four industrially polluted sites and one control site in Kosovo: Kishnica, Obiliq, Mitrovica, Drenas (polluted sites) and Dragash (unpolluted site), in two research seasons (spring and autumn). From each hematoxylin and eosin-stained tissue biopsy, they were systematically analyzed and counted at a microscopic magnification of 400×, where the first field was randomly selected. On average, 70 microscopic fields of the liver for each individual were systematically analyzed. Our results showed significant differences between research sites and between seasons in the studied parameters, which had higher values in frogs from industrially polluted sites compared to the control site, as well as higher values in the autumn season compared to the spring season. The current study confirms the importance of using melanomacrophages in the liver of the frog Pelophylax ridibundus as a very important parameter for environmental biomonitoring studies.

Keywords: Environmental Monitoring, Anura, Seasonal Differences, Pigmented Cells

EFFECT OF AQUEOUS EXTRACT OF SAUSSUREACOSTUSON COLON INFLAMMATION IN FEMALE ALBINO WISTER RATS

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ABSTRACT

Inflammatory bowel diseases are a group of disorders that cause inflammation and ulceration of parts of the gastrointestinal tract, generally encompassing two conditions: ulcerative colitis and Crohn's disease.The study of the anti-inflammatory activity of Saussureacostus was carried out on female rats of the Albino Wister strain, weighing between 250 and 310g, provided by the Pasteur Institute of Algiers.To highlight the anti-inflammatory activity, an experimental model was selected for intestinal inflammation which is based on the induction of acetic acid CH3COOH via rectal route in rats according to the method described by (Randhawa et al., 2014). The experiment was carried out on 20 rats randomly divided into 5 groups with 4 individuals per group. Each group received experimental solutions namely, acetic acid (5%), sulfazalazine (100mg/Kg) and the plant extract (400 mg/Kg and 600 mg/Kg). The study of the anti-inflammatory activity of the aqueous extract of Saussureacostus shows that rats treated with doses of aqueous extract at 400 mg/kg and 600 mg/kg showed an improvement in the clinical symptoms of colitis caused by acetic acid with a recovery of the length of the colon. Rats treated with Saussureacostus aqueous extract showed no significant difference compared to those treated with Sulfasalazine (reference drug). Indeed, Saussureacostus aqueous extract showed a curative effect against colonic damage.

Keywords: Keywords: Saussureacostus, inflammatory, colitis

INSECTICIDAL AND BACTERICIDAL BIOACTIVITY OF ESSENTIAL OILS FROM SELECTED AROMATIC PLANTS IN THE CONTROL OF STORED-PRODUCT PESTS

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ABSTRACT

The development of scientific knowledge about the plant world opens new pathways for their utilization in various aspects of life, including as biopesticides, antibiotics, or food additives. The primary objective of this study is to evaluate and compare, under laboratory conditions, the insecticidal activity of four aromatic plants (Lantana camara, Thymus vulgaris, Tanacetum parthenium, and Pistacia lentiscus), applied individually via topical administration at different doses to newly emerged pupae of the stored-product insect pests Tribolium castaneum and Ephestia kuehniella. Additionally, the bactericidal effects of essential oils from Laurus nobilis, Thymus sp., Ocimum basilicum, and Rosmarinus officinalis were assessed by determining their Minimum Inhibitory Concentration (MIC) against two potentially pathogenic microbial strains: Escherichia coli and Staphylococcus aureus. Based on the results obtained, the essential oils (EOs) tested against stored-product pests showed varying degrees of effectiveness. Thymus vulgaris EO demonstrated the highest efficacy against Tribolium castaneum, with lethal doses 50 and 90 (LD_{50} = 9.656 µl; LD_{90} = 35.93 µl). In contrast, Lantana camara EO was the most toxic to Ephestia kuehniella, with inhibitory doses 50 and 90 (ID_{50} = 9.12 µl; ID_{90} = 16.94 µl).Thymus sp. exhibited strong bactericidal effects against both bacterial strains, with an MIC of 0.289 mg/ml.

Keywords: essential oils, insecticidal activity, bactericidal activity, Tribolium castaneum, Ephestia kuehniella, Escherichia coli, Staphylococcus aureus

BIOVALORIZATION OF THE MICROALGAE NANNOCHLOROPSIS GADITANA THROUGH ITS ANTIOXIDANT ACTIVITY BY MEASURING DPPH AND FRAP

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ABSTRACT

Introduction: The microalga Nannochloropsis gaditana, belonging to the class of Eustigmatophytes, is recognized for its promising properties in various fields. The objective of this work was to valorize the Nannochloropsis gaditana cultivated in Algeria for the production of food supplements for humans and animals, as well as bioactive substances. **Methods:** The antioxidant power by DPPH (diphenyl picryl-hydrazyl) of Nannochloropsis gaditana extracts is determined according to Sanchez-Moreno, et al., (1998). Iron reducing power is determined by the FRAP method which is based on the reduction reaction of ferric iron (Fe3+) present in the K3Fe(CN)6 complex to ferrous iron (Fe2+) by an antioxidant according to the technique of (Oyaizu et al., 1986) **Results:** The percentage of inhibition by the DPPH test is 22.37±3.5% and 12.27±1.4% for EENg and EMNg respectively with extracts at the concentration of 0.5 mg/ml. The reducing powers of EENg, EMNg and ascorbic acid determined by the FRAP method are expressed in optical density and are respectively 0.031±0.023; 0.029±0.009 and 0.439±0.035 optical density (OD) units at the concentration of 0.15 mg/ml. These values also become respectively 0.349±0.037; 0.414±0.012 and 1.15±0.07 D at the concentration of 5 mg/ml. **Conclusion:** The study of antioxidant power using DPPH radical and iron reduction activity by FRAP method reveals that N. gaditana has moderate antioxidant activity.

Keywords: Biovalorisation, Nannochloropsis gaditana, Antioxydant Activity, DPPH, FRAP

DIET OF THE COMMON CUTTLEFISH SEPIA OFFICINALIS (LINNAEUS, 1758) (CEPHALOPODA: SEPIIDAE) IN THE WESTERN ALGERIAN COAST (ORAN BAY)

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ABSTRACT

The diet of the common cuttlefish (Sepia officinalis) was studied monthly from the Western coast of Algeria**.** A total of 581 individuals were examined, including 253 males (7.2 < mantle length < 21 cm; 55 < total weight < 950 g) and 328 females (6.5 < total length < 23.8 cm; 55 < total weight < 1360 g). Analysis of the stomach contents of S. officinalis confirms that it is a carnivorous predator. Its diet composition is highly varied, consisting mainly of carnivorous prey, with a marked preference for benthic invertebrate prey, primarily crustaceans (Goneplacidae, Parthenopidae, Thiidae, and unidentified shrimps) (IRI: Index of relative importance = 74.87%; preferred prey), followed by bony fish (Osteichthyes) (Congridae, Sparidae, and Carangidae) (IRI = 24.6%; secondary prey) and cephalopod mollusks (IRI = 0.14%; accidental prey). The only cephalopods identified belong exclusively to the species Sepia officinalis itself. Indeed, this occasional cannibalistic behavior has been observed in many cephalopod groups.

Keywords: Sepia officinalis, diet, stomach contents, IRI: Index of relative importance, Western coast of Algeria

LC-ESI-MS/MS PHYTOCHEMICAL PROFILING , ANTIOXIDANT AND CYTOTOXICITY ACTIVITIES OF EHTYL ACETATE AND N-BUTANOL FRACTIONS OF HYPERICUM EXCTRACT

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ABSTRACT

A developed LC-ESI-MS/MS method was used to characterise the phytochemical profiles of the ethyl acetate (EAFHT) and n-butanol (BEHT) fractions of hypericum. This method reveled the presence of 26 and 16 compounds in these fractions. three technique were used to assess the antioxidant activity: DPPH+, ABTS++ and, CUPRAC. The EAFHT showed a stronger antioxidant activity than BEHT, which was consistent with its greatest polyphenolic content and biggest levels of recognized polyphenolics. . Furthermore, the EAFHT (IC50:3.13±0.12 mg/mL) and the BEHT (IC50:5.22±0.74 mg/mL mg/mL) revealed the most highest antioxidant capacity in DPPH test. The cytotoxicity potential of the extract fractions was evaluated on four different cell lines: Caco-2 (colorectal adenocarcinoma), SKOV-3 (ovarian adenocarcinoma), T98G (glioblastoma), and L929 (non-cancerous fibroblasts). The cytotoxicity was assessed using the MTT assay after 24 hours of treatment with increasing concentrations (25, 50, 100, and 200 µg/mL). The results indicate that both BEHT and EAFHT extracts exhibit moderate cytotoxic activity on colorectal cancer cells (Caco-2), with limited activity on ovarian cancer cells and almost no effect on glioblastoma. The extracts also affect non-cancerous fibroblasts, which raises concerns about their therapeutic selectivity.

Keywords: Hypericum, LC-ESI-MS/MS, antioxidant, cytotoxicity

HPLC-DAD ANALYSIS, ANTIOXIDANT AND CYTOTOXICITY ACTIVITIES OF ETHYL ACETATE AND N-BUTANOL EXTRACTS FROM ECHIUM

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ABSTRACT

Medicinal plants have been used as a source of remedies since ancient times in Algeria. The present study was designed to investigate and enhance the value of natural products. The objective of this study was to determine the chemical composition of polyphenol extracts from the studied plant using HPLC-DAD, as well as to evaluate the antioxidant activity of flavonoid extracts and the cytotoxicity of ethyl acetate and n-butanol extracts from Echium. The antioxidant potential of both extracts was evaluated using different assays, namely total antioxidant activity, DPPH (1,1-diphenyl-2-picrylhydrazyl) radical scavenging, the ABTS (2,2′-azinobis-(3-ethylbenzothiazoline-6-sulfonic acid)) test, and cupric reducing antioxidant capacity (CUPRAC). The results were expressed as IC_{50} values. The ethyl acetate extract showed significantly stronger radical scavenging activity in the DPPH assay (4.05 ± 0.66 µg/mL) compared to the n-butanol extract (57.50 ± 0.64 µg/mL), indicating higher antioxidant potency. However, in the ABTS and CUPRAC assays, both extracts displayed comparable activity, with the n-butanol extract showing slightly better performance in ABTS (26.15 ± 2.16 µg/mL) compared to the ethyl acetate extract (27.35 ± 0.42 µg/mL), while the CUPRAC values were similar (34.33 ± 0.01 µg/mL and 36.00 ± 0.02 µg/mL, respectively). These findings suggest that the antioxidant effectiveness of the extracts varies depending on the assay used, with the ethyl acetate extract showing remarkable DPPH scavenging activity. Their cytotoxic activity was evaluated against four cell lines: colorectal adenocarcinoma (Caco-2), ovarian adenocarcinoma (SKOV-3), glioblastoma (T98G), and mouse fibroblast (L929) using the MTT assay. Both extracts demonstrated moderate, dose-dependent cytotoxic activity, particularly on Caco-2 cells.

Keywords: HPLC, Antioxidant, Cytotoxicity and Echuim

EXPLORING THYROID CANCER IN SÉTIF , ALGERIA

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ABSTRACT

Thyroid cancer (TC) is the most common type of endocrine malignancy, that had a marked interest in many countries, raising critical concerns about its risk factors and underlying pathophysiology. The aim of this study was identifying the epidemiological factors and treatment patterns of this cancer in Sétif, Algeria, during five years (2020-2024).74 patients were diagnosed with TC . Patient data, including sociodemographic, clinical information, and treatment history, were collected from hospital archives using a questionnaire. The results showed that papillary thyroid cancer (PTC) was the most common type, accounting for 63.5% of all cases. Age and gender were significantly associated with thyroid cancer types, with a female predominance (75.7%), and a highest prevalence in the (39-48) age group (28.37%). In contrast, no significant association was found regarding profession, habitat place, medical history of thyroid pathologies such as nodules (27%), goiter (18%), and hypothyroidism (8%). The primary treatment modality was total thyroidectomy, performed in 39% of cases. This study clearly establish that papillary cancer was the predominant form of TC in Sétif region, and age or gender are possible risk factors for TC types. These results highlight the significance of focused public health efforts for early identification of this cancer and treatment.

Keywords: Thyroid cancer, risk factors, papillary cancer, treatment, Sétif.

INSPECTING THE PREVALENCE OF FETAL MACROSOMIA IN SÉTIF , ALGERIA - 5 YEARS REVIEW (2020-2024)

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ABSTRACT

Fetal macrosomia (FM), defined as a birth weight of 4000 grams or more, remains a significant obstetric concern due to its association with increased risks of adverse outcomes for both mother and newborn. These complications include postpartum hemorrhage, prolonged labor, and perineal tears, as well as neonatal complications including shoulder dystocia, birth trauma, and even perinatal mortality. This retrospective descriptive study was conducted at El-Bez Mother and Child Hospital in Sétif, Algeria, covering the period from January 2020 to December 2024, and aimed to establish an epidemiological profile of macrosomia in Sétif region during the last 5 years. Out of 48513 total deliveries, 3677 macrosomic cases were recorded, yielding a prevalence of 7.6%. In the present study, the frequency of new-borns with birth weight ≥4000 g was 9.21% in 2020, 7.65% in 2021, 6.16% in 2022, 6.88% in 2023, and 7.74% in year 2024.The mean birth weight was 4216.9 ± 265.5 g, and the majority of macrosomic newborns were male (61.6 %). Deliveries were mostly at term (79.9 %). These findings highlight the significance of early identification and management of maternal risk factors during pregnancy. Enhanced antenatal monitoring and timely obstetric intervention are essential to minimize both maternal and neonatal complications associated with fetal macrosomia.

Keywords: Fetal Macrosomia, Prevalence, weight, Sétif, Algeria

INVESTIGATION OF CARBAPENEM RESISTANCE AND VIRULENCE FACTORS IN ANIMAL FOOD-ORIGIN E. COLI AND K. PNEUMONIAE

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ABSTRACT

Escherichia coli and Klebsiella pneumoniae are gaining importance due to their rising antibiotic resistance. In this study, carbapenem resistance and biofilm-forming abilities of 41 E. coli and 30 K. pneumoniae strains isolated from 70 food samples (24 raw milk, 26 cheese, 8 poultry meat, and 12 raw calf meat) collected from markets, butcher shops, farms, and dairies in Ankara, Turkey, were investigated. Bacteria within biofilms exhibit significantly reduced susceptibility to antibiotics compared to their planktonic counterparts, thereby increasing antimicrobial resistance and complicating treatment outcomes for biofilm-associated infections. In this study, the biofilm-forming abilities of K. pneumoniae and E. coli strains were assessed using the microtiter plate assay. Among the E. coli isolates, 22% were strong, 29.3% moderate, 31.7% weak biofilm producers, and 17.07% were non-producers. For K. pneumoniae isolates, 16.6% were strong, 20% moderate, 40% weak biofilm producers, while 23.3% did not form biofilms. Carbapenem-resistant Enterobacteriaceae (CRE) are defined as isolates that are resistant to at least one carbapenem (ertapenem, meropenem, imipenem, or doripenem) or possess carbapenemase-producing enzymes. In this study, carbapenemase production was evaluated using the Modified Hodge Test (MHT), and all isolates were found to be 100% susceptible to imipenem, meropenem, ertapenem, and doripenem. In conclusion, biofilm formation and antibiotic resistance should be carefully monitored in the context of food safety and public health. **Acknowledgement**: This study was supported by the Gazi University Scientific Research Projects (BAP) Coordination Unit under project number FYL-2025-10098.

Keywords: Escherichia coli, Klebsiella pneumoniae, biofilm, carbapenem resistance

THE CHEMICAL COMPOSITION AND NEMATICIDAL ACTIVITY OF ALGERIAN WHITE MUGWORT

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ABSTRACT

The white mugwort, scientifically known as Artemisia herba alba Asso (Asteraceae), is a medicinal and aromatic plant that is extensively used in Algeria. This species occupies around 3 million hectares of Algerian land, primarily found in steppe regions that extend over 1,200 km. Numerous studies have validated the application of white mugwort as a natural substitute for synthetic chemicals, highlighting its bactericidal, insecticidal, and fungicidal attributes. The objective of this research is to assess in vitro the toxicity of the essential oil derived from this plant against the juveniles of the root-knot nematode Meloidogyne incognita. White mugwort is harvested in the province of Batna, located in eastern Algeria. The method we used to extract the essential oil from Artemisia herba alba is hydrodistillation. We placed 100 L2 juveniles in Petri dishes, each containing plant essential oil at the following concentrations: 0.185 mg/L, 0.37 mg/L, and 0.75 mg/L. We conducted three replicates for each treatment. Dead larvae were counted using a counter under a binocular microscope after 24, 48, and 72 hours. The effect of these doses was compared with the control and with the chemical solution fenamiphos. A phytochemical analysis was conducted to identify the secondary metabolites present in the essential oil of mugwort. The findings indicated that the essential oil of Artemisia herba alba possesses notable nematicidal properties. A mortality rate exceeding 50% among juveniles was recorded after 24 hours of plant treatments. At elevated doses (0.75 mg/L), the mortality rate of M. incognita juveniles reached 100% after 72 H. In the case of chemical treatment, the mortality rate of M. incognita juveniles was 74.57%. The chemical analysis of white mugwort suggested that the nematicidal effect is likely attributed to the plant's abundance of secondary metabolites, especially tannins, saponins, and flavonoids.

Keywords: Essential oil, mortality, Meloidogyne incognita, white mugwort

PRE-TREATMENT WITH GILABURU EXTRACT ALLEVIATES H_2O_2-INDUCED CYTOTOXICITY IN ENDOTHELIAL CELLS

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ABSTRACT

Viburnum opulus L. (Gilaburu) is a traditional medicinal plant known for its antioxidant, anti-inflammatory and diuretic properties. It is rich in polyphenols, vitamin C, L-malic acid and other bioactive compounds that contribute to its potential as a natural protectant. In this study, the effects of Gilaburu (Glb) extract on oxidative stress-induced cytotoxicity in human endothelial cells were investigated. Treatment with Glb extract alone resulted in a significant, dose-dependent reduction in cell viability. Exposure to hydrogen peroxide (H_2O_2) caused marked cytotoxicity, simulating oxidative damage. However, pretreatment with a Glb extract of 100 µg/mL significantly improved cell viability compared to H_2O_2 alone, indicating a protective effect. These results suggest that Glb can attenuate oxidative stress and maintain endothelial cell integrity. Its traditional use in kidney and liver diseases, hypertension and menstrual cramps may be related to its antioxidant effects. Overall, V. opulus extract proves to be a promising natural cytoprotectant against oxidative damage in vascular cells.

Keywords: Cytotoxicity, Gilaburu, Hydrogen peroxide, Protective effect, Viburnum opulus

A CASE OF ACTINOMYCOTIC MYCETOMA

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ABSTRACT

Introduction: Mycetoma is a pathological process during which fungal or actinomycotic etiological agents of exogenous origin produce granules. It mainly affects soft tissues and bones. It is a sporadic pathology in the Maghreb countries, endemic in tropical and subtropical countries. Contamination occurs during skin breaks by soiled thorns, allowing inoculation of the saprophytic pathogen from the soil and plants. **Materials and Methods:** A 22-year-old patient, BZ, a carpenter by profession, residing in the suburbs of Algiers, with no particular medical history and no experience in tropical regions, presented with a left plantar polyfistulized swelling that had been developing for a year and a half, associated with two retromalleolar lesions that had been developing for three months. Histological examination demonstrated the presence of tangled mycelial filaments. Radiological examination at this stage did not reveal any bone involvement. The patient presented to the Parasitology-Mycology laboratory for a mycological examination. In the laboratory, the history revealed trauma with a wooden thorn while practicing his carpentry profession. White grains emitted under pressure at the fistulous openings using a sterile vaccinostyle were sampled. Microscopic examination of the grains was performed in the fresh state after clearing with potassium hydroxide, and smears were read after crushing the grains and staining with May Grunwald Giemsa (MGG), GRAM, and ZIEHL. Grain cultures were performed on Lowenstein-Jensen and Saboouraud media. A pathological examination of the grains was also performed in the pathology laboratory. **Results:** Direct examination of the white grains with potassium hydroxide revealed grains with club-shaped fringes on the periphery, highly characteristic of the species Actinomadura madurae. Smears were read to visualize fine, tangled filaments with a diameter of 1 micron, typical of actinomycetes. In our observation, the first grain cultures did not produce any actinomycete growth. The pathological examination of the grain revealed a morphology strongly suggestive of the species Actinomadura madurae. Medical treatment with cotrimoxazole was initiated and then combined with amikacin. **Conclusion:** Our observation reports a new case of actinomycetoma in a patient residing and living in Algiers. Although rare in Algeria, mycetomas should be considered and diagnosed at an early stage in predisposed individuals, particularly farmers and carpenters, for better management.

Keywords: actinomycotic, mycetoma, Actinomadura, madurae

POLYMORPHISM OF SILKWORM (BOMBYX MORI L.) BREEDS FROM GERMPLASM RESOURSES OF BULGARIA

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ABSTRACT

We conducted a population genetic analysis among Bombyx mori L. breeds of different origins, kept in Bulgaria and identified polymorphism in soluble proteins and nonspecific esterases from hemolymph by 7.5% PAGE. The allele frequencies, the percentage of polymorphic loci, the observed and expected heterozygosity were calculated through the BIOSYS-1 program. It was found that non-specific esterases of the mulberry silkworm are a highly polymorphic group of isoenzymes, which are very suitable markers for interbreed comparisons and the study of intrabreed heterogeneity at verious stages of larvae development. The breed variability of this species can also be analyzed based on total soluble proteins, but only at certain stages of larval development. Based on the intra- and interbreed polymorphism in the expression of esterases and total soluble proteins from the hemolymph that we have found, preliminary testing of the parental forms can be carried out even in the larval stages of individual development (III-V instar), and optimal crossing options can be developed to regulate intrabreed heterogeneity and when implementing interbreed hybridization. Based on the established polymorphism, the correlation between the degree of differences of the initial parental forms and the expressivity of some biotechnological traits with selective significance can also be traced. This correlation can be used in breeding practice. A heterosis effect in selectively significant traits (viability, cocoon weight, silk cover weight, etc.) can be expected when the parental individuals contrast in the set of esterase and protein fractions.

Keywords: Bombyx mori L., polymorphism, hemolymph, nonspecific esterases, soluble proteins

EXPRESSION PATTERNS OF TGA2, TGA5, AND WHIRLY1 IN SUNFLOWER ROOTS EXPOSED TO OROBANCHE CUMANA

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ABSTRACT

Sunflower resistance to Orobanche cumana Wallr., a destructive holoparasitic angiosperm, is complex and involves multiple pre- and post-attachment mechanisms, including suppression of parasite seed germination, inhibition of haustorium penetration into roots, and induction of parasite necrosis. Resistance is typically vertical, following a gene-for-gene interaction model, although quantitative trait loci contributing cumulatively to reduced parasite emergence have also been identified. There are also some sporadic studies indicating a possible reduction in Orobanche cumana infestation through the activation of systemic acquired resistance. Transcription factors TGA2, TGA5, and WHIRLY1 (WHY1) play essential roles in various plant processes, including growth, development, circadian rhythm regulation, detoxification, and the modulation of cellular and molecular responses to biotic and abiotic stress. TGA2 and TGA5 are key redox-sensitive regulators involved in salicylic acid-dependent defense pathways and systemic acquired resistance (SAR). In these pathways, they interact with the co-activator protein NPR1 to activate the expression of pathogenesis-related (PR) genes. On the other hand, WHIRLY1 (WHY1) contributes to oxidative stress tolerance and genome stability. WHY1 has been shown to regulate the expression of certain PR genes, particularly PR1, through both NPR1-dependent and NPR1-independent mechanisms. This study investigated the early transcriptional response of TGA2, TGA5, and WHY1 genes in sunflower (Helianthus annuus L.) roots under biotic stress induced by broomrape. Root tissues from three sunflower hybrids, Favorit and P64LE20 (resistant), and Performer (susceptible), cultivated in the presence of previously germinated parasite seeds, were analyzed at 2, 6, 12 and 24 hours post-inoculation using qPCR. Results revealed genotype-specific and time-dependent expression dynamics. TGA2 expression in sunflower roots under Orobanche cumana infection remains relatively stable, with minor oscillations. Interestingly, the control samples (without the parasite) show greater fluctuations in TGA2 expression. For TGA5, expression generally appears more uniform across genotypes, with both sensitive and resistant genotypes exhibiting similar transcriptional profiles in control and infested conditions. However, under stress, Favorit genotype generally maintains a stable TGA expression, the sensitive Performer genotype shows downregulation of TGA2 and TGA5, whereas the resistant P64LE20 exhibits upregulation of TGA2 and downregulation of TGA5, revealing diverse transcriptional responses to the parasitic infection. The expression of WHY1 was more variable, with Performer exhibiting increased transcript accumulation at 12–24 h, unlike Favorit and P64LE20, where expression was predominantly suppressed. The findings highlight a differential engagement of TGA2, TGA5, and Why1 transcription factors in the early response of sunflower to parasitic infection by O. cumana. Resistant genotypes exhibit more stable and predominantly upregulated expression profiles, whereas the sensitive genotype showed more variable and often repressed expression.

Overall, the gene expression of the analyzed genes varied over time, with significant changes (either over-expression or under-expression) observed predominantly at 12 and 24 hours post-inoculation. These insights enhance our understanding of the molecular mechanisms of sunflower resistance to parasitic plants and provide information for future breeding strategies aimed at enhancing crop resilience. **Acknowledgement.** This work was supported by the Subprogram 011101 Genetic and biotechnological approaches to agroecosystem management under climate change, financed by the Ministry of Education and Research of the Republic of Moldova.

Keywords: Helianthus annuus, Orobanche cumana, Root parasitic plant, gene expression, TGA2, TGA5, WHIRLY1

DETERMINATION OF THE STABILITY OF POLYPHENOL OXIDASE FROM BLACK MULBERRY TOWARDS DIFFERENT ORGANIC SOLVENTS AND SURFACTANTS

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ABSTRACT

Black mulberry (Morus nigra L.) was used in this study as a natural source of polyphenol oxidase (PPO). It is known for its high lycopene content and antioxidant activity. The enzyme was extracted by mixing the fruit with a solution containing 0.1 M sodium phosphate buffer (pH 7.0), 0.5% PEG 6000, 10 mM ascorbic acid and 50 mM K2HPO4. This resulted in a PPO activity of 3753 U/mL. We treated the enzyme after extraction with different organic solvents (DMSO, ethanol, isopropanol and methanol) and surfactants (SDS, Triton X-100, Tween-20 and Tween-80) to see how stable and active it was. Isopropanol and methanol were the best solvents for restoring activity, while Tween-80 had the same effect as the surfactants. These results show that PPO from the black mulberry tree can handle many organic solvents and surfactants, making it a good candidate for use as a strong biocatalyst in industry, especially in systems that do not contain water or surfactants.

Keywords: Morus nigra L., polyphenol oxidase, organic solvent, surfactant, enzyme activity

PHENOTYPIC AND GENOTYPIC DETECTION OF BIOFILM PRODUCTION OF *Staphylococcus aureus* FROM CHICKEN MEAT

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ABSTRACT

Staphylococcus aureus, a Gram-positive and coagulase-positive bacterium, serves as both a commensal and opportunistic pathogen in mammals. It can potentially cause a wide range of severe and fatal diseases. Biofilm production is an essential virulence factor in pathogenic bacteria including S. aureus. Biofilms have a major role in their pathogenesis and persistence. S. aureus biofilm is mediated by the icaABCD gene cluster, which regulates intercellular adhesion and exopolysaccharide matrix production, facilitating biofilm development and long-term bacterial survival. A total of 11 S. aureus isolates from chicken meat were tested for biofilm formation using microtiter plates and the presence of icaABCD genes using PCR. All isolates were biofilm producers. Three isolates (27.2%) were classified as weak, four isolates (36.6%) as moderate, and four isolates (36.6%) as strong biofilm producers. All the isolates were positive for icaAD genes. In addition, 10 isolates (90.6%) were positive for icaB whereas eight isolates (54.5%) were positive for icaC. In this study, S. aureus isolates from chicken meat demonstrated the biofilm formation ability by the quantitative microtiter plate method and the presence of icaABCD biofilm forming genes by the PCR method, emphasizing the risk of food contamination and public health concerns.

Keywords: Biofilm, icaABCD, chicken meat, Staphylococcus aureus

PRESENCE OF merA GENE AND MERCURY RESISTANCE AMONG PATHOGENIC BACTERIA

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ABSTRACT

Pathogenic bacterial microorganisms cause an important threat to human health and can result in infectious diseases. These bacteria can spread through various environments such as food and water. Mercury is a heavy metal that is highly persistent in the environment and has extremely strong toxic effects. Therefore, this research aimed to determine the mercury resistance of eight distinct pathogenic reference strains using the broth microdilution method and to identify the presence of the merA gene using the PCR method. Out of the eight pathogenic reference strains, five (62.5%) strains were resistant to mercury. The highest minimum inhibitory concentration (MIC) value with a 16 µg/mL was observed in Pseudomonas aeruginosa ATCC 27853 and Enterobacter cloacae NCIMB 13597 strains. Mercury-sensitive bacteria such as Salmonella Typhimurium ATCC 13311, Staphylococcus aureus ATCC 29213, and Escherichia coli ATCC 25922 had a minimum inhibitory concentration (MIC) of 1 µg/mL. All mercury-resistant strains were also positive for the merA gene, except for Enterococcus faecalis ATCC 51299. Mercury-sensitive strains did not carry the merA gene. The findings demonstrate an important correlation between the existence of the merA gene and mercury resistance and emphasize the need for detecting heavy metal resistance in pathogenic bacteria for public health.

Keywords: Pathogenic bacteria, mercury resistance, merA gene, MIC

BIOCONTROL AND PLANT GROWTH-PROMOTING POTENTIAL OF SACCHAROTHRIX SP. MG75: A PROMISING ACTINOBACTERIUM FOR SUSTAINABLE AGRICULTURE

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ABSTRACT

Actinobacteria are widely recognized for their role as plant growth-promoting bacteria (PGPB), with the genus Streptomyces extensively studied and validated for its beneficial effects. In contrast, Saccharothrix, a relatively rare genus within the phylum Actinobacteria, remains underexplored for its potential as a biocontrol and plant growth-promoting agent. This study evaluates the plant growth-promoting (PGP) and biocontrol potential of Saccharothrix sp. Mg75. In vitro assays were conducted to assess its ability to produce key plant-beneficial compounds, including indole-3-acetic acid (IAA), siderophores, ammonia, and 1-aminocyclopropane-1-carboxylate (ACC) deaminase. Additionally, its antagonistic activity against several fungal and bacterial phytopathogens was evaluated using the agar plug method. The whole genome of strain Mg75 was sequenced and analyzed in silico using PLaBAse, a specialized database for plant-associated bacteria, with the PGP-pred tool to identify plant-beneficial traits. For in vivo validation, Fusarium oxysporum f. sp. lycopersici (Fol) was used as a phytopathogen to induce Fusarium wilt in tomato plants. Tomato seedlings were initially grown hydroponically before being transferred to a perlite/vermiculite substrate for a total cultivation period of two months. Two formulations of the bacterial treatment were tested: one using a pellet collected from a liquid culture and the other using spores collected from solid culture. Growth parameters and disease severity were recorded, followed by statistical analyses to evaluate treatment effects. In vitro results confirmed that strain Mg75 produces all four tested compounds and exhibits antagonistic activity against all tested Fusarium strains, particularly to Fol. PLaBAse analysis revealed promising plant growth-promoting traits. In vivo application significantly enhanced plant growth, with shoot length increasing by 6.23% (pellet) and 6.69% (spores), while root fresh weight improved by 91.17% and 84.10%, respectively. Additionally, Fol-induced disease severity was reduced by 42.49% (pellet) and 38.55% (spores) compared to the untreated infected control. These findings highlight Saccharothrix sp. Mg75 potential as a promising candidate for further in vivo validation as a biocontrol and plant growth-promoting agent for sustainable agriculture.

Keywords: Actinobacteria, Biocontrol, Plant growth promotion

INFLUENCE OF SACCHAROTHRIX ALGERIENSIS NRRL B-24137 ON THE EXPRESSION OF VASCULAR FUSARIUM WILT IN LENTIL

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ABSTRACT

Saccharothrix algeriensis NRRL B-24137 is an actinobacterium isolated from Saharan soil in Adrar, Algeria. This strain produces several antibiotics with potent antifungal and antibacterial activities, belonging to the dithiolopyrrolone family—sulfur- and nitrogen-containing heterocycles. This study aimed to evaluate the influence of S. algeriensis (SA) on the development of the pathogenic fungus Fusarium oxysporum f. sp. lentis (FOLe) in sandy soil and its effect on the expression of vascular wilt disease in lentil. Inocula of SA and FOLe were prepared from 12- and 10-day-old cultures, respectively, grown on ISP2 medium. Spores were suspended in sterile distilled water and adjusted to concentrations of 10^8 CFU/mL for the actinobacterium and 10^4 CFU/mL for the pathogen. When incorporated into soil at a density of 10^8 spores per gram of dry soil, SA reduced the FOLe population by approximately threefold compared to the untreated control after 9 weeks of incubation. At the same concentration, SA significantly decreased the severity of vascular wilt in lentil, achieving up to 61.2% disease reduction after 7 weeks of plant growth. The biocontrol efficiency of SA was influenced by several factors, including the presence or absence of indigenous soil microflora (i.e., sterile vs. non-sterile soil), as well as the timing of SA application in relation to pathogen inoculation and seed sowing. These findings highlight the promising potential of Saccharothrix algeriensis as a biological control agent against vascular wilt in lentil, and its possible applications in sustainable plant disease management are discussed.

Keywords: Saccharothrix algeriensis – Fusarium oxysporum f. sp. lentis – Lentil – Vascular wilt – Biological control – Actinobacteria – Antifungal activity – Soilborne pathogen

BIOSURFACTANT-PRODUCING BACTERIA FROM SKIKDA'S OIL-CONTAMINATED SOILS: IDENTIFICATION AND PHYLOGENETIC CHARACTERIZATION

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ABSTRACT

Petrochemical industrial zones in Algeria, such as the Skikda refinery, are frequently exposed to hydrocarbon leaks and spills, leading to high concentrations of toxic aromatic compounds in the soil. In this study, crude oil-polluted soil samples from Skikda were collected and analyzed for both mono- and polyaromatic hydrocarbon content. Their physicochemical characteristics were also measured to evaluate pollution impact. From these samples, 34 aerobic bacterial strains were isolated, among which 11 demonstrated strong biosurfactant (Bs) and bioemulsifier (Be) activities. These were further subjected to molecular identification based on partial 16S rDNA gene sequencing. Phylogenetic analysis revealed affiliations to the Firmicutes and Proteobacteria phyla, with closest homology (>95%) to genera such as Bacillus, Priesta, Pseudomonas, Enterobacter, and Kosakonia. These findings underline the biotechnological potential of native Algerian bacteria as promising candidates for efficient bioremediation of severely oil-polluted soils.

Keywords: Aromatic hydrocarbons, Biosurfactants, Bioemulsifiers, Skikda refinery, Soil pollution, 16S rDNA sequencing

SATUREJA CANDIDISSIMA: AN ENDEMIC MEDICINAL PLANT FROM ALGERIA WITH PROMINENT BIOLOGICAL ACTIVITIES

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ABSTRACT

Satureja candidissima, an aromatic and medicinal plant of the Lamiaceae family, grows naturally in rocky grasslands at altitudes around 400 meters, especially in western Algeria. It is traditionally used both as a culinary herb and in folk medicine for treating influenza, fever, intestinal parasites, and menstrual disorders. This study aimed to evaluate the antioxidant, antimicrobial, and anti-inflammatory activities of hydromethanolic and aqueous extracts of Satureja candidissima. Antioxidant activity was assessed using DPPH radical scavenging, β-carotene bleaching, and total antioxidant capacity (TAC) assays. The hydromethanolic extract exhibited strong DPPH activity (IC_{50} = 14.39 µg/mL), outperforming the aqueous extract. In the β-carotene assay, moderate activity was observed, with the aqueous extract showing better inhibition (47.43%). Both extracts displayed comparable results in the TAC assay. Moderate antimicrobial activity was recorded for both extracts, with the hydromethanolic extract showing greater effectiveness, particularly against fungal strains such as Aspergillus and Penicillium species. Anti-inflammatory activity, evaluated by the protein denaturation method, showed significant inhibition in both extracts, with the aqueous extract reaching up to 92% inhibition. HPLC-DAD analysis revealed the presence of several phenolic acids and flavonoids, which may be responsible for the observed biological activities. These findings provide scientific support for the traditional uses of S. candidissima and highlight its potential as a natural source of antioxidant, antimicrobial, and anti-inflammatory agents.

Keywords: Satureja candidissima, antioxidant activity, antimicrobial activity, anti-inflammatory activity, HPLC-DAD analysis

EFFECT OF Saccharomyces cerevisiae GROWTH IN YEAST SEPARATION WASTE ON THE ACTIVITY OF SOME ENZYMES USED IN BREAD MAKING

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ABSTRACT

Saccharomyces cerevisiae is the most well-known yeast and is used as the primary ingredient in bread-making. Enzymes such as amylase, protease, lipase, invertase, and cellulase play important roles in bread making. In this study, Saccharomyces cerevisiae was grown in 1.5% and 3% separation waste of yeast industry together with YPD (yeast extract-peptone-dextrose) broth as a yeast growth medium. It is assumed that the separation waste contains some essential minerals (such as C and N) and vitamins necessary for yeast growth and development. The experiment was conducted for a period of 10 days, and 20 mL samples were collected from the flasks on days 0, 5, and 10. According to the results obtained, when compared to Saccharomyces cerevisiae grown in medium without separation waste, sufficient levels of yeast were found in petri dishes containing yeast extract agar, although yeast growth was slightly reduced compared to the control. 20 mL samples were subjected to centrifugation and microfiltration, and then invertase, protease, cellulase, and amylase activities were measured using appropriate methods. Invertase activity was found to increase by up to 900% in the group containing 3% separation waste compared to the control group. When amylase activity was measured, an increase of up to 1000% was observed in the same group compared to the control group. When protease and cellulase activities were examined, protease activity increased by up to 300% in the growth medium containing 1.5% separation waste, while no significant change was observed in cellulase activity.

Keywords: Saccharomyces cerevisiae, Enzyme activity, Bread, Protease, Amylase, Cellulase, Invertase

FORE-TIBIAL CLEANING DEVICES IN ODONATES (INSECTA: ODONATA: ANISOPTERA)

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ABSTRACT

In this study, the microstructure of previously undocumented fore-tibial cleaning devices in eight species, −Aeshna isoceles (Müller), Cordulegaster insignis Schneider, Somatochlora borisi Marinov, Somatochlora meridionalis Nielsen, Onychogomphus forcipatus (Linnaeus), Crocothemis erythraea (Brullé), Orthetrum coerulescens (Fabricius), and Sympetrum fonscolombii (Selys)−, representing five families (Aeshnidae, Cordulegastridae, Corduliidae, Gomphidae, and Libellulidae) of the suborder Anisoptera was examined using Scanning Electron Microscopy (SEM). SEM observations revealed that the edges of the flag-shaped setae forming the cleaning device were smooth, and their external surfaces exhibited the raised patterns. A row of soft and fine setae, has not been previously reported and likely contributing to the grooming function was observed to located along to the inner side of the setae forming the cleaning apparatus in individuals of the studied suborder and paralel to them. When compared with data from other suborder, it was seen that the number and size of the setae forming the cleaning device were more and larger in Anisoptera species depending on body and eye size, and the distinct surface patterns of the cleaning setae in the examined species differed at the possible suborder level. Additionally, while the short and flattened setae were detected at the bases of the femurs of forelegs near the eye in Aeshna isoceles and Cordulegaster insignis from two families, such setae were absent in the basal femurs of species from the other three families. These micro- and nanostructures presented in insect morphology have inspired humans to develop the novel structures and products. Therefore, the identification of these structures is significant as they can lead to develop biomimetic innovations.

Keywords: Odonata, Anisoptera, fore-leg, cleaning device, grooming, microstructure

ACTINOBACTERIA: A PROMISING AGENT FOR BIOLOGICAL CONTROL

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ABSTRACT

More than half of the bioactive substances reported in the literature are attributed to microorganisms from the phylum Actinobacteria, recognized for their exceptional biocontrol properties and ability to promote plant growth. In the context of developing environmentally friendly agricultural products with antimicrobial activity against various phytopathogens, Actinobacterial strains were isolated from vineyard soils in Algeria. These strains were identified as belonging to the genus Streptomyces through 16S rRNA gene sequencing and physiological characterization. Streptomyces is widely documented for its strong biocontrol potential. To validate this, the isolated Streptomyces strains were tested for antimicrobial activity against 11 phytopathogenic fungi and 3 phytopathogenic bacteria. The strain with the highest activity, as indicated by the largest inhibition zones, was further evaluated for enzyme production. These assays included cellulase, amylase, caseinase, gelatinase, lipase, esterase, pectinase, and catalase. Enzyme production is key to biocontrol potential, as many fungal pathogens' cell walls are composed of polymers like chitin, glucan, cellulose, proteins, and lipids.Among the isolated bacteria, selected St reptomyces strains showed promising antagonistic activity, with 50% of the tested strains exhibiting activity against all phytopathogens. The strain that demonstrated broad-spectrum enzyme production across all substrates tested was chosen for further in vivo analysis as a potential biocontrol agent.

Keywords: Actinobacteria, Streptmyces, antnimicrobial activity and enzyme prodution

GENOME MINING OF A STREPTOMYCES STRAIN ESF7, ISOLATED FROM AN ALGERIAN EXTREME ENVIRONMENT, REVEALS HIGH BIOSYNTHETIC POTENTIAL

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ABSTRACT

Actinobacteria are renowned producers of bioactive secondary metabolites with significant applications in agriculture, biotechnology, and medicine. In this study, several actinobacterial strains were isolated from a harsh and poorly explored environment in Algeria, aiming t to explore their biosynthetic potential with a focus on discovering new molecules and thus using genomic approaches. Following initial screening for antimicrobial, enzymatic, and antioxidant activities, the most promising strain was selected for whole-genome sequencing and in-depth bioinformatics analysis. The strain labeled ESF7 was isolated from saline soil (sabkha) in the commune of Naâma, an extreme environment that may contribute to its metabolic uniqueness. ESF7 exhibited strong antibacterial activity against a variety of Gram-positive bacteria, such as Staphylococcus aureus, Micrococcus luteus, as well as potent antifungal activity against pathogenic fungi such as Aspergillus niger, Fusarium culmorum, Fusarium line, and Penicillium spp. Additionally, ESF7 demonstrated noteworthy enzymatic activity, including lipase, gelatinase, and others, further indicating its metabolic versatility. Genomic analysis identified the strain as a member of the genus Streptomyces, a group globally recognized for its unparalleled ability to produce secondary metabolites, including antibiotics, antifungals, immunosuppressants, and plant-protective compounds. Genome mining using the antismash tool revealed a rich diversity of BGCs, including polyketide synthases (PKS), nonribosomal peptide synthetases (NRPS), and RiPP-like clusters. Several gene clusters displayed low similarity to known references, indicating the presence of potentially novel metabolites. This rich array of biosynthetic gene clusters suggests a strong capacity of this strain to produce diverse secondary metabolites. This work reinforces the value of Streptomyces from extreme or underexplored environments, which remain as reservoirs and a largely untapped source of novel bioactive products. It also highlights the importance of integrating classical microbiology with genome mining approaches to accelerate the discovery of novel compounds.

Future work will focus on deeper analysis of the biosynthetic gene clusters to better understand their metabolic pathways, and experimental efforts will aim to isolate, purify, and characterize the predicted bioactive molecules.

Keywords: Streptomyces, biomolecules, antismash, BGCs, genomics

FIRST RECOD OF A PROTIST PATHOGEN OF LABIDOSTOMIS RUFA (COLEOPTERA: CHRYSOMELİDAE) (WALTL, 1838) IN ISPARTA, TURKIYE

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ABSTRACT

The family Chrysomelidae is one of the main families of the order Coleoptera, which is very important in terms of species number and species diversity. Both adults and larvae feed on cultivated plants as well as some useful wild plants or shrubs. The protection of agricultural products is very important both in terms of ensuring food security and contributing to the national economy. Interest in the use of entomopathogens (EPO) as an alternative to chemical insecticides in plant pest control strategies is increasing day by day. Therefore, this study aimed to investigate Labidostomis rufa, which is quite common in Turkey, for the first time in terms of the presence of entomopathogenic protists. Within the scope of the study, a total of 109 L. rufa adults, 67 living and 42 dead samples, collected from Crataegus monogyna in city center of Isparta, were dissected and examined under a light microscope. As a result of dissection, a coccidian pathogen was identified from this pest for the first time. The identified coccidian pathogen was observed in the fatty tissue of adults. Polysporocystic oocysts of the pathogen are evidence of infection, and the pathogen's oocysts have been measured at 30-38 µm in diameter. Additionally, the infection rate was found to be 2.8%. Thus, with this study, L. rufa was examined for the presence of entomopathogenic protists for the first time in Turkey. Since entomopathogenic protists play an important role as natural suppressive factors in pest populations, the present study is a preliminary study and is of great importance in terms of preventing or minimizing the damage caused by possible L. rufa outbreaks that may occur in agricultural and forest areas in the future.

Keywords: Crataegus monogyna, Labidostomis rufa, Entomopatohogen, Coccidia, Isparta, Türkiye

PRESENCE OF NOSEMOSIS IN HONEY BEES IN ISPARTA PROVINCE, TURKIYE

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ABSTRACT

Isparta province is a province where both continental and Mediterranean climates are experienced together, as it is located in the continental interior of the Mediterranean Region. So, winters are cold and summers are hot and dry. Geographically located in the lake region, this province has both mountains and flat areas. It is known that geographical conditions affect the spread of bee diseases and increase the incidence of bee losses. For this reason, researching beekeeping and bee diseases in Isparta province is very important. In this study, the first findings on the presence of Nosemosis in bee colonies in Isparta province are presented. Nosemosis was detected in two of the examined beehives. Five of the 194 live bee samples and four of the 180 dead bee samples were infected with nosema agents. The infection rate varies between 11.4% and 3.8%. The infection average is 2.4%. However, the number of sampled beehives needs to be increased to represent the entire Isparta region, other pathogens and parasites need to be investigated and each needs to be identified at the species level.

Keywords: Honey bee, Disease, Nosemosis, Isparta, Türkiye

EFFECTS OF MENTHA PULEGIUM ON FERTILITY OF FEMALE PRE-PUBERTAL RABBITS

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ABSTRACT

Background and aim: Essential oils extracted from plants, are natural compounds with active ingredients that give them a high therapeutic power due to their wide use for preventive or curative purposes. Several studies had showed the effects of essential oils in particular on the reproductive function. The aim of this work is to evaluate the effect of essential oils (Mentha pulegium) on the body and gonad weights of female pre-pubertal rabbits treated with different dose of essential oils. **Methods:** Twenty females rabbits were used in this study, animals are divided into 4 groups: one control group and three groups treated with three different doses of Mentha pulegium essential oil, respectively 200µl/kg, 300µl/kg and 400µl/kg. After the sacrifice, the gonads were weighed and fixed for histological study. **Results:** The results show that treatment with essential oil of Mentha pulegium resulted in increased body weight of rabbits in the group treated with a high dose of essential oil (400 µl/kg) compared to controls. The histological sections of the ovaries revealed an hyperstimulation of ovulation and an increase in the number of follicles at different stages, Greater in comparison to control rabbits and an increase in the number of mature follicles, more important in rabbits treated with dose 3 compared to those treated with dose 1 and 2. Control rabbits, present some stages of folliculogenesis. **Conclusion:** It would seem that the essential oil of Mentha pulegium at three different doses would have a stimulating effect on the development of gonads, folliculogenesis and fertility of pre-pubescent rabbits.

Keywords: Mentha pulegium, gonad, rabbit, fertility, pre-pubescent

EXPLORING THE GENOMIC LANDSCAPE OF STREPTOMYCES SPP.: REFINEMENT OF TAXONOMIC CLASSIFICATION, AND EVOLUTIONARY INSIGHTS INTO THE EMERGENCE OF PATHOGENIC LIFESTYLE

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ABSTRACT

The Streptomyces genus, renowned for its vast genomic diversity and ecological versatility, plays a pivotal role in plant-microbe interactions, encompassing strains that exhibit both plant growth-promoting and phytopathogenic properties. This study aims to compare the genomes of plant-related Streptomyces phytobeneficial and phytopathogenic strains from both functional and taxonomic perspectives. Using advanced bioinformatics tools, a dataset of 27 Streptomyces strains was selected from the PLabase platform, and we investigated the evolutionary relationships among these strains through the TYGS platform based on genomic approaches, including the GBDP approach. Our investigation revealed that most genomes of this genus are incomplete drafts with a large number of contigs and uncovered numerous inconsistencies that suggest a meticulous reevaluation of the classification of its constituent strains. This process led to the refinement of the identification of 14 Streptomyces spp., resolving ambiguities, and confirming their true identities. In addition, our findings offered compelling evidence to propose 13 new genomospecies within Streptomyces displaying distinct phylogenetic signatures, characterized by notably low dDDH values below 70%. Furthermore, we shed light on the original lifestyle within this group. Based on the phylogenomic analysis, we suggest that the plant growth-promoting trophism represents an ancestral trait within the Streptomyces genus, whereas phytopathogenicity has emerged as a recent evolutionary phenomenon, having manifested independently multiple times during the evolution of the Streptomyces group, which could be the result of host-specific adaptation. In conclusion, this study enhances our understanding of the complex interplay between Streptomyces strains and plants, and by deciphering the genomic underpinnings of these interactions, it contributes to elucidating the evolutionary trajectories and ecological significance of Streptomyces in plant-associated environments

Keywords: Streptomyces, comparative genomics, PLabase, TYGS, pathogenicity, symbiosis

EFFECTS OF EDDHA-DERIVED MANGANESE CHELATE COMPLEXES ON SALT STRESS TOLERANCE AND ANTIOXIDANT DEFENSE MECHANISMS IN RICE (ORYZA SATIVA L.)

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ABSTRACT

Manganese (Mn) is an essential micronutrient involved in several fundamental physiological processes in plants, including photosynthesis, enzymatic reactions, and defense against oxidative stress. It plays a critical role as a component of the oxygen-evolving complex in Photosystem II, crucial for electron transport, and functions as a cofactor for superoxide dismutase (Mn-SOD) enzymes within antioxidant systems. However, under alkaline soil conditions, Mn solubility decreases, leading to deficiency symptoms such as chlorosis, stunted growth, and metabolic disorders. To overcome Mn deficiency, agricultural practices frequently utilize chelated micronutrient forms to enhance solubility and plant uptake. In this study, five different manganese chelate complexes (F-BD, F-ET, F-TR, F-H, F-OC), synthesized with EDDHA-derived 1-(a–e) ligands, were evaluated for their morphological, physiological, and biochemical effects on rice (Oryza sativa L.) plants under salt stress conditions. Seedlings grown hydroponically for 14 days were treated with the respective Mn chelate complexes, followed by induction of salt stress using 150 mM NaCl. Post-treatment assessments included shoot length, relative water content, total chlorophyll levels, lipid peroxidation (TBARS), hydrogen peroxide (H_2O_2) accumulation (spectrophotometric assay and DAB staining), and activities of superoxide dismutase (SOD) and catalase (CAT). The F-BD and F-ET complexes significantly maintained shoot growth and water retention capacity, while the highest chlorophyll content was observed with the F-TR treatment. Regarding oxidative stress parameters, TBARS and H_2O_2 levels notably decreased in plants treated with F-H and F-BD complexes. DAB staining indicated minimal accumulation of H_2O_2 in the F-TR and F-H treatment groups. SOD activity increased notably in the F-BD and F-TR groups, whereas CAT activity showed significant elevation in the F-H and F-BD groups. In conclusion, the F-BD and F-ET complexes supported morphological resilience, while F-TR and F-H treatments optimized photosynthetic efficiency and antioxidant defense. These findings demonstrate the potential of Mn chelate complexes to enhance bioavailability under high pH and salt stress conditions, thereby improving stress tolerance in rice plants.

Keywords: EDDHA, Chelate, Rice (Oryza sativa L.), Salt stress, Micronutrient, Manganese deficiency

ENHANCED ANTIOXIDANT DEFENSE AND OSMOREGULATION IN SOYBEAN UNDER SALT STRESS WITH NOVEL PGR DERIVATIVES

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ABSTRACT

Soil salinity is one of the most common abiotic stress factors threatening plant production. In plants exposed to salt stress, ionic imbalance, osmotic stress, and oxidative damage occur, leading to significant losses in growth, development, and yield. In this study, the effects of two newly synthesized compounds, designated as B and C, derived from the combination of dopamine and 1,2,4-triazole cores, were investigated in Glycine max L. 'Samsoy' cultivar under salt stress conditions. Plants were treated with 100 µM concentrations of the test compounds and subjected to 100 mM NaCl to induce salt stress. Morphological evaluations showed significant increases in shoot length in the groups treated with compound B. In terms of total chlorophyll content, both compounds B and C showed a marked increase compared to the Hoagland+Salt group. Lipid peroxidation (TBARS) and hydrogen peroxide (H_2O_2) levels decreased significantly with B and C treatments compared to dopamine and triazole control groups. Osmolyte accumulation analyses revealed increases in proline and total sugar levels in the B+Salt and C+Salt treatment groups. Additionally, positive changes were observed in carotenoid and ascorbate levels. Regarding antioxidant enzyme activities, significant increases in SOD, CAT, and APX activities were particularly noted in the B+Salt group. These results demonstrate that dopamine-triazole derivatives are effective in mitigating oxidative stress in plants. In conclusion, compounds B and C are promising next-generation plant growth regulators (PGRs) for enhancing plant tolerance to salt stress.

Keywords: Salt stress, Glycine max, Dopamine-triazole derivatives, Plant growth regulators (PGRs), Antioxidant defense, Osmoregulation, Oxidative stress mitigation

ASSESSMENT OF CATAGLYPHIS NODUS (BRULLÉ, 1833) IN THE ECOSYSTEMS AROUND NARTA LAGOON AS ENVIRONMENTAL INDICATOR

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ABSTRACT

Ants (Family Formicidae) are essential eusocial insects crucial for ecosystems, often used as environmental indicators due to their sensitivity to ecosystem changes. This study examines the specific role of the species Cataglyphis nodus (Brullé, 1833), known for its adaptation to dry and high-temperature environments, within the wetland ecosystem of Narta Lagoon, an internationally important Protected Area in Albania. Through sampling with "Pitfall Traps" at 11 stations during June-July 2025, we analyzed the distribution of C. nodus based on soil moisture, soil type, vegetation, and anthropogenic impacts. The results clearly showed that the highest density of individuals was found in areas with sandy/gravelly, dry soil and herbaceous vegetation. Zones with agricultural activities and those used as pastures also showed a high presence, suggesting that human interventions might create suitable habitats for this xeric species. This highlights its role as a valuable ecological indicator in the lagoon ecosystem, signaling xeric (drought) conditions, open and sandy microhabitats, and anthropogenic impact. In conclusion, C. nodus is an important indicator species for monitoring drought trends, changes in habitat structure, and assessing the impact of human activities in lagoon ecosystems. Continued studies of this nature are recommended to gain clearer information on ecosystem adaptations and their services to climate change.

Keywords: Formicidae, indicators, ecological, xeric species, Cataglyphis nodus, lagoon

ASSESSMENT OF ANTIBACTERIAL AND ANTIFUNGAL ACTIVITIES OF EXTRACTS FROM LAVANDULA ANGUSTIFOLIA DISTILLATION WASTE

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ABSTRACT

This study is part of a valorization approach for the by-products of Lavandula angustifolia distillation, an aromatic and medicinal plant widely cultivated in Morocco. After essential oil extraction, the remaining solid residues still contain bioactive compounds with potential antimicrobial properties. The objective was to evaluate the antibacterial and antifungal activities of various extracts from these residues. We used maceration and Soxhlet extraction with a range of solvents: water, ethanol and their hydroalcoholic mixtures (50% ethanol, 75% ethanol). Antimicrobial potential was assessed via disk diffusion and direct contact on agar media for antifungal evaluation. Results showed significant inhibition of Listeria monocytogenes, indicating a strong affinity of the active compounds for Gram-positive bacteria, while displayed lower sensitivity. Antifungal activity was selective, notably inhibiting Fusarium oxysporum, though Aspergillus ochraceus and Botrytis cinerea remained unaffected. These results indicate that Lavandula angustifolia distillation residues can be considered a valuable source of natural antimicrobial agents. These properties could be exploited in the formulation of active packaging films, edible coatings, or surface treatments for perishable food products.

Keywords: Lavandula angustifolia; distillation residues; antibacterial; antifungal

NATURAL ALTERNATIVES TO ANTIBIOTICS: A STUDY ON JUNIPERUS COMMUNIS ESSENTIAL OIL

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ABSTRACT

The limited effectiveness of conventional antibiotics against resistant bacterial strains has raised global concern and underscored the urgent need for alternative therapeutic strategies. One promising area of investigation involves essential oils derived from medicinal plants, which have shown significant antimicrobial potential due to their rich and diverse phytochemical composition. Juniperus communis, commonly known as juniper, is one such plant valued for its traditional medicinal applications and bioactive properties. This study examines the antibacterial activity of its essential oil, aiming to contribute to the development of effective, plant-based alternatives for combating multidrug-resistant (MDR) infections. The antibacterial potential of Juniperus communis essential oil was evaluated against four MDR bacterial strains: Staphylococcus aureus (MRSA), Escherichia coli, Klebsiella pneumoniae, and Enterococcus faecalis. The plant material was collected in 2023 from the Sétif region in northeastern Algeria. Essential oil was extracted from the aerial parts by steam distillation and stored at 4 °C. Antibacterial activity was assessed using the disc diffusion method against clinically isolated strains obtained during an epidemiological study conducted at the Military Hospital of Constantine. The essential oil demonstrated notable antibacterial activity, with inhibition zones ranging from 8 mm to 30 mm. The most significant effects were observed against E. faecalis and S. aureus. These findings suggest that Juniperus communis essential oil may serve as a promising natural antibacterial agent, particularly as part of complementary approaches targeting MDR pathogens. Further research is needed to evaluate potential synergistic effects with conventional antibiotics, as well as toxicity and formulation for therapeutic use.

Keywords: Juniperus communis, Essential Oil, Multidrug Resistant Bacteria, Antibacterial Activity

DOES CELIAC DISEASE AFFECT GLYCEMIC CONTROL IN CHILDREN WITH TYPE 1 DIABETES MELLITUS? A RETROSPECTIVE STUDY

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ABSTRACT

Celiac disease (CD) and type 1 diabetes mellitus (T1DM) are autoimmune conditions with a well-established association, particularly among children and adolescents. (Taczanowska A, 2021).Several studies have demonstrated that the coexistence of CD and T1DM is linked to elevated HbA1c levels, as well as an increased risk of hypoglycemia and microvascular complications. (Rohrer, T. R 2015). The objective of our study was to evaluate the implications of the co-occurrence of both diseases on glycemic control and the management of T1DM. This retrospective study was based on a handwritten medical files of 109 children adolescents diagnosed with T1DM documented between the years 2004 and 2022 in the pediatric unit of Mustapha Bacha University Hospital, Algiers, Algeria. Among the 109 patients included in the study, 11 were diagnosed with CD associated. Glycemic control was assessed in all children and adolescents based on the annual mean HbA1c value, in accordance with the ISPAD 2022 guidelines. The Mann-Whitney U test was used to compare HbA1c mean values between patients with and without CD associated with T1DM, in order to assess the effect of CD on glycemic control. The mean HbA1c was 8,47±1,42%, nevertheless only 11,92% of cases presented with an HbA1c

Keywords: Celiac disease, type 1 diabetes mellitus, HbA1c, glycemic control, children

EXPLORING THE BIOACTIVE POTENTIAL OF STREPTOMYCES ML1 ISOLATED FROM ALGERIAN SOILS: LINKING BIOSYNTHETIC GENE CLUSTERS TO ANTIMICROBIAL ACTIVITY

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ABSTRACT

Actinobacteria, and particularly Streptomyces species, are well-known for their metabolic diversity and their ability to synthesize a wide range of secondary metabolites, including antibiotics, antifungals, and enzymes of industrial interest. In this context, we investigated the functional potential of strain ML1, isolated from Algerian soil, by combining in vitro antimicrobial and enzymatic assays with in silico genome mining to identify biosynthetic gene clusters (BGCs) associated with bioactive metabolite production. The antimicrobial activity of ML1 was evaluated against a panel of pathogenic microorganisms using the agar diffusion method. ML1 exhibited potent inhibitory activity against Gram-positive bacteria, including Staphylococcus aureus ATCC43300 (35 mm inhibition zone) and Listeria monocytogenes (35 mm), as well as Gram-negative bacteria, such as Vibrio cholerae (40 mm) and Salmonella typhi (15 mm). Furthermore, significant antifungal activity was recorded against Penicillium expansum (39 mm) and Aspergillus flavus (20 mm). In addition, ML1 exhibited strong enzymatic activities, including amylase, lipase, gelatinase, and tyrosinase, highlighting its metabolic versatility. To explore the genetic basis of the observed bioactivity, whole-genome sequencing and antiSMASH 8.0.1 analysis were performed. The genome of ML1 (8.66 Mb, 72.08% GC content, 151 contigs) revealed 34 biosynthetic gene clusters (BGCs). These included NRPS, PKS (types I–III), terpenes, RiPPs, siderophores, indole, and hybrid PKS–NRPS systems. While some BGCs exhibited high similarity to known clusters (e.g., actinorhodin and geosmin), several clusters showed low or no similarity to known entries in the MIBiG database, indicating the potential production of novel bioactive compounds. Notably, region 25.1 (NRPS), which displayed a moderate similarity score (0.46) to telomycin, stands out as a candidate for the synthesis of structurally distinct derivatives. Hybrid PKS-NRPS clusters (e.g., regions 5.4 and 16.2) and RiPP-like clusters with low similarity scores further underscore the untapped biosynthetic potential of this strain. By integrating experimental bioactivity assays and computational genome mining, our results demonstrate the biosynthetic richness of ML1 and its potential for antimicrobial drug discovery. This study highlights the importance of exploring Algerian ecosystems as reservoirs of microbial diversity and novel secondary metabolites.

Keywords: Streptomyces ML1; antimicrobial activity; antiSMASH; NRPS; PKS; BGCs; genome mining; biodiversity

EVALUATION OF THE BLOOD INFLAMMATORY PROFILE IN A MURINE MODEL OF COLONIC CARCINOGENESIS INDUCED BY 1,2-DIMETHYLHYDRAZINE (DMH)

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ABSTRACT

Experimental carcinogenesis in rodents is a key model for studying the mechanisms of colorectal cancer and the associated inflammatory responses. In this study, we evaluated alterations in the peripheral inflammatory profile of BALB/c mice following tumor induction with 1,2-dimethylhydrazine (DMH). Three groups of mice were established: a control group receiving weekly saline injections, a group treated with DMH (20 mg/kg) for 12 weeks followed by a 2-week latency period, and a third group treated with DMH (20 mg/kg) for 15 weeks, also followed by a 2-week latency. After sacrifice, cardiac punctures were performed to carry out a complete blood count (CBC), focusing on white blood cells, red blood cells, platelets, and hemoglobin levels. The results revealed significant changes in the inflammatory profile between the treated groups (12 and 15 weeks) and the control group ($p < 0.0001$). However, no statistically significant difference was observed between the DMH 12-week and DMH 15-week groups for any of the hematological parameters evaluated. These findings suggest that the systemic inflammatory response reaches a plateau after 12 weeks of DMH induction. Prolonged exposure up to 15 weeks does not significantly alter this profile, indicating early stabilization of the inflammatory state in this model.

Keywords: Colorectal cancer, DMH, inflammation, murine model, CBC, hematological profile

EFFECTS OF PRENATAL HİPOKİNESİA ON BLOOD PARAMETERS OF PREGNANT RABBİTS

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ABSTRACT

Considering the adverse effects of the hypokinesia factor on both animal and human organisms, it can be evaluated as an unfavorable environmental factor. The prenatal hypokinesia factor influences the course and outcome of pregnancy. In modern research, hypokinesia affecting the fetus during intrauterine development retains its relevance as a clinically significant factor with embryotoxic effects. Based on studies conducted on pregnant rabbits maintained under hypokinetic conditions during different stages of gestation (embryonic, pre-fetal, and fetal stages), it can be stated that hypokinesia, as an unfavorable extreme factor, negatively impacts the course and outcome of pregnancy, causing resorption of the fertilized ovum or embryo. Prenatal hypokinesia can also lead to the birth of offspring with low viability, cannibalism, and stillbirths. The primary objective of this study was to investigate the dynamics of changes in the formed elements of blood before and after exposure to hypokinesia in pregnant rabbits subjected to its influence during various stages of prenatal development, as well as to determine the effects of these changes on the course of pregnancy. For the research, mature female rabbits with a body length of 40–58 cm and a body weight of 800–1300 g were used. The gestation period in rabbits lasts 28–30 days. The main aim of our investigations was to monitor variations in hematological parameters in pregnant rabbits during the embryonic, pre-fetal, and fetal stages as a result of prenatal hypokinesia. All pregnant rabbits were divided into two groups: control and experimental. Control animals were kept under normal conditions, whereas the experimental animals experienced hypokinesia during different gestational stages. To create hypokinetic conditions, specially sized cages were prepared, allowing each pregnant rabbit to sit individually, thereby limiting their mobility. Blood samples were collected from the marginal ear vein to determine the dynamics of leukocytes, lymphocytes, monocytes, granulocytes, erythrocytes, hemoglobin, mean corpuscular hemoglobin content, erythrocyte sedimentation rate, and platelet count. Complete blood count was performed using a “Mindray BC-2800Vet” hematology analyzer. The results of our study demonstrated that exposure to hypokinesia leads to alterations in the coagulation system and variations in the counts of leukocytes, lymphocytes, monocytes, and granulocytes. Disruption of the blood coagulation system under the influence of hypokinesia plays a key role in slowing the overall developmental dynamics of the organism and causes functional impairment of the placental vessels responsible for fetal nutrition. Our findings indicate that hematological changes in pregnant rabbits during certain critical periods of gestation, resulting from hypokinesia, lead to a reduction in litter size. It was established that prenatal hypokinesia negatively affects the course and outcome of pregnancy, as well as fetal development. Restricting motor activity during various stages of pregnancy, along with anxiety-induced stress, directly influences the condition of blood supply to the offspring, which significantly reduces the survival rate of the newborns. This research contributes to achieving Sustainable Development Goal (Good Health and Well-being) by enhancing the undertsanting of prenatal factors affecting reproductive health and fetal development.

Keywords: hipokinesia, prenatal, embryonic stage, pre-fetal stage, fetal stage, SDG

CHARACTERIZATION OF ALGERIAN LAVENDER ESSENTIAL OIL LOADED PLA NANOFIBERS "ANTIBACTERIAL PROPERTIES"

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ABSTRACT

Nanofibers represent a unique class of nanomaterials with significant application potential, largely due to their semi-crystalline structure, high aspect ratio, porosity, flexibility, and distinctive surface properties. Antibacterial materials have gained increasing importance across various applications—especially in the biomedical field—driven by growing concerns over bacterial resistance to conventional antibiotics. One promising approach to developing effective antibacterial materials is the incorporation of essential oils into polymer matrices, such as polylactic acid. Lavender essential oil has been widely recognized for its potent antimicrobial properties, making it a suitable candidate for incorporation into PLA nanofibers. It was achieved by electrospinning method by blending with increasing concentrations of lavender essential oil (10%, 15%, 20% v/w) to form lavender essential oil-loaded PLA composite nanofibers. The morphology and physical properties of the nanofibers were extensively characterized using scanning electron microscopy and Thermogravimetric analysis. The antibacterial efficacy of the lavender essential oil-loaded PLA nanofibers was evaluated against Bacillus subtilis and Bascillus cereus bacteria. The antimicrobial activity was assessed through disc diffusion method. As the ratio of lavender essential oil in nanofibers increased, the inhibition zone diameter of both two bacteria (B. cereus and B. subtilis) increased. The nanofiber containing 20% LEO was more effective than antibiotics Amoxicillin for B. cereus. Among bacterial strains, B. cereus is more sensitive to lavender essential oil than B. subtilis. According to TGA analysis the increase of the LEO amount reduced the degradation peak of the PLA matrix to lower temperatures. The SEM images indicated that LEO increased the diameter of the nanofiber filaments in the PLA films. Adding 20% LEO is considered sufficient to produce antibacterial PLA nanofiber material for different applications.

Keywords: Lavander essential oil, PLA nanofiber, Antibacterial efficacy, Bacillus, SEM, TGA

PHYTOCHEMICAL ANALYSIS AND BIOACTIVITY ASSESSMENT OF FERULA LONGIPES COSS. EX BONN. & MAURY. METHANOLIC EXTRACT: INSIGHTS INTO ANTIOXIDANT, AND ANTI-CORROSIVE PROPERTIES

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ABSTRACT

This study is the first to analyze the polyphenolic profile and evaluate both antioxidant and This study presents the first analysis of the polyphenolic profile and evaluation of antioxidant and anti-corrosive properties of the methanolic extract from Ferula longipes Coss. ex Bonn. & Maury. Using LC-MS/MS, significant bioactive compounds were identified, notably including quercetin-3-D-xyloside (643.10 mg/g), trans-ferulic acid (632.05 mg/g), quercetin-3-glucoside (425.74 mg/g), and hyperoside (310.21 mg/g). Total polyphenol content reached 111.94 ± 1.63 µg GAE/mg extract, and total flavonoid content was 47.85 ± 0.077 µg QE/mg extract. The extract demonstrated high anti-corrosive efficiency, achieving inhibition rates of 91.2% for aluminum, 82.7% for steel, and 72.3% for zinc electrodes in 0.5 M HCl. This protection is attributed to the adsorption of phytochemicals onto the metal surfaces, forming a protective interfacial layer. These findings highlight the potential of F. longipes as a natural source of plant-derived, surface-active corrosion inhibitors for potential industrial applications.

Keywords: Anti-corrosives properties, Ferula longipes Coss. ex Bonn. & Maury., Flavonoids, Phenolic acids

INNOVATIVE AGRICULTURE THROUGH RECYCLING: SUSTAINABLE BIOLOGICAL PRODUCTION SYSTEMS FROM DISCARDED MATERIALS

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ABSTRACT

The increasing urgency of climate resilience, resource efficiency, and ecological responsibility in agricultural systems has intensified the search for sustainable, low-cost, and adaptable technologies. This study presents a novel approach to biological production by transforming discarded mini glass-door refrigerators into automated, sensor-based silkworm incubation units. Designed at the intersection of agricultural innovation, environmental sustainability, and STEAM-based education, the project offers an integrated model that serves both pedagogical and technological functions. The study was implemented at Bodrum Science and Art Center, involving 12 gifted middle and high school students. The system utilized an Arduino UNO microcontroller combined with DHT11 temperature-humidity sensors, a real-time clock (RTC), mist generators, LED lighting, and ventilation components. The automated control system was coded and calibrated to maintain optimal environmental conditions across the 60-day life cycle of Bombyx mori. Each unit was assembled inside a repurposed mini refrigerator, thereby significantly reducing production costs and promoting e-waste recycling. This the project, students engaged in hands-on learning through sensor integration, circuit building, algorithmic thinking, and biological observation. Pre- and post-assessments, observational rubrics, and learning journals were employed to evaluate their cognitive and technical progress. Quantitative findings revealed over a 40% improvement in students' abilities related to electronics, coding, and biological process management. The system maintained environmental stability within ±1.5 °C for temperature and ±4% RH for humidity, effectively supporting all developmental stages of the silkworm. Qualitative data indicated enhanced student motivation, confidence, and collaborative problem-solving capacity. The prototype proved to be not only a viable incubation device for educational purposes but also a scalable, low-energy agricultural solution suitable for use in rural or resource-limited settings. Its open-source design allows for modular replication and adaptation to other biological applications such as seed germination, mushroom cultivation, or microgreen farming. This project demonstrates the power of combining circular economy principles with educational technology and ecological production. It contributes to the global discourse on sustainable agricultural innovation and provides a model for integrating engineering thinking into life science education. As such, it stands as a replicable example of how discarded technologies can be reimagined into tools for both learning and living systems management.

Keywords: Sustainable agriculture, recycling, silkworm, incubation system, Arduino, STEAM education, biological production

IDENTIFICATION OF SNP MARKERS ASSOCIATED WITH GENES CONTROLLING POTASSIUM AND SODIUM CONCENTRATION IN WALNUT FRUIT BY GWAS METHOD

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ABSTRACT

Owing to its beneficial impact on human health and its abundance of essential nutrients, the walnut is considered one of the most nutritionally valuable tree nuts. This study's objective was to find SNPs related to potassium (K) and sodium (Na) accumulations in walnut fruits collected in 2021 and 2022 from a population of 154 different walnut genotypes, using the GWAS method. It was observed that K concentrations ranged from 131.75 mg/100g to 850.00 mg/100g, while Na concentrations varied between 2.00 mg/100g and 84.50 mg/100g. The genotypes exhibited a statistically significant impact on both nutrient elements, according to variance analysis (p-value ≤ 0.01). The concentrations of K and Na exhibited high heritability estimates, both recorded at 0.99. 13.611 clean SNPs and the MLM (PCA+K) approach were used GWAS analysis and a total of 17 significant associations were identified (16 for K and 1 for Na). Of the 16 significant SNPs identified for K, 14 were found in both years. Additionally, the SNP identified for Na was consistent for both years. For the investigation of potential candidate genes, 17 SNP sequences were aligned with the Juglans regia genome, and potential candidate genes were detected. It was discovered that thirteen of these SNPs match onto particular chromosomes in the walnut genome. For the SNPs related to K accumulation, 118 candidate genes in all were found. For the SNP marker related to Na accumulation, 18 candidate genes were detected. The findings obtained from our study suggest that the SNPs related to K and Na accumulation in walnut fruit, along with the candidate genes related to these SNPs, could contribute to marker-assisted selection applications in future walnut breeding efforts and plant breeding studies using genetic engineering approaches.

Keywords: Walnut, GWAS, SNP, potassium, sodium, plant-based nutrition

MYCOTOXIN PROFILING OF FUSARIUM STRAINS ASSOCIATED WITH DATE PALM DISEASE SYMPTOMS IN TUNISIA

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ABSTRACT

During the period 2022-2024, a proliferation of symptoms of abrupt dieback and fruit rot was observed on date palms in southern Tunisia. Samples of diseased plants were collected from 8 separate areas. Based on morphological analyses, the most frequently identified fungal genus was the genus Fusarium. Sequencing of genes encoding the translation elongation factor, calmodulin and the second largest subunit of RNA polymerase II was implemented to determine representative Fusarium strains at the specific level and examine their phylogenetic relationships such as Fusarium proliferatum, F. brachygibbosum, F. chlamydosporum, and F. solani. Mycotoxin-producing capacity in vitro cultures and pathogenicity were also assessed on young date palm plants (leaves and roots) of 'Manakher' variety. Pathogenicity assay revealed that all Fusarium strains were pathogenic and capable of producing various types of mycotoxins. F. proliferatum species primarily produce fumonisins (FB) and beauvericin (BEA), while enniatins (ENN), T-2 toxin, and zearalenone (ZEA) are produced in lower amounts. F. brachygibbosum strains produce low levels of ZEA, acetyl-deoxynivalenol (ACDON), and deoxynivalenol (DON). Species belonging to the F. incarnatum-equiseti species complex (FIESC) produce only enniatin A (ENNA) and nivalenol (NIV). As for F. solani strains, they produce only low amounts of BEA. This work represents a comprehensive multidisciplinary study on Fusarium species, addressing both phytopathological aspects and food safety concerns.

Keywords: Fusarium; date palm; Disease Symptom; pathogenicity; mycotoxin

ANALYSIS OF THE FREQUENCY EFFECT OF ELF-EMF ON BIOFILMS BASED ON EXPERIMENTAL RESULTS

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ABSTRACT

There is a growing and well-documented interest in the effects of electromagnetic fields (EMFs) on cell biology. This topic attracts attention from diverse scientific fields, including molecular biology, medicine, engineering, and agriculture. Numerous studies have been continuously published on this subject. Several years ago, our collaborative research team published a study demonstrating that extremely low-frequency electromagnetic fields (ELF-EMFs) can significantly impact biofilm removal. While that study primarily focused on the overall effects of ELF-EMF exposure, it did not explore the influence of varying frequencies. In subsequent experiments, our team investigated the frequency-dependent effects of ELF-EMFs in the range of 45 Hz to 300 Hz on biofilm removal. The results indicate that specific frequencies within this range can enhance the efficacy of biofilm disruption. This article presents the detailed findings of those frequency-specific effects and discusses their potential implications.

Keywords: ELF-EMT, Frequency Effects, Biofilm Removal

BIO-ADSORPTION OF ORGANIC COMPOUNDS IN LIQUID EFFLUENTS : AN EXPERIMENTAL AND STATISTICAL STUDY

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ABSTRACT

This study investigates the utilization of biosorbents derived from both raw and modified pomegranate peel treated with SnCl2/FeCl2 for the adsorptive removal of crystal violet (CV) dye from synthetic wastewater. The obtained biosorbents were analyzed using various analytical methods, including FTIR, SEM, EDX, XRD,TGA, XRF, BET and point of zero charge analysis. The adsorption process was modeled using the central composite design model, and its suitability was assessed through ANOVA analysis. The results indicate that treated pomegranate peel (PP/SnCl2-FeCl2) exhibits a higher adsorption capacity for CV dye removal compared to RPP. The maximum adsorption capacities for CV by RPP and PP/SnCl2-FeCl2 were found to be 172.40 mg/g and 389.88 mg/g, respectively. This novel biosorbent, PP/SnCl2-FeCl2, showed a larger maximum adsorption capacity compared to similar studies, confirming its superior CV removal effectiveness. The adsorption process conforms to Langmuir and Freundlich isotherms, and the kinetics follow a pseudo-second-order model, as indicated by isotherm and kinetic analysis. Thermodynamic data suggest a spontaneous and endothermic process. Furthermore, the prepared biosorbents exhibit good reusability, maintaining efficacy for up to seven consecutive cycles.

Keywords: Bio-adsorption, Dye removal, Biosorbent, modification, Pomegranate peel

VALORIZATION OF AGRICULTURAL WASTE IN THE PREPARATION OF VEGETALE ACTIVATED CARBON. APPLICATION IN THE ADSORPTION OF A PHARMACEUTICAL MOLECULE

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ABSTRACT

In the context of the circular economy, which valorises agricultural waste to produce biomaterials of ecological and economic value, this work focuses on the preparation of activated carbon from date pits for use in the adsorption of a pharmaceutical molecule; a non-steroidal anti-inflammatory drug flubifene ®100mg. The date pits were washed, dried and ground, the powder obtained was chemically activated by a solution of ZnCl2 at 85°C. At a temperature of 500°C and a speed of 10°C/min, the activated powder was carbonised for two hours. Characterisation by X-ray diffraction (XRD), Fourier transform infraed spectroscopy (FTIR), Scanning electron microscopy (SEM) and zero charge point indicated the adsorbent capacity of the synthesised activated vegetable carbon. The study of adsorption isotherms showed that adsorption is favourable by a Langmuir 1 model with a maximum capacity of 0.297 mg/g in a single layer adsorption.

Keywords: Vegetal activated carbon, Adsorption isotherms, biomaterials, Chemical activation

DUAL-FUNCTIONALIZED GELATIN-BASED HYDROGEL FOR CONTROLLED DEXAMETHASONE RELEASE AND CHONDROGENIC DIFFERENTIATION OF WJ-MSCS FOR CARTILAGE TISSUE REGENERATION

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ABSTRACT

Background: The avascular and low-cellularity nature of cartilage tissue continues to present a challenge for cartilage regeneration in the clinic. Hydrogels are promising platforms for tissue engineering due to their highly biomimetic microenvironment that supports cell survival and differentiation. Herein, a dual-functionalized gelatin-based hydrogel was fabricated using click chemistry and photopolymerization to obtain a well-crosslinked polymer network, capable of controlled dexamethasone (DEX) release to promote chondrogenic differentiation of Wharton's Jelly mesenchymal stem cells (WJ-MSCs) for cartilage tissue regeneration. **Method:** Gelatin was dually functionalized with methacrylate and furan groups. The resulting gelatin polymer complex (GELFUMA) was reacted with the Mal-PEG-Mal crosslinker and encapsulated with DEX, forming a hydrogel via Diels-Alder reaction of furan and maleimide functionality. The hydrogel was UV-cured to photopolymerize the methacrylate groups until achieving complete crosslinking. WJ-MSCs were seeded on the hydrogel and incubated in unsupplemented basal culture medium, followed by RT-PCR gene expression analysis. **Results:** The hydrogel obtained showed improved mechanical properties, in addition to a controlled dexamethasone release. WJ-MSCs on the hydrogel also exhibited chondrogenic differentiation with markedly increased gene expression of the essential chondrogenic markers, collagen II and prolactin. **Conclusion:** This dual-functionalized hydrogel system offers a versatile and bioactive framework for cartilage regeneration that combines Diels-Alder chemistry with UV-mediated photopolymerization. The sustained release of dexamethasone within a mechanically stable, photo-crosslinked environment facilitates WJ-MSC-derived chondrogenesis, which may represent a promising stem cell-based alternative strategy for regenerative medicine and tissue engineering applications.

Keywords: Dual-Functionalized gelatin, hydrogels, Click chemistry, Sustained Dexamethasone release, Cartilage tissue engineering

OPTIMIZATION OF CONCRETE-OLIVE POMACE BIOCOMPOSITE: THERMAL, MECHANICAL AND HYGRIC IMPACTS

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ABSTRACT

In response to the growing concern over rising energy consumption in the building sector in recent years, the use of insulating materials in building envelopes appears to be a highly attractive solution. This work aligns with this approach, aiming to design a new composite material based on concrete and plant fibers (olive pomace) for use as thermal insulation in buildings. An experimental study was conducted to determine the thermo-physical characteristics (thermal conductivity and diffusivity) and mechanical properties of samples made from concrete with varying proportions of olive pomace. The effect of humidity (moisture content) on their performance was thoroughly examined. The results show that adding fibers (olive pomace) to concrete enhances the insulating capability of the resulting material (lightweight concrete) but compromises its mechanical performance. Consequently, a judicious choice regarding the proportion of added olive pomace in the concrete must be made. This ensures improved thermal characteristics (insulating capability) without undermining mechanical performance, which remains the decisive parameter for any material used in construction.

Keywords: Energy consumption, Building insulation, biomaterial, Concrete, Olive pomace, Thermo-physical properties, Mechanical properties, Moisture content

EFFECT OF BASIL OIL EXTRACT ON A TARGET GROUP OF HOUSE MOSQUITOES CULEX PIPIENS

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ABSTRACT

Insecticides are commonly used to control pests, such as mosquitoes, to protect human health and agricultural crops. However, the use of pesticides can have significant and negative impacts on the environment, humans, and animals in particular. Our study aimed to evaluate the effectiveness of basil oil in biological control against a target species, Culex pipiens larvae, and to determine its effectiveness as an alternative insecticide for controlling house mosquito larvae. Basil is a common medicinal plant in the Mediterranean region and is widely found in Algeria. It is used in traditional medicine and has several therapeutic properties. We conducted a toxicity test of basil oil at several concentrations on fourth-instar Culex mosquito larvae. We performed statistical analysis using Excel 2010, and the results showed a significant difference between the effects of different concentrations. We repeated the experiments three times to verify the results and avoid errors. The results showed that basil oil was highly effective in eliminating the larvae. These results confirm that basil oil can be an effective natural means of controlling Culex mosquitoes. Therefore, it could be used in biological control programs to reduce the spread of mosquitoes and the diseases they transmit. This study also opens the door to further research to determine the biological effectiveness of basil oil against Culex pipiens mosquitoes, as well as to study the mechanisms of action of these oils in controlling mosquitoes, avoiding the use of insecticides.

Keywords: Keywords: Plant, Basil oil, Culex pipiens, Insecticide, Extract

HOME GARDENS AS BIOCULTURAL RESERVE OF LOCAL PLANT DIVERSITY AND TRADITIONAL KNOWLEDGE

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ABSTRACT

The garden is biocultural reserve where valuable local plant genetic resources, as well as knowledge about their cultivation and use, are conserved from generation to generation. Especially in the case of food plants, an important example of which are beans, the desire to preserve landraces is result from the emotional devotion towards the traditional taste of local dishes. In this context the role of gardens as repositories of biological diversity has been acknowledged and a comprehensive, interdisciplinary investigation of their agro-biodiversity is needed. Home gardens, whether situated in rural or urban areas, are characterized by a structural complexity and multifunctionality which enables the provision of different benefits to ecosystems and people. Local farmers engage in food production for subsistence or small-scale marketing and the variety of crops and wild plants provides nutritional and medicinal benefits. At the same time, home gardens are important social and cultural spaces where knowledge related to agricultural practices is transmitted and through which households may improve their income and livelihoods. The present study summarizes available documentation on 11,334 local accessions, collected from expeditions in Bulgaria. It discusses future opportunities and prospect of promoting their role in conservation of agricultural biodiversity and cultural heritage. The results support the hypothesis that home gardens sustain rich diversity while contributing to its conservation. However, with the intensive agricultural production, home gardens are unlikely to be preserved if they are not actively mainstreamed in production and conservation policies through add value as cultural heritage.

Keywords: landrace, on farm conservation, agroecosystem, heritage, add value

EXPLORING THE AVAILABILITY OF BULGARIAN PLANT GENETIC RESOURCES IN THE INTERNATIONAL CROP NETWORKS

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ABSTRACT

Ex situ collections are backup copy of diversity and thus its conservation is guaranteed. One of the most widely discussed topics in current ecological politics is concerning the open access to the plant genetic resources by all stakeholders. EU countries are acting together to ensure the access to the gene fund as a public resource responsible for food security and with critical importance for the sustainability of the agrifood system. IPGR-Sadovo maintains the richest genebank collection in Southeast European region and it is nominated as a national focal point in the European search catalogue for plant genetic resources – EURISCO (http://eurisco.ecpgr.org). The electronic network includes passport information according to FAO/Bioversity descriptors. The study aims to present the status of Bulgarian National Inventory in EURISCO. The standard of the data allows the development to be evaluated and described using passport descriptors: number of accession, genus, species, common crop name, collecting number, geographic coordinates (latitude, longitude, elevation), collecting and acquisition date, FAO institute code, biological status of accession (wild, landraces, breeding material, advanced cultivar), collecting source (wild or cultivated habitat, research organization or genebank). The results show high diversity level between data recorded for each descriptor and crop. The published ex situ accessions in EURISCO from Bulgaria are 70,996 in total and belong to 532 genera and 1,927 plant species. The national collection is the 7th largest in Europe with a share of 3.36% after Great Britain, Russia, Germany, Ukraine, Poland and Spain. The information system for documentation of Bulgarian genebank implements an export from the database to EURISCO. A convenient and flexible architecture of the application has been developed, which includes intelligent modules to facilitate the data transfer process. Through EURISCO, the data for Bulgarian collection is presented in the other international information networks such as, AEGIS, WIEWS and GENESYS.

Keywords: accession, plant databases, passport descriptors, European collaboration, open access

STUDY OF REPRODUCTION OF THE FLATHEAD GREY MULLET MUGIL CEPHALUS (LINNAEUS, 1758) (TELEOSTEI, MUGILIDAE) FROM NORTH-EASTERN ALGERIA

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ABSTRACT

This biological study devoted to the flathead grey mullet (Mugil cephalus) in the eastern of Algeria, was carried out over seven months and from a global sample of 137 individuals (18.76 ≤ Lt ≤ 33 cm; 57.8 ≤ TW ≤ 384.9 g; 53.3≤ EW ≤ 333.6 g). We focused mainly on the reproduction of this species. The maximum total length measured in this work does not exceed 33 cm. Our study period runs from October 2024 to April 2025 and does not cover the summer period, the latter being the breeding season for mullet according to the literature. The gonado-somatic ratio is ranged between 0.11 to 0.89 and the the hepato-somatic index varied from 0.46 to 2.04. Monitoring the monthly variations of the condition coefficient K showed fluctuations during the sampling period. Overall, the values range between 0.19 and 1.12. The global sex ratio is in favor of females (SR = 0.25 ; χ^2obs = 29.76 ; p ≤ 0,001), constant in October, March and April (0.38 ≤ SR ≤ 0.8; 0.11 ≤ χ^2obs ≤ 2.27; p ≤ 0.05) and females dominate the rest of the year.

Keywords: Mugil cephalus, reproduction, North-eastern, Algeria

SCALIMETRIC STUDY AND POPULATION GROWTH OF THE FLATHEAD GREY MULLET MUGIL CEPHALUS (LINNAEUS, 1758) (TELEOSTEI, MUGILIDAE) FROM NORTH-EASTERN ALGERIA

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ABSTRACT

The present study concerns the ecosystem management of Mugi cephalus (Linaeus, 1758) of Easthern of Algeria. Different points were addressed: the study of age and growth (linear and weight), in order to better characterize the population of the flathead grey mullet in extreme North-East Algeria, especially that no recent studies had not been reported in the region. Using the scalimetric method, we isolated 4 age classes with a predominance of the 2 year old size class in the total population (F = 56.82%). The maximum total length measured does not exceed 33 cm. The growth of M. cephalus was described by the classic Von Bertalanffy model which gave calculated asymptotic lengths ($L\infty$ = 34.49 cm) matching perfectly with the maximum length observed in the total population (Lt = 33 cm), as well as an asymptotic weight ($P\infty$ = 403.712 gr), a growth rate k = 0.39 and a t0 = -7.67. Growth performance in this species is relatively high (Φ = 2.67) in the study area compared to other Mediterranean populations.

Keywords: Mugil cephalus, scalimetry, growth, North-Eastern, Algeria

CONTRIBUTION TO THE INVENTORY OF MARINE MACROALGAL SPECIES ALONG THE SKIKDA COAST (NORTHEAST ALGERIA): BIODIVERSITY AND HEALTH OF MARINE ECOSYSTEMS

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ABSTRACT

Algal biodiversity is extraordinary, species number varies from around 30,000 to several million (Mathew, 2011). Algal diversity is of interest in various economic, medicinal fields. Eologically, they are vital to the health of aquatic ecosystems (Mata et al., 2010). In Algeria, algae are particularly varied, thriving along the Mediterranean coast and including endemic and common species to Mediterranean waters, (Seridi and Bouzidi., 2016). Our work is the first contribution to the development of an inventory of macrolagues on the coastline of SKIKDA, and to our knowledge, of eastern ALGERIA, and represents a significant step forward in determining the marine biodiversity of this region. In addition, will help to assess water quality and the health of marine ecosystems. Three sites were chosen (Plage MARKET, MILITAIRE 2 and PARADIS) for our experimental study, located in the open sea in the STORA gulf on the north-western side of the town of SKIKDA.Algal harvesting was carried out by random sampling. On the beach, a 25-metre transect was marked out, in which 3 quadrats of 1 square metre (1m2) each were set up. The species identified and their numbers were determined per quadrat and per site. Species identification is carried out using the Atlas of marine algae identification key (Hariot 1892), the FAO species identification sheets and scientific documents (Boudouresque, 2005; Pergentet al, 2007). As well as several databases: Algae Base (https://www.algaebase.org/) , DORIS (Données d'Observations pour la Reconnaissance et l'Identification de la faune et la flore Subaquatiques) (https://doris.ffessm.fr/), the nature22 website (https://www.nature22.com/).The classification and scientific names used were established according to WoRMS Taxon detail (Word Register of Marine Species (https://www.marinespecies.org/).Statistical analysis included the calculation and comparison of algal species means using the ANOVA test, Excel 2021 software and garphpad prism 9.The identification enabled us to collect 18 species divided between the three taxa as : Chlorophyta (2 families, 3 genera, 4 species) ; Ochrophyta (4 families, 5 genera, 5 species) and Rhodophyta (7 families, 9 genera, 9 species). Red algae are distinguished by their greater richness in terms of families, are often more resistant to stressful conditions and can thrive where other species cannot. Green algae, on the other hand, show the lowest diversity, perhaps indicating a more specific ecological niche. It is necessary to continue this work over several years and to carry it out on other beaches and areas in order to estimate the marine biodiversity of the Macroalgae of our coastline. Additional studies on the physico-chemical characteristics of seawater could help to explain the distribution of species on beaches and the state of health of our marine ecosystems.

Keywords: Macro-algae, marine ecosystems, biodiversity, Gulf of SKIKDA, eastern ALGERIA

IMPACT OF FIRE ON THE AVIFAUNA OF CORK OAK FORESTS IN EL-KALA NATIONAL PARK

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ABSTRACT

Birds are a group of organisms that are particularly sensitive to natural or artificial changes in the environment. It is well established that the physiognomy of vegetation has a direct influence on the structure of their abundance. The consequences of changes in vegetation on birds have been demonstrated in a variety of contexts, including succession processes in forest environments, intensification of agricultural environments, agricultural abandonment and post-fire dynamics. The recurrence of fires is a threat to Algerian cork oak forests. The aim of this study was to determine the composition and structure of the Fringillidae passerine population in a post-fire suberial forest in the El-Kala National Park, in order to measure the adaptability of species in this family, which is already threatened by illegal trade, in constrained environments. To monitor passerines, we adopted the IPA method, in which surveys were carried out from March to June in a post-fire forest and a control forest over three consecutive seasons. The results show that 3 species of Fringillidae can be considered as persistent or pioneers: the Tree Finch, the Cinereous Finch and the European Greenfinch. However, species richness and density are lower in the post-fire subéraie. It would appear that fire plays a major role in the decline in Fringillidae populations, although subéraies subject to fire are capable of gradually regenerating and recovering, at least in part, their initial avifauna populations.

Keywords: avifauna, Fringillidae, IPA, forests, fire, Cork oak

PRELIMINARY STUDY ON THREATS AND STRANDINGS OF SEA TURTLES IN ALGERIA (WESTERN MEDITERRANEAN)

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ABSTRACT

Between December 2015 and December 2017 a total of 63 sea turtles were recorded as being stranded along the Algerian coast. The loggerhead sea turtle Caretta caretta was the most commonly stranded species (n = 44) (69.8%), followed by the leatherback Dermo chelys coriacea (n = 18) (28.6%) and the green turtle Chelonia mydas (n = 1). There was a slight dominance of the adult size class for stranded loggerhead turtles, while, for the leatherback, late juveniles and adults prevailed. Most loggerhead turtles stranded during the summer months (July and August), whereas most leatherbacks stranded during winter. The breakdown of the strandings by region shows a slight dominance along the western and central shores for C. caretta and a clear dominance in the west for D. coriacea. The primary cause of death was determined in 50.8% of the stranded turtles. Regarding the evidence of interactions with humans the major cause of stranding in loggerhead turtles was incidental catch by artisanal fisheries, followed by boats' collisions. The main causes of leatherback strandings were boats' collisions. Algerian data show that human activities affect loggerhead turtles and also prove a significant presence of the leatherback turtle on this coast.

Keywords: Algerian coast, Caretta caretta, Chelonia mydas, Dermochelys coriacea, Mediterranean Sea

SOME TAXONOMIC, ECOLOGICAL AND ETHNO-ENTOMOLOGICAL DATA ON THE LOCUSTS (ORTHOPTERA) OF THE HABITATS OF VLORA

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ABSTRACT

The Order Orthoptera belongs to the Class of Insects. This study presents taxonomic, ecological, and ethno-entomological data of species of the Order Orthoptera in various habitats of the Vlora area. Expeditions were conducted to collect biological material at 4 stations in the area, from 2022-2023. Our study presents a taxonomic analysis of the species, genera, and families of the specimens we encountered in these habitats, as well as some ecological considerations of the behavior of these species, based on the taxonomic analysis. We identified 33 species and 4 families of the order Orthoptera; keys and similar literature for this area were used for species identification. From the taxonomic analysis, the Acrididae family represents the highest biodiversity of Orthoptera species, with 19 species, followed by the Tettigoniidae family with 11 species. Regarding the stations, we found the highest number of species in Lepenica with 16 species, and fewer species on Zvernec Island with 12 species. The habitats in Lepenica offer optimal conditions for these species. Additionally, in this study, we took an ethno-entomological approach, based on semi-structured interviews with the local community (N=25) regarding their perceptions, attitudes, and various uses of insects, including locusts.

Keywords: Orthoptera, Biodiversity, Ethno-entomology, Taxonomy, Perceptions

MORPHOMETRIC AND MERISTIC CHARACTERIZATION OF THE GOLDBLOTCH GROUPER (EPINEPHELUS COSTAE) FROM THE GULF OF ANNABA (ALGERIA)

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ABSTRACT

Geographic structuring in Gnathostomes is a central issue in the study of population dynamics and the sustainable management of fisheries. In this context, the quantification of morphological traits within a group of individuals can reveal the degree of speciation, influenced by both biotic and abiotic factors, thereby facilitating the identification of distinct stocks. Biometric analysis traditionally aims to distinguish specific or intraspecific differences (such as subspecies or racial groups) within a single population, based on morphological parameters that may be shaped by environmental conditions. In teleosts, the combined use of morphometric and meristic traits remains an effective method for detecting genetic divergence between populations. In this study, we focus on the morphological structuring of Epinephelus costae, a commercially important grouper species found in the Gulf of Annaba (northeastern Algeria). A total of 81 individuals ($18{,}9 \leq Lt \leq 85$ cm), including both males and females, were recorded. For each specimen, 4 meristic and 14 morphometric characters were measured and then correlated with total length in order to assess morphological variability within the studied population. Mean values of the different measured parameters were compared using Student's t-test. A significant correlation ($0{,}55 \leq r \leq 0.99$, $p \leq 0{,}05$) was observed for all metric parameters with respect to total or head length. Among the fourteen morphometric characters studied, eight (57%) exhibited positive allometric growth, while four (28%) showed isometric growth.

Keywords: Epinephelus costae, Biometry, Gulf of Annaba, Algeria

AGE STRUCTURE AND GROWTH MODELING OF THE WHITE SEABREAM DIPLODUS SARGUS SARGUS FROM THE GULF OF ANNABA (ALGERIA)

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ABSTRACT

For the implementation of sustainable fisheries management, it is essential to have fundamental data on the biology, ecology, and population dynamics of exploited fish species. Among these, information on age and growth plays a central role. Indeed, age and growth data are critical for understanding the life-history traits of species and populations (such as longevity, age at recruitment, age at sexual maturity, spawning periods, migration, and mortality), as well as for analyzing the demographic structure and dynamics of populations. In this context, the study of age and growth in Diplodus sargus sargus in the Gulf of Annaba provides key insights for assessing stock status and guiding management strategies. A total of 103 individuals, ranging in length from 10.8 to 29 cm and including both males and females, were sampled. Fish age was determined using scale reading (scalimetry), which allowed the identification of five age groups within the overall population. Growth was modeled using the von Bertalanffy growth equation, with the following estimated parameters: $L\infty = 28.1$ cm, $W\infty = 390.6$ g, $k = 0.39$, and $t_0 = -0.134$. The parameters of the length–weight relationship, which were also analyzed to better characterize individual development, indicated that D. sargus sargus in the Gulf of Annaba exhibits isometric growth.

Keywords: Diplodus sargus sargus, age, growth, length–weight relationship, Gulf of Annaba, Algeria

FLORISTIC DIVERSITY IN THE SERVICE OF HEALTH: THE CASE OF PLANTS WITH THERAPEUTIC PROPERTIES USED AGAINST RESIRATORY DISEASES

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ABSTRACT

Algeria's vast territory and climatic diversity provide a wide variety of flora. This plant flora represents an invaluable reservoir of resources for the health of indigenous populations. The objective of this study is to identify the main plants used therapeutically to treat respiratory diseases and their symptoms. To do this, an ethnobotanical survey was conducted in two provinces: Algiers and Blida, using a questionnaire sent to 30 herbalists and 120 randomly selected members of the general public. The field study showed that the use of the aerial part, primarily the leaf, is the most widespread in the treatment of respiratory diseases, and infusion is the dominant method of preparation, administered exclusively orally. Examples of conditions treated include coughs, colds, asthma, and bronchitis. Furthermore, this survey made it possible to identify several aromatic and medicinal plants reported by herbalists and the population, such as: Green Anise, Clove, Thyme, Eucalyptus, Cinnamon, Mastic, Licorice, Lavender, Ginger, Oregano, Mint and many others. These plants, alternatives or complements to conventional treatments, contain substances with expectorant, anti-inflammatory, antimicrobial and bronchodilator effects that help soothe the respiratory tract, facilitate the expulsion of mucus and improve breathing. The preservation of plant diversity is essential to maintain this source of natural remedies and for the discovery of new therapeutic molecules.

Keywords: therapeutic plant, respiratory diseases, ethnobotanical survey, plant diversity

ASSESSMENT OF MOLECULAR AND AGROMORPHOLOGICAL VARIATION IN ALGERIAN SAHARAN BREAD WHEAT

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ABSTRACT

This study examines the genetic and agronomic diversity among 23 local cultivars. An inventory has been conducted in the west of Algeria (North and South) to collect bread wheat accessions for their morphological and molecular characterization. In this context, a collection of 28 traditional and new accessions was investigated using nine quantitative agro-morphological traits and ten preselected SSR markers. The phenotypic diversity was determined by the Shannon-Weaver diversity index (H') at different levels. The H' showed a wide phenotypic variability for different traits with H' average of 0.59. The multiple correspondence analysis and hierarchical clustering showed a clear distinction between different accessions. The tested SSRs produced a total number of 20 alleles with an allelic size ranged from 100 pb (WMC261) to 400 pb (WMC257). The allele frequency varied from 0.1 for the allele 230 pb (WMC156) to 1 for the alleles 187 pb, 310 pb (WMC97, WMC168). The PIC values ranged from 0 (WMC97, WMC168) to 0.5 (WMC327, WMC233), with an average of 0.34 and the observed heterozygosity (Ho) from 0 to 0.88, with an average of 0.55. The molecular variance (AMOVA) revealed the highest level of intra-population differentiation of local Saharan bread wheat (97%) and the statistical geometric distributions based on PCoA, NJ method and structure analysis confirmed the existence of four major classes of bread wheat. The phenotypic results revealed great diversity of wheat accessions. These accessions were partially matched the names of varieties because of the existence of homonyms and synonyms in the names given by farmers. While the molecular results showed that these local accessions are mainly cultivated by traditional farmers who conserve this genetic resource, often on very small plots in the oases or in an inaccessible terrains. These results substantiate the previous researches based on the morphological markers and contribute for the first time in Algeria to create the genetic fingerprint of the Saharan bread wheat resources and to valorize their drought resistance potential through breeding programs.

Keywords: Bread wheat, SSR marker, Saharan accessions, morphometric trais

THE FLORISTIC DIVERSITY OF THE ATLAS CEDAR FOREST OF DRAA CHAAB, OULED HANNECHE FOREST, BORDJ GHEDIR (W. BORDJ BOU ARRERIDJ, ALGERIA)

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ABSTRACT

A study of the floristic diversity of the series of Cedrus Atlantica vegetation was carried out in Draâ Chaâb, on the northern slope of the Ouled Hanneche forest located in the southern part of the wilaya of Bordj Bou Arréridj. It is located in semi-arid bioclimat, with a cold winter variant. During this study, 21 floristic surveys were carried out. The analysis of floristic diversity revealed the presence of 234 taxa distributed between 59 families and 180 genres, belonging to various biological and chorological types. The number of endemic taxa is equal to 35 species and that of rare and/or threatened taxa is equal to 72. Different thematic cards are developed thanks to the geographic information system with the use of a satellite image (2020) and the realization of several outings on the ground. These cards have the distribution of the plant cover according to ecological conditions and topographic characteristics. This study has demonstrated the ecological value of the Atlas Cedar Forest of Draâ Chaâb.

Keywords: Draâ chaâb's Atlas Cedar Forest, Cedrus atlantica, ecology, biodiversity, flora, cartography.

THE MURAL FLORA OF ARCHAEOLOGICAL SITES IN ALGERIA: THE CASE OF THE ROYAL MAUSOLEUM OF MAURETANIA

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ABSTRACT

The royal mausoleum of Mauretania is a monument of the time of Numidia which dates back to the first century BC (Laporte & Kherbouche, 2010). It is a circular monument, built large blocks of stones placed on each other without any connection. It has been classified since 1982 UNESCO World Heritage. The walls of this building are colonized by a so -called muricole flora. Works on the muricole flora is almost nonexistent in Algeria. Only 2 sites were studied: the ruins of the Tlemcen region (Jourdan, 1866 and Kazi Aouel, 2017) and the Royal Mausoleum of Maurétanie (Jourdan, 1867; Maire & Senevet, 1928 and Wojterski, 1985). This work undertaken in 2022 made it possible to compare the floristic inventories led by Jourdan in 1867 by Mayor & Senevet in 1928 and by Wojterski in 1985 on the flora of the monument. 80 floristic surveys were carried out and distributed over the 4 facades of the monument according to a systematic sampling. The flora which covers the royal mausoleum of Mauretania is characterized by a great systematic diversity, i.e. 168 species of vascular plants belonging to 138 genres and 59 Botanical families. There is a clear dominance of Asteraceae and Poaceae with 22 and 18 species respectively. Therophytes are the dominant biological type of this flora with a contribution of 35.09%. As for the geographical distribution, the Mediterranean floristic element largely dominates (67.26%) and fairly well characterizes the inventoried flora. The mausoleum constitutes not only a reservoir of a large number of species from neighboring habitats but also serves as a refuge for a certain number of remarkable species namely, 7 rare species, two endemic species and a protected species on a national and international scale (IUCN, 2022). Maintaining biodiversity within the mausoleum requires a vigilant maintenance aimed at reducing the growth of chamaephytes and phanerophytes occupying the joints and cavities between the blocks of the walls. This type of plants has a very important root system that can affect the stability of the building in addition to erosion and its exposure to atmospheric aggressions (rain, hail, thermal deviations). In addition, restoration or consolidation work of blocks in precarious equilibrium must be initiated for its preservation.

Keywords: Mural flora, Floristic diversity; Biological types, Endemism, Rarity; Royal mausoleum of Mauretania

MAIN CITRUS PESTS AND CONTROL METHODS: BIOLOGICAL CONTROL

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ABSTRACT

Algerian citrus orchards are attacked by several pests, all of which contribute directly or indirectly to the decline in production by weakening and deteriorating the host plant. The objective of our work is to study the fluctuations of some citrus pests and biological control methods. The study showed the presence of eight orders with 18 species including nine pests, one parasitoid, five predators and three other unidentified insects. The results obtained showed that the infestation rates of aphids (Aphis gossypii, Aphis spiraecola); the citrus leaf miner (Phyllocnistis citrella) and the Mediterranean fruit fly (Ceratitis capitata) are closely linked to the sap flow. The temporal evolution of the infestation of black and green aphids, the leaf miner and the Ceratitis show that their presence was rather slow and temporal and climate changes (temperature and humidity) had a direct influence on their presence. We also used an extract of a plant as a means of controlling aphids (green and black) this is nettle manure; the results obtained showed the effectiveness of nettle manure on the reduction of aphids. Also, preliminary work was carried out on the breeding of the ladybug (Coccinella Septem punctata), considered a natural enemy of aphids, and showed great interest

Keywords: ladybug, aphids, Ceratitis capitata, pest

THE ASSESSMENT OF THE FLORISTIC DIVERSITY OF GRASSLANDS IN THE REGION OF MOUDJBARA, NORTH-WEST ALGERIA

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ABSTRACT

The condition of the Algerian steppes is very concerning because the deterioration has worsened in recent decades. The significant alterations in vegetation cover and grazing potential necessitate actions for safeguarding, enhancing, and managing pasturing lands. Within this framework, we assess the biological and ecological potential of the Moudjbara area (Algeria) to enhance the direction of management efforts. This study is based on a phytoecological sampling conducted over two campaigns in the spring. The 49 surveys and 155 species collected were analyzed using multivariate ordination (A.F.C) and classification (C.H.A), leading to the identification of four plant groups distinguished both qualitatively and quantitatively. The numerical analysis (A.F.C) emphasized the key ecological factors influencing the vegetation distribution of the groups, which include soil texture, sand encroachment, and levels of human activity. The qualitative (taxonomic, biological, phytogeographic diversity) and quantitative (diversity index, evenness, disturbance index) assessment is carried out through a comparative analysis of the groups in the study area. Taxonomically, all the groups have a comparable composition, with the most prevalent families being mainly: Asteraceae (Compositae), Poaceae (Gramineae), Fabaceae (Leguminosae), and Caryophyllaceae. The groups featuring Stippa tenacissima and Lygeum spartum exhibit the highest diversity in terms of genera and species, along with the total number of families present. The analysis of the biological spectra reveals the significance of the impact of anthropogenic action and climate, indicated by a shift towards of therophytes and chamaephytes, and the invasion of species associated with degradation that have minimal pastoral value. The phytochoric spectra confirm the preponderance of Mediterranean elements compared to other phytogeographic elements and underscore the increasing presence of Saharo-Arabian elements within degraded formations. As for the endemic elements, their representation in the plant cover remains low in all the groups, despite an appreciable specific diversity. Analysis of the usefulness of the flora indicates that the study area is quite rich in species of economic value (pastoral, medicinal, aromatic, food, and industrial), that may serve as a significant asset for the area. Disturbance indices underscore the impact of human activity (grazing, cultivation), which appears to affect all groups. Indeed, grazing generally induces environmental heterogeneity favorable to plant diversity; however, it must be moderate, as intense disturbance can lead to a decrease in diversity. Diversity indices (Shannon (H') and Evenness indices (E)) reflect overall average diversity, with low regularity in species distribution. This work presents an initial diagnosis of the condition of the rangelands in the study area, as well as their evolution concerning disturbance factors, and must be continued with more detailed analyses to monitor the evolution of vegetation and the environment, along with a more accurate evaluation, utilizing direct methods, of pastoral capacity to enhance comprehension of the functioning mechanisms of disturbance factors and the adaptive strategies of biological resources.

Keywords: Steppe, biodiversity, index, pastoral potential

RAPID ASSESSMENT OF THREAT STATUSES OF FISH SPECIES IN DRIN RIVER - ALBANIA

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ABSTRACT

Drin River is the longest river in Albania with about 285 km length. Its two branches start respectively from Lake Ohrid and from its waterfall in Western Kosovo. The fish fauna of the Drin River consists of 52 species. Of these, 9 species have a significant threat status according to the IUCN, while only 13 of them are included in the list of threatened species for Albania. In order to assess the global and national threat levels of the fish species of Drin River, after the preparation of the species list, IUCN global and national threat statuses have been established, as well as comparisons and discussions have been made for species or groups of species in different cases. From the list of threatened species for Albania, in 9 cases the national level of threat is higher than the global one, for 3 species it is lower and for one it's the same. More than half of the fish species of the Drin River belong to the group of market fish species that are used for consumption. The river Drin should be considered as an important habitat with many values in terms of fish fauna. Therefore, it is necessary to carry out in-depth studies and take measures to preserve the populations of these species.

Keywords: fish, threatened species, Drin River, biodiversity, ecosystem

COLEOPTERAN DIVERSITY IN PEAR ORCHARDS OF KHEMIS MILIANA, ALGERIA

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ABSTRACT

With the aim of studying the diversity of Coleoptera associated with Pear cultivation (Pyrus communis) in 2018, three orchards located in the Khemis Miliana region in north-west Algeria were chosen, belonging to the subhumid to temperate winter bioclimatic stage. One was a control orchard that had undergone no phytosanitary treatment, and the other two were orchards with different cardinal directions (north-south) and (east-west) treated by a reasoned chemical control. In order to identify the component of this order, two main sampling methods were used: Barber pots and yellow plates, supplemented by other sampling methods using Japanese umbrella, sweep nets, and shelter traps. The results obtained for one year of study and field prospection revealed that, in the control orchard, the Coleoptera order is represented by 536 individuals in 17 families. The Carabidae were the best represented, with 370 individuals, or 69% of the total number of Coleoptera caught. The most dominant Carabidae species were Poecilus striatopunctatus (166 individuals, 10.36%), Brachinus efflans (123 individuals, 7.68%) and Pseudoophonus rufipes (20 individuals, 1.25%). In terms of abundance for the two orchards N/S and E/O, the Coleoptera inventoried were represented by 15 and 14 families respectively. The results obtained for the N/S orchard revealed that the Carabidae family is the most dominant (61%), represented by 4 abundant species: P. striatopunctatus (113 individuals or 5.80%), Brachinus sp. (50 individuals or 2.57%), B. efflans (43 individuals or 2.21%) and P. rufipes (14 individuals or 0.72%). In the E/O orchard, Carabidae remained the most abundant species, accounting for 63% of the total. The most abundant species in this family are P. striatopunctatus (120 individuals, 4.44%), B. efflans (77 individuals, 2.83%), C. rotundicollis (34 individuals, 1.25%), H. distinguendus (30 individuals, 1.10%) and P. rufipes (22 individuals, 0.81%).

Keywords: Coleoptera, Khemis Miliana, Pyrus communis, Carabidae, Poecilus striatopunctatus

BIODIVERSITY OF EPIPHYTIC LICHENS ON CEDRUS ATLANTICA IN THE CHELIA FOREST MASSIF (AURÈS, NORTHEASTERN ALGERIA)

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ABSTRACT

The Chelia forest massif, located in the Aurès region, is characterized by an exceptional lichen flora, given the diversity of its woody plant formations, represented mainly by the Atlas cedar. To date, no lichen study has been conducted in this forest massif, hence the interest of this work, which highlighted the influence of the phorophytes studied on the distribution of different lichen taxa. Lichen surveys were carried out on 10 phorophytes, which nevertheless presented the most species-rich groupings. More than 60 lichens were recorded on Cedrus atlantica, represented by two types of photobionts: green algae and cyanobacteria. The systematic spectrum indicates that the inventoried lichens belong to 19 families, the largest in terms of taxa being Physciaceae and Lecanoraceae, with 18 and 15 species respectively. The physiognomic spectrum notes the predominance of two lichen categories: crustose and fruticose. The total richness quantified by vegetation type highlights the importance of lichens from the mesomediterranean zone, with 50%. The ecological index related to the phytogeographic aspect indicates that the lichen flora of the studied phorophytes is composed of two main chorotypes; the temperate and the suboceanic.

Keywords: Lichens, Cedrus atlantica, Biodiversity, Chelia, Aurès, Algeria

ORNITHOLOGICAL VALUE AND NATURAL FUNCTION OF A MEDITERRANEAN WETLAND, THE MEKHADA MARSH (NORTHEASTERN ALGERIA)

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ABSTRACT

The Mekhada marsh is one of the most important wetlands in the El Kala complex. This study aims to assess the current biodiversity of the avian population of the said marsh over one year (from September 2023 to August 2024). It aims to characterize the resident and non-resident avifauna in the different habitats of the Mekhada marsh. These habitats are the result of the developments carried out on the main wadis that feed the marsh. The method used is progressive frequency sampling (PFS), perfectly suited to the field of study. Sampling was carried out in different environments (meadow, mudflat, shallow water, wadi and Phragmites and Orundu formations, reforested dike and banks. The sampling made it possible to count 123 species distributed among 39 families and 17 orders. The best represented order is that of the Passeriformes with 15 families. The total richness of the breeding avifauna varies between 30 species in the wet meadow, 25 species in the mudflat, 37 species in the Phragmites and shallow water, 33 species in the wadi and Phragmites and Orundu formation and finally 44 species for the reforested dike and bank. In terms of the phenology of the breeding population, there is a predominance of sedentary birds compared to summer visitors and visitors in the Mekhada marsh. The values of the H' diversity index are high in the five habitats, especially at the of the reforested dike and the banks, or 5.16 bits. The equitability values tend towards 1 for all marsh habitats. In terms of temporal variation in site richness during the study period, the winter period is more diverse than the summer period for three habitats, while the last two habitats (wadi and phragmites and orundu formation, reforested dike and bank) have higher summer season values. Niche overlap for all studied habitats ranges from 0.98 to 1.00, indicating the existence of resource sharing between the species that inhabit the different marsh habitats.

Keywords: Avifauna, habitat, wetland, ecological indices, Mekhada marsh, Algeria

ENTOMOLOGICAL BIODIVERSITY OF OAK FORESTS IN THE AIN ZANA REGION (SOUK-AHRAS, NORTHEASTERN ALGERIA)

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ABSTRACT

The Ain Zana Forest in northeastern Algeria is a biodiversity hotspot characterized by a mosaic of oak species and varied habitats. This study examines how habitat heterogeneity influences arthropod diversity across five forest habitats: Cork Oak, Zeen Oak, Mixed Oak formations, Afares Oak, and Low Scrubland. A total of 116 arthropod taxa, spanning 44 families and nine orders, were recorded, with Coleoptera emerging as the most diverse group. The results reveal that habitat structure significantly influences arthropod assemblages, with Low Scrubland hosting the highest diversity and Cork Oak forests showing the lowest. Unique taxa were most prevalent in transitional habitats, while shared species highlighted ecological connectivity between habitats. Non-metric multidimensional scaling (NMDS) and Jaccard index analyses demonstrated distinct taxa compositions across habitats and vegetation strata. These findings highlight the critical role of habitat heterogeneity in shaping biodiversity and emphasize the need for conservation efforts tailored to the unique ecological features of oak-dominated landscapes.

Keywords: Arthropod diversity, Oak forests, Ain Zana, Souk Ahras, Algeria

MORPHOLOGICAL AND SOIL BASED DIFFERENTIATION OF A NATIVE GENETIC RESOURCE: TRACHYSTEMON ORIENTALIS

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ABSTRACT

Trachystemon orientalis is a perennial, edible species native to the Eastern Black Sea Region of Türkiye and holds growing interest as a local genetic resource for climate-resilient agriculture. This study investigated the relationship between morphological traits and soil characteristics across 36 natural populations of T. orientalis collected from diverse ecological zones within the provinces of Rize, Trabzon, and Artvin. Plant traits such as height, leaf number, rhizome length, and rhizome diameter were measured on site. Corresponding soil samples were analyzed for texture, organic matter (OM), pH, electrical conductivity (EC), calcium carbonate ($CaCO_3$), and the availability of macro- and micronutrients (P_2O_5, K_2O, Ca, Mg). The results of the Pearson correlation analysis compellingly demonstrate strong positive relationships between rhizome traits and the availability of essential nutrients such as phosphorus, potassium, and magnesium. Additionally, there is a notable correlation with OM and EC. Soil texture was negatively correlated with saturation and rhizome development. Principal Component Analysis (PCA) explained 75.3% of the total variation in the first five components. The first principal axis (27.3%) captured variation in soil fertility (P, K, Ca, EC), while morphological traits were primarily loaded on later components (F4 and F5), suggesting that rhizome expression is shaped by a combination of soil nutrient status and structural properties. The results highlight significant morphological and edaphic differentiation among populations, underscoring the species' adaptability and the influence of local soil environments on phenotypic traits. These findings contribute to the understanding of T. orientalis as a promising native resource for sustainable cultivation, habitat-based selection, and conservation under variable growing conditions.

Keywords: native vegetable, genetic resource, rhizome development, soil–plant interaction, phenotypic variability, sustainable agriculture

IMPACT OF PARASITIC LOAD ON THE MORPHOLOGICAL PARAMETERS OF THE MEDITERRANEAN POND TURTLE MAUREMYS LEPROSA IN NORTH-EASTERN ALGERIA

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ABSTRACT

Morphological parameters were measured on a population of the Mediterranean pond turtle Mauremys leprosa, (Schweigger, 1812) in Majen Belahriti pond in the region of Guelma (North-east of Algeria). Females exhibited a longer carapace length (CL) at 177 ± 23.85 mm, surpassing that of males (151.45 ± 31.12 mm), and they also displayed a higher body weight (BW) at 756.52 ± 243.91 g, which was notably greater than that of males (453.09 ± 224.42 g). Placobdella nabeulensis Ben Ahmed, Gajda, Utevsky, Kwist & Świątek, 2023 (Hirudinida, Glossiphoniidae) was identified as the only ectoparasite affecting M. leprosa, with an average body length and width of 11 ± 5.83 mm and 5.1 ± 2.89 mm respectively. The intensity, represented by the average number of leeches per turtle, was calculated to be 2.21 ± 1.31 for this specific population and a prevalence rate of 21.17 %. The tail region showed the highest parasite load, indicating its increased susceptibility compared to other body parts.

Keywords: Mediterranean pond turtle, morphological parameters, leaches, prevalence, infestation, Algeria

COUNTING OF NESTING BIRDS AT A RAMSAR SITE (NORTHEAST ALGERIA)

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ABSTRACT

The wetland complex of northeastern Algeria is composed of several freshwater and brackish water bodies, most of which play a crucial role during the summer period, which is essential for many waterbird species. Lake Tonga (northeastern Algeria), a Ramsar site, is considered an important wintering and breeding wetland for avifauna in North Africa. The main objectives of this study were to assess the abundance of individuals, the number of nests, and the number of eggs during the breeding seasons over two years: 2024 and 2025. After two years of study, a total of eighteen species belonging to six families were recorded. The results revealed that the Eurasian Coot (Fulica atra) was the most abundant and most reproductive species, showing a marked increase in numbers between the two years (5,341 individuals in 2024 compared to 8,260 in 2025), as well as the highest number of nests and eggs. Other species such as the Common Moorhen, Great Crested Grebe, and Cattle Egret were also well represented in terms of individuals, nests, and eggs. In contrast, the Little Bittern and the Glossy Ibis were rarely observed. Shannon diversity indices showed a steady increase from February to May, reaching high and similar values in both years: approximately 2.28 bits for individuals, 2.69 bits for nests, and 2.52 bits for eggs, with an evenness index ranging from 0.87 to 0.90. These results reflect a rich and balanced avian community. Statistical analysis (ANOVA) confirmed that species, year, and sampling period significantly influenced abundance and reproduction, with species having the most significant effect ($p < 0.0001$). Overall, these results reflect the ecological stability and avifaunal richness of Lake Tonga.The wetland complex of northeastern Algeria is composed of several freshwater and brackish water bodies, most of which play a crucial role during the summer period, which is essential for many waterbird species. Lake Tonga (northeastern Algeria), a Ramsar site, is considered an important wintering and breeding wetland for avifauna in North Africa. The main objectives of this study were to assess the abundance of individuals, the number of nests, and the number of eggs during the breeding seasons over two years: 2024 and 2025. After two years of study, a total of eighteen species belonging to six families were recorded. The results revealed that the Eurasian Coot (Fulica atra) was the most abundant and most reproductive species, showing a marked increase in numbers between the two years (5,341 individuals in 2024 compared to 8,260 in 2025), as well as the highest number of nests and eggs. Other species such as the Common Moorhen, Great Crested Grebe, and Cattle Egret were also well represented in terms of individuals, nests, and eggs. In contrast, the Little Bittern and the Glossy Ibis were rarely observed.

Shannon diversity indices showed a steady increase from February to May, reaching high and similar values in both years: approximately 2.28 bits for individuals, 2.69 bits for nests, and 2.52 bits for eggs, with an evenness index ranging from 0.87 to 0.90. These results reflect a rich and balanced avian community. Statistical analysis (ANOVA) confirmed that species, year, and sampling period significantly influenced abundance and reproduction, with species having the most significant effect ($p < 0.0001$). Overall, these results reflect the ecological stability and avifaunal richness of Lake Tonga.

Keywords: Lake Tonga, waterbirds, breeding, nests, eggs, abundance

INVENTORY OF DAY BUTTERFLIES « RHOPALOCERANS » AT MELLAH LAKE (NORTH EASTEREN –ALGERIA)

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ABSTRACT

This study aimed to determine the diversity and abundance of butterflies (Rhopalocera) in the Lake Mellah region of Algeria. It compares the distribution of different butterfly families across various habitats, highlighting their response to thermal gradients and environmental disturbances. This work emphasizes that natural habitats support greater diversity and a more balanced distribution of species, whereas cultivated habitats show a dominance of certain families, such as Pieridae. These insects are considered important bioindicators, as their behavior and diversity reflect the ecological state of environments. Recent research in Algeria has deepened the understanding of these populations, thereby contributing to their conservation and the management of local ecosystems.

Keywords: Rhopalocera, diversity, Lake Mellah, Bioindicators

SPATIAL AND TEMPORAL VARIABILITY OF SOIL FAUNA IN DIFFERENT RAMSAR SITES (NORTHEAST ALGERIA)

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ABSTRACT

This study focuses on soil fauna in Lakes Mellah, Tonga and Oubeira, located in the El Kala region, with particular emphasis on seasonal variation in faunal communities. Soil fauna, which is essential to soil health and ecosystem functioning, exhibits remarkable taxonomic diversity, comprising mainly arthropods, molluscs and annelids. Analyses showed that Lake Tonga has the highest abundance of individuals but low evenness, reflecting a dominance by a few families, while Lake Oubeira has the highest richness and diversity with a more balanced distribution of species. Lake Mellah, although less rich in families, shows good uniformity in their distribution. The results revealed significant seasonal fluctuations in species composition and abundance, influenced by environmental factors such as temperature, humidity and vegetation cover, as well as site-specific characteristics. These variations were significant between lakes, highlighting the sensitivity of soil fauna populations to seasonal changes. The distribution of families is mostly specific to each lake, with little overlap, and increased homogeneity of communities observed in winter. Finally, the soil biological quality index (SBQI) confirms that the soils of these lakes have very good to excellent biological quality, indicating healthy ecosystems that are well adapted to local conditions. This study thus provides valuable insights into the dynamics of soil fauna in the El Kala region and their role in ecological processes.

Keywords: Soil fauna, Mellah Lakes, Tonga, Oubeira, El Kala region, Arthropods, Molluscs, Annelids, Abundance, Evenness, Species richness, Diversity, Soil biological quality index (SBQI)

DIVERSITY OF ELASMOBRANCHES IN THE NORTHEAST ALGERIAN

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ABSTRACT

At the level of the Mediterranean, one finds a rather diverse fauna of elasmobranchs including 45 species of sharks and 36 species of rays. More than 80% of these species are identified as being vulnerable, endangered or critically endangered. Little work has been done on this zoological group in Algerian waters, particularly the northeast coast, where their fishing is opportunistic rather than targeted, as their capture is not daily and regular. To update the list of elasmobranch species, we studied the diversity of these cetaceans through observations of their landings at the port level. During this study, 18 species of elasmobranchs were encountered, distributed among 15 species of rays and 3 species of sharks. Data on the frequency of landings by species reveal that the shark Scyliorhinus canicula and the ray Raja radula are the most landed species with the presence of two species classified as critically endangered Rhinobatos rhinobatos and Manta birostris. Furthermore, male individuals are predominant in the samples surveyed and females are longer than males.

Keywords: Chondrichthyans, Inventory, Sharks, Batoids, Red list

ASSESSMENT OF ROTIFER DIVERSITY AND PHYSICO-CHEMICAL WATER QUALITY IN THE OURKISS RESERVOIR (OUM EL BOUAGHI, ALGERIA)

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ABSTRACT

The Ourkiss Dam reservoir, located in Wilaya of Oum El Bouaghi (northeastern Algeria), serves as a major water supply source for domestic and agricultural purposes. As a reservoir that receives transferred water from the Beni Haroun Dam and Oued Athmania (W. Mila), it lies within the Constantine Plateau hydrological basin a transitional zone between the Tellian and Saharan Atlas. This study aimed to assess the diversity of rotifers and evaluate the physico-chemical water quality of the reservoir. Sampling was conducted during autumn, winter, and spring of 2022–2023 at three different stations. Water quality parameters were measured, and zooplankton was collected using a 50 µm mesh plankton net. The results revealed 14 rotifer species belonging to 9 families. The family Brachionidae was the most represented, with 4 species of the genus Keratella. The most abundant species was Keratella cochlearis cochlearis, observed throughout the entire sampling period, indicating eutrophic conditions. Physico-chemical analyses showed poor to mediocre dissolved oxygen levels, moderate concentrations of sulfates and suspended solids, good levels of calcium, nitrate, and pH, and very good values for temperature, ammoniacal nitrogen, and orthophosphates. Winter exhibited the highest species richness with 12 species. However, the presence of certain pollution-tolerant rotifer species suggests moderate to high levels of organic pollution, likely due to anthropogenic influences.

Keywords: Rotifers; water quality; freshwater ecology; dam reservoir; Algeria

SUSTAINABLE USE AND CONSERVATION PERSPECTIVES OF PALLENIS HIEROCHUNTICA IN ARID ALGERIAN ECOSYSTEMS: BETWEEN MEDICINAL DEMAND AND ECOLOGICAL FRAGILITY

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ABSTRACT

Pallenis hierochuntica is a highly valued wild medicinal plant in Algeria, particularly in the arid ecosystems of the Tebessa region. While its phytochemical richness and therapeutic potential make it an attractive candidate for pharmacological and cosmetic industries, its growing demand raises serious concerns regarding overharvesting and ecological sustainability. This study investigates the ecological distribution of P. hierochuntica and assesses the pressures exerted on its natural habitats due to unsustainable collection practices. Through a combination of field observation, local interviews, and literature review, the study identifies the major threats to its survival, including habitat degradation, lack of cultivation initiatives, and absence of regulatory frameworks. The findings emphasize the urgent need for a sustainable management plan that includes in-situ and ex-situ conservation, cultivation programs, and community awareness. By integrating ecological and socio-economic perspectives, this work proposes a balanced approach to valorize P. hierochuntica without compromising its long-term viability in fragile steppe ecosystems.

Keywords: Pallenis hierochuntica, Arid ecosystems, Wild medicinal plants, Overharvesting, Sustainable use, Environmental conservation, Community-based cultivation

COMPARATIVE STUDY OF THE MALACOFAUNA IN PORTO PALERMO BAY (ALBANIA, IONIAN SEA)

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ABSTRACT

Porto Palermo Bay is located along the rocky Ionian coast of southwestern Albania, in Himara area. This study presents a comparative analysis of the species composition, quantitative characteristics, population stability, and seasonal variation of mollusc communities in the bay, where historical data on malacofauna have been limited. Sampling was conducted in two different seasons, Autumn (October) 2022 and Spring (May) 2024, focusing on the supralittoral and mediolittoral zones. The Spring 2024 survey recorded a significantly higher number of taxa, with 48 taxa compared to 24 identified in Autumn 2022. Species richness was higher in Spring season. Mollusc families of Cerithiidae, Trochidae, Patellidae, Pisaniidae, Rissoidae, Columbellidae, and Mytilidae showed greater abundance in Spring compared to Autumn. By contributing new data on the composition and distribution of mollusc communities, this research enhances current knowledge and understanding of marine malacofauna in Albania. Additionally,it further supports scientific evidence for biodiversity conservation and coastal management strategies in this ecologically valuable region, including the recently proclaimed Marine Protected Area of Porto Palermo – Llaman.

Keywords: benthic invertebrates, molluscs, marine protected areas, marine and coastal conservation

DISTRIBUTION OF BREEDING BIRDS AT LAKE TONGA

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ABSTRACT

Our study aimed to assess the diversity and nesting site of waterbirds at Lake Tonga, a key Ramsar site within the wetland complex of El Tarf province, also designated as a strict reserve in El Kala National Park. Surveys conducted during the 2024 and 2025 breeding seasons recorded 18 nesting species. A clear dominance of generalist species (Eurasian Coot, Common Moorhen, Little Grebe) was observed, while more sensitive species (Ferruginous Duck, Little Bittern, Glossy Ibis), which depend on specific plant formations such as belts of Scirpus, Typha, and Willows were less represented. Statistical analysis (Type III ANOVA, $p < 0.00001$) revealed a significant effect of year, month, and species on nest abundance. Shannon diversity indices showed a steady increase throughout the breeding season (from 0.69 to 2.73 bits in 2024 and from 0.64 to 2.69 bits in 2025), while evenness remained high (between 0.89 and 0.95), reflecting a balanced distribution of individuals across species. These results highlight the ecological importance of Lake Tonga as a nesting site for waterbirds and underscore the need to protect its vegetative habitats from growing anthropogenic pressures.

Keywords: Lake Tonga, breeding birds, GIS, vegetation, maps, nest

IMPACT OF PARASITIC LOAD ON THE REPRODUCTIVE PARAMETERS OF NESTING BIRDS IN EL-KALA NATIONAL PARK (NORTH-EASTERN ALGERIA)

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ABSTRACT

62 nests were studied during two breeding seasons (2016-2017). The results show that nests were built in well-defined strata (bushy strata for the Sylvia melanocephale melanocephala and tree strata for the Fringilla coelebs africana. The average laying date for the Sylvia melanocephale melanocephala is early (April 11) compared to that of the Fringilla coelebs africana (May 2), with a laying period of 54 days and 46 days, respectively. The average clutch size is 4.14 eggs per nest for the Sylvia melanocephale melanocephala and 3.18 eggs per nest for the Fringilla coelebs africana. The characteristics of the eggs of both species are similar to those found in Europe. The average hatching success and average reproductive success of the species studied are relatively low compared to European populations. The study of the parasite load showed that both populations are infested with five genera of hemoparasites, namely Plasmodium, Haemoproteus, Leucocytozoon, Microfilaria, and Trypanosoma. In both species studied, the abundance of hemoparasites or the parasite load of hemoparasites is significant, with Plasmodium and Haemoproteus dominating. Statistical analysis shows significant correlations between parasite load and certain reproductive parameters.

Keywords: PNEK, Sylvia melanocephala melanocephala, Fringilla coelebs africana, Reproductive biology, Adult blood parasites, Parasitic load.

INSECTICIDAL EFFECT OF CLEOME ARABICA L. EXTRACT (PARIETALES, CAPPARIDACEAE) ON APHIDS OF MARKET GARDEN CROPS IN THE OUARGLA REGION, SOUTHERN ALGERIA

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ABSTRACT

The control of aphids, serious pests in vegetable crops, is becoming increasingly complex due to the growing inefficacy of chemical insecticides. This is linked to the emergence of resistance and their harmful effects on the environment. In this study, we evaluated the insecticidal potential of the aqueous extract of Cleome arabica L., an endemic plant of southern Algeria, as an ecological alternative. The experiment was conducted under greenhouse conditions on naturally infested eggplant and pepper plants. Five concentrations of the extract (100%, 80%, 60%, 40%, 10%) were applied by direct spraying. Aphid mortality was recorded at 24, 48, and 72 hours after treatment. The data were subjected to analysis of variance (ANOVA), followed by Tukey's test for mean comparison. Additionally, probit modeling was used to estimate LC_{50}, LC_{90}, and LT_{50} values. Results showed a highly significant insecticidal effect ($p < 0.0001$), with a maximum mortality of 85.86% at 72 hours for the 100% concentration. The LC_{50} was estimated at 0.309 g/ml, the LC_{90} at 3.321 g/ml, and the fastest LT_{50} at 5.24 hours. These results confirm the efficacy of Cleome arabica L. as a promising biopesticide suitable for integration into sustainable biological control programs in protected Saharan agriculture.

Keywords: Biological control, Extract, Cleome arabica L, Aphids, Ouargla, Algeria

SYNTHESIS OF RESEARCH ON THE USE OF WILD PLANT EXTRACTS IN THE CONTROL OF PARLATORIA BLANCHARDI TARG. (HOMOPTERA – DIASPIDIDAE) IN SOUTHERN ALGERIA

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ABSTRACT

A bibliographic synthesis was carried out in the context of date palm-growing regions in southern Algeria. It focuses on evaluating the effectiveness of aqueous extracts from spontaneous plants in the control of Parlatoria blanchardi, the white scale insect of the date palm. This major pest causes a weakening of palm trees and a significant decrease in date production. The research approach adopted is based on the collection, consultation, and critical analysis of previous scientific publications that addressed this topic. The results from these studies show that several plant extracts exhibit significant insecticidal activity, with mortality rates reaching up to 100% under laboratory conditions and a significant reduction in infestations in the field. However, the effectiveness varies considerably from one plant species to another, depending on the nature of the bioactive compounds present. Fifteen species have been identified as promising, including Nerium oleander, Eucalyptus camaldulensis, Ricinus communis, Colocynthis vulgaris, Zizyphus sp., Urtica urens, Cleome arabica, Allium sativum, Mentha viridis, Solenostemma argel, Rosmarinus officinalis, Piper nigrum, Ocimum basilicum, Peganum harmala, and Calotropis procera. This synthesis highlights the real potential of these plant extracts as sustainable alternatives to chemical pesticides, as part of an integrated pest management strategy adapted to Saharan conditions

Keywords: Biological control, extract, spontaneous plants, Parlatoria blanchardi, date palm, Algeria

SPECIES RICHNESS AND ECOLOGICAL IMPORTANCE OF FRESHWATER CRABS FROM THE BENI BAHDEL RESERVOIR IN NORTHWESTERN ALGERIA

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ABSTRACT

Freshwater crabs play a crucial role within aquatic ecosystems. Their limited dispersal capacity often makes them endemic species, thereby increasing their conservation value. However, their low fecundity and strong dependence on specific habitats render them particularly vulnerable, and many species are currently threatened with extinction. The Beni Bahdel reservoir, located in western Algeria, provides a favorable habitat for crabs of the Potamon genus and constitutes a strategic site for their preservation. This study aims to better understand regional biodiversity and highlight its essential role in maintaining endemic freshwater crab species. The findings revealed the presence of two species belonging to the Potamidae family, Potamon algeriense and Potamon sp1. Although species richness is limited, it reflects notable local diversity within the aquatic environment. Relative abundance shows a clear dominance of Potamon algeriense, which represents the majority of the collected population, emphasizing the dam's major ecological role in conserving this genus in Algeria. Data collected indicate that Potamon algeriense is particularly abundant in the dam, with 44 individuals recorded. This species is significantly more present in spring (33 individuals) than in winter (13), which may be linked to its breeding season or favorable seasonal environmental conditions. Conversely, Potamon sp1 was observed in very low numbers during spring (2 individuals), possibly indicating greater sensitivity to pollution or stricter ecological requirements. Finally, the analysis of collected specimens by sex reveals a marked predominance of males, which could have implications for the dynamics of local populations.

Keywords: Freshwater Crab, genus Potamon, Beni Bahdel Reservoir, Algeria

MIGRATION OF FRESHWATER FISHES IN TÜRKİYE AND OBSTACLES ENCOUNTERED BY FISHES DURING MIGRATION

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ABSTRACT

Türkiye's inland waters have significant potential in terms of fish species diversity. Recent studies have reported that 427 fish species, 215 of which are endemic, inhabit Türkiye's inland waters (lakes, rivers, dams, etc.). Some fish species prefer a settled life, while others have to migrate long or short distances. Physical, chemical and biological factors such as light, water depth, currents, pollution, sexual development, spawning, feeding and escape from predators play an important role in fish migration. During migration, various natural or man-made hydraulic obstacles, especially those that are not suitable for the biology and ecological requirements of freshwater fish, put pressure on the development, reproduction and genetic characteristics of many fish species and may cause some species to the point of extinction. In order for fish migrations to take place as they should, the removal or reorganization of some existing obstacles in rivers and even the construction of suitable fish passages on river systems positively affect the continuity of fish populations. In this study, the barriers that harm the diversity of freshwater fishes in Türkiye and what can be done to prevent the damages caused by these barriers were evaluated.

Keywords: Freshwater fish, Fish migration, Hydraulic barriers, Biodiversity

DNA BARCODING AND PHYLOGENETIC RELATIONSHIPS OF BARBUS SPECIES DISTRIBUTED IN TURKIYE

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ABSTRACT

The genus Barbus, commonly referred to as barbel fishes, comprises benthic-feeding cyprinids typically inhabiting fast-flowing rivers within the so-called "barbel zone." These species are distributed throughout Europe, Asia, and Anatolia. In Türkiye, twelve Barbus species have been reported from various inland freshwater habitats. In this study, a total of 124 specimens from 11 different locations were analyzed using cytochrome c oxidase subunit I (COI) gene sequences to investigate DNA barcoding, genetic diversity and phylogenetic relationships. Analysis of COI barcoding region revealed a high level of haplotype diversity (Hd = 0.893 ± 0.014) and nucleotide diversity (π = 0.03396 ± 0.00173). Twenty haplotypes with at least one mutational difference were identified. The most common haplotype, Hap4 shared by B. tauricus and B. escherichii. Pairwise genetic distances ranged from 0.00% (B. tauricus and B. escherichii) to 6.66% (B. cyclolepis and B. escherichii, B. oligolepis, and B. cyri). Phylogenetic analyses revealed two major clades: one consisting of species distributed in the Aegean and Marmara regions, and the other comprising species from the Black Sea basin and eastern Anatolia. These findings contribute to the molecular identification of Barbus species in Türkiye and offer insights into their evolutionary and biogeographical relationships.

Keywords: Barbel, DNA Barcoding, COI

AGROBIODIVERSITY IN FRENCH GUIANA MARKETS, INDICATORS OF AGRICULTURAL, SOCIAL AND CULTURAL DYNAMICS

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ABSTRACT

In the current global context of agricultural intensification, a decrease in nutrients is observed in cultivated vegetables and partly explains the fact that more than two billion people worldwide suffer from deficiencies in essential micronutrients (iron, zinc, vitamins, etc.). The erosion of the nutritional value of our food is rooted in multiple factors, such as a changing composition of foods on our plates, the selection of high-yielding crops, often less nutritious, the increase in agricultural practices associated with soil depletion, and the gradual abandonment of traditional cropping systems, which are nevertheless the guarantors of a healthy and diversified diet. For all these reasons, more studies are focusing on agroecology, which relies in part on significant agrobiodiversity in the fields and on our plates, foundation of food security and human health. This work focuses on the agrobiodiversity observable in the markets of French Guiana. We assessed the diversity of products sold, their geographical origin and their link with the agricultural practices of the different selling communities (Hmong, Bushi Konde Sama, Amerindians, Creoles, Haitians, etc.) through a study of stalls in eight markets in French Guiana. The results show significant agrodiversity, with 156 agricultural products offered for sale, but a heterogeneous distribution between the markets and the origins of the sellers. They also highlight the importance of rare products, often specific to a particular community. The diversity found in the fields highlights the impact of cultural practices linked to the specific lifestyles of the communities on the composition of their stalls (example of Amerindians oriented towards self-consumption). Comparison with data collected in 2009 reveals a change in the composition of the stalls, with the appearance and disappearance of certain species, as well as a different distribution of communities (decline of Hmong stalls, increase of Creole stalls). Finally, these results allow us to better understand the role of markets as indicators of agricultural, social and cultural dynamics, and highlight the importance of preserving agrobiodiversity to ensure healthy and sustainable food for all.

Keywords: Agrobiodiversity, Agroecology, Evolution, French Guiana

FIRST RED LIST OF ENDEMIC AND THREATENED PLANTS OF A MOROCCAN COSTAL SAND DUNE ECOSYSTEM: HIGHLIGHTING THE CONSERVATION STATUS OF THE ENDEMIC AND THREATENED SUBSPECIES: THYMUS BROUSSONNETII SUBSP. BROUSSONNETII

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ABSTRACT

Among the most vulnerable species is the emblematic Thymus broussonnetii subsp. broussonnetii, an endemic Moroccan subspecies currently at risk of extinction in a costal sand dune ecosystem characterized by exceptional plant diversity. However, this area faces multiple environmental threats, including recurrent droughts, habitat destruction, and overgrazing, which jeopardize its native flora This study presents a systematic and integrative synthesis of the floristic diversity within the costal sand dune ecosystem in southwestern Morocco, employing standardized taxonomic identification keys and aligning species assessments with the most recent IUCN Red List categories and criteria. Endemic, rare, and threatened taxa identified in this ecosystem represent a significant subset of Morocco's national flora under conservation concern. Quantitatively, endemic species and subspecies account for 1.59% of the country's total endemics, while rare and threatened taxa constitute 2.68% of Morocco's overall at-risk flora. Notably, this investigation constitutes the first exhaustive Red List evaluation of vascular endemic, rare, and threatened plants specific of this costal sand dune ecosystem, thereby establishing a foundational reference point to inform and guide subsequent conservation planning and biodiversity management strategies.

Keywords: Red List, Diversity, Endemic, Rare, Threatened, Southwestern Morocco

ETHNOBOTANICAL STUDY OF AN APOCYNACEAE

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ABSTRACT

In the arid and Saharan regions of Morocco, Calotropis procera, belonging to the family Apocynaceae, holds a prominent place in the traditional pharmacopoeia due to its remarkable ecological adaptability and the diversity of its applications. Ancestral knowledge reports the use of various parts of this plant, notably the leaves, latex, and bark, in the treatment of a wide range of ailments, including chronic digestive disorders as well as certain skin and respiratory diseases. Furthermore, this plant plays a significant role in veterinary medicine, with specific preparations dedicated to treating animal diseases such as camel mange and certain ovine parasitoses. According to scientific studies, this species contains a diversity of secondary metabolites — flavonoids, alkaloids, triterpenes, steroids, and phenolic compounds — which underlie its traditional uses by conferring anti-inflammatory, antioxidant, analgesic, and antimicrobial properties. However, the well-known toxicity of its latex among local populations calls for heightened caution in its use. This duality between medicinal potential and toxicological risks underscores the need for rigorous studies aimed at scientifically validating traditional practices and ensuring the safe modalities of their application.

Keywords: Apocynaceae, Calotropis procera, Secondary metabolites, Ethnopharmacology, Toxicity

REPRESENTATION OF THREE-DIMENSIONAL PROTEIN STRUCTURE USING DOT PLOT

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ABSTRACT

Various methods are currently used for three-dimensional protein representation. These methods are used in studies such as protein analysis, protein-protein interactions, and protein-drug interactions. Computer technologies are widely used in the three-dimensional structure representation of proteins using these methods, and protein representation software is used in computer environments. Examples of these softwares include PyMol, UCSF ChimeraX, and VisionMol. In this paper, software was developed that uses dot plot to display the three-dimensional structure of any desired protein molecule. The source code for this software is a script written in the Python programming language, and the Matplotlib library was used. This software is more user-friendly, faster, and consumes less system resources than other software used for three-dimensional protein structure representation. The software developed can be used for three-dimensional protein representation in future studies.

Keywords: protein, structure, dot-plot, representation

A PERSONALIZED AND LOW-RESOURCE CONSUMPTION PROTEIN DATA BANK APPROACH

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ABSTRACT

Today, protein data banks are used to store various information about protein molecules for the benefit of researchers working on protein-related topics. Current protein data banks are large-scale and run on specific servers. Additionally, the user interfaces of these protein databases are somewhat challenging to use. In this paper, we developed a low-resource, easy-to-use protein data bank approach that researchers working on protein-related topics can install on their own servers and use the protein molecule files they need for their research. This approach has been developed into web-based software. This web-based software requires only an HTTP server and does not contain any server-side program code. The software has been shown to function correctly with low-resource requirements using mmCIF protein molecule files uploaded as files.

Keywords: protein data bank, personalized, low-resource, accessibility, web-based

MODERN AND ADVANCES IN SOFTWARE AND TOOLS FOR DRUG DISCOVERY

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ABSTRACT

Recent advances in software and computational tools have significantly accelerated drug discovery workflows, driven by developments in machine learning, AI, and high-throughput data analytics. Deep learning frameworks such as convolutional neural networks (CNNs) and graph neural networks (GNNs) have enabled highly accurate virtual screening and target prediction by modeling complex biochemical interactions at atomic resolutions. Integration of large-scale omics datasets with AI-driven algorithms facilitates the identification of novel therapeutic targets and biomarker discovery, enhancing precision medicine initiatives. Structure-based drug design has benefited from enhanced molecular docking algorithms and free-energy perturbation (FEP) methods, supported by GPU-accelerated simulations that improve the accuracy of binding affinity predictions. Ligand-based approaches leverage cheminformatics and QSAR models, often embedded within multi-parametric optimization platforms that incorporate ADMET (Absorption, Distribution, Metabolism, Excretion, Toxicity) parameters to refine candidate selection early in lead optimization. Advances in cryo-electron microscopy (cryo-EM) data processing pipelines, combined with AI algorithms for image analysis, facilitate high-resolution structure determination of challenging biomolecular complexes, directly informing structure-based design. Cloud computing and distributed data infrastructures enable the integration and analysis of massive multimodal datasets, supporting in silico phenotypic screening and polypharmacology studies. AI-enabled de novo drug design platforms, such as generative adversarial networks (GANs) and variational autoencoders (VAEs), generate novel chemical entities with optimized pharmacokinetic and pharmacodynamic profiles. These models incorporate multi-objective optimization algorithms to balance potency, selectivity, and safety profiles. Furthermore, multi-parameter simulation tools now allow for comprehensive ADMET prediction and toxicity modeling, incorporating physiologically-based pharmacokinetic (PBPK) modeling and in silico toxicology. The application of natural language processing (NLP) and semantic data mining facilitate literature curation, patent analysis, and continuous updating of knowledge bases, thus keeping pace with the rapidly evolving drug discovery landscape. Collectively, these technological advancements are converging to enable truly integrated, rapid, and cost-effective drug discovery pipelines, transforming traditional empirical approaches into sophisticated, data-driven processes capable of delivering therapeutics with higher success rates and shorter timelines.

Keywords: Modern Advances, tools, drug, discovery

ANTIPROLIFERATIVE, ANTIOXIDANT ACTIVITIES AND HPLC-DAD PROFILING OF AN ALGERIAN SENECIO MASSAICUS (MAIRE) EXTRACTS

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ABSTRACT

Plants are a very valuable source for obtaining various pharmacologically active substances used to address a range of human health problems**1**. Within this context, plants belonging to the genus Senecio have particularly captivated researchers due to their diverse array of secondary metabolites and promising pharmacological activities**2**.Among them, Senecio massaicusis a particularly intriguing species found growing in Algeria and Morocco**3**. the aim of this study was to investigate the antioxidant and anticancer activities of Senecio massaicus. The phytoconstituents of CHCl3, EtOAC, and n-BuOH extracts were screened using HPLC-DAD. Total phenolic and flavonoid contents were quantified, antioxidant activity, using DPPH radical scavenging activity, ABTS+° decolorization, CUPRAC, reducing power, and anti-proliferative activity against HeLa cell lines were investigated and quantified. The results showed the presence of seven phenolic acids and three flavonoids in CHCl3, AcOEt, and n-BuOH extracts. However, these substances have a number of intriguing biological characteristics according to the literature. Additionally, the extracts with the highest concentrations of phenolic contents and the best antioxidant activity were the n-BuOH and AcOEt extracts. This was supported by the strong correlation that was observed between the antioxidant activity and the flavonoid content values (261.17 ± 0.4343 and 216.98 ± 2.42 mg QE/g) and total phenolic content (341.45 ± 3.44 and 445.96 ± 1.91 mg GAE/g, respectively). When compared to 5-FU, AcOEt extract exhibits a very significant antiproliferative capacity, particularly at high concentrationswith an IC50 of 38.5 ± 0.03 µg/ml and an IC75 of 60.1 ± 0.03 µg/ml.

Keywords: Senecio massaicus; HPLC-DAD; antioxidant activity; anti-proliferative effect

GC-MS ANALYSIS, ANTIOXIDANT AND ANTI-INFLAMMATORY ACTIVITIES OF CHLOROFORM EXTRACT FROM BORAGINACEAE FAMILY SPECIE

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ABSTRACT

This work concerned the phytochemical and biological study of a boraginaceae specie, the dried plant was extracted by soxhlet using methanol as a solvent the obtained extract was concentrated under vacuum, diluted with water and then extracted with chloroform, ethyl acetate and n-butanol. The GC-MS analysis of the chloroform extract allowed us to identify seventeen metabolites ; most of them were hydrocarbons (92.25%), with 2-methylheptacosane (15.02%), pentacosane (12.12%) and tetracosane (10.59%) as major constituents. The DPPH free radical-scavenging test of the chloroform extract showed an IC50 value of 0.166±0.032 mg/mL very close to the one exhibited by α-tocopherol (0.146±0.030 mg/mL). While the β-carotene bleaching assay gave an inhibition percentage of 28.70% ±1.82. On the other hand the anti-inflammatory activity of the same extract gave a remarkable inhibition percentage of 79.79%±1.47 compared to the reference medicine diclofenac (59.24 %±1.20).

Keywords: Phytochemistry, GC-MS analysis, antioxidant and anti-inflammatory

QUALITATIVE AND QUANTITATIVE ANALYSIS OF POLAR EXTRACTS FROM SANTOLINA SPECIES

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ABSTRACT

The plant kingdom provides an abundant and renewable source of bioactive compounds that are highly required by the pharmaceutical industry. This study focuses on enhancing knowledge of Algerian flora, with particular attention to the species Santolina rosmarinifolia, aiming to validate its traditional medicinal uses. Preliminary chemical screening revealed the presence of alkaloids, tannins, terpenes, and flavonoids in the plant extracts. The quantification of total phenolic compounds and flavonoids in the plant extracts indicated a high presence of phenolic compounds, especially flavonoids, in ethyl acetate and n-butanol extracts. Four compounds were isolated from ethyl acetate and n-butanol extracts using paper chromatography and characterized using analytical methods such as UV spectrophotometry and proton NMR. The antioxidant potential of these extracts was confirmed by the DPPH assay, validating the presence of compounds with strong antioxidant activity and supporting the traditional medicinal use of the plant.

Keywords: Santolina rosmarinifolia, phytochemical screening, phenolic compounds, flavonoids, antioxidant activity

HPLC ANALYSIS, ANTIOXIDANT AND ANTI-INFLAMMATORY ACTIVITIES OF AN ETHYL ACETATE EXTRACT FROM BORAGINACEAE FAMILY SPECIE

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ABSTRACT

This work is about the phytochemical and biological study of a boraginaceae specie, the dried plant was extracted by soxhlet using methanol as a solvent the obtained extract was concentrated under vacuum, diluted with water and then extracted with chloroform, ethyl acetate and n-butanol. The HPLC analysis of the ethyl acetate extract allowed us to identify nine flavonoids (127.548 mg/g) and eight phenolic acids (52.5095 mg/g). Where epicatechin (106.5625 mg/g) was the most abundant compound in the extract. The DPPH free radical-scavenging test of the ethyl acetate extract showed an IC50 value of 0.0725±0.0022 mg/mL compared to the one obtained by ascorbic acid (0.039±0.022 mg/mL). while the β-carotene bleaching assay gave an inhibition percentage of 45 %±2.96 similar to the obtained ones from both ascorbic acid (43.54%±0.91) and α-tocopherol (46.93%±1.14). On the other hand the anti-inflammatory activity of the same extract gave a significant inhibition percentage of 94.52%±0.41 compared to the reference drug diclofenac (59.24 %±1.20).

Keywords: phytochemical; HPLC analysis; DPPH free radical-scavenging test

SPERM TAIL ABNORMALITIES IN APIS MELLIFERA DRONES: A LINK TO APIARY COLONY LOSSES

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ABSTRACT

The alarming decline of honey bee colonies has led to significant concerns regarding the long-term viability of this crucial pollinator species. This study examines the occurrence of morphological abnormalities in the sperm tails of drones collected from apiaries with varying levels of colony mortality. Chromatographic analysis identified the presence of 24 pesticide residues in both bee tissues and stored hive food. Microscopic analysis of semen samples revealed a high frequency of sperm tail malformations, including fragmented, bent, coiled, bifurcated, and multiple flagella, as well as structurally compromised sperm tails. Their significantly higher frequencies in drones from apiaries with the most severe colony losses, compared to those with minimal mortality, suggest a link between impaired spermatogenesis and environmental toxic stressors. These findings support the hypothesis that pesticide residues present in bee tissues and hive-stored food pose a significant risk to drone reproductive health, potentially contributing to the reduced vitality and resilience of honey bee colonies.

Keywords: honey bees, drone spermatozoa, tail abnormalities, pesticides, colony mortality

IN VITRO ASSESSMENT OF ANTIOXIDANT, A-AMYLASE INHIBITORY, AND ANTIBACTERIAL ACTIVITIY OF ARTEMISIA JUDAICA AERIAL PARTS

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ABSTRACT

Artemisia judaica is a wild aromatic plant renowned for its therapeutic and medicinal properties. Traditionally, it has been used to treat gastrointestinal disorders, skin diseases, and atherosclerosis, and is valued for its immunostimulatory effects. The aim of this study was to assess the phytochemical content, antioxidant activity, α-amylase inhibition, and antibacterial activity of organic extracts prepared from the aerial parts of A. judaica collected from the Tassili N'Ajjer region in Algeria. The total phenolic content (TPC) and total flavonoid content (TFC) were quantified using spectrophotometric methods. Antioxidant activity was evaluated in vitro by DPPH radical scavenging and ferric reducing antioxidant power (FRAP) assays. The inhibitory effects of the extracts on α-amylase enzyme activity were assessed to determine their antidiabetic potential. Antibacterial activity was tested using the broth microdilution assay against four bacterial strains. Quantitative analysis revealed a rich content of total polyphenols and flavonoids; with the ethyl acetate extract containing the highest amounts (153.20 ± 10.4 mg GAE/g for polyphenols and 46.5 ± 3.11 mg QE/g for flavonoids). All extracts exhibited considerable antioxidant activity, as evidenced by DPPH radical scavenging and FRAP assays. Moreover, the ethyl acetate extract showed a significant inhibitory effect on α-amylase enzyme activity (IC_{50} = 9.96 ± 0.20 mg/mL) and demonstrated notable antibacterial activity, with minimum inhibitory concentrations (MIC) of 20 mg/mL and 40 mg/mL against Bacillus subtilis and Staphylococcus aureus, respectively. This study revealed that Artemisia judaica is rich in bioactive compounds and holds potential for application in the treatment of diverse diseases.

Keywords: Artemisia judaica, Antioxydant and Antibacterial activity, Antidiabetic activity, Tassili N'Ajjer

ANTI-PHYTOPATHOGENIC AND CYTOTOXIC BROMINATED SESQUITERPENES FROM THE INDONESIAN RED SEAWEED LAURENCIA INTRICATA

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ABSTRACT

Marine natural products have been providing structurally novel bioactive substances, some of which were developed as medicines or were promising leads for new drugs. During the search for bioactive substances from marine organisms, we detected anti-phytophatogenic (an oomycete ofPhytophthora) activity for extracts of the Indonesian red seaweed Laurencia intricata. The active hexane and 90% methanol extracts were combined and separated on silica gel and then purified by HPLC to obtain four related compounds. Based on 2D NMR and MS analysis, they were identified as aplysistatin, palisadin A, palisol, and 5b-hydroxypalisadin B, which are all known brominated sesquiterpenes. The minimum doses to inhibit Phytophthora capsici are 100, 300, 300, and 300 mg/disk, respectively. Cytotoxic activity of these compounds was also evaluated against human epidermoid carcinoma A431 cells, showing the IC50 values of 0.15, 1.42, 0.59, and 0.45 mg/ml, respectively. Based on these biological data, aplysistatin may probably play a role for the anti-Phytophthora and cytotoxic activity.

Keywords: Laurencia intricata; Anti-phytophatogenic; Cytotoxicity; Bioactivity

COMPARATIVE ANALYSIS OF RIPE AND UNRIPE BANANA PEEL AS A SUSTAINABLE FEEDSTOCK FOR BIOPLASTIC PRODUCTION

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ABSTRACT

Plastic has been known to provide several benefit such as sheet and film used for carriage and transportation of material. Moreover, plastic made from synthetic sources are not degradable in nature leading to soil clog and water pollution. Thus, this research explores the potential of using banana peel as a suitable feedstock for bioplastic production. The starch content of banana peel was extracted and used for bio-plastic production via reacting it with glycerol as plasticiser. The results revealed high starch content of 81% in unripe banana than ripe banana of 58%. Highest tensile stress of 3.5 Mpa was recorded in ripe babana than unripe having 0.2 Mpa. In the case of elongation property, ripe banana produces 51% than unripe banana with 20% at 6 mL concentration of glycerol. The results of the Biodegradation ability of the produced Bio-plastic revealed that degradation increase with time and highest degradation was achieved at 25 days test with ripe banana degrading faster than unripe banana. The results for molecular characterization of the bacteria responsible for degradation of synthesized bio-plastic revealed the presence of Bacillus cereus. This research suggested that bioplastic produced from unripe banana peels is recommended for application requiring higher tensile strength such as packaging materials and ripe banana for agricultural mulches.

Keywords: Plastic, Banana peel, Starch, Biodegradation, Glycerol

LAVENDER ESSENTIAL OIL AS A GREEN CORROSION INHIBITOR FOR CARBON STEEL IN SULFURIC ACID MEDIUM

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ABSTRACT

The essential oil from a species of the Lavandula genus has been investigated as an eco-friendly and biodegradable corrosion inhibitor for carbon steel in acidic environments, particularly in 0.5 M H2SO4 solution. Electrochemical analyses, such as potentiodynamic polarization and electrochemical impedance spectroscopy, revealed that the oil acts as a mixed-type inhibitor, reducing both anodic and cathodic reactions. The inhibition efficiency increases with concentration, typically exceeding 80% at optimal doses. The organic constituents of the oil, such as linalool and linalyl acetate, adsorb onto the steel surface, forming a protective film that hinders metal dissolution. Weight loss measurements and microscopic observations further confirm the significant reduction in acid attack. These findings suggest that lavender essential oil is a promising green alternative to conventional corrosion inhibitors in acidic media.

Keywords: corrosion, green inhibitor, Lavandula, essential oil, electrochemical impedance spectroscopy

PLANT BY-PRODUCTS AS BIOACTIVE GOLDMINES: INSIGHTS FROM SUNFLOWER SEEDS AND POMEGRANATE PEELS

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ABSTRACT

Plant by-products like sunflower seeds and pomegranate peels are valuable sources of bioactive compounds, with significant potential for applications in food, pharmaceutical, and cosmetic industries. This study examines their biochemical profiles and bioactivities to promote sustainable resource utilization. Proximate analysis revealed distinct compositions: sunflower seeds, with notably low moisture content, contrast sharply with the high-moisture pomegranate peels (over 80% water). Sunflower seeds contain a higher lipid percentage, while pomegranate peels have minimal lipids. Both by-products exhibit comparable protein levels and total soluble sugars, highlighting their nutritional value. Antioxidant activity, assessed via DPPH scavenging, was significantly stronger in sunflower seeds (approximately five times higher than pomegranate peels). However, pomegranate peels offered a substantially higher extraction yield, nearly four times that of sunflower seeds. HPLC analysis identified diverse phenolic profiles: pomegranate peels were rich in catechin, ellagic acid, and rutin, while sunflower seeds contained elevated levels of resorcinol and sinapic acid. Both demonstrated antimicrobial activity against Staphylococcus aureus, with sunflower seeds showing roughly double the inhibition of pomegranate peels. These findings underscore the unique bioactive potential of each by-product, suggesting their valorization could drive innovation in functional products, reduce waste, and support circular economy goals. Further exploration of their industrial applications is highly promising.Plant by-products like sunflower seeds and pomegranate peels are valuable sources of bioactive compounds, with significant potential for applications in food, pharmaceutical, and cosmetic industries. This study examines their biochemical profiles and bioactivities to promote sustainable resource utilization. Proximate analysis revealed distinct compositions: sunflower seeds, with notably low moisture content, contrast sharply with the high-moisture pomegranate peels (over 80% water). Sunflower seeds contain a higher lipid percentage, while pomegranate peels have minimal lipids. Both by-products exhibit comparable protein levels and total soluble sugars, highlighting their nutritional value. Antioxidant activity, assessed via DPPH scavenging, was significantly stronger in sunflower seeds (approximately five times higher than pomegranate peels). However, pomegranate peels offered a substantially higher extraction yield, nearly four times that of sunflower seeds. HPLC analysis identified diverse phenolic profiles: pomegranate peels were rich in catechin, ellagic acid, and rutin, while sunflower seeds contained elevated levels of resorcinol and sinapic acid. Both demonstrated antimicrobial activity against Staphylococcus aureus, with sunflower seeds showing roughly double the inhibition of pomegranate peels. These findings underscore the unique bioactive potential of each by-product, suggesting their valorization could drive innovation in functional products, reduce waste, and support circular economy goals. Further exploration of their industrial applications is highly promising.

⁎This work was elaborated under the framework of the PRIMA project “MEDGOAT”

Keywords: Keywords: Biological activities, Nutritional composition, Phenolics, Waste valorization

STRUCTURAL AND FUNCTIONAL CHARACTERIZATION OF ESSENTIAL OIL MICROCAPSULES: THE ROLE OF BIOPOLYMER SELECTION IN COMPLEX COACERVATION

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ABSTRACT

Essential oils face challenges like volatility and degradation, limiting their applications. This study focused on the encapsulation of an essential oil mixture of Origanum vulgare, Rosmarinus officinalis, and Piper nigrum. This study optimizes their encapsulation via complex coacervation using maltodextrin/gelatin and maltodextrin/casein (1:1 ratio, 3% total polymer concentration). Liquid coacervates were characterized for particle size, polydispersity index (PDI), zeta potential, morphology (optical microscopy). Results revealed that maltodextrin/gelatin formed smaller and more monodisperse particles compared to maltodextrin/casein, suggesting better homogeneity. Zeta potential measurements indicated higher stability for maltodextrin/gelatin due to stronger electrostatic interactions, while maltodextrin/casein showed lower stability. FTIR confirmed successful encapsulation, with no essential oil degradation and characteristic peaks of polymer-essential oil interactions. Optical microscopy revealed distinct coacervate morphologies: maltodextrin/gelatin produced spherical microcapsules, whereas maltodextrin/casein formed irregular aggregates. These findings demonstrate that polymer selection critically influences coacervate properties, with maltodextrin/gelatin offering superior uniformity and stability for essential oil encapsulation. This work provides a foundation for optimizing essential oil delivery systems in food, pharmaceutical, or cosmetic applications, where controlled release and protection of volatile compounds are essential.

Keywords: Essential Oils; Complex coacervation; Encapsulation; Maltodextrin

ANTIOXIDANT AND ANTIBACTERIAL ACTIVITIES OF ETHYL ACETATE EXTRACT FROM ARGANIA SPINOSA L. OF TINDOUF REGION

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ABSTRACT

Ethyl acetate extract (Ace) of Argania spinosa L region Tindouf. plant was assayed to determine their antioxidant and antibacterial activities. Total polyphenol contents were determined using Folin-Ciocalteu's reagent. The antioxidant properties of the pulp part extracts were evaluated using 1,1-diphenyl-2 picrylhydrazyl (DPPH) radical-scavenging. The result showed that the Ace contains amount of total polyphenols with 12.08 ±2.80µg gallic acid equivalent/mg of dry weight. Ace present an important antioxidant activity with an IC 50 = 25,8 ± 0,004mg/ml compared to BHT as standard (87.26 µg/mL), A positive correlation between antioxidant capacities and total phenol contents was observed. These extract (Ace) have also the highest antibacterial activity against Gram-negative bacteria Salmonella gallinarum (ATCC700623) with zone d'hinibition 10± 0mm at a concentration of 100 mg/mL and Gram +positive Staphylococcus aureus (ATCC25923) with zone d'hinibition 8 ±1mm. These results indicate that the pulp of Argania spinosa extract has potent antioxidant activities, the highest antibacterial activity and may prove to be of pcotential health benefit

Keywords: Argania spinosa, Phenol content, Antioxidant activity, Antibacterial activity

THE IMPACT OF UNIQUE YEAST EXTRACTS DERIVED FROM TURKEY'S BIODIVERSITY ON FOOD AROMA: A SENSORY ANALYSIS-BASED COMPARISON

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ABSTRACT

Yeast extracts are natural flavor enhancers that impart complex aroma compounds such as umami, meaty, and roasted notes to food products. These extracts contain water-soluble components obtained through autolysis or enzymatic hydrolysis of yeast cells, and exert taste-enhancing effects primarily through non-volatile compounds such as 5'-nucleotides, amino acids, and short peptides. Today, most commercial yeast extracts used in the food industry are derived from Saccharomyces cerevisiae, which limits product diversity and aroma complexity. With its diverse ecological zones and rich endemic microflora, Turkey is a natural reservoir for a wide range of yeast species. This study aims to comparatively evaluate the sensory aroma profiles of yeast extracts obtained from strains previously isolated from various regions of Turkey and preserved in microbial collections. The evaluated strains include Torulaspora delbrueckii, Kluyveromyces marxianus, Saccharomyces paradoxus, Debaryomyces hansenii, and Pichia kudriavzevii. The yeast extracts were incorporated at three different concentrations (0.5%, 1.0%, and 2.0%) into a model food matrix based on savory noodle seasoning powder. Sensory analyses were conducted by a trained panel of 12 individuals using a 9-point descriptive scale across five key categories: aroma intensity, umami character, naturalness perception, identifiable aroma notes (e.g., broth, mushroom, fermented fruit, nutty), and overall acceptability. The results revealed distinct sensory differences among the species. Extracts derived from T. delbrueckii received high scores for their intense umami profile, resembling soy sauce and broth. K. marxianus extracts were noted for roasted grain and nutty characteristics, while P. kudriavzevii samples provided a unique profile with fruity and slightly sour notes. D. hansenii extracts exhibited a pronounced "marine" character, suggesting their suitability for seafood-oriented applications. However, at higher concentrations, some species exhibited undesirable flavor attributes such as bitterness, metallic notes, or overly fermented tastes, which negatively impacted overall acceptability scores. This study clearly demonstrates the potential of yeast strains native to Turkey in contributing to sensory richness and diversity in food formulations. The use of locally sourced and unique yeast strains in industrial flavor production could reduce dependence on imports and support the development of natural solutions aligned with clean-label trends. In this context, the systematic sensory-driven screening of indigenous strains offers a promising roadmap for designing functional aroma systems.

Keywords: Yeast extract, Turkish biodiversity, Sensory analysis, Indigenous microorganisms, Natural flavor, Noodle seasoning

INVESTIGATION OF THE AMELIORATIVE EFFECTS OF PHYCOCYANIN-RICH SOLUTIONS ON CADMIUM STRESS IN WHEAT LEAF SEGMENTS

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ABSTRACT

Wheat (Triticum aestivum L.), which is used as a nutritional source in many countries of the world, is an annual herbaceous plant species with high food value. Cadmium (Cd) is a heavy metal that is toxic and an environmental pollutant and can pass through agricultural soils for various reasons and contaminate the food chain. Phycocyanin, which can be extracted in high amounts from the Arthrospira platensis species, is a blue accessory protein pigment. It has gained importance in recent years due to its effective applications in the industry, pharmaceutical, and food sectors. Therefore, it is a natural alternative that competes with artificial food dyes. In this study, leaf segments were taken from 10-day-old wheat seedlings, and these segments were incubated under 5 μM cadmium stress for 2 days. Then the effects of stressed segments on physiological and pigment levels were examined, and the potential protective role of phycocyanin-rich (35%) Arthrospira platensis solutions at concentrations of 0.01 g/L and 0.1 g/L against these effects was investigated. While Cd stress caused a significant decrease in fresh weight, chlorophyll a, chlorophyll b, total chlorophyll and anthocyanin contents, solutions provided improvement in these parameters especially at 0.1 g/L concentration. While carotene level did not change at 0.01 g/L solution concentration, it was more effective at 0.1 g/L concentration. Cd stress increases the activity of antioxidant enzymes such as catalase and peroxidase by triggering the accumulation of reactive oxygen species (ROS). Application of phycocyanin-rich solutions reduced this stress and suppressed the enzymatic defense system. The results showed that phycocyanin alleviates the effects of Cd-induced oxidative stress and may support the plant defense system. For these reasons, it is assumed that phycocyanin can be used as a supporting agent for biochemical defense systems against cadmium stress in the future.

Keywords: Investigation of the Ameliorative Effects of Phycocyanin-Rich Solutions on Cadmium Stress in Wheat Leaf Segments

THE CLP PROTEASE GENE IN CANNABIS SATIVA APPEARS TO BE A POTENTIAL HOTSPOT REGION FOR GENETIC VARIATION

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ABSTRACT

Hemp (*Cannabis sativa* L.) is an herbaceous plant that has been subject to strict legal regulations in many countries due to its psychoactive properties. The classification of *C. sativa* as either industrial hemp or drug-type marijuana primarily depends on the content of tetrahydrocannabinol (THC), the major psychoactive compound in the plant. Industrial hemp typically contains THC below legally defined thresholds (0.3%) and is cultivated for fiber, seed, and oil, whereas marijuana contains higher levels of THC (0.3% *C. sativa* cultivars have highlighted the genic region encoding the Clp protease subunit as a potential hotspot. The Clp protease is a crucial component of the protein quality control machinery in plant cells, playing an essential role in regulating protein degradation and maintaining cellular homeostasis. The observed accumulation of sequence variations, particularly SSRs, in this genic region across different cultivars suggests its utility as a molecular marker. This, can make Clp protease gene a valuable target for developing efficient and reliable genotype-specific marker in *C. sativa*. Results will serve future genetic studies focusing on cultivar differentiation, population genetics, and marker-assisted selection in hemp breeding programs.

Keywords: Hemp, genetic marker, hotspot region, cpDNA

BIOSURFACTANT POTENTIAL OF PROBIOTIC MICROORGANISMS ISOLATED FROM FERMENTED CABBAGE: A SUSTAINABLE APPROACH TO FUNCTIONAL BIOPRODUCTS

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ABSTRACT

Fermented foods, such as cabbage, harbor diverse probiotic microorganisms with untapped potential for sustainable biotechnological applications. Among these, biosurfactants- amphiphilic compounds produced by microbes- are gaining attention for their biodegradability, low toxicity, and multifunctionality across environmental, agricultural, pharmaceutical, and food industries. This study aimed to evaluate the biosurfactant-producing potential of five bacterial isolates obtained from naturally fermented cabbage, using a combination of qualitative and quantitative assays. The oil spread method, Parafilm M test, and drop collapse test were employed to screen for biosurfactant activity. All five isolates tested positive in these assays, indicating their ability to reduce surface tension and interact with hydrophobic substrates- key characteristics of biosurfactant producers. Quantitative assessment through the emulsification activity test revealed variable but promising results. After 48 hours of incubation, isolate 2.18.1 showed the highest emulsification index (40%), followed by isolate 2.4.2 (12%), 3.5.1 (8%), 2.4.1 (6.6%), and 2.2.1 (4%). Interestingly, all isolates displayed emulsification indices above 40% at the 24-hour mark, suggesting a potential peak in biosurfactant stability or production at earlier time points. Biochemical characterization of the isolates further supported their probiotic nature and potential safety. All five isolates were urease-positive, while testing negative for the methyl red and Voges-Proskauer reactions—indicating a consistent biochemical profile among them. These findings position fermented cabbage as a low-cost, accessible, and natural source of biosurfactant-producing probiotics. The study contributes to the growing interest in green biotechnology and functional microbial bioproducts, paving the way for further exploration of fermented food microbiota in sustainable biosurfactant development. Future work will focus on molecular identification, biosurfactant purification, and potential application trials in agroecological or biomedical contexts.

Keywords: emulsification index, surface tension reduction, fermented food microbiota, biochemical characterization, green biotechnology

ADVANCEMENTS IN CUCUMBER MICROPROPAGATION - THE ROLE OF MEDIA, GROWTH REGULATORS AND EXPLANTS

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ABSTRACT

Our current work aims to select suitable protocol for successful micropropagation of different cucumber genotypes. Therefore, more than 30 articles from the1980s until now were analyzed. Since the 1980s, advancements in tissue culture protocols have focused on optimizing media compositions and plant growth regulators to improve shoot proliferation, rooting, and overall plantlet development in different cucumber genotypes. Yet, Murashige and Skoog (MS) medium has remained as a primary choice for cucumber micropropagation, regularly supplemented with varying concentrations of cytokinins and auxins. Early studies favored BAP as the key cytokinin for shoot induction, while NAA and IBA were commonly used for root development. Over the years, various explants have been used as starting material for cucumber micropropagation, including cotyledons, hypocotyls, shoot tips, nodal segments, and leaf discs. Shoot tips and nodal segments have been widely preferred for direct organogenesis, while cotyledons and hypocotyls have been utilized for adventitious shoot regeneration and genetic transformation studies. The choice of explants significantly influences regeneration efficiency and response to plant growth regulators. Although there is significant progress, challenges such as genotype dependency, explant sensitivity, and somaclonal variation are still present. Future research should focus on adjusting hormonal interactions, genetic stability, and cost-effective alternatives for large-scale application.

Keywords: Cucumis sativus L., genotype, cytokinins, auxins, explants

APPLICATION OF HET-CAM ON MASCARAS AND EYELINERS

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ABSTRACT

Objective: This study aims to analyze the potential ocular injury of certain cosmetic products commonly marketed in Algeria. Aware of the irritation risks these products can cause, we favored the use of the Hen's Egg Test-Chorioallantoic Membrane (HET-CAM) as an alternative method. This test is distinguished by its speed, low cost, and compliance with ethical principles, compared to the Draize test traditionally used on live albino rabbits. **Materials and Methods:** Sixteen beauty products were evaluated at different dilutions. Embryonated chicken eggs were incubated until the chorioallantoic membrane appeared, which was then placed in direct contact with the samples. Three types of reactions—hemorrhage, vascular lysis, and coagulation—were carefully observed and timed over a period of 300 seconds. Each manifestation was weighted according to a specific scale to establish an overall irritation score. **Results and Discussions:** The comparative analysis between the two methods revealed that six (06) of the 16 product seizures tested showed perfect agreement with the results obtained by the Draize test, indicating a lack of ocular irritation. The other ten (10) products generated minimal reactions classified as mildly irritating by the HET-CAM, without, however, reaching the critical irritation threshold. These data tend to demonstrate that the HET-CAM test has increased sensitivity compared to the Draize test, tending to overestimate the potential for irritation without ever overlooking a real risk. This characteristic makes the HET-CAM a safe screening method, effectively contributing to consumer protection. **Conclusion:** Despite its inherent limitations, the HET-CAM test constitutes a promising alternative to the Draize test for the early screening of cosmetic-induced ocular irritation. Its ability to reliably detect potential irritant effects, while respecting current ethical and economic standards, makes it a tool of choice for assessing the safety of beauty products intended for the general public.

Keywords: HET-CAM, Draize, Mascaras, eye-liner

THE IMPORTANCE OF IMMERSION IN WATER FOR DIFFERENT PERIODS IN THE ADAPTATION OF TISSUE CULTURED CANNABIS PLANTS TO EXTERNAL CONDITIONS

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ABSTRACT

Cannabis plants produced by tissue culture thrive in culture vessels under high humidity (80-90%). When these plants are removed from the culture vessels, they experience water loss from their leaves due to more rapid evapotranspiration, and the limited water content in the shoots causes the leaves to wilt and dry. Therefore, careful protection of the seedlings is necessary for the plants to survive under harsh environmental conditions. In this study, tissue culture and rooted plants of the Vezir Köprü Narlı cannabis line taken from the culture vessels were washed with warm water after removing the agar and then immersed in sterile distilled water for 30, 60, 90, and 120 minutes. The best adaptation was obtained from plants immersed in water for 120 minutes. Newly developing plants were kept under high-mist conditions until they began to grow by reducing cell damage. Plantlets immersed in water for shorter periods (30 and 60 minutes) did not adapt and wilted and dried within 7 days. In contrast, plants immersed and held in water for 90 and 120 minutes achieved adaptation within a period of 7-10 days under high fog. Analysis of various tests showed that plantlets immersed in water for 30 and 60 minutes inhibited the formation of new cellulose and lignin, and died. Conversely, plantlets immersed in water for 90 and 120 minutes stimulated chlorophyll formation. The results determined that reducing factors affecting evapotranspiration, which lead to damage to plant cells and death of cultured plants, is important for plant adaptation. The results showed 51.8% adaptation in plantlets immersed in water for 90 minutes and 60.9% adaptation in plantlets immersed in water for 120 minutes. The results for chlorophyll a and b, and total chlorophyll formation also confirmed the obtained results. The results of the study emphasize the importance of immersing new plants in water for maintaining the viability of tissue cultured plants.

Keywords: absorbance, rooting, contabsorbance, rooting, adaptation

COMPOSITE TRANSFORMATION OF ŞERBETÇI OTU USING AGROBACTERIUM RHIZONEGES

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ABSTRACT

Humulus lupulus (şerbetçi otu), Cannabaceae familyasina ait çiçekli bir bitki tür olup, İlkbaharda yeni sürgünler oluşturarak ve soğukluğa dayanıklı bir bitki olup, Bilecik ilinde yaygın olarak yetiştirilmekte olup, bira üretimde yaygın olarak kullanılmaktadır. Agrobacterium tumefaciens, eksplantların gövdesinde tümörler oluşturur. Agrobacterium rhizogenes ise, mekanik yaralarındamuamele ettikten sonra dikotiledon bitkilere virülent suşların aşılanmasıyla saçak kök transfomasyonu için kullanılır. Virülent olmayan suşlar kök veya tümör oluşturmaz. Bu çalışmasında, 4 adet şerbetçi otu çeşidinin sürgünlerinde rizogenesis başlatmak için Agrobacterium rhizogenes'in 15834 Virülans suşunu kullanmış ve yarım saat muamele ile saçak köklerin transforme edildiği bir kompozit bitki üretmiştir. Amaç, transgenik tohumlar üretmeden çevresel ve edafik stres faktörlere karşı dirençli bitkilerin üretilmesine destek olacaktır.

Keywords: Transformation, Agrobacterium rhizogenes, composite transformation, zorluk,

BIOTECHNOLOGICAL VALORIZATION OF LAVANDULA DENTATA: OPTIMIZED IN VITRO PROPAGATION AND CALLOGENESIS

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ABSTRACT

Lavandula dentata, a medicinal and aromatic species from the Lamiaceae family, is known for its therapeutic properties. Due to its ecological and economic value, establishing efficient in vitro propagation protocols is essential for its conservation and large-scale multiplication. This study aimed to optimize the in vitro culture conditions of L. dentata through the evaluation of germination, shoot induction, and callus formation. Seeds collected from the Beni Houa region in Algeria were disinfected and cultured on MS and B5 media. MS medium yielded the highest germination rate (80%). Nodal segments from in vitro seedlings were cultivated on MS medium supplemented with 6-benzyladenine (BA) and gibberellic acid (GA_3). The best response was observed with 0.25 mg/L BA + 0.5 mg/L GA_3, significantly enhancing axillary bud formation (145.45%), shoot elongation (249.42%), and biomass accumulation (233.33%) compared to the control. For callus induction, leaf explants were cultured on MS medium containing 2,4-D and BA. The combination of 0.5 mg/L 2,4-D and 0.25 mg/L BA induced the highest callus formation rate (100%) and the largest callus surface area. These results provide a reliable protocol for L. dentata micropropagation and offer promising perspectives for future biotechnological applications such as secondary metabolite production and conservation strategies.

Keywords: Lavandula dentata, micropropagation, MS medium, BA, GA_3, 2,4-D, tissue culture, callogenesis.

ABIOTIC ELICITATION OPTIMIZATION FOR ENHANCED BIOMASS AND ANTIOXIDANT ACTIVITY IN CALLUS AND HAIRY ROOTS OF CATHARANTHUS ROSEUS

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ABSTRACT

Catharanthus roseus is a medicinal plant renowned for its bioactive alkaloids with anticancer and antioxidant properties. Enhancing its in vitro production of secondary metabolites is a key challenge in plant biotechnology. This study aimed to optimize the production of biomass and secondary metabolites from in vitro-derived callus and hairy roots of Catharanthus roseus (var. Cooler blush) using hormonal modulation and abiotic elicitation strategies. Callus induction was performed using different explants (leaves, stems, hairy roots) on MS media supplemented with various auxin/cytokinin combinations. The best callogenesis rate (up to 100%) was obtained with media containing 2,4-D and BAP. Subsequently, abiotic elicitors such as sucrose, salicylic acid, mannitol, and potassium chloride were tested for their effects on biomass accumulation and extract yield. Mannitol (80 mg/L) and KCl (300 mg/L) significantly enhanced dry biomass and extraction yield. Antioxidant activity of the extracts was assessed using the DPPH assay. Callus treated with mannitol exhibited strong radical scavenging capacity compared to control. These findings demonstrate that elicitor-based strategies can significantly enhance the biotechnological potential of C. roseus in vitro cultures.

Keywords: Catharanthus roseus, callus, hairy roots, elicitation, DPPH, secondary metabolites, antioxidants.

EFFECTS OF NACL AND MORINGA OLEIFERA EXTRACT ON SECONDARY METABOLITES ACCUMULATION AND ANTIOXIDANT ACTIVITY IN LAVANDULA DENTATA IN VITRO SHOOT CULTURES

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ABSTRACT

Lavandula dentata, known as fringed lavender, is a medicinal plant from the Lamiaceae family traditionally used in Mediterranean folk medicine. Studies have highlighted its antimicrobial, antioxidant, and anti-inflammatory properties, supporting its potential use in natural health products, aromatherapy, and cosmetics. This study investigates the effects of Moringa oleifera extract and sodium chloride (NaCl) on the accumulation of secondary metabolites and antioxidant activity in Lavandula dentata in vitro shoot cultures. Cultures were treated with varying concentrations of M. oleifera extract (0.2, 0.4, and 0.8mg/L) and NaCl (0.5, 1, and 2 mg/L), with untreated shoots serving as the control. The phenolic composition was analyzed by colorimetric assays and HPLC-DAD, whereas antioxidant activity was evaluated using TAC and DPPH assays. The results showed that both treatments influenced phenolic and flavonoid contents, as well as antioxidant activity, in a concentration-dependent manner. At lower concentrations, both Moringa extract (at 0.2 and 0.4 mg/L) and NaCl (at 0.5, 1 mg/L) significantly reduced the levels of polyphenols, flavonoids, total antioxidant capacity (TAC), and DPPH radical scavenging activity compared to the control. In contrast, higher concentrations particularly 0.8 and 2 mg/L led to notable increases in these parameters. These findings suggest that both Moringa oleifera extract and NaCl can modulate secondary metabolism and antioxidant potential in L. dentata, with higher concentrations enhancing bioactive compound accumulation under in vitro conditions.

Keywords: Lavandula dentata, secondary metabolites, in vitro culture, antioxidant activity, phenolic compounds, HPLC-DAD analysis

THE PROPAGATION OF SOME HUMULUS LAND RACES IN VITRO CONDITIONS

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ABSTRACT

Humulus lupulus L. (hops) Hops belongs to the Cannabiaceae family and is widely used in beer production to create a specific taste and aroma. Four village cultivars grown by farmers were used in this study. In this study and obtained from Pazaryeri Bilecik. The aim of this study was to determine the regenerative potential of these samples. The plant is usually propagated vegetatively. The shoot meristems of vegetatively propagated plants were used as explants. Each explant, induced 4-5 shoots per explant. All village varieties exhibited variable genotype dependent regeneration potentials. The shoots subjected to in vitro regeneration were rooted on ¼ × MS medium containing 1mg/l IBA. Their acclimatisation is underway in the climate room.

Keywords: Hops, Genetic diversity, Propagation methods, Regenative potential

APPLICATION OF BIOPROTECTION IN WINEMAKING: REDUCING SULFITE USE WITH NON-SACCHAROMYCES YEASTS

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ABSTRACT

In the traditional winemaking practices, the sulfur dioxide (SO_2) has been used for its antimicrobial and antioxidant properties. In recent decades, increasing consumer demand for healthier, low-intervention, and additive-free wines has promoted researchers and producers to explore for natural alternatives. Thus, non-Saccharomyces wine yeasts are proposed as a sustainable alternative to sulfur dioxide amid health and consumer concerns. This method involves the early inoculation of must or grapes with selected yeast strains such as Metschnikowia pulcherrima, which produce antimicrobial metabolites to protect the wine, and contributes to wine aromatic complexity. This study aimed to evaluate the effectiveness of a selected M. pulcherrima strain as a bioprotection agent in wine production. Controlled fermentations were conducted in triplicate, comparing conventional sulfiting with bioprotected must. The kinetics and microbial populations were monitored during the fermentation process and the final wine was analyzed for quality parameters. The results demonstrated that M. pulcherrima effectively limited undesirable microflora and improved fermentation kinetics without compromising wine quality. These findings support the potential of bioprotection as a promising strategy for reducing SO_2 in winemaking. This approach previously unexplored in the Albanian wine industry, offers a promising pathway for the development of organic, natural and sustainable wines using native cultivars and for the preservation of local biodiversity.

Keywords: Bioprotection, Non-Saccharomyces Yeasts, Sulfite Reduction, Natural Wine, Biodiversity

DEVELOPMENT OF ANTIBACTERIAL FILMS FROM SHRIMP CHITOSAN AND WILD CARROT ESSENTIAL OIL FOR NATURAL PACKAGING APPLICATIONS

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ABSTRACT

The increasing environmental concern over plastic waste has driven the search for sustainable alternatives in food packaging. This study presents the development of biodegradable films based on chitosan extracted from shrimp shell waste and Daucus carota essential oil, known for its antimicrobial properties. The films were formulated using solvent casting and characterized by Fourier-transform infrared spectroscopy (FTIR). Results showed that the incorporation of essential oil improved the films' mechanical properties, water resistance, and antibacterial activity. This biocomposite film offers a promising solution for short-shelf-life foods, aligning with global sustainability goals and supporting transition to a circular bioeconomy. These natural films represent an innovative approach to valorize marine waste while addressing food safety and environmental challenges.

Keywords: Chitosan, Daucus carota, Edible film, Antibacterial, Biodegradable packaging, Food preservation

COMPOSITE TRANSFORMATION OF HUMULUS LUPULUS (HOPS) USING AGROBACTERIUM RHIZONEGES (ENGLISH)

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ABSTRACT

Humulus lupulus (hops) is a flowering plant species belonging to the Cannabiceae family. It produces new shoots in the spring and is resistant to cold. It is widely grown in Bilecik province and is widely used in beer production. Agrobacterium tumefaciens forms tumors on the stems of explants. Agrobacterium rhizogenes is used for hairy root transformation by inoculating virulent strains onto dicotyledonous plants after treating mechanical wounds. Non-virulent strains do not form roots or tumors. In this study, the 15834 Virulence strain of Agrobacterium rhizogenes was used to induce rhizogenesis in the shoots of four hop varieties and produced a composite plant in which hairy roots were transformed with a half-hour treatment. The aim is to support the production of plants resistant to environmental and edaphic stress factors without producing transgenic seeds.

Keywords: Agrobacterium, rhizogenes, roots, genetic transformation, saçak kökler(Turkçe) Agrobacterium, rhizogenes, roots, genetic transformation, saçak kökler

ANTIFUNGAL POTENTIAL OF PHYSALIS PERUVIANA CALYX EXTRACTS AGAINST BOTRYTIS CINEREA

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ABSTRACT

Botrytis cinerea, a necrotrophic fungus responsible for gray mold, poses a significant threat to horticultural crops. In the search for sustainable alternatives to synthetic fungicides, Physalis peruviana (Cape gooseberry), a plant known for its phytochemical richness, offers promising antifungal potential. This study evaluated the antifungal activity of ethanol extracts obtained from the calyces of 21 accesions of P. peruviana against B. cinerea and investigated their chemical composition. The extracts were prepared using ultrasonic-assisted extraction and subsequently analyzed through liquid chromatography–mass spectrometry (LC–MS) to determine their metabolite composition. An amended bioassay method was employed to assess antifungal activity by measuring the inhibition of mycelial growth of B. cinerea on PDA medium amended with varying concentrations of the extracts. Covariate-based multivariate analyses were used to integrate the LC–MS data with the biological results to identify bioactive compounds. The LC–MS profiling revealed a complex mixture of flavonoids and withanolides, with a predominance of five-membered lactone-containing withanolides. The extracts demonstrated significant, concentration-dependent inhibition of B. cinerea mycelial growth. Integrative chemometric analysis linked the antifungal activity to specific withanolides bearing five-membered lactone moieties, suggesting their key role in the observed bioactivity. These findings support the potential of P. peruviana calyx extracts as a natural source of antifungal agents. The study also emphasizes the value of combining metabolite profiling with bioassay-guided correlation analyses to identify active constituents in complex plant matrices. This work contributes to the development of plant-derived biopesticides and highlights the calyces of P. peruviana as underutilized yet potent reservoirs of bioactive compounds. The present study is a product derived from the project EXT-CIAS-3854 financed by Vicerrectoria de Investigaciones at UMNG, validity 2023.

Keywords: Physalis peruviana, withanolides, Botrytis cinerea, antifungal activity, LC–MS profiling

CRISPR/CAS9 TECHNOLOGY: MECHANISM, APPLICATIONS IN VETERINARY MEDICINE, AND ETHICAL PERSPECTIVES

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ABSTRACT

The CRISPR/Cas9 system is an innovative gene-editing technology derived from the adaptive immune mechanism of prokaryotes, enabling highly accurate modifications of target DNA sequences. The system operates on the principle of Cas9 endonuclease recognizing a target DNA sequence through a guide RNA (gRNA) and introducing a double-strand break in the presence of a protospacer adjacent motif (PAM). These breaks are repaired by intracellular DNA repair mechanisms—either homology-directed repair (HDR) or non-homologous end joining (NHEJ)—allowing the desired genetic modifications to be integrated into the genome. In next-generation applications, more precise edits can be made without inducing physical DNA breaks using techniques such as "base editors" and "prime editing." In veterinary medicine, the CRISPR/Cas9 system is employed in diverse areas including the treatment of genetic disorders, development of disease-resistant animals, and enhancement of production efficiency. Successful examples include the knockout of the CD163 gene in pigs to confer resistance to PRRS, the insertion of the NRAMP1 gene in cattle to increase tuberculosis resistance, and the development of immunity against Marek's disease in chickens. Furthermore, phenotypic traits such as muscle growth, coat texture, and feather color can be simultaneously modified by targeting genes like MSTN, FGF5, and BCO2. Despite its vast potential, CRISPR/Cas9 technology presents several limitations, including the risk of off-target mutations, ethical concerns, and regulatory inconsistencies. The European Union classifies this technology under genetically modified organisms (GMOs), although it also acknowledges that the risks associated with CRISPR are comparable to those of conventional breeding methods. Issues such as animal welfare, preservation of genetic diversity, and public perception of these technologies must be carefully addressed. The safe, effective, and ethically grounded implementation of CRISPR/Cas9 in veterinary medicine must be supported not only by scientific competence but also by societal responsibility and legal frameworks.

Keywords: CRISPR/Cas9, gene editing, veterinary medicine, animal genetics, ethics, GMO, prime editing

GENOMIC APPROACHES TO SILENCE CLIMATE CHANGE INDUCED STRESS FACTORS IN KALE

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ABSTRACT

Abiotic stresses such as drought, heat and salinity, which are intensifying due to global climate change severely disrupt plant growth and productivity and pose a major threat to food security. Kale (Brassica oleracea var. acephala), a nutrient-rich leafy vegetable considered a 'superfood,' is particularly sensitive to these environmental stress factors, leading to reduced yield and quality. To address these challenges, the development of climate-resilient kale genotypes through advanced genomic interventions has become increasingly important. This review synthesizes recent advances in genomic approaches aimed at enhancing abiotic stress tolerance in kale. Key tools addressed include quantitative trait locus (QTL) mapping, genome-wide association studies (GWAS), transcriptomics, and CRISPR/Cas9 gene editing, with an emphasis on their benefits in identifying and modulating genes associated with stress responses. Additionally, emerging areas such as epigenomics and non-coding RNAs are being explored for their regulatory roles under abiotic stress conditions. Although progress has been achieved in related Brassica species, kale remains underrepresented in genomic research. This underscores the need for targeted studies and field-level validations. The review also highlights the importance of integrating multi-omic platforms and promoting international breeding collaborations to ensure sustainable kale production in the context of ongoing climate change. Collectively, this review provides a comprehensive foundation for the application of genomic technologies to support the future resilience and productivity of kale.

Keywords: drought, heat, salinity, irregular rainfall, stress responses, genome-wide association, transcriptomics

IDENTIFICATION OF GENE REGIONS ASSOCIATED WITH IMPORTANT DISEASES IN TOMATOES USING MOLECULAR MARKERS

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ABSTRACT

Tomatoes are the most widely produced vegetable in the world. Viral diseases are among the leading causes of limited tomato production worldwide and in our country. Intensive production increases the risk of viral and fungal diseases, such as Tomato Yellow Leaf Curl Virus (TYLCV), Tomato Spotted Wilt Virus (TSWV), and root and root collar rot (Fusarium oxysporum f. sp. radicis-lycopersici, or FORL), which cause significant economic losses in tomato production areas. Identifying disease-associated gene regions in tomato plants is an important and landmark step in this field of research. These identifications, made using molecular markers, aim to establish a solid foundation for identifying disease-resistant tomato varieties and contributing to our country and the world. The time-consuming and limited nature of traditional breeding methods has brought the use of molecular markers to the forefront. Marker-assisted selection (MAS) enables the identification of gene regions associated with disease resistance and the integration of these genes into the plant genome for early selection. Molecular markers, particularly SSR, SCAR, and CAPS-type markers, are effectively utilized in tomato breeding programs and have largely replaced conventional tests. Recent studies have revealed the development and application of numerous molecular markers to identify resistance genes, such as Ty-1 and Ty-3 against TYLCV, Sw-5 against TSWV, I-1 and I-2 against Fusarium, and Mi against nematodes. These markers are used to screen local genotypes and wild tomato species, enabling the effective evaluation of genetic resources. According to the review conducted for this thesis, integrating molecular markers into breeding programs offers significant advantages in terms of time, labor, and cost. It also enables faster, more reliable results than classical methods. Additionally, developing lines that carry multiple resistance genes is crucial for safeguarding the production potential of tomatoes in the face of climate change and mounting disease pressure. In conclusion, the widespread use of the MAS method greatly contributes to developing new, resistant tomato varieties and aligns with sustainable agriculture goals.

Keywords: Tomato, disease, virus, molecular marker, MAS

THE IMPORTANCE OF MARKER ASSISTED SELECTION IN BLACKBERRY

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ABSTRACT

Plant breeding is a scientific process based on genetic principles that aims to import desired traits to plants. The development of molecular marker technologies and the application of Marker Assisted Selection (MAS) have accelerated and improved the reliability of breeding efforts compared to traditional methods. The ability to select fruit species based on genetic information, especially in the early stages, offers substantial time and cost savings in the breeding processes. Although genetic maps using molecular markers have been created for many important agricultural species, this data is rarely integrated into commercial breeding programs. The blackberry (Rubus sp.) is an example of this due to its high ploidy level and complex genetic structure. In this species, which is difficult to breed conventionally, genetic mapping and genome analysis must first be developed in order to effectively utilize MAS. Widespread wild blackberry populations in Turkey are an important source of genetic diversity and offer the potential to develop local varieties by integrating them into breeding efforts. To benefit from this potential, it is crucial to develop genomic and mapping studies, increase research on MAS, and effectively evaluate genetic resources. In this review, the importance of MAS studies in blackberry breeding and molecular studies on this subject are included.

Keywords: Blackberry, Marker Assisted Selection, Moleculer markers

MOLECULAR AUTHENTICATION OF SPICE THYME IN MARKET BY DNA BARCODING

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ABSTRACT

Thyme (Thymus vulgaris and Origanum onites) is an aromatic, perennial plant rich in essential oils and Turkiye is biggest thyme-producer country in the world. Due to its strong flavor and ability to enhance the taste of food, spice thyme is widely used in gastronomy throughout the world. This characteristic makes thyme a commercially valuable product. However, the high commercial value also leads to economically motivated adulteration, where non-thyme plant materials are deliberately added to thyme products. Such practices violate both trade ethics and consumer safety. In this context, it is critically important to analyze commercial thyme products using reliable methods and to detect potential adulteration. One of the modern biotechnological approaches that meets this need is the DNA barcoding method. DNA barcoding is very useful technique for identification of the all species by analyzing of the universal one or a few loci in the genome and distinguish living organisms at the molecular level. Through this method, the genetic identity of a food product can be accurately determined and verified. The aim of this project is to determine the authenticity of commercially available thyme products and to identify possible adulteration. For this purpose, thyme samples obtained from various retail outlets in Edirne, Turkey, were analyzed using the DNA barcoding technique. In the study, a total of 10 commercially available thyme spice products from different brands and 2 reference plants leaves from Trakya Agricultural Research Institute were analyzed. For this, matK and trnH-psbA loci were amplified by universal primers and sequenced. Nucleotide sequences of the each sample and each locus were used for searching homology in NCBI database by BLASTn. Our results showed real genetic composition of the thyme spice products, thereby allowing the reliable detection of non-thyme plant materials (such as olive leaves, carrot, or wild lettuce) within the products. Based on the our findings, it was concluded that the analysed thyme products do not consist of 100% thyme, but contain mixtures of different species, especially olive leaves, carrots and wild lettuce. This study highlights the applicability of DNA barcoding as a control tool for species authentication in food products, contributing significantly to both commercial reliability and consumer health.

Keywords: Thyme, DNA Barcoding, Molecular Authentication

INVESTIGATION OF RECOMBINANT CHYMOSIN ENZYME PRODUCTION WITH DIFFERENT FEEDING STRATEGIES IN BIOREACTOR-SCALE PRODUCTION

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ABSTRACT

In industrial-scale enzyme production, various microorganisms are generally used. It is known that many parameters, such as environmental conditions such as temperature and pH, reactor type, intracellular/extracellular production method, and medium composition, affect the production of enzymes in solid or liquid culture fermentation. In the recombinant enzyme production process, firstly, a clone is designed that has an optimum genetic construct. Secondly, the enzyme production was performed at the shake flask level, and some process parameters, such as pH and temperature, were optimized. Then, the bioreactor scale enzyme production was conducted under the optimized conditions. In this study, a yeast (Pichia pastoris) clone that was created in the previous study (Ersöz et al. 2025) was used for chymosin enzyme production. The clone produces the chymosin enzyme under the control of a mutant promoter (SNT5) induced by ethanol. However, we have previously discovered that glucose can be used as an inducer, instead of ethanol. For this purpose, the feeding solution was restructured to contain glucose, and the chymosin production was carried out within the Basal Salt Medium with different feeding strategies on a bioreactor scale. The BSM medium used in enzyme production contains 4% glycerol, and within the scope of the study, this content was changed to 4% and 8% glucose. A solution containing 50% glucose was used as the feeding solution, and it was applied at a constant and glucose-limited feeding rate. In the control group, the enzyme was produced in standard BSM media (containing 4% glycerol) with ethanol feeding, and the enzyme activity was detected as 43 IMCU/mL. In the test group, the chymosin enzyme was produced as 38 IMCU/mL at 28°C and pH 3 conditions, using BSM media containing 8% glucose with constant glucose feeding. As a result of this study, it was shown that glucose can be used in the feed solution instead of ethanol. In this study, two different glucose contents in the medium and different feeding parameters were tested. However, more comprehensive optimization studies should be done in future studies.

Keywords: bioreactor, chymosin, feeding, Pichia pastoris, recombinant

ENHANCING THE NUTRITIONAL VALUE OF OLIVE LEAVES THROUGH SOLID-STATE FERMENTATION WITH SELECTED MICROBIAL STRAINS

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ABSTRACT

Olive leaves (OL), a major by-product of olive cultivation, are rich in valuable bioactive compounds but remain underutilized. This study evaluated the effects of solid-state fermentation (SSF) using Aspergillus niger, A. oryzae, Candida utilis, and Lactobacillus acidophilus on the chemical profile of OL, with a focus on their potential for agricultural and feed applications. Key compounds such as oleuropein (OLE), hydroxytyrosol (HT), elenolic acid (EA) derivatives, and the triterpenes maslinic (MA) and oleanolic acids (OA) were monitored, alongside protein content and mineral profiles relevant to feed applications. SSF significantly altered OL composition. OLE and EA derivatives were fully degraded during fermentation, while HT initially increased—reaching up to 1 mg/g dw with A. niger—before declining. MA and OA remained stable, and antioxidant activity was best preserved in OL fermented with A. niger (13.8% reduction at 72 hours). Notably, protein content increased to 187 mg/g, suggesting enhanced feed value. These results demonstrate that SSF can be an effective, sustainable approach to valorize olive leaves by improving their nutritional and functional properties. The process holds promise for applications in animal nutrition and circular bioeconomy initiatives within the agricultural sector.

Keywords: Agro-industrial by-products, Bioactive compounds, Circular bioeconomy, Aspergillus niger

INSECTICIDAL POTENTIAL OF LEAVES AND FRUITS OF ZIZYPHUS LOTUS L. AGAINST TRIBOLIUM CASTANEUM (HERBST)

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ABSTRACT

In order to develop an integrated pest management strategy for stored grain pests in Algeria, the insecticidal activities of powders made from the fruits and leaves of Zizyphus lotus L. against the larvae and adults of Tribolium castaneum Herbst were conducted under laboratory conditions. The powders were mixed with Triticum durum grains at doses of 10, 20, 30, and 50%. A significant mortality effect was observed, with the mortality percentage increasing with the plant species (leaves or fruit), the duration of treatment, and the concentration. Mortality rates ranging from 49% to 100% were achieved after 12 and 24 hours of treatment for larvae, and after 24 and 72 hours of treatment for adults, at a concentration of 50%, respectively for the leaves and fruits of Zizyphus lotus L. The leaf powder of Zizyphus lotus L. caused the highest and most significant mortality at all concentrations, and it was demonstrated that larvae are more sensitive than adults for both the leaves and fruits of Z. lotus L. The TL50 indicates that the shortest time was obtained with the leaf powder of Zizyphus lotus L. at 50% concentrations (6 hours and 8 hours for larvae, and 14 hours and 48 hours for adults). For the fruit powder of Zizyphus lotus L. at the same concentration, the TL50 was 12, 24, and 48, 72 hours respectively for larvae and adults. This wild plant could be useful for managing populations of Tribolium castaneum and deserves further study.

Keywords: Zizyphus lotus L., Tribolium castaneum, leaves powder, fruits powder, grain protectant, Insecticidal potential.

ANALYSING THE ORIGINALITY OF PISTACHIO FOOD PRODUCTS IN MARKETS BY DNA BARCODING

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ABSTRACT

In recent years, various factors such as global developments and climate impacts have increased the amount of food required worldwide. This situation creates a basis for the rise of adulterated food products that threaten food safety. Such undesired additives directly or indirectly affect human health. Therefore, effective and sensitive detection of the suspicious ones is an important issue for food safety. This situation is the main reason to start this project. Pistachios is one of the important product of Turkiye. It used as an indispensable ingredient in many food such as desserts, pastries, chocolates, and nuts and aldulteration are commonly observed, both due to their high cost and their status. The study is aimed to detect originality of the pisctachio in different food products in the market by DNA barcoding method. Thanks to this method, it is possible to define unknown samples with a relatively quick and economic way by comparing the barcod sequences with the already analysed samples from Data Banks. In the study, examined samples were obtained as packaged products (chocolate, croquant, Turkish fairy floss, halva, Turkish delight) or cooked dessert (baklava and künefe). The pistachio pieces were separated from the samples and used for DNA extraction. trnaH- psbA in chloroplast genome were selected for DNA barcod locus that are suitable for species identification. The locus was amplified from the DNA samples by universal locus specific barcod primers. The amplified DNA fragments were sequenced and BLAST at NCBI data bank. Our results showed that 7 products of the samples included original pistachio while two of them unlabelled walnut ingredients (Juglans mandshurica and Cyclocarya paliurus) and one was found to contain peas. As a result, DNA barcoding has been determined the food safety. This research was supported by TÜBİTAK 2209-A program.

Keywords: Food safety, DNA barcoding, Pistacia Vera

METABARCODING ANALYSIS OF ARBUSCULAR MYCORRHIZAL FUNGAL COMMUNITIES ASSOCIATED WITH AN ENDEMIC MEDICINAL AROMATIC PLANT IN MOROCCO

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ABSTRACT

In the arid and semi-arid regions of Morocco, arbuscular mycorrhizal fungi (AMF) serve as essential symbionts, significantly enhancing plant mineral nutrition, abiotic stress tolerance, and ecological resilience. This study investigates the diversity of AMF communities associated with an endemic aromatic and medicinal plant (AMP) of Morocco, whose biotechnological potential remains largely untapped. Using a high-throughput metabarcoding approach targeting the 18S rDNA region from rhizospheric soil, we characterized the composition and structure of AMF communities. The results revealed a remarkably high diversity, with a predominance of the genera Glomus and Rhizophagus, indicating specialized and functionally significant mycorrhizal associations. These symbiotic interactions are critical for plant adaptation to harsh environmental conditions and may hold promise for agroecological applications, including the sustainable cultivation of this endemic AMP.By providing novel insights into the structure and diversity of AMF communities, this study advances our understanding of microbial symbioses in Moroccan Mediterranean ecosystems. The findings underscore the importance of preserving these fungal-plant interactions to support biodiversity conservation and sustainable agricultural practices in vulnerable arid regions.

Keywords: arbuscular mycorrhizal fungi; metabarcoding; aromatic medicinal plant; fungal diversity; microbial ecology; high-throughput sequencing

APPLICATION OF DAPI STAINING FOR MICROSPORE STAGE IDENTIFICATION AND NUCLEAR INTEGRITY ASSESSMENT IN EGGPLANT (SOLANUM MELONGENA L.) ANTHER CULTURE

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ABSTRACT

Anther culture is a powerful tool for producing doubled haploid (DH) lines in Solanum melongena L. (eggplant), facilitating rapid development of homozygous genotypes for hybrid breeding. The success of androgenesis is highly dependent on the developmental stage of microspores, with the uninucleate stage being most responsive to embryogenic induction. In this context, 4′,6-diamidino-2-phenylindole (DAPI) staining serves as a critical technique for identifying microspore stages and assessing nuclear integrity. DAPI binds preferentially to AT-rich regions of DNA, enabling precise visualization of nuclei under fluorescence microscopy (Calabuig-Serna et al., 2021). This study integrates DAPI staining into a comparative analysis of eggplant anther culture methods, revealing its utility in selecting viable microspores and monitoring embryogenic progression (Seguí-Simarro, 2016). The staining protocol was optimized for fixed anther tissues, allowing differentiation between uninucleate, binucleate, and multicellular stages. Additionally, DAPI staining supports ploidy analysis when combined with flow cytometry, aiding in the identification of spontaneous DH regenerants (Springer Protocols, 2021). The findings underscore the value of DAPI staining as a rapid, cost-effective diagnostic tool to enhance the efficiency and reliability of eggplant anther culture systems.

Keywords: Solanum melongena L., Double haploid, DAPI, anther culture

USE OF MEDICINAL PLANTS BY PATIENTS ATTENDING THE ENDOCRINOLOGY DEPARTMENT AT THE UNIVERSITY HOSPITAL OF SIDI BEL ABBES, ALGERIA: PLANT-DRUG INTERACTIONS

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ABSTRACT

Introduction: Endocrine disorders are common chronic conditions that significantly affect patients' quality of life. These conditions increasingly prompt interest in complementary approaches, particularly the use of medicinal plants. This study aims to evaluate the use of medicinal plants among hospitalized and outpatient individuals in the Endocrinology Department of the Abdelkader Hassani University Hospital of Sidi Bel Abbes, while also identifying potential plant-drug interactions that may pose a risk. **Materials and Methods:** A descriptive study was conducted in the endocrinology department over a one-month period. Data were collected using a structured questionnaire composed of three main sections: (1) patient profile, including age, gender, medical history, and reason for consultation or hospitalization; (2) medications, covering current drug treatments, dosage, duration, and frequency; and (3) phytotherapy, identifying the types of medicinal plants used, preparation methods, frequency of use, and perceived effects. Participants were recruited from both hospitalized patients and outpatients. **Results and Discussion:** The study included 49 participants: 15 hospitalized (30.6%) and 34 outpatients (69.4%). Among them, 26 patients (53.1%) reported using medicinal plants alongside their prescribed treatments. The most commonly reported conditions were diabetes, hypertension, and thyroid disorders. The most frequently used medicinal plants included olive leaves (Olea europaea), used by 12.2% of participants (6 patients), mainly as an infusion to manage diabetes; and tiger nut (Cyperus esculentus), used by 6.1% (3 patients) for hypothyroidism, either chewed or in powdered form. Other plants mentioned by 1 or 2 participants each included turmeric (Curcuma longa), sage (Salvia officinalis), hibiscus (Hibiscus sabdariffa), cinnamon (Cinnamomum verum), and fenugreek (Trigonella foenum-graecum), mostly used for diabetes and hypertension. A major finding is that most patients did not inform their physicians about their concurrent use of medicinal plants and pharmaceutical drugs, which increases the risk of plant-drug interactions. Olive leaves, for example, can potentiate the effects of hypoglycemic drugs, while turmeric, known for its anti-inflammatory properties, may alter the hepatic metabolism of certain medications. **Conclusion:** This study reveals a high frequency of medicinal plant use among patients with endocrine diseases, often without prior consultation with healthcare professionals. There is a need to promote the integration of phytovigilance into routine clinical practice to improve understanding and management of plant-drug interactions.

Keywords: Medicinal plants, Phytovigilance, Endocrinology.

NEW DATA ON DISTRIBUTION OF WULFENIA BALDACCII DEGEN

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ABSTRACT

Wulfenia baldaccii is an Albanian endemic and a Tertiary relict species, currently listed as Vulnerable (VU) on the Albanian Red List (2013). Its known distribution is restricted to a few localities in the western Albanian Alps, typically on north-facing limestone grasslands at altitudes between 900 and 2200 m a.s.l. Here we report a newly discovered population of W. baldaccii at Syri i Kaltër, Theth, Albania, occurring at approximately 600 m a.s.l. The plants were found on humid limestone walls, predominantly covered by mosses and frequently associated with Ramonda serbica, Pinguicula hirtiflora, and the liverwort Marchantia polymorpha. This site represents the lowest altitude recorded for the species to date. The presence of W. baldaccii in the permanently humid microhabitats of a major karstic spring underscores the exceptional ecological value of this site, particularly for the conservation of Tertiary relict flora, which are highly vulnerable to climate change and increasing drought conditions. However, Syri i Kaltër is also a popular tourist destination, and increasing human activity poses potential threats to this vulnerable species. This finding underscore both the importance of targeted conservation measures and the need for careful management of high-interest natural monuments hosting rare plant populations.

Keywords: Wulfenia baldaccii; Tertiary relict flora; Albanian Alps; karstic spring; conservation

COMPARATIVE ANALYSIS OF THE MAIN BIOLOGICALLY ACTIVE SUBSTANCES OF THE BULGARIAN REPRESENTATIVES OF SATUREJA MONTANA L.: A REVIEW

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ABSTRACT

Satureja montana L. is a well-known aromatic and medicinal species from the family Lamiaceae, originates from the Mediterranean and is widely distributed across Europe. In Bulgaria, the species typically grows in dry, rocky habitats at altitudes ranging from 100 to 1400 meters above sea level. This review presents a comparative analysis of the main biologically active compounds identified in S. montana, with particular emphasis on essential oils, phenolic compounds, flavonoids, and other secondary metabolites. The review integrates published phytochemical and pharmacological data to highlight the species' potential as a natural source of antioxidants, anti-inflammatory, and antimicrobial agents. The findings indicate significant qualitative and quantitative variations in the chemical composition of bioactive substances, influenced by environmental factors such as geographic origin, altitude, soil type, climate conditions, and extraction techniques. Special attention is given to the diversity of essential oil profiles, notably the varying content of major constituents such as carvacrol, thymol, and p-cymene. The review aims to consolidate current knowledge and provide insights into the potential for future applications of S. montana in pharmaceuticals, cosmetics, and the food industry, as well as its cultivation and conservation. This comprehensive overview underlines the importance of further research into the chemotypic diversity and pharmacological potential of this valuable medicinal plant.

Keywords: Keywords: Satureja montana L., essential oils; phenolic compounds; phytochemistry; Bulgaria; medicinal plants; biologically active substances

ASSESSMENT OF RIPARIAN VASCULAR FLORA OF THE RIVER SHKUMBIN NEAR ELBASAN AREA, ALBANIA

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ABSTRACT

The river Shkumbini is one of the most erosive rivers in Albania and it lies in the central part of the country. Our fieldworks were done in the riparian areas from Peqin to Elbasan area, during the last two years. Among vascular plant collected, we identified up to 254 taxa, consisting into 55 plant families, each of them represented by different levels of species richness. The most represented families were: Poaceae (12%), Fabaceae (11%), Lamiaceae (7%), and Brassicaceae (5%), according to their proportional occurrence. The predominant biological forms observed were hemicryptophytes, therophytes, and phanerophytes. Referring to the data collected, the riparian flora of the studied area is predominated by Populus alba L. Salix alba L., Salix eleagnos Scop., Alnus glutinosa (L.) Gaertn., Typha minima Hoppe, Carex sp., etc. The anthropogenic influence is remarked by the presence of many ruderal species, as well as the presence of grapevine cultivars (Vitis vinifera L.), wild cabbage (Brassica oleracea), tomato (Solanum lycopersicum) and potatoes Solanum tuberosum L. as the areas near were agricultural ones.

Keywords: Shkumbini river, riparian, flora, taxa, Elbasan

EVALUATION OF THE NUTRITIONAL VALUE OF THREE AMARANTHUS L. SPECIES AS POTENTIAL FOOD AND FORAGE PLANTS

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ABSTRACT

This study focuses on three species from the genus Amaranthus L. – A. blitum L., A. hybridus L., and A. retroflexus L. Members of this genus are widespread across Bulgaria and are typically described as ruderal and/or weedy plants. They are commonly found in various habitats, including cultivated fields, gardens, roadsides, and other disturbed areas, ranging from 0 to 1000 meters above sea level. A total of 17 populations were surveyed: 2 of A. blitum, 8 of A. hybridus, and 7 of A. retroflexus, across six floristic regions in Bulgaria – Central Stara Planina, Thracian Plain, West Frontier Mountains, Strandzha Mountain, Tundzha Hilly Plain, and the Western Rhodopes. The aim of the study was to assess the potential of these three Amaranthus species as alternative food and forage plants. The following parameters were determined: Chemical composition of aboveground biomass (crude protein, crude fat, crude fibre, ash, and nitrogen- free extract – NFE); Mineral content; Digestibility; Gas production over a 24-hour and 48- hour periods; Metabolizable energy (ME); Relative feed value (RFV); Contents of neutral detergent fiber (NDF) and acid detergent fiber (ADF). The data were summarized and compared across the species. Regression equations were developed to predict metabolizable energy, as well as to estimate relative feed value through the relationship between NDF and ADF. The results indicate that certain populations of Amaranthus spp. exhibit promising potential as alternative food and forage plants, provided appropriate agronomic management is applied. **Acknowledgments:** The authors gratefully acknowledge receiving funding from the Bulgarian Ministry of Education and Science through project: KP-06-H66/11/SUNI/-BG-175467353-2022-04-0026 “Traditional food practices - fundament for diversification of food market and social innovation in rural areas”.

Keywords: Amaranthus blitum L., A. hybridus L., A. retroflexus L.; chemical composition; mineral content; detergent fibre; “in vitro” gas production; relative feed value

RIPARIAN FLORISTIC DIVERSITY AT TWO SAMPLING SITES ALONG THE MIDDLE-STREAM OF THE SHKUMBIN RIVER

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ABSTRACT

In its middle course, the Shkumbin River traverses the central Albanian cities of Elbasan and Peqin, flowing predominantly from east to west. This study conducted in the riparian environments of Elbasan and Peqin aims evaluating their vascular floristic diversity. The comparative analysis of the two stations indicates differences in family-level taxonomic richness, with certain families exhibiting notable variation in their relative abundance, such as: Poaceae Compositeae Fabaceae most present in Sinaballaj with almost 15 % of the presence and lower in Paulesh 4 % of the presence for Peqin and for Elbasan those are equivalent for Murriqan with almost 15 % of the presence, 9 % in Jagodinë and 11 % of the presence in Shushicë. The percentage of native plant species recorded at the Elbasan station is 78%, whereas at the Peqin station it reaches 87%. This indicates a higher degree of floristic naturalness and lower anthropogenic impact in the Peqin riparian zone compared to Elbasan. The riparian flora of Peqin and Elbasan shows notable differences in the distribution of biological forms. In Peqin, therophytes are more dominant, reflecting open and often disturbed habitats. In contrast, Elbasan shows a relatively higher proportion of hemicryptophytes and phanerophytes, indicating the presence of more stable, perennial vegetation and woody species. These variations suggest differences in microclimatic conditions, land use intensity, and habitat disturbance between the two sites.

Keywords: flora, riparian areas, Shkumbini

ETHNOPHARMACOLOGICAL USES OF PALLENIS HIEROCHUNTICA IN THE TEBESSA REGION OF ALGERIA: CHALLENGES IN KNOWLEDGE TRANSMISSION AND PRESERVATION

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ABSTRACT

Pallenis hierochuntica (L.) is a medicinal plant widely used in traditional medicine in the Tebessa region of eastern Algeria. This study aims to document its ethnopharmacological uses and examine the mechanisms and challenges of knowledge transmission among local communities. Field surveys were conducted in rural areas using semi-structured interviews with herbalists, elderly practitioners, and knowledgeable community members. The findings reveal that P. hierochuntica is traditionally used for a wide range of ailments, including skin disorders, digestive issues, and as a general tonic. The study highlights a significant decline in the transmission of ethnobotanical knowledge due to modernization, lack of written records, and generational gaps. While oral tradition remains the main mode of knowledge preservation, it is increasingly threatened by socio-economic and cultural changes. The study underlines the urgent need for safeguarding traditional plant knowledge through documentation, community-based education, and integration into national biodiversity conservation strategies. This ethnopharmacological perspective provides a vital link between cultural heritage and future pharmaceutical or phytotherapeutic research.

Keywords: Pallenis hierochuntica, Traditional medicine, Ethnopharmacological uses, Knowledge transmission, Local communities, Socio-cultural changes, Plant heritage conservation

ETHNOBOTANY IN BULGARIA – A REVIEW

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ABSTRACT

Traditional knowledge about plants sheltered by different communities is often a key component in shaping policies for the sustainable use of plant resources, contributing to a more effective decision-making regarding species and habitats, and their management, usage, cultivation, and introduction to new territories. Traditional knowledge in Europe is subjected to changes,erosion and finally loss. This trend has prompted ethnobotanists to carry out field studies aimed at documenting, preserving, and comparing data on local plant-use practices. The aim of this study is to organize and analyze the ethnobotanical data collected in Bulgaria to date—specifically, to identify the recorded plant taxa and studied regions, to compare the methodologies used and topics discussed, and to outline directions for future research. The Balkan Peninsula is considered an important reservoir of ethnobotanical knowledge. However, the region has experienced considerable political and economic changes, which have significantly influenced the local way of life, economy, diet, relationship with nature, and the transmission of traditional knowledge. In Bulgaria, the number of systematized ethnobotanical studies has been increasing in recent years, but still is one of the less studied areas in Europe. A review of the available literature indicates that Bulgarians possess rich traditional knowledge related to plants and their use for various purposes, including food, spices, medicine (for humans and animals), fodder, and decoration. Plants also play a central role in both religious and non-religious rituals. Given the limited number of detailed studies focused on specific regions of the country, there is a clear need to continue systematic ethnobotanical research. Establishing connections between academia and local communities can contribute to biodiversity conservation, economic development, and the preservation of traditional knowledge. **Acknowledgments:** The authors gratefully acknowledge receiving funding from the Bulgarian Ministry of Education and Science through project: KP-06-H66/11/SUNI/-BG-175467353-2022-04-0026 “Traditional food practices - fundament for diversification of food market and social innovation in rural areas”.

Keywords: ethnobotany, Bulgaria, traditional knowledge, plants, communities

EMBRYOLOGICAL STUDY ON THE DEVELOPMENT OF THE FEMALE GAMETOPHYTE OF POLYGONATUM MULTIFLORUM (L.) ALL. (ASPARAGACEAE)

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ABSTRACT

In this study, the female gametophyte development of Polygonatum multiflorum, a species belonging to the Asparagaceae family and used for medicinal purposes, was examined under a light microscope. The ovules were identified as anatropous, bitegmic, and crassinucellate, and the development of the embryo sac was observed to follow the monosporic Polygonum type. The resulting tetrads were mostly T-shaped, with linear types observed rarely. Through this study, the embryological characteristics of Polygonatum multiflorum were revealed for the first time, and these features were found to support the species placement within the Asparagaceae family.

Keywords: Embryology, Polygonum-type, Female gametophyte, Ovule structure

CORRELATION ANALYSIS BETWEEN PHYTOCHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY IN GALLIUM VERUM L. EXTRACTS COLLECTED FROM BULGARIA

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ABSTRACT

Galium verum L. is a widespread medicinal plant traditionally used for its diuretic, anti-inflammatory, and antimicrobial properties. Numerous studies have reported that its diverse biological activity is primarily attributed to its pronounced antioxidant potential, which is directly related to the content of phenolic compounds and flavonoids. This study aimed to investigate the relationship between the phytochemical composition and antioxidant activity in the aerial parts of G. verum. Wild plant samples were collected from natural populations in three floristic regions of Bulgaria, all located within the temperate continental climatic zone. The phytochemical profile was assessed through spectrophotometric determination of total phenolic content (TPC), total flavonoid content (TFC), and total anthocyanins. Antioxidant activity was evaluated using the DPPH radical scavenging assay. The results revealed clear differences in the levels of phenolic compounds and flavonoids among the analyzed samples. A comparative characterization of their phytochemical composition was conducted, and a correlation analysis was performed to assess the contribution of these constituents to the antioxidant capacity of G. verum extracts. **Funding**: This work is financially supported by the EU and the Bulgarian Ministry of Education and Science through project BG-RRP-2.004-0006-C02 “Development of scientific research and innovation at Trakia University in the service of health and sustainable well-being”.

Keywords: Galium verum, phenolic compounds, flavonoids, antioxidant activity, DPPH, phytochemical analysis, correlation

DGS AND SRR-META-MATERIAL DOUBLE INSULATION MIMO ANTENNAS FOR ADVANCED WIRELESS COMMUNISATIONS

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ABSTRACT

Materials with negative permeability, permittivity, or both are known as metamaterials (MTMs). MTM-based antennas include those that employ ENG (Epsilon Negative), MNG (μ-negative), or DNG (Double Negative) substrates, while MTM-inspired antennas are those that use solely MTM cells, such as SRR (Split Ring Resonator) or CSRR (Complementary Split Ring Resonator). Metamaterials (MTMs) are used for the improvement of isolation between adjacent elements of MIMO antennas due to the existence of a band gap in their response frequency. MIMO technology is a multiplexing mechanism that is used in wireless networks and radars to send data more quickly and over longer distances. Band gaps can act as band notch filters and destroy the mutual coupling between neighboring antenna elements. The EM fields of the neighboring antenna can be obstructed using SRRs if the external magnetic field is perpendicular to the resonator rings. Split-ring resonators (SRRs) can function as insulators to block EM waves, thus reducing the mutual coupling between elements The creation and design of a two-port (2x1) MIMO antenna with four radiating elements is the main goal of this work. Double insulation employing an SRR structure of metamaterials (MTM) in conjunction with the ground plane modification technique (DGS) was used to maximize the radiation characteristics of the antenna. The antenna may achieve resonance at 16.6GHz with a bandwidth of 2.4GHz and a peak gain of 5.22, according to the data. When employing double isolation of -29.2dB, a notable decrease in mutual coupling between the two antenna ports and the four patches was noted. When compared to the findings published in earlier research, these outcomes are thought to be the best.

Keywords: DGS, Meta-material, MIMO antenna, wireless communications

ELCTROCHEMICAL STUDY AND MODELING OF GREEN INHIBITOR BEHAVIOR USING MATLAB SOFTWARE

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ABSTRACT

The use of inhibitors remains one of the most effective strategies for protecting metals against corrosion. However, conventional inhibitors are often toxic, carcinogenic, and harmful to the environment. In response to these concerns, increasing attention has been given to the development of environmentally friendly corrosion inhibitors derived from plant extracts. This study presents a series of investigations on the corrosion inhibition of XC38 steel in an acidic medium (1 M H_2SO_4) using a green inhibitor. The methodology includes the preparation of the extract through drying, grinding, methanol extraction, and thermal treatment. The electrochemical behavior of the steel in the presence of varying concentrations of the natural inhibitor was evaluated using electrochemical techniques. The results demonstrate that the inhibition efficiency improves with increasing concentrations of the extract, reaching a significant protective effect at 2000 ppm. Furthermore, data analysis and simulation conducted using MATLAB software confirmed the optimal efficiency point and supported the experimental findings. This work contributes to the growing field of green corrosion inhibitors and underscores the potential of red onion skin as a sustainable and effective alternative to conventional inhibitors.

Keywords: corrosion, green inhibitor, XC38 steel, acidic medium, MATLAB software, efficiency

EXPERIMENTAL AND NUMERICAL STUDY OF CHEMICAL STRIPPING FOR SCALE AND OILY FOULING

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ABSTRACT

Fouling is one of the major issues encountered in industry, significantly impacting production rates and potentially causing unit shutdowns, leading to substantial economic losses. This paper presents an experimental study on the chemical cleaning of fouling composed of machine oil and scale deposits in industrial equipment. The objective is to evaluate the effectiveness of chemical cleaning using sodium hydroxide (NaOH) and hydrochloric acid (HCl) at various concentrations and under controlled temperatures. The cleaning efficiency was assessed gravimetrically by measuring the amount of deposit removed. The results proved to be highly satisfactory in terms of both cleaning performance and treatment duration. To optimize the results obtained experimentally, we used MATLAB software for data analysis, which shows the degree of cleaning efficiency of the product following a well-defined protocol.

Keywords: Fouling, chemical cleaning, efficiency, gravimetric method, MATLAB software

STUDY OF THE EVOLUTION OF THE LOSS OF DIMENSION USING THE SIMPLE EXPONENTIAL SMOOTHING METHOD (POLLUTED ELASTOHYDRODYNAMIC CONTACT)

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ABSTRACT

Maintaining the longevity of mechanical parts in elastohydrodynamic contacts depends on optimally maintaining the condition of the surfaces in contact. Although several studies have explored this problem, the study of the evolution of the loss of dimensions using the simple exponential smoothing method (Polluted Elastohydrodynamic Contact) makes it possible to focus the evolution on the time interval that marks the greatest loss. The smoothed value is a filtered and stabilised version of the raw data, calculated to better represent the underlying trend of a time series and facilitate forecasting. The results show that for $\alpha \geq 70$ the loss of rating increases, confirming that catastrophic wear can occur and that the loss of rating continues to increase under the conditions of the investigation.

Keywords: Mechanical contact, Lubrication, simple exponential smoothing method, solid pollution.

INVESTIGATION OF THE EQUIVALENT MECHANICAL PROPERTIES OF TPMS LATTICE STRUCTURES

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ABSTRACT

Triply Periodic Minimal Surface (TPMS)-based lattice structures offer innovative material solutions for the aerospace, biomedical, automotive, and energy industries with their advantages of lightweight design, high strength-to-weight ratio, and multifunctional properties. This study comprehensively investigates the equivalent mechanical properties of TPMS structures through analytical models, parametric analyses, and literature data. The geometric characteristics of TPMS types such as Gyroid, Diamond, Primitive, and I-WP, along with their smooth and continuous surface topologies, reduce stress concentrations and provide superior mechanical performance and fatigue resistance. Compared to conventional porous materials such as metal foams, honeycomb structures, and space frame systems, TPMS structures stand out with their ability to control isotropic/anisotropic behavior, high surface area-to-volume ratio, and optimized energy absorption capacity. In determining equivalent mechanical properties such as elastic modulus, yield strength, and Poisson's ratio, analytical approaches like the Gibson-Ashby model are utilized to detail the power-law relationships between mechanical behavior and relative density (solid volume fraction). Parametric analyses reveal the influence of unit cell size, surface curvature, and porosity on mechanical performance and demonstrate that different TPMS topologies exhibit distinct responses even at the same relative density. This enables application-specific design optimization. The study provides a theoretical framework for the design and analysis of TPMS-based structures.

Keywords: Triply Periodic Minimal Surface (TPMS), Equivalent Mechanical Properties, Relative Density (Volume Fraction), Gibson-Ashby Model, Lattice Structures

EFFECT OF POROSITY RATIO ON SOUND ABSORPTION IN STRUCTURES PRODUCED WITH 3D PRINTING

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ABSTRACT

Today, studies carried out for the purpose of noise control and increasing sound comfort bring the importance of acoustic insulation to the forefront more and more each passing day. In this context, porous materials used to reduce or absorb sound energy in various engineering applications offer efficient solutions. In addition, the development of layered manufacturing (3D printing) technologies in recent years has made it possible to design materials with controllable acoustic properties and customized internal structures. In this study, the sound absorption performances of samples produced with 3D printing technology using PLA (Polylactic Acid) material with different volumetric porosity ratios were comparatively examined. Sound was given to the input end of the experimental setup at fixed frequencies and sound pressure levels were measured in dB at the output end. The effect of the change in porosity ratio on sound absorption was evaluated.

Keywords: Acoustic performance, Sound insulation, Porous material, 3D printing, PLA

FORECASTING HYDROCARBON STORAGE CAPACITY USING THE ARIMA APPROCH (SKIKDA DISTRIBUTION UNIT)

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ABSTRACT

The challenges of inventory management are a vital aspect of any business. Effective inventory management not only maintains operational continuity but also reduces costs and improves customer satisfaction. This work demonstrates our strategy to achieve advanced forecasting in order to remain competitive in a constantly evolving sector such as hydrocarbons. The ARIMA (Auto Regressive Integrated Moving Average) method is used to forecast future market consumption of unleaded petrol and diesel in order to update storage facilities. This modelling and forecasting technique is presented as a robust and flexible tool, capable of providing accurate forecasts despite its complexity and data stationarity requirements. The results obtained are compared with real data and show the effectiveness of the forecasting method used.

Keywords: Inventory, Management, ARIMA, Supply, Hydrocarbon

IMPACT OF REGULAR WATER-BASED CLEANING ON THE ENERGY EFFICIENCY OF PHOTOVOLTAIC PANELS

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ABSTRACT

Solar energy is abundant in many countries worldwide and is easier to use compared to other renewable energy sources. However, the overall conversion efficiency of photovoltaic (PV) panels used for electricity generation from solar energy remains relatively low. Maximizing the efficiency of solar energy systems requires maintaining the cleanliness of PV panel surfaces. In this study, the effect of periodic cleaning of PV panel surfaces with only water on energy efficiency was investigated. An experimental solar energy conversion system was installed on the campus of Trakya University Faculty of Engineering. The setup included two polycrystalline PV panels (PV A and PV B), each with a nominal output power of 260 W. Initially, both PV panels were cleaned. Subsequently, PV A was left uncleaned, while PV B was washed with only water at 30 day intervals. Daily energy production data from both panels were recorded over a five month period. At the end of this period, the energy output of PV B, which was cleaned monthly with water, was approximately 3% higher than that of the uncleaned PV A. The experimental results indicate that washing PV panels with water every 30 days can improve energy efficiency. Future studies are expected to build upon these findings by comparing more frequent cleaning intervals to evaluate their effects on energy performance in greater detail.

Keywords: Energy, PV panel, Water cleaning, Efficiency

GATED RECURRENT UNITS-BASED ADDITIVE ATTENTION FOR RUL PREDICTION OF LI-ION BATTERIES

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ABSTRACT

Accurate prediction of the Remaining Useful Life (RUL) of lithium-ion batteries is crucial for optimizing performance of battery management systems (BMS), ensuring reliability and enabling proactive maintenance in renewable energy storage systems. Traditional RUL estimation approaches, including physical/empirical models and basic data-driven approaches, lack often the adaptability and precision required to capture the complex, nonlinear dynamics and long-term dependencies of battery aging under varying operational conditions. Recent advances in deep learning, particularly Gated Recurrent Units (GRUs) and attention mechanisms, have shown promise in addressing these challenges by capturing temporal dynamics and prioritizing critical degradation features. This work proposes a hybrid architecture integrating GRU networks with additive attention mechanisms to enhance RUL prediction. The GRU layer models the temporal dependencies of sequential battery data with reduced computational complexity compared to LSTM, while the additive attention mechanism dynamically weights historical time steps, allowing the model to focus on the most relevant patterns that impact the battery's health trajectory. The proposed framework is trained and evaluated using publicly available Li-ion battery datasets (NASA PCoE), Root Mean Square Error (RMSE), Mean Absolute Error (MAE), and R-squared (R^2) are used as performance metrics to benchmark the model against non-attention-based GRU and LSTM architectures. Experimental results reveal that the GRU-attention model significantly outperforms baseline models, by lowering the RMSE about 14%. The proposed framework enhances predictive maintenance strategies thereby extending battery lifespan and reducing replacement costs.

Keywords: Lithium-ion batteries, Remaining Useful Life (RUL), Deep Learning, Machine Learning

EFFECT OF IRON FOUNDRY DUST ON THE ENERGY EFFICIENCY OF HYDROPHILIC NANOCOATED PHOTOVOLTAIC PANELS

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ABSTRACT

In this study, the impact of dust accumulation an important factor affecting the efficiency of photovoltaic (PV) panels on energy production was experimentally investigated, with a specific focus on hydrophilic nanocoating and iron foundry dust. Two equivalent 100W PV panels were installed on the campus of the Faculty of Engineering at Trakya University. One of the panels (PV Panel A) was treated with a hydrophilic nanocoating, while the other panel (PV Panel B) was left untreated in its standard state. The experimental study was conducted over a five-week period from April 22 to May 27, 2025. During this time, the energy output of both PV panels was continuously recorded. According to the analysis of the experimental results, the total energy production of the hydrophilic nanocoated PV Panel A was measured as 13,485.6 Wh, whereas the standard PV Panel B produced a total of 10,197.0 Wh. It was observed that PV Panel A, with the hydrophilic nanocoating, generated 3,288.6 Wh (32.3%) more energy than PV Panel B during the test period. At the conclusion of the study, energy production graphs for both PV panels were plotted, and relevant analyses were presented.

Keywords: Energy, Photovoltaic Panel, Hydrophilic Nanocoating, Iron Foundry Dust

USE OF INFORMATION TECHNOLOGIES FOR THE MANAGEMENT OF QUALITY CONTROL DATA IN THE MANUFACTURING PROCESS OF BAKERY PRODUCTS

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ABSTRACT

Rope spoilage is a bread defect, which is caused by the growth and development of bacteria of the genus Bacillus. The main parameters that need to be monitored in the bread-making process to prevent the risk of rope spoilage are the total number of sporulated bacteria in the flour, the acidity of the dough at the end of the fermentation stage, and the temperature of the bread core at the stage of cooling after baking. In accordance with the instructions for the prevention of rope spoilage of bread, it is recommended to: avoid using in bread making of flour with a total number of sporulated bacteria greater than 1000 c.f.u./g; ensure the pH value of the dough below 5; ensure that the temperature of the bread core decreases rapidly below 20°C after removing it from the oven. Digitalization can significantly ease the quality management process and help prevent non-compliant products more effectively. In this research, the possibility of integrating information technologies for the collection and processing of data from the analysis was studied. For this purpose, devices were chosen, such as: colony counter (ISOLAB Laborgeräte GmbH, Germany); pH meter (HANNA instruments, HI9810402, Romania); digital thermometer (HANNA instruments, HI98509, Romania), which allow the analysis data to be obtained in an electronic format, and a platform (database) has been designed, which allows the semi-automatic collection and processing of the data of the mentioned analyses. Thus, the possibility of integrating information technologies in the quality management process of bakery products was identified. **Acknowledgments:** This research was carried out within the institutional research subprogram, number 070101 "Studies for the integration of information technologies in the management processes of enterprises in the food industry for their sustainable development", supported by the Ministry of Education and Research of Republic of Moldova.

Keywords: rope spoilage of bread, quality control data, digitalization, monitoring platform

STATIC ANALYSIS OF FUNCTIONALLY GRADED POROUS SANDWICH BEAMS

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ABSTRACT

In this study, the static behavior of functionally graded (FG) porous sandwich beams is investigated through theoretical modeling and numerical analysis. FG composite structures are advanced engineering materials characterized by a continuous and gradual variation of material properties along the thickness direction, enabling the simultaneous achievement of low weight, high mechanical strength, and stiffness. In sandwich beam design, applying different distributions of density and elasticity to the core and face layers allows for the optimization of the structure's overall mechanical performance. To model the response of the porous sandwich beam under static loading, the Hyperbolic Shear Deformation Theory (HSDT) is employed, and the governing equations are derived using Hamilton's principle. The HSDT approach provides more accurate results for thick beams by effectively accounting for shear deformation effects. The derived governing equations are solved analytically using the Navier solution technique. The study presents a comprehensive analysis of dimensionless displacement distributions under various material gradation functions, porosity levels, and simply supported boundary conditions. The results clearly demonstrate that both the porosity ratio and the distribution of material properties significantly influence the static response and stiffness characteristics of the beam.

Keywords: Functionally graded materials, Static analysis, Porous sandwich beam, Porosity ratio

INVESTIGATION OF THE ADHESION STRENGTH OF BIOCERAMIC COATINGS ON LIGHTWEIGHT METALS

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ABSTRACT

Lightweight metals, particularly magnesium and aluminum, have attracted great interest in various fields such as biomedical, automotive, and aerospace industries due to their low density and high specific strength. However, their corrosion resistance and surface mechanical properties can be insufficient in certain demanding environments. Therefore, improving these properties through surface coating techniques has become increasingly important. In this study, the adhesion strength of bioceramic coatings applied to the surfaces of magnesium and aluminum alloys was systematically investigated. The mechanical bonding characteristics at the coating-substrate interface were evaluated using various test methods (such as pull-off, scratch, or indentation-induced delamination tests), and the effects of surface pre-treatment, coating type, and application parameters on adhesion strength were analyzed. The results showed that bioceramic coatings not only enhance surface performance but also contribute to long-term usability by providing strong adhesion to the substrate. Optimizing adhesion strength is thus identified as a critical factor that enables lightweight metals to be used more reliably in both mechanical and biological environments. This study demonstrates that bioceramic coatings offer a promising surface modification approach to enhance the durability and functionality of lightweight metal-based materials in engineering and biomedical applications.

Keywords: Lightweight metals, bioceramic coating, adhesion strength, magnesium, aluminum, surface modification, corrosion resistance, mechanical properties,

CLASSIFICATION OF CURRENT ARTIFICIAL INTELLIGENCE APPLICATIONS ACCORDING TO THEIR FUNCTIONALITY

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ABSTRACT

With the advancement of technology in nature-related sciences, solutions in these fields are also shifting towards digitally focused approaches. Among these, fields such as agriculture, forestry, zootechnics, aquaculture, and biomedicine are leading breakthroughs in leveraging the benefits of artificial intelligence and Industry 5.0. Because Industry 5.0 is human-centered, the technology it seeks must be human-friendly and, therefore, close to nature. Therefore, the robot-nature relationship, including artificial intelligence, opens the door to a hybrid world. In this context, artificial intelligence provides us with the key to utilizing these two components. With machine learning and deep learning algorithms, artificial intelligence helps us leverage functions in the created environment and utilize them in the right direction. On the technical side, the correct use of data and algorithms allows us to manage technology effectively and achieve rapid results. This study compiles and discusses the applications of the technical aspects of Industry 5.0 and artificial intelligence used in the aforementioned fields of agriculture, forestry, zootechnics, aquaculture, and biomedicine. The article also discusses the impact of machine learning on modern and traditional methods in these fields. It also touches on assistive technologies such as 6G and IoT. Thus, the aim of this review is to inform and guide scientists on the most appropriate AI application(s) for their field of study.

Keywords: Artificial Intelligence, Bioscience, Machine Learning

IMPLEMENTATION OF A SMART IRRIGATION SYSTEM FOR WATER AND ENERGY WASTE REDUCTION USING ARDUINO

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ABSTRACT

Water scarcity and inefficient irrigation practices pose critical challenges to sustainable agriculture, especially in regions lacking access to advanced infrastructure. This study presents the development and implementation of a smart irrigation system designed to optimize water and energy usage using Arduino-based automation system. The system integrates soil moisture sensors and an ultrasonic water level sensor with an Arduino Uno microcontroller to monitor real-time environmental conditions. When the soil moisture falls below a predetermined threshold, and sufficient water is available, the system activates a water pump through a relay module to irrigate crops effectively. An LCD screen displays instant feedback such as soil moisture, water level in tank and pump status. Tests in real-world conditions have shown that the system reduces water consumption by more than 40% and maintains optimal soil moisture levels while minimizing energy usage. With its low-cost and scalable structure, this solution contributes to environmental sustainability by promoting precision agriculture. The study serves as a strong example of how simple and accessible technologies can address resource management challenges in small and medium-sized agricultural enterprises.

Keywords: Sustainable Agriculture, Irrigation System, Arduino, Soil Moisture

ESTIMATION OF FUTURE FUEL STORAGE CAPACITY OF SERVICE STATIONS USING THE BOX–JENKINS APPROACH

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ABSTRACT

Inventory management is essential for operational continuity, cost control, and customer satisfaction. It directly affects a company's cash flow, as inventory represents a significant portion of current assets. Excessive inventory unnecessarily ties up capital and generates additional costs (storage, insurance, risk of deterioration), while insufficient inventory can lead to lost sales. An optimal balance ensures the availability of the right products in the right place at the right time. Here, we present our advanced forecasting strategy to remain competitive in the dynamic hydrocarbon sector. The ARIMA (AutoRegressive Integrated Moving Average) model is used to anticipate future consumption of unleaded gasoline and diesel. This robust and flexible approach facilitates the adjustment of storage capacities. Despite its stationarity requirements, ARIMA provides highly accurate forecasts. Comparison between forecasts and actual data confirms its effectiveness.

Keywords: Inventory management, ARIMA, Supply, Fuel, Forecasting, Hydrocarbons.

INTERVAL VALUED PYTHAGOREAN AHP—INTERVAL VALUED PYTHAGOREAN TOPSIS METHOD FOR SOLAR POWER PLANT SITE DECISION

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ABSTRACT

Solar energy systems yield significant results in terms of environmental, economic, and energy security. They are utilized in residential energy production, industrial applications, agriculture, and the transportation sector. As a renewable energy source, solar energy systems contribute to achieving the Sustainable Development Goals. The utilization of solar energy reduces reliance on fossil fuels, thereby enhancing the sustainability of energy systems. This research aims to evaluate Turkey's investment priorities for efficient, reliable, economic, continuous, and environmentally friendly electricity production, leveraging its notable renewable energy resource potential. In this context, existing literature has been utilized, and the Turkish Ministry of Energy and Natural Resources' (ETKB) 2015-2019 Strategic Plan has been taken as a fundamental reference. The proper establishment of solar energy systems is supported by the systematic analysis of the right criteria and alternatives, allowing for the selection of sustainable energy solutions. The decision regarding the suitable site for newly planned renewable energy plants is based on a multidisciplinary approach and complex process management. In modern decision-making processes, various methods have been developed to cope with uncertainty and complexity. IVPF-AHP (Interval Valued Pythagorean Analytic Hierarchy Process) and IVPF-TOPSIS (Interval Valued Pythagorean Technique for Order of Preference by Similarity to Ideal Solution) methods stand out as approaches used together to manage such uncertainties more effectively. This method has been applied to three regions planned for solar energy investment. The application was conducted with five expert decision-makers in the field. IVPF-AHP and IVPF-TOPSIS methods used to improve decision-making processes in solar energy investments guide the successful selection of locations for solar energy projects. A systematic and rational decision-making process has been carried out for the selection of solar power plant sites. The analysis results provided concrete data to decision makers regarding which option represents an efficient investment. The analytical evaluation results are of great importance in terms of both economic and environmental sustainability.

Keywords: Interval Valued Pythagorean AHP-Interval Valued Pythagorean TOPSIS, Solar Power Plants, Multi-Criteria Decision Making, Turkey

SYNTHESIS AND EVALUATION OF THE ANTIMICROBIAL AND ANTIOXIDANT ACTIVITY OF AN ESTER DERIVATIVE OF MALONIC ACID

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ABSTRACT

Malonic ester derivatives are widely used in chemistry as organic synthesis intermediates. Considering the biological activity of the organochlorines compounds, we were interested in the synthesis and the evaluation of the antimicrobial and antioxidant of a highly reactive malonic ester derivative, a bispentachlorophenyl ester of malonic acid, in order to use it in the preparation of heterocyclic mesoionic compounds containing a pyrimidine ring. Due to its chemical activity, this malonic ester reacts with amidine derivatives under mild conditions to product pyrimidiniumbetaines, and the reaction proceeds within minutes. Microbiological tests using the disk diffusion method showed that this organochlorine compound revealed significant antimicrobial activity against the target germs: Bacillus subtilus, Salmonella enterica, Mucor ramannianus and Candida albicans and this activity depends on the concentration of tested ester. The study of the antiradical power by the 2,2-diphenyl -1-picrylhydrazyl (DPPH) assay, with a view to its valorization as an antioxidant, showed that this malonic ester reduces the DPPH free radical very slowly due to its poor solubility in water and organic solvents. The results of biological activity suggest that the synthesized bispentachlorophenyl ester of malonic acid may be useful for the development of new antimicrobial drugs and might be used to treat various diseases.

Keywords: Malonic esters, Bispentachlorophenyl ester of malonic acid, Synthesis, Antimicrobial activity, DPPH assay

ASSESSING THE OXIDATIVE STABILITY OF ESSENTIAL OILS VIA THE THIOBARBITURIC ACID REACTIVE SUBSTANCES (TBARS) TEST

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ABSTRACT

This study investigated the oxidative stability of essential oils by quantifying lipid peroxidation and evaluating their antioxidant potential. Lipid peroxidation was assessed by measuring malondialdehyde (MDA) levels, a key secondary product of lipid degradation, using the thiobarbituric acid reactive substances (TBARS) assay. The procedure involved reacting essential oil supernatants with thiobarbituric acid under heating, forming a colored adduct with maximum absorbance at 531 nm. Spectrophotometric measurements were conducted, and MDA concentrations were determined using a 1,1,3,3-tetramethoxypropane standard curve. Results were expressed as mg MDA/kg essential oil, providing a quantitative measure of oxidative susceptibility. Furthermore, the antioxidant capacity of the essential oil was evaluated by determining its ability to inhibit TBARS formation. This was achieved by comparing MDA levels in essential oil-treated samples with untreated controls, expressed as a percentage of inhibition. This methodology offers a comprehensive approach to assess both the inherent susceptibility of essential oils to lipid oxidation and their potential to mitigate this process. The findings contribute to a better understanding of essential oil quality and their potential applications as natural antioxidants.

Keywords: Keywords: Essential oils, Oxidative stability, Lipid peroxidation, Malondialdehyde (MDA), Thiobarbituric acid reactive substances (TBARS), Antioxidant capacity.

ELIMINATION OF METHYLENE BLUE FROM AN AQUEOUS SOLUTION BY AN ADVANCED OXIDATION PROCESS IN THE PRESENCE OF ALUMINA-SUPPORTED TRANSITION METALS AS CATALYSTS

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ABSTRACT

Dyes discharged by industry into receiving environments inhibit aquatic life and cause visible pollution. They tend to sequester metals, resulting in toxicity for fish and other aquatic organisms. Dyes are generally poorly biodegradable. Their removal requires separation by adsorption or chemical treatment such as advanced oxidation processes. In this study, methylene blue removal is achieved by an advanced oxidation process using hydrogen peroxide in the presence of a heterogeneous catalyst. The catalysts used are transition metals (copper and nickel) supported on activated alumina (Al2O3). The use of heterogeneous catalysts allows their recovery after pollutant removal. The influence of various parameters was studied, namely dye concentration, catalyst dose and stability. The catalysts used were also characterized.

Keywords: Methylene blue, Elimination, Depollution, Water, Advanced oxidation, Catalysts, Alumina

SYNTHESIS OF CUO ZNO NANOPARTICLES AND THEIR USE AS CATALYSTS FOR CYANIDE REMOVAL BY OXIDATION IN AQUEOUS SOLUTION

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ABSTRACT

Cyanides are considered among the most toxic industrial pollutants. Discharge standards in receiving environments are among the most stringent (0.1mg/L in Algeria). Some industries, in particular metallurgical processes (extraction of gold and silver) and plating and surface finishing, discharge them into their wastewater. The treatment of cyanide effluents by the oxidation process with hydrogen peroxide has shown its effectiveness by the fact that it can eliminate cyanides without producing dangerous intermediates and without increasing the salinity of the water. However, this process uses soluble copper Cu(II) (itself a heavy metal) as a catalyst, which can pose the problem of its elimination at the end of the treatment. Currently, many studies tend to use nanocatalysts in order to be able to recover them and use them for other treatment cycles. The influence of various parameters was studied, namely cynide concentration, nanocatalyst dose, and stability. The nancatalysts used were characterized.

Keywords: Cyanide, Elimination, Water, Oxidation, Hydrogen peroxide, Nanaocatalysts

INVESTIGATION OF NICKEL OXIDE PRODUCED BY ANODIC OXIDATION OF NICKEL IN ACID MEDIUM

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ABSTRACT

Nickel oxide is considered an important semiconductor; it has several applications in various fields, like photocatalysis, batteries, gas sensor [1] and in supercapacitors [2]. The purpose of this work is to study the electrochemical characteristics of passive film (NiO) formed anodiquelly on Ni surface in sulfuric acid (1N), using four electrochemical techniques and surface analysis. EIS analysis shows that charge transfer controls the corrosion of Ni in the 1N H2SO4 solution. Whereas Mott–Schottky results reveals that the passive film formed on nickel is p-type, that corresponds to a preponderance of oxygen vacancies and nickel interstitials in the barrier layer. The acceptor density and flat potential, of the semi-conductive passive layer growing on nickel surface in sulfuric acid solution, were determined. Nickel oxide is considered an important semiconductor; it has several applications in various fields, like photocatalysis, batteries, gas sensor [1] and in supercapacitors [2]. The purpose of this work is to study the electrochemical characteristics of passive film (NiO) formed anodiquelly on Ni surface in sulfuric acid (1N), using four electrochemical techniques and surface analysis. EIS analysis shows that charge transfer controls the corrosion of Ni in the 1N H2SO4 solution. Whereas Mott–Schottky results reveals that the passive film formed on nickel is p-type, that corresponds to a preponderance of oxygen vacancies and nickel interstitials in the barrier layer. The acceptor density and flat potential, of the semi-conductive passive layer growing on nickel surface in sulfuric acid solution, were determined.

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Keywords: Nickel oxide- Anodic oxidation- Mott-Shottky- Passive film-Semi-conductor

MOLECULAR DOCKING AND ADME-TOXICITY ANALYSIS OF SOME IMINES ANTICANCER ACTIVITY

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ABSTRACT

The potential inhibitory effects of six imines (I1-I6), synthesized by our team, were investigated against key proteins linked to some of the most common cancer types worldwide. To evaluate their binding affinities, molecular docking simulations were performed using Autodock Vina, comparing these compounds to standard chemotherapy agents and assessing their specificity toward the target proteins. Protein structures were obtained from the RCSB Protein Data Bank, with both ligands and targets prepared accordingly. Ligand optimization was performed using the DFT/B3LYP/6-31G(d,p) method in Gaussian 09, and RMSD calculations were conducted to ensure the docking results' reliability. The docking outcomes showed strong interactions between the imines and their respective targets, with compounds I1 and I4 exhibiting higher binding affinities than the conventional drugs. Some imines displayed a clear preference for specific targets—such as I1 and I6 for lung cancer, and I2 and I3 for prostate cancer. Additionally, predictions of absorption, distribution, metabolism, excretion (ADME), and toxicity suggested that these imines possess favourable pharmacological characteristics. However, additional in vitro and in vivo experiments are needed to verify the therapeutic potential of these compounds.

Keywords: Molecular Docking, Imines, Cancer, ADME-toxıcıty

SYNTHESIS AND EVALUATION OF A PISTACHIO SHELL-BASED COMPOSITE BIO-ADSORBENT FOR THE EFFICIENT REMOVAL OF BASIC FUCHSIN FROM AQUEOUS SOLUTION

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ABSTRACT

This study investigates the use of pistachio shells (PIS) as a low-cost adsorbent for water depollution. To enhance adsorption efficiency, a PIS-Fe/Ni composite was synthesized by modifying the shells with binary iron-nickel oxides. The study compares the efficiency of this composite and raw shells (PIS-B) for the removal of basic fuchsin (BF) in aqueous solution, evaluating the impact of different experimental parameters. The kinetic data fit the pseudo-second-order model for both adsorbents. The equilibrium adsorption of BF on PIS-B follows the Langmuir isotherm, while on PIS-Fe/Ni, it is better described by the Freundlich model. Thermodynamic data indicate an endothermic and spontaneous process for both materials.

Keywords: Adsorption, Composite, Pistachio shell, Basic fuchsin, Kinetics, Isotherm, Thermodynamics.

POLY(4,4"-BIS(2'-FLUORENYLIDENEIMINO)-3,3"-DIMETHYLBIPHENYL): ELECTROSYNTHESIS, CHARACTERIZATION AND APPLICATION IN ORGANIC PHOTOVOLTAIC CELL

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ABSTRACT

In this study, we report the synthesis and full characterization of a novel o-tolidine-based fluorescent monomer, 4,4″-bis(2′-fluorenylideneimino)-3,3″-dimethylbiphenyl, obtained via Schiff base condensation between o-tolidine and two equivalents of fluorene-2-carbaldehyde. Structural confirmation was achieved through IR and NMR spectroscopies, while optical properties were assessed using UV-Vis and fluorescence spectroscopy, revealing strong absorption in the ultraviolet region and a band gap of 2.58 eV. Electrochemical analysis via cyclic voltammetry showed the monomer has a HOMO energy level of –6.04 eV and a LUMO level of –3.46 eV. Subsequently, the monomer was successfully electropolymerized onto a platinum electrode through cyclic voltammetry, forming a thin, adherent, and electroactive film. The resulting polymeric material displayed enhanced electronic delocalization due to increased π-conjugation. This was confirmed by a significant narrowing of the band gap to 1.80 eV, as well as an upward shift in the HOMO level to –5.41 eV, and in the LUMO level to –3.61 eV. These results demonstrate that polymerization leads to a reduction in band gap and improved charge transport, consistent with the extension of the conjugated system in the polymer backbone. Considering the electronic properties of the polymer, it is well-suited as a donor material in organic photovoltaic (OPV) applications. Its HOMO/LUMO alignment is favorable for pairing with fullerene-based acceptors such as [6,6]-Phenyl-C_{61}-butyric acid methyl ester (PCBM), which possesses a LUMO level of approximately –4.0 eV. This offset ensures efficient exciton dissociation and electron transfer, satisfying the energy level requirements for high-performance bilayer or bulk heterojunction solar cells. These findings underscore the potential of the synthesized electropolymer as a promising donor material for future development of solution-processed or electrochemically deposited OPV devices.

Keywords: Organic photovoltaic cells; Cyclic voltammetry; HOMO; LUMO; Gap.

GREEN SYNTHESIS OF SILVER NANOPARTICLES USING PISTACIA LENTISCUS LEAF EXTRACT AND EVALUATION OF THEIR ANTIBACTERIAL ACTIVITY

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ABSTRACT

This study focuses on the green synthesis of silver nanoparticles (AgNPs) using an extract from Pistacia lentiscus leaves, aiming to replace conventional chemical reducing agents—which are often toxic and expensive—with environmentally friendly, non-toxic, and readily available plant-based alternatives, such as plant extracts and essential oils. The synthesized nanoparticles were characterized using various techniques, including X-ray diffraction (XRD), Fourier-transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), and energy-dispersive X-ray spectroscopy (EDS). The results showed that the AgNPs are spherical in shape, with a crystallite size of approximately 34 nm. The lattice parameters (a = b = c = 4.088 Å) closely match those of the JCPDS card No. 040783 (a = b = c = 4.086 Å), confirming the crystalline quality of the particles. EDS analysis further revealed that silver is the predominant element, indicating high purity of the synthesized nanoparticles. The antibacterial activity of the AgNPs was tested against two highly resistant pathogenic bacterial strains: Staphylococcus aureus ATCC 29213 and Escherichia coli ATCC 25922. The results demonstrated good antibacterial activity, with a maximum inhibition zone of 16 mm observed for S. aureus at a concentration of 100 μg/mL.

Keywords: Silver nanoparticles, green synthesis, X-ray diffraction, antibacterial activity

QUANTUM-CHEMICAL STUDY OF NOVEL MULTIFUNCTIONAL POLYMER BY SUBSTITUTION REACTION OF GRAFTING ACETYLSALICYLIC ACID

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ABSTRACT

During these last years, the important evolution in the computer field and the progress made in the methods of calculation of quantum chemistry make it possible to give a good prediction and a good description of the electronic properties of a given entity. In this work, we have used theoretical study of the substitution reaction by grafting of aspirin on a unit of epichlorohydrin. We have determined the purely theoretical parameters of the dipole moment (DM), the energy of the frontier orbitals, HOMO, LUMO and the energy gap by two methods HF and DFT, we have also calculated the characters DEN (Normal Electronic Demand) or DEI (request Electronic Inverse) on the substitution reaction of salicylic acetyl (aspirin) + poly (epichlorohydrin); we have calculated the HOMO/LUMO gap energies for the two combinations. The electronic chemical potential μ, and the nucleophilicity index (N). Local reactivity descriptors of aspirin and epichlorohydrin were calculated using the population analyzes of Mulliken and Hirshfeld by the method DFT/6-31 G(d,p) and also using the analysis of ESP population. A theoretical spectral study of the final product: IR, 1 H NMR, 13 C NMR was carried out.

Keywords: Epichlorohydrin, HOMO, DFT, salicylic acetyl, nucleophilicity, Computational Chemistry.

EXCESS MOLAR VOLUMES FOR THE BINARY MIXTURES OF 1,2-DICHLOROALKANE WITH TETRAHYDROPYRANE AT DIFFERENT TEMPERATURES

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ABSTRACT

Experimental data of excess thermodynamic properties, for liquid mixtures, are essential for good design of industrial chemical process and for the development of models describing the thermodynamic behaviour of these mixtures. Excess volume represents, besides many important properties, a good thermodynamic tool to explore the behaviour of liquid mixture.
Chloroalcanes and ethers represent not only two technically important classes of compounds, but also, from a theoretical point of view, two interesting families of molecules. Indeed,. Ethers are also industrially important solvents used in several chemical reactions. So, tetrahydropyrane, a cyclic ether with a zero dipole moment, is a good aprotic solvent. Moreover, chloroalcanes, ethers, and their mixtures are used as fuel additives, resulting from increasing fuel demand, environmental concern and occasional oil crises. This work is a theoretical, experimental and theoretical study of the volumetric properties of binary liquid systems 1,2-dichloroethane + Cyclic Ether Tetrahydropyrane. The first experimental part of this study begins with a determination of the excess molar volumes of the binary systems studied, from the densities of the liquid mixtures and pure constituents, at several temperatures between [288 and 303] K determined by the Densitometric experimentan al technique ogine-with vibrating tube. The second theoretical part of this study consists of pplication of the PrigFlory-Patterson theoretical model to the studied binary systems.

Keywords: densitie, Excess molar, chloroalkane, ethers

TOTAL PHENOLIC AND FLAVONOID CONTENTS, ANTIOXIDANT AND UREASE INHIBITORY ACTIVITIES OF A WILD AMARANTHACEAE HALOPHYTE FROM THE ALGERIAN SAHARA

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ABSTRACT

Halophytic plants of the Amaranthaceae family are increasingly recognized for their nutritional value, ecological resilience, and promising biotechnological applications, including their use as "green salt" in food products. Sabkhas, which are salt-rich landscapes commonly found in arid and semi-arid regions, offer ideal conditions for the growth of these salt-tolerant species. This study investigates a native halophyte that grows naturally in the saltmarshes of the Oued Righ region in the Algerian Sahara, traditionally consumed for its therapeutic benefits. Its environmental adaptability and seasonal visual appeal make it a strong candidate for use in sustainable green infrastructure projects in saline or degraded landscapes. Phytochemical screening was conducted on both aqueous (AqE) and hydroethanolic (80:20 v/v) extracts (EtE), with all analyses performed using UV-Vis spectrophotometry. The total phenolic content (TPC), determined using the Folin–Ciocalteu method at 760 nm and expressed in gallic acid equivalents (GAE), was 28.19 mg GAE/g extract for AqE and 33.89 mg GAE/g extract for EtE. The total flavonoid content (TFC), measured by the aluminum nitrate [$Al(NO_3)_3$] method at 415 nm and expressed in quercetin equivalents (QE), was 92.08 mg QE/g extract for AqE and 243.13 mg QE/g extract for EtE. Antioxidant activity, evaluated by the ABTS radical scavenging assay, showed IC_{50} values of 78.47 ± 4.12 µg/mL for AqE and 179.85 ± 5.35 µg/mL for EtE. The silver nanoparticle (SNP) assay revealed $A_{0.5}$ values of 94.06 ± 3.5 for AqE and 173.40 ± 8.19 for EtE, indicating a notable reducing capacity. Urease inhibitory activity, tested using thiourea as a reference standard, showed weak inhibition by both extracts, with IC_{50} values greater than 200 µg/mL. These findings highlight the richness of this underexplored Saharan halophyte in secondary metabolites that help reduce oxidative stress. Future work will focus on mineral composition, isolation, and characterization of bioactive compounds using high-performance liquid chromatography (HPLC), mass spectrometry (LC-MS/MS), and nuclear magnetic resonance (NMR) spectroscopy. This research will contribute to the discovery of novel natural compounds and support the integration of traditional knowledge into modern pharmaceutical and food development.

Keywords: Amaranthaceae, halophyte, antioxidant activity, urease inhibition, Algerian Sahara, phenolic content, flavonoids

CONTROL OF THE COORDINATION MODE OF NHC LIGANDS IN SQUARE-PLANAR COMPLEXES $(M(PYR)_2(NHC)_2)^{2+}$, $(MBR(PYR)(NHC)_2)^{+}$, AND $M(BR)_2(NHC)_2$ (M = PD, NI, AND PT): A DFT STUDY

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ABSTRACT

This work aims to study the impact of the metal (Pd, Ni, Pt) and the nature of the ligands on the stability and electronic structure of square-planar ML_4-type complexes featuring NHC ligands. Three types of complexes, $(M(Pyr)_2(NHC)_2)^{2+}$, $(MBr(Pyr)(NHC)_2)^{+}$, and $M(Br)_2(NHC)_2$, where M = Pd and hypothetical cases where M = Pt and Ni in C1 symmetry, are investigated to determine the influence of a progressive substitution of pyridyl ligands with bromide ligands, using DFT calculations (BP86 and B3LYP). Our results reveal a clear preference for singlet states, correlated with a wider HOMO-LUMO gap, particularly pronounced for Ni and Pt complexes. All complexes exhibit a quasi-square-planar geometric structure, with slight structural distortions depending on the metal and the number of bromide ligands. EDA analysis highlights the predominant role of electrostatic interactions, although the covalent contribution (ΔEorb) varies significantly with the metal and the degree of substitution of pyridyl ligands with bromide ligands. These results confirm the strong influence of the metal and the coordination mode of NHC ligands on reactivity, which is crucial for the design of effective catalysts in organometallic chemistry. The analysis of natural populations (NPA) obtained from NBO calculations supports these observations. This trend is confirmed by Wiberg indices, which are higher for metal-ligand bonds in Pd and Pt complexes. This study provides quantitative data that will enhance the design of new catalysts based on transition metal complexes.

Keywords: DFT, square-planar complex, N-heterocyclic (NHC), analysis (EDA) and (EDA-NOCV).

STUDY OF THE INTERACTIONS OF POLYMERIC BINARY MIXTURES: PHYSICO-CHEMICAL AND RHEOLOGICAL CHARACTERISATION

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ABSTRACT

The aim of this work is to carry out a study on a binary polymer blend in order to combine the characteristics of two polymers, sodium alginate and hydroxypropylmethylcellulose. This combination will result in the formation of a viscous mixture. Several binary mixtures were prepared at different ratios, for which we studied the effect of varying pH and ionic strength. These mixtures were subjected to physico-chemical and rheological characterisation in order to assess the effect of pH and ionic strength on the properties of the different polymer mixtures considered. The results revealed that: The highest absorbance was observed for sodium thiosulphate, probably due to the dissolution of Na2 S2 O3 in water. The study of viscoelastic behaviour in oscillatory modulus revealed gelation which are recorded for pH 2 and 2.5 phase separation is observed. The concentration of added salt has an effect on the macroscopic and microscopic appearance of the different polymer ratios.

Keywords: Alginate-Na, HPMC, interaction, rheology, ionic strenght, pH

INTEGRATING BIG DATA CURATION AND PREDICTIVE MODELING IN CHEMOINFORMATICS USING KNIME

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ABSTRACT

The exponential growth of chemical and biological data over the past two decades has introduced significant challenges in data management, integration, and analysis [1]. Converting these vast and heterogeneous datasets into actionable knowledge is both resource-intensive and time-consuming. To address these challenges, workflow-based platforms such as KNIME have emerged as powerful tools, enabling the automation of data curation, integration, and predictive model development [2]. In this study, we present a fully automated workflow for the curation, development, and validation of QSAR (Quantitative Structure-Activity Relationship) models using KNIME. As a case study, we investigated the prediction of the partition coefficient (log P), a key physicochemical property in drug discovery. We retrieved 250,250 chemical structures from the NCI database, and after processing through our curated workflow, 3,520 compounds with experimentally measured log P values were retained [3]. The importance of robust data curation in QSAR modeling has been previously emphasized, and our workflow integrates best practices to ensure data quality. The curated dataset was then used to evaluate and optimize several log P prediction algorithms, demonstrating the effectiveness of automated workflows for handling large-scale chemical data in predictive modeling.

Keywords: QSAR modeling, Data curation, log P prediction, Chemoinformatics.

SOFT CHEMISTRY NANOCOMPOSITE OF MGO DOPED PVC FABRICATION FOR PHOTOCATALYTIC APPLICATIONS

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ABSTRACT

The objective of this research is to explore the photocatalytic properties of poly (vinyl chloride) (PVC) films, both pure and doped with varying concentrations of nanoscale magnesium oxide (MgO), fabricated by the soft chemistry method and deposited using spin-coating technique. The concentrations of MgO used were 3%, 7%, and 10%. Various analytical methods were employed to characterize the samples. The presence of MgO nanocrystals within the PVC films was confirmed through X-ray diffraction, infrared and UV-visible spectroscopies. X-ray diffraction analysis revealed an average particle size of 22.29, 23.77 and 29.68 nm for the MgO with concentration of 3%, 7%, and 10% respectively. FTIR infrared spectroscopy confirmed the presence of peak corresponding to the Mg–O–Mg bond vibration. Optical analysis revealed distinct differences between the spectra of pure and doped matrices. Increasing in doping led to decreased absorption in visible region. Thus, the transmittance drops from 90% (undoped PVC matrix) to 80% (10% MgO doped PVC matrix). Slight redshifted of absorption edge compared to the bulk semiconductor. The optical band gap of the nanocomposites decreased with increasing MgO concentration, ranging from 3.75 to 3.69 eV. Atomic force microscopy also shows a change in the roughness of the nanocomposites film with increasing MgO nanoparticles percentage. Photocatalytic activity assessments demonstrated that the inclusion of MgO nanoparticles enhanced the efficiency of the nanocomposites under UV light. The (PVC/10% MgO) sample exhibited a 65 % efficiency in removing methyl blue (MB) within 150 min, comparable to other samples with lower efficiency. The photodecomposition reaction of MB followed first-order kinetics, characterized by a rate constant (k) of 0.00526 min−1.

Keywords: MgO, PVC films, X-Ray, FTIR, Doped, Semiconductor, Gap.

ADSORPTION MODELING OF AN ORGANIC DYE AND HEAVY METAL USING MULTI-PARAMETER ISOTHERMS

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ABSTRACT

This work aims to valorize pine cones powder (PCP), an agricultural waste, as a bioadsorbent for the removal of a cationic dye, Rhodamine B (RhB), and hexavalent chromium Cr(VI) from an aqueous solution. The adsorbent was characterized by SEM, FTIR, and XRD. Batch adsorption experiments were conducted to find the best conditions for pollutant removal. The maximum adsorption capacities achieved were 19.861 mg/g for Cr(VI) and 6.565 mg/g for RhB. Extensive isotherm modeling, incorporating a wide range of two-, three-, four-, and five-parameter models, revealed that the Freundlich isotherm described the best the adsorption of Cr (VI) and RhB onto PCP, since it gave the highest R2 values associated with the lowest error values ($\chi 2$, RMSE, and Δq). The calculated Dubinin–Radushkevich mean energy (E) is less than 8 kJ/mol, confirming the physical character of adsorption onto PCP sorbent. Experimental data for Cr(VI) and RhB ion adsorption onto PCP, fitted well the pseudo-second-order kinetic model ($R2 \geq 0.997$). According to the thermodynamic analysis, the retention of Cr(VI) and RhB followed a physisorption, endothermic, and spontaneous process at all temperatures for Cr(VI), and at higher temperatures for RhB dye. These results suggest that PCP may be envisaged as a promising biosorbent for water remediation without the need of costly heat and activation processes as a cheap and sustainable adsorption process.

Keywords: Adsorption, Pine cone powder, Rhodamine B, Hexavalent chromium, Isotherms

IN VITRO ANTIOXIDANT AND ANTIDIABETIC OF MAESA KAMERUNENSIS MEZ. PLANT EXTRACT

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ABSTRACT

The genus Maesa Forssk., belong to the Myrsinaceae family and comprising some 150 species distributed throughout the Old World. In this study, the antioxidant, and antidiabetics properties of (hexane, ethyl acetate, methanol, n-butanol and water) extracts of Maesa kamerunensis that grows naturally in the Cameroon were investigated. ABTS·+ scavenging, β-carotene-linoleic acid, Cupric-reducing antioxidant capacity (CUPRAC), DPPH·scavenging, and metal chelating assays were performed to evaluate antioxidant activities of the extracts. The enzyme inhibitory potential of extracts was investigated against key enzymes involved in antidiabetics (α-amylase and α-glucosidase). The spectrophotometric methods were used to determine the total phenolic, flavonoid, ascorbic acid, β-carotene, and lycopene contents. Among the extracts tested, the crude extract of stems showed the highest antioxidant activity in CUPRAC (A0.50: 9.34±0.71 µg/mL), ABTS·+ (IC50: 3.27±0.25 µg/mL), DPPH (4.09±0.45 µg/mL), β-carotene linoleic acid (IC50: 6.18±0.25µg/mL) assays. At 200 µg/mL, the ethyl acetate extract of M. kamerunensis was more active against α-glucosidase and α-amylase enzymes with the IC50 at 10.61±0.31 and 12.07±0.37 respectively, follow by the methanol extract of fruits with IC50 at 28.65±0.44 and 22.20±0.13 respectivly. This study contributes to the traditional therapeutic uses of M. kamerunensis and emphasizes its value in the development of new therapeutic agents exhibiting antioxidant and anti-diabetic activity.

Keywords: Maesa kamerunensis, antidiabetic potential, antioxidant proprieties

ANTIDIABETIC AND ANTIOXIDANT ACTIVITY OF TWO SAPONINS ISOLATED FROM M. KAMERUNENSIS MEZ.

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ABSTRACT

Diabetes mellitus (DM) represents a global health problem. It is the most common of the endocrine disorders and is characterized by chronic hyperglycemia due to relative or absolute lack of insulin secretion or insulin actions. According to the World Health Organization projections, the diabetes population is likely to increase to 300 million or more by the year 2025. Complementary and alternative approaches to diabetes management such as isolation of phytochemicals with anti-hyperglycemic activities from medicinal plants is therefore imperative. The current study aim to identify new compounds by a systematic study of the anti-oxidant and anti-diabetic activity of stems of M. kamerunensis. Phytochemicals were isolated from the methanolic extract of stem parts of the plant by column chromatography and identified by nuclear magnetic resonance spectroscopy and mass spectroscopy. A new triterpenoid saponin glycoside was isolated. The isolated phytochemicals were identified as 3β-O-{([α-L-rhamnopyranosyl-(1→2)-β-D-galactopyranosyl-(1 → 3)]-[β-D-galactopyranosyl-(1 → 2)]-β-D-glucopyranosyl)}-22α-(2-methylbutanoyl)-13β,28-oxido-olean-16α,28α-diol and 3β-O-{([α-L-rhamnopyranosyl-(1→2)-β-D-galactopyranosyl-(1→3)]-[β-D-galactopyranosyl-(1→2)]-β-D-glucuronopyranosyl)}-21α-angeloyloxy,22-(E)-cinnamoyl)-13α,28-oxido-olean-16β,28β-diol (**2**). For the antioxidant activities, compound **1** showed the higher value of IC50 at 124.8±1.15 µg/ml for β-Carotene-linoleic acid assay and 185.3±1.10 for ABTS•+ assay. For antidiabetic potential activities, compound **1** elicited stronger α-glucosidase (IC50 = 36.80±0.73) and moderate α-amylase (IC50 = 28.05±0.54 g/ml) inhibitory activities as compared to acarbose. Overall, the data suggested that the saponin isolated from M. kamerunensis has potentials as natural antioxidants and antidiabetics.

Keywords: M. kamerunensis; saponin; antioxidant activity; antidiabetic activity; α-Glucosidase; α-amylase

DEVELOPMENT OF A POST-COLUMN PHOTOCHEMICAL DERIVATIZATION HPLC-FL METHOD FOR THE SIMULTANEOUS DETERMINATION OF AFLATOXIN G1 AND G2 IN COMMERCIALLY AVAILABLE NUT PRODUCTS

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ABSTRACT

A sensitive, selective and rapid analytical method was developed for the simultaneous determination of aflatoxin G1 and G2 in various commercially available nut products, including peanuts, pistachios, and hazelnuts. The method is based on reversed phase high performance liquid chromatography (RP-HPLC) coupled with post column photochemical derivatization and fluorescence detection (λex=365 nm, λem=435 nm). Chromatographic separation was achieved using a C18 column (150 mm × 4.6 mm, 5 µm) maintained at 30 °C, with an isocratic mobile phase composed of water:methanol:acetonitrile (60:20:20, v/v/v) at flow rate of 1.0 mL/min. The injection volume was 20 µL. Post column ptohochemical derivatization was applied to enhance the natural florescence of aflatoxins G1 and G2, significantly improving detection sensitivity without the need for chemical reagents. The method was validated according to ICH guidelines, evaluating specificity, linearity, precision, accuracy and robustness. Excellent linearity was observed in the range of 0.01-50 µg/kg, with a correlation coefficient (r2) of 0.9998. The limit of detection (LOD) and limit of quantification (LOQ) were found to ve 0.003 µg/kg and 0.01 µg/kg, respectively. Intraday and interday relative standard deviation (RSD) values were below 3.8% indicating high method precision and reproducibility. No interference was observed from matrix components in blank nut samples. This validated method was successfully applied to the analysis of 10 different nut products, demonstrating its suitability for routine monitoring, quality control, and regulatoray testing of food products for aflatoxin G1 and G2 contamination.

Keywords: AFLATOKSIN G1 AND G2, HPLC-FL, METHOD VALIDATION, FOOD SAFETY

CHLORINE CONTAMINATION IN DILUTE NITRIC ACID PRODUCTION: SOURCES, EFFECTS, AND PREVENTION METHODS

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ABSTRACT

Dilute nitric acid (NA), in addition to its widespread use in the chemical industry, has also gained importance in various areas of the healthcare sector, particularly in anesthesia applications. Therefore, product purity and quality have become critical. This study identifies potential sources of chlorine contamination encountered in dilute nitric acid production and proposes solutions to prevent this. The primary causes of chlorine contamination include residues in the influent water, raw material purity, cleaning agents used in process equipment, and sealants. Furthermore, intermediate species such as nitrosyl chloride (NOCl) that may form during the production process can also cause chlorine to be retained in the system. Field analyses revealed that the chlorine level in the products was initially above 10 ppm. It was understood that this level decreased after the products were stored in silos for a certain period of time, and the chlorine was removed from the system by separating the intermediate species. These findings are promising for the supply of high-purity products to the healthcare sector. One of the goals of İGSAŞ is to offer this product at a quality level suitable for the healthcare sector and to open up to new markets.

Keywords: Nitric Acid, Cholarine

OXİDANT STATUS OF SPIRULINA EXTRACTS

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ABSTRACT

Arthrospiraplatensis Spirulina is a cyanobacteria species known for its rich nutritional content and biologically active phycocyanin components. It is a dietary protein that is used safely and beneficially as a supplementary food additive. Spirulina contains two types of biliproteins: C-phycocyanin and allophycocyanin. Phycocyanin is a water-soluble, blue photosynthetic pigment with high antioxidant and strong fluorescent properties. In this study, oxidative stress values and DNA protective activities of Spirulina extracts with 35% phycocyanin content were evaluated. Total Oxidant Level (TOS) and Total Antioxidant Level (TAS) were determined using Rel Assay Diagnostics kits. pBR322 plasmid DNA and UV-C method were used for DNA protective activity. It was determined that spirulina extracts at different concentrations showed good antioxidant properties and oxidative stress values of all samples were low. All Spirulina extracts showed good DNA protective activity.

Keywords: Spiriluna, Oxidant

PHENOLIC COMPOUND PROFILE OF SUNFLOWER HONEYS PRODUCED IN THRACE REGION

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ABSTRACT

Honey is a natural food widely appreciated for its high sugar content and distinctive aroma, which makes it an important source of energy. In addition to its nutritional value, honey is also considered a functional food due to its antioxidant and antimicrobial properties, which are attributed to bioactive compounds such as enzymes, pollen, aromatic compounds, and phenolic constituents. Among these, phenolic compounds play a key role in determining the biological activity of honey and serve as important indicators in elucidating its chemical structure. In this study, the phenolic compound profiles of sunflower honeys produced in eight different districts of Tekirdağ, the leading sunflower honey-producing province in the Thrace region, were analyzed. High-performance liquid chromatography with a diode-array detector (HPLC-DAD) was used to identify and quantify the phenolic compounds. The analysis revealed the presence of several phenolic compounds in the samples, including ferulic acid (5.914–6.052 μg/g honey), gallic acid (186.176–443.794 μg/g honey), vanillic acid (1.064–3.419 μg/g honey), chlorogenic acid (0.348–1.573 μg/g honey), and p-hydroxybenzoic acid (1.001–3.494 μg/g honey). The notably high levels of gallic acid are of particular importance in terms of the functional properties of sunflower honey. According to the results, while no qualitative differences were observed in the phenolic profiles based on production location, quantitative variations were detected among the samples. These findings demonstrate that sunflower honeys produced in the Tekirdağ region are rich in bioactive compounds and highlight their potential for use in apitherapy products. Therefore, this study provides valuable data for identifying chemical differences based on the botanical and geographical origin of honey and for supporting its functional food properties.

Keywords: Phenolic compounds, sunflower honey, HPLC-DAD

COMPARATIVE MOLECULAR DOCKING STUDY OF LOCALLY SYNTHESIZED SCHIFF BASES AGAINST ACETYLCHOLINESTERASE AND BUTYRYLCHOLINESTERASE: TOWARD SELECTIVE INHIBITOR DESIGN

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ABSTRACT

In this study, we evaluated the potential inhibitory activity and selectivity of six locally synthesized Schiff bases (S1–S6) against two cholinesterase enzymes: acetylcholinesterase (AChE) and butyrylcholinesterase (BChE). Molecular docking simulations were performed using AutoDock Vina to compare the binding affinities of these compounds with those of two reference drugs, donepezil and tacrine. The target protein structures were retrieved from the RCSB Protein Data Bank and prepared according to standard protocols. Ligands were optimized using the DFT/B3LYP/6-31G(d,p) method via Gaussian 09, and RMSD calculations were carried out to assess docking reliability. Docking results revealed that all Schiff bases exhibited good binding affinities toward both AChE and BChE, with binding energies ranging from -7.8 to -10.4 kcal/mol. Compound S2 showed the highest affinity for AChE (-10.4 kcal/mol), surpassing both donepezil (-8.1 kcal/mol) and tacrine (-9.7 kcal/mol), while S1 and S4 also demonstrated strong inhibition potential. Regarding BChE, the compounds displayed moderate selectivity, with S1 and S4 again showing relatively high binding affinities (-9.6 and -9.0 kcal/mol, respectively). Overall, the data suggest that Schiff bases S1, S2, and S4 are promising candidates with potential selectivity for AChE over BChE, warranting further investigation through biological assays.

Keywords: Molecular docking, Schiff bases, Acetylcholinesterase, Butyrylcholinesterase, Selectivity, Alzheimer's disease

EVALUATION OF THE COMPLEX STABILITY AND BIOAVAILABILITY POTENTIAL OF EDDHA-DERIVED IRON CHELATES IN RICE (ORYZA SATIVA L.) UNDER IRON DEFICIENCY AND SALT STRESS CONDITIONS

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ABSTRACT

Iron (Fe) deficiency and salt stress are among the major environmental factors that limit plant development. In this study, five different EDDHA-derived Fe(III) chelate complexes (F-BD, F-ET, F-TR, F-H, F-OC) were synthesized, their complex stability constants were determined, and their effectiveness against salt stress was evaluated in rice (Oryza sativa L.) plants. The stability constants of the synthesized complexes with Fe^{3+} ions were determined using spectrophotometric methods, and the calculated log K values were: F-BD (1b) = 14.46 ± 0.06, EDDHA (1a) = 14.28 ± 0.14, F-H = 9.92 ± 0.19, F-OC = 9.95 ± 0.01, and F-TR = 9.75 ± 0.09. Following a 14-day hydroponic growth period, plants were transferred to nutrient solutions containing the Fe chelates, and salt stress was induced two days later with 150 mM NaCl. Post-harvest analyses revealed that, despite the salt stress, all Fe complexes significantly maintained shoot and root length compared to the control group. Notably, the F-BD treatment increased root length by 30% and shoot length by 20%. In addition, the F-BD group exhibited the highest chlorophyll content and catalase (CAT) activity, while the F-H and F-ET groups showed the lowest levels of hydrogen peroxide (H_2O_2) and thiobarbituric acid-reactive substances (TBARS). The results indicate that the F-BD complex, with its high log K value, enhances Fe bioavailability and physiological activity, supporting both morphological development and antioxidant defense in rice under salt stress. These findings suggest that Fe chelates with high complex stability represent an effective strategy for improving stress tolerance in agricultural applications.

Keywords: EDDHA, Complex stability, Rice (Oryza sativa L.), Salt stress, Iron deficiency

UTILIZATION OF LIQUID SMOKE FROM OIL PALM FROND BIOMASS AS A CALCIUM CARBONATE SCALE INHIBITOR USING THE UNSEEDED EXPERIMENT METHOD

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ABSTRACT

The production of palm oil in Indonesia continues to increase annually. However, this also results in a significant rise in waste generation, one of which is oil palm fronds. If not properly managed, this biomass waste poses a threat to the environment. With advances in science and technology, palm fronds can now be processed into an environmentally friendly and economically valuable product known as liquid smoke. Liquid smoke is obtained through pyrolysis—either direct or indirect combustion—of carbon-rich materials containing active chemical compounds, some of which have been shown to inhibit scale formation. Scale formation, particularly calcium carbonate ($CaCO_3$), is a serious issue in various industrial systems, especially boilers. This study aims to evaluate the effectiveness of liquid smoke derived from oil palm fronds as an environmentally friendly inhibitor for calcium carbonate scale formation at 90 °C, by varying the concentration of growth solution and inhibitor dosage using the unseeded experiment method. The results demonstrated that the liquid smoke from palm frond biomass significantly inhibited the growth of $CaCO_3$ crystals. SEM and XRD analyses revealed that, in the absence of inhibitor, the scale consisted of calcite and aragonite crystal phases. In contrast, with the addition of the inhibitor, the dominant crystal phases shifted to vaterite and fragile calcite. Quantitative analysis using PSA indicated a decrease in the particle size distribution of $CaCO_3$ scale upon inhibitor addition. Based on both qualitative and quantitative findings, it can be concluded that liquid smoke from oil palm fronds is effective as an eco-friendly inhibitor for calcium carbonate scale formation.

Keywords: Liquid smoke, scaling inhibitor, calcium carbonate, oil palm frond

SYNTHESIS AND CHARACTERIZATION OF POLY(ACRYLIC ACID)/IRON OXIDE HYDROGEL FOR REMOVAL OF METHYLENE BLUE DYE

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ABSTRACT

Hydrogels are three-dimensional polymer networks that can be natural, synthetic, or hybrid and can retain large amounts of water thanks to their hydrophilic groups. Their high swelling, porosity, pH sensitivity, and functionalizability demonstrate the importance of hydrogels in adsorption applications. Polyacrylic acid (PAA) is a synthetic polymer with repeating -COOH groups. In aqueous solutions, these PAA groups ionize, providing strong electrostatic attraction with cationic pollutants on the polymer. Due to the widespread use of metal oxides in adsorption applications, this study synthesized PAAs in the presence of iron oxide at different ratios. The methylene blue adsorption capacity of these PAA/iron oxide composites was investigated, and the effects of iron oxide nanoparticles were demonstrated. The highest adsorption capacity was 80%, which was observed in the PAA/iron oxide composite containing 5% iron oxide.

Keywords: Hydrogels; Iron oxide; Adsorption; Methylene blue

PREPARATION AND CHARACTERIZATION OF BACTERIAL CELLULOSE/IRON OXIDE COMPOSITE FOR REMOVAL OF METHYLENE BLUE DYE

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ABSTRACT

Bacterial celluloses are biocompatible and renewable polymers of great importance with their high surface area and nanofibrillar network structure. They can be used as is to adsorb methylene blue from aqueous solutions or can be chemically modified with carboxyl, amine, or sulfate groups to enhance adsorption. Iron oxide nanoparticles, with their easy recovery by magnets, high surface area, reactive surface, biocompatibility, and ability to be functionalized with various groups, are also used in adsorption applications. In this study, iron oxide nanoparticles were first synthesized, and then bacterial cellulose/iron oxide composite films were prepared. Activated bacterial cellulose/iron oxide composites were also prepared. These composites were characterized by FTIR and XRD analyses. They were used for the adsorption of cationic dyes such as methylene blue, and the concentration of methylene blue was determined by UV-Vis spectroscopy. The results indicated that the adsorption capacity of the activated bacterial cellulose/iron oxide composite was higher than that of the bacterial cellulose/iron oxide film, with 310 mg/g.

Keywords: Bacterial cellulose; Iron oxide; Adsorption; Methylene blue

SYNTHESIS AND PHYSICOCHEMICAL CHARACTERIZATION OF PURE FE AND SR DOPED AND CODOPED TIO2 PHOTOCATALYSTS: APPLICATION FOR REMOVING OF PHARMACEUTICAL POLLUTANT

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ABSTRACT

Heterogeneous photocatalysis has become a much-studied field in recent decades, due to its great potential for solving environmental pollution problems and the global energy crisis. In order to better understand this technique and its practical applications, we have carried out a study on the photo-degradation of paracetamol, with pure, Iron and Strontium doped and codoped TiO2 photocatalysts at the same concentration, which are elaborated by the sol-gel method, and characterized by several techniques among them: DRX, FTIR, UV-visible and photoluminescence (PL). The DRX study showed that pure TiO2 exhibits an anatase structure, while 1%Fe/TiO2, 1%Sr/TiO2 and 1%Fe-1%Sr/TiO2 shows no phase change after doping and cooping of TiO2. FTIR analysis revealed the presence of OH groups, promoting the photo-catalytic reaction. The fundamental absorption is observed in pure TiO2 in the UV (< 400 nm), which is typical for TiO2 (Eg ~3.2 eV). Fe and Sr doping amplifies the absorption in the UV with a slight shift towards the visible. The highest absorption is observed with Sr doping. For co-doping, an increased absorption in the ultraviolet is observed compared to pure TiO2. Pure TiO_2 exhibits the highest PL intensity. The intensity of 1%Fe/TiO_2 decreases compared to pure TiO_2, and that of (1%Sr/TiO_2) decreases even more significantly. The co-doped (1%Fe-1%Sr/TiO_2) intensity is the lowest of all samples and almost coincides with that of (1%Sr/TiO_2). The photodegradation of the paracetamol was studied as a function of several parameters: doping effect, paracetamol concentration, photocatalyst mass. We found that the paracetamol was eliminated at 100% in 150 min with 30 mg of 1% Sr/ TiO2 catalyst using 5mg/L of paracetamol solution following first-order kinetics.

Keywords: photocatalysts, paracetamol, sol-gel, titanium dioxide (TiO2), doping

GREEN FUEL FROM AGRICULTURAL BY-PRODUCTS: ENHANCING BIOETHANOL YIELD THROUGH PROCESS OPTIMIZATION

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ABSTRACT

The transition to renewable energy sources is a critical global priority, driven by concerns over climate change, environmental degradation, and the depletion of fossil fuel reserves. In this context, the utilization of agricultural residues for biofuel production offers a sustainable and eco-friendly alternative that addresses both energy and waste management challenges. Agricultural by-products, often underutilized or discarded, represent a valuable resource for generating green energy while contributing to circular economy practices. Their conversion into bioethanol not only reduces environmental pollution but also enhances the economic value of farming systems, especially in rural and agro-industrial regions. This study aims to optimize the key operational parameters influencing the production of bioethanol from sugar beets, an abundant and renewable agricultural resource. A Box-Behnken response surface methodology was implemented to systematically evaluate the effects of three critical variables: plant matter-to-liquid volume ratio, heating temperature during fermentation preparation, and yeast mass. A total of fifteen experimental runs were carried out, leading to the development of a statistically significant second-order polynomial model that accurately describes the relationship between bioethanol yield and the selected process variables. $R = 10{,}0200+0{,}1250X1+0{,}9513X2+0{,}3813X3-0{,}1113X12+0{,}3512X22-0{,}1687X32+0{,}0500X1X2-0{,}0400X1X3-0{,}0475X2X3 +\varepsilon$. The analysis revealed that temperature exhibited the most significant influence on ethanol production, followed by the plant matter-to-volume ratio and yeast concentration. Through model optimization and validation, the optimal process conditions for maximizing bioethanol yield were successfully identified. The optimal operating conditions identified are a temperature of 65°C, a beet-to-water mass ratio of 0.95, and a yeast mass ranging from 4.5 to 5 g. To ensure the produced bioethanol met fuel-grade quality requirements, several physical and chemical characterization techniques—including density, refractive index, calorific value, and FTIR spectroscopy—were employed. The measured properties complied with international standards, confirming the high quality and potential usability of the bioethanol as a renewable biofuel. The valorization of agricultural residues, such as sugar beet waste, represents a sustainable solution to two major global challenges: agricultural waste management and clean energy production. Instead of being discarded or left to decompose, these residues can be converted into high-value biofuels, thus promoting both environmental preservation and rural economic development. The integration of agricultural by-products into energy systems reduces dependence on fossil fuels, minimizes greenhouse gas emissions, and supports a closed-loop approach to farming and energy.

Keywords: Bioethanol production; Sugar beet biomass; Box-Behnken design; Response surface methodology; Agricultural by-products; Renewable energy.

EFFECT OF FERRITE DOPING ON ENHANCED PHOTOCATALYSIS TOWARDS METHYLENE BLUE DYE REMOVAL

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ABSTRACT

The effect of Ferrite (CMFT) doping on the structural, optical, morphological and photocatalytic properties of TiO2/GO prepared by humid impregnation method was investigated. The different stages of preparation of this composite were characterized by: X-ray diffraction (XRD), infrared spectroscopy (FTIR) and Raman spectroscopy. The results of these analyses confirm the success of the synthesis of the composite CMFT- TiO2/GO. CMFT (10%) doped TiO2/GO composite exhibited high photocatalytic activity with UV irradiation regarding Methylene Blue dye degradation, surpassing the performance of commercial TiO2. Under neutral pH conditions, the composite CMFT- TiO2/GO effectively degraded Methylene Blue dye following pseudo-first-order kinetic. This study highlights a sustainable approach for the synthesis CMFT- TiO2/GO that offers wider potential for use.

Keywords: TiO2, Composite, Ferrite, Photocatalytic, XRD

VALORİZATİON OF DEMOLİTİON WASTE FOR THE MANUFACTURE OF PORTLAND CEMENT

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ABSTRACT

Urban expansion in Algeria generates significant amounts of demolition waste, which has a harmful impact on the environment. This work studies the effect of replacing clinker with this waste in cement production. We used block waste mixed with limestone to partially replace clinker at different percentages. We examined water demand, setting time, and standard sieve refusal results. The results show that the cements obtained have sieve refusal values around 45 mm that are very close, as well as satisfactory results in terms of Blaine specific surface area (SSB), indicating that the addition of limestone to block waste does not influence grindability. However, water demand (E/C ratio) and setting time increase with the increase in limestone quantity

Keywords: Blaine specific surface, cement, Compressive strength, demolition

NUMERICAL SIMULATION OF THE REMINERALIZATION OF REVERSE OSMOSIS WATER

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ABSTRACT

The remineralization of reverse osmosis (RO) water is a crucial post-treatment step to ensure its chemical stability before distribution. RO water is typically unbalanced in terms of the calcium-carbonate equilibrium, which can lead to corrosion or scaling phenomena within distribution networks. In this work, we developed a calculation software for assessing the calcium-carbonate equilibrium, based on the Legrand-Poirier model. The software is coded in GNU Fortran, with a graphical user interface built using Python (PyQt5). It enables both numerical and graphical evaluation of water equilibrium status and calculates the optimal doses of reagents to be added, depending on the type of treatment applied, in order to obtain water that is neither aggressive nor scale-forming. The software was validated by comparing its results with those from the reference case presented by Legrand et al. (1981), showing perfect agreement. Two real-life cases were then simulated. The first involved brackish water (from the Sahara region): five remineralization techniques were tested and compared. The most effective methods were the addition of lime and CO_2, and filtration through a bed of calcined dolomite, both achieving a pH of 7.5 and a calcium hardness of 15 °F. The second case involved seawater (Tipaza province): a carbonation process (lime + CO_2) successfully stabilized the water with a Ca^{2+} concentration of 8 °F (80 mg/L as $CaCO_3$), and a Langelier Saturation Index close to zero.These results confirm the relevance of the software as a decision-support tool for selecting suitable remineralization processes for different types of desalinated water. It also serves as an educational and technical resource for desalination plant operators.

Keywords: Remineralization, Post-treatment, Calcium-carbonate equilibrium, Desalination

MULTI-SITE EVALUATION OF NITROGEN DYNAMICS IN INHIBITOR-ENRICHED UREA APPLICATIONS UNDER FIELD AND CONTROLLED CONDITIONS

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ABSTRACT

This study investigates the soil nitrogen transformation dynamics of inhibitor-enriched urea formulations under both protected tomato cultivation (field trial in Söğüt, Bilecik) and non-plant pot trials (controlled conditions in Antalya). A total of six formulations, alongside uncoated urea and a Max 46 reference, were evaluated for total nitrogen (N), ammonium (NH_4^+), and nitrate (NO_3^-) contents across different timepoints. In field trials, soil samples were collected on Day 7 and Day 16 post-application. In pot experiments, three samplings were performed across 14 days. Results revealed that Formulation 3 consistently retained higher total nitrogen and ammonium levels with reduced nitrate formation, indicating superior nitrogen use efficiency. Controlled pot trials corroborated the field findings, emphasizing the stabilizing effects of inhibitors in delaying nitrification. These results highlight the potential of inhibitor formulations to reduce nitrogen loss, enhance fertilizer longevity, and contribute to sustainable agriculture. Nitrogen efficiency in agricultural systems is critically affected by urea's rapid conversion to nitrate, resulting in significant leaching and volatilization. To counteract this, inhibitors like NBPT (N-(n-butyl) thiophosphoric triamide) are incorporated into urea fertilizers to delay nitrification and preserve nitrogen in ammonium form. This study assesses the performance of six inhibitor-based urea formulations under two different trial settings: Open-field protected tomato greenhouse in Söğüt (with crop), Controlled pot trials in Antalya (without crop influence). The dual approach allows a comprehensive evaluation of fertilizer behavior in both real-world and isolated settings. The integration of NBPT inhibitors in urea formulations demonstrated measurable benefits in both field and controlled settings. Formulation 3 stood out with consistent nitrogen preservation, making it a viable candidate for large-scale agricultural applications. The Antalya pot trial strengthened these findings by removing plant uptake as a variable, emphasizing the chemical stabilization effects of inhibitors. Future trials should focus on yield impact and multi-year validation across different soil types.

Keywords: Urea inhibitor, nitrogen efficiency, ammonium, nitrate, tomato greenhouse, pot trial, NBPT

INTEGRATED REMOTE SENSING AND HYDROLOGICAL ANALYSIS FOR OPTIMIZED WATER MANAGEMENT IN THE UPPER PASAK AND CHAO PHRAYA RIVER BASINS

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ABSTRACT

This study integrates remote sensing and hydrological data to enhance water resource management in Thailand's Upper Pasak and Chao Phraya River Basins, focusing on optimal streamflow gauging station placement and salinity control during drought. Using Normalized Difference Vegetation Index (NDVI), Land Surface Temperature (LST), Digital Elevation Model (DEM), 10-year rainfall averages, dam storage, and runoff data, multiple linear regression analysis identifies LST as a key factor for gauging station suitability ($p=0.001$, Unstandardized Coefficient=0.978, Adjusted $R^2=0.481$). Salinity management is evaluated using Water Hammer Operation at Lat Pho Watergate during the 2019/20 drought, reducing salinity by 0.92 g/day compared to 0.60 g/day with standard methods. Addressing reduced rainfall (1,333 mm in 2019, 16% below the 30-year average) and limited dam storage (5,377 mcm), this framework supports sustainable water management under climate change.

Keywords: Sreamflow Gauging, Salinity Management, Water Hammer Operation, Hydrological Parameters.

SPATIO-TEMPORAL ASSESSMENT OF URBANIZATION EFFECTS ON AGRICULTURAL LAND IN THE CASABLANCA METROPOLITAN PERIPHERY

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ABSTRACT

Peri-urban agricultural zones are increasingly affected by the unregulated expansion of urban settlements, challenging their productive capacity and long-term viability. This study focuses on the spatial analysis of land use change in the wider metropolitan area of Casablanca, using a 40-kilometer radius around the city center to encompass urban, peri-urban, and rural communes. A GIS-based framework was employed, integrating Landsat imagery and supervised classification techniques to delineate major land cover transitions over a defined period. The methodological workflow involves spectral image processing, classification validation, and spatial cross-analysis with administrative boundaries. By applying structured typologies and spatial indicators, the study identifies differentiated patterns of land artificialization and reveals the heterogeneity of urban pressure across the territory. The findings underscore a deepening spatial fragmentation of agricultural landscapes and raise critical questions about the resilience of these systems under urban pressure. This analysis supports the need for integrated territorial diagnostics and offers strategic insights for agricultural land protection. The geospatial tools and typologies developed in this research are intended to inform land-use planning, guide future fieldwork, and contribute to regional policies promoting sustainable agriculture in urbanizing contexts. The study highlights the potential of remote sensing in producing evidence-based evaluations of land transformation for agronomic and environmental decision-making.

Keywords: Agricultural land transformation, remote sensing, spatial analysis, periurban agriculture

THE SEASONAL EVALUATION OF COSTAL POLLUTION IMPACT OF TRACE METAL ELEMENTS IN THE MEDITERRANEAN SNAIL STRAMONITA HAEMASTOMA USING THE MULTIBIOMARKER POLLUTION INDEX

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ABSTRACT

The assessment of coastal pollution is a key point in the determination of the marine ecosystem health state, particularly with the increased concerns regarding marine pollution mainly due to anthropic activities. This study aimed to investigate the seasonal impact of trace metal elements (TME) along the Algerian East Coast in the foot of the mediterranean snail Stramonita haemastoma. The seasonal effects evaluation concerned three sites namely Aouinete (S1), Messida (S2) in eastern part of El-Kala, and Cap de Garde (S3) in the Annaba Gulf over a one-year assessment period from 2013 to 2014 using the Multibiomarker pollution index (MPI) composed of reduced glutathione (GSH), glutathione S-transferase (GST), malondialdehyde (MDA), metallothionein (MT) acetylcholinesterase (AChE) and catalase (CAT) activities. The calculation of the MPI consists of summing the response indices for all biomarkers at each site. The results revealed in the temporal trend that the winter and spring seasons had the highest MPI levels, GST retained the maximum response factor levels and the highest Discriminatory levels along with MDA and MT. The MPI results allowed the classification of S3 as a critically contaminated environment, while S1 and S2 as a moderately contaminated environment, the highest pollution index values were recorded at S2 and S3 (MPI = 46, MPI = 48, respectively) while the lowest values were recorded at S1 (MPI = 27). The results of this study confirmed the important impact of TME and further distinguished S. haemastoma as a potential bioindicator of coastal environment health.

Keywords: Stramonita haemastoma, TME, marine pollution, Multibiomarker pollution index.

RESEARCH AND IDENTIFICATION OF ORGANOCHLORINE PESTICIDE RESIDUES IN SEDIMENTS: THE CASE OF OUED SEYBOUSE AND ITS TRIBUTARIES IN THE GUELMA SUB-BASIN (NORTH-EASTERN ALGERIA)

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ABSTRACT

The present work focuses on the research and identification of organochlorine pesticide residues in sediment in the Seybouse wadi (Algeria's second largest wadi) and its main tributaries. With a length of 160 km and a catchment area of around 6471km², the wadi flows into the vast Guelma basin, following the basin's west-east axis and crossing it in its entire length, for around 25 km. In addition to the industrial and man-made activities that characterize the study area, it is classified as an agricultural region. The excessive use of fertilizers and pesticides in this region has turned the wadi into a veritable dumping ground for various types of waste, notably pesticide residues, This highly polluting waste has a major impact on the ecosystem and aquatic life, as well as on human health, given that water from the valley is used directly for crop irrigation. To maximize the chances of obtaining fine sediments to which the molecules of interest have a high affinity, 12 sites were sampled, always taking into account the most anthropized areas. extraction was performed in an ultrasonic bath from 100 mg of sediment. Chromatographic analysis was performed on a Perkin Elmer 600 chromatograph, coupled to a Perkin Elmer 600C mass spectrometer. The results obtained for the different sites are shown in chromatograms. Each chromatogram is composed of more than three peaks, each corresponding to a compound or chemical product. Compound identification is based mainly on the interpretation of mass spectra. This identification is made by comparison with the mass spectra library (NIST 2005) ‹‹ The National Institute of Standards and Technologie ›› with references for 147198 different molecules. The only pesticide molecule detected at station S9 is 4-chlorobenzenesulfonamide, also known as Terpineol-4, classified as a toxic active substance in the Chlorsulfuron group. The analysis also enabled us to detect several organic substances such as alpha pinene compounds (S9 , peak 54.29) used in the synthesis of certain insecticides, Bicyclo (2 2 1) heptane, 2chloro also known as Norbornane, 2-chloro- (S1, peak 34.58) which doesn't have as many practical uses as ethylene or other basic chemicals. It is used to make pharmaceutical intermediates composed of pesticides.

Keywords: Keywords: Wadi Seybouse; pesticides; chromatography; agricultural; waste; organochlorines.

SOURCES OF INSTITUTIONAL SUPORT FOR SUSTAINABLE MANAGEMENT OF TREES FROM THE GENUS Tilia sp. IN BOSNIA AND HERZEGOVINA

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ABSTRACT

The research of the three dominant linden species in Bosnia and Herzegovina as part of the DBU "MOE" 2021 scholarship program opened the door for a new perspective of these species in the Bosnian-herzegovinian economy, primarily forestry as an industrial branch. Species from the genus Tilia in Bosnia and Herzegovina are characterized by a wealth of intra- and interpopulation diversity, and due to their good properties (primarily resistance to long-term drought) they are considered trees of the future. The goal of the wider research project is to assess the possibilities for raising linden nurseries in Bosnia and Herzegovina in the future, so that the country can provide high-quality, highly resistant planting material, which would be used in mass afforestation. Based on the review of transparent information of forestry companies in the country, it was learned that several companies are already growing linden trees in their nurseries. This article discusses how support could be provided to forestry experts, who could possibly promote the idea of more frequent planting of trees from the genus Tilia in Bosnia and Herzegovina in the future. Namely, Bosnia and Herzegovina as a country has a relatively complex administrative structure, however, this should not be an obstacle to sustainably managing forests of interesting genetic importance throughout the territory of Bosnia and Herzegovina. Namely, research conducted as part of the MOE scholarship (DBU.de, 2021) (if the report of this research is reviewed) indicates that linden, especially the species Tilia tomentosa, should be viewed as a potential tree of the future. Since the facts indicate that linden spreads in almost all habitats in Bosnia and Herzegovina and other countries of the Western Balkans, a logical question arises: "Why not support innovative ideas in order to find sustainable solutions for the wood market on the Balkan Peninsula?". Although it was relatively difficult to obtain detailed information on the popularity of linden in nursery production based on the data available on the websites of forestry companies, it is noticeable that the websites of forestry companies are relatively transparent and aesthetically adequately arranged. Forestry companies in Bosnia and Herzegovina transparently provide contact information, so that it is possible to establish contact and inquire about cultivation, protection and sale, as well as prices of planting material. This article relies on a literature review method, as well as an overview of available relevant information on the work of forestry companies and the species that are represented in nursery production for filling forest crops, planting plantations, but also for planting in alleys, on river banks and in floodplains. The main results of the research indicate that the functioning of forestry enterprises in Bosnia and Herzegovina is sufficient to sustainably manage species of the genus Tilia, especially considering that the Governments of both entities are willing to support the Master Plans for Afforestation and that there is an interest in carrying out the necessary afforestation of forest land with adequate tree species, as well as supplementing forest crops with valued commercial tree species.

Keywords: Tilia, Plant nursery, Sustainable Management, state organisation, governmental support

INVENTORY OF AQUATIC INSECTS AT EL TARF REGION (NORTHEAST ALGERIA)

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ABSTRACT

Ecology is a relatively modern science. It developed during the twentieth century and began to take its place among the sciences in recent years. The usual definition of this science is the study of the relationship of a living organism or organisms with its surroundings. As the world possesses huge groups of living organisms, including plants, complex animals, and simple organisms, but the living organism, whatever it is, cannot live on its own, but every organism lives depending on other organisms, whether living or non-living, in the surrounding environment. The simplest definition given to it is that space in which humans practice their various activities of life, and this framework includes all living organisms, including animals, plants and humans. Preserving biological diversity is a global issue that necessarily requires full knowledge of the distribution of animals and plants. And aquatic insects have an environmental importance. In this work, we carried out six outputs for the scope of the study "Gaart Djamel" located in the state of Annaba, where they were divided into three stations, with the aim of counting the numbers of aquatic insect species present there in order to know the differences in distribution and the extent to which the existence of each aquatic insect species is related to another. We found that there are several aquatic insect species whose presence is affected by each other. Thus, the distribution of aquatic insects varies according to the temperature, and even the insects themselves affect the presence of each other.

Keywords: Insects, Inventory, Gaart Djamel, Ecology.

ENVIRONMENTAL DRIVERS OF ZOOPLANKTON STRUCTURE IN MEDITERRANEAN FRESHWATER ECOSYSTEMS: A CASE STUDY FROM ALGERIA

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ABSTRACT

This study investigates the influence of key environmental variables on zooplankton community structure in the Taksebt Dam, located in northern Algeria. Sampling was conducted during the summer season; a period characterized by elevated temperatures and reduced water levels typical of Mediterranean climates. Samples were collected as one-time samplings using a 50 µm mesh plankton net at the station B located at the center of the reservoir. Environmental parameters including temperature, pH, and dissolved oxygen (DO) were measured in parallel with zooplankton collection. Preliminary results revealed a clear association between variations in water temperature and the relative abundance of dominant zooplankton taxa. Higher temperatures (31.2°C) and slightly alkaline pH (8.5) levels appeared to favor certain species, while dissolved oxygen showed a regulatory effect on community composition. The observed patterns suggest that environmental drivers play a key role in shaping zooplankton dynamics during summer, a season particularly sensitive to climate and anthropogenic pressures. This case study provides insight into the ecological responses of freshwater zooplankton to environmental fluctuations in Mediterranean reservoirs and supports the use of zooplankton as bioindicators in aquatic ecosystem monitoring.

Keywords: Zooplankton, Taksebt Dam, Environmental parameters, Mediterranean freshwater, Dissolved oxygen, Biodiversity

TOXICITY SCREENING OF CONTAMINATED FRESHWATER SEDIMENT USING THE OSTRACOD CRUSTACEAN HETEROCYPRIS INCONGRUENS

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ABSTRACT

Sediment contamination poses significant environmental problems for aquatic ecosystems under severe anthropogenic pressure. Contaminated sediments contain a wide range of chemical substances such as heavy metals, polycyclic aromatic hydrocarbons, and polychlorinated biphenyls that degrade water quality and adversely affect aquatic organisms, particularly benthic organisms. Given that benthic organisms are the most likely to be in direct contact with and ingest the sediments, evaluating the effects of sediment-associated contaminants on benthic organisms is a direct measure of sediment quality and toxicity. The main objective of this study is to assess the quality of sediments collected from rivers in the Northeast of Algeria. A dual approach, including trace metals assessment as well as chronic toxicity test using Heterocypris incongruens in laboratory conditions, was conducted. The endpoints being mortality, growth inhibition and IC50. Results showed that surface sediments were contaminated with Cd, Cr, Cu, Pb and Zn. Heterocypris incongruens chronic toxicity test showed that sediments with the highest trace metal contents reduced ostracod growth, and appear to be potentially ecotoxic. These results confirm the usefulness of these approaches in sediment quality assessment especially when using H. incongruens which is very sensitive to heavy metal contamination.

Keywords: freshwater sediments, heavy metals, chronic toxicity test, Heterocypris incongruens,

ANALYSIS OF PHYTOPLANKTON BIODIVERSITY IN A MEDITERRANEAN FRESHWATER ECOSYSTEM

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ABSTRACT

Le phytoplancton est l'un des constituants les plus importants des écosystèmes aquatiques, ayant un impact important sur la qualité de l'eau et la santé de l'écosystème. La présente étude porte sur la biodiversité phytoplanctonique dans le réservoir de Boukerdane situé dans la partie sud-est de la wilaya de Tipasa, en Algérie. L'échantillonnage de l'eau a été saisonnier, de novembre 2023 à juillet 2024, à quatre sites de surveillance. Les analyses physico-chimiques ont montré une eau de bonne qualité avec une température saisonnière inférieure à 30°C, un pH alcalin de 8,1, une conductivité électrique en valeurs modérées (1114 µS/cm), et de l'oxygène dissous de 10,81 mg/L. En ce qui concerne la biodiversité, 71 espèces de phytoplancton ont été trouvées, réparties dans six groupes taxonomiques identifiés, avec la prédominance des classes Chlorophyceae et Diatomophyceae. Cette diversité reflète non seulement la richesse écologique, mais aussi l'importance des réservoirs pour la biodiversité aquatique. Nos résultats soulignent l'importance de préserver cet écosystème face aux risques de dégradation de l'environnement. Le suivi de la biodiversité phytoplanctonique est un outil de valeur dans la gestion durable des ressources en eau pour la protection du patrimoine faunique et floristique de la retenue de Boukerdane.

Keywords: Phytoplankton, Biodiversity, Water Quality, Aquatic Ecosystems, Seasonal Variations.

BIOSORPTION OF A CATIONIC AZO-DYE BY DEAD FUNGAL BIOMASS IN AGITATED BATCH REACTOR

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ABSTRACT

Many industrial activities especially textile and paper industries discharge effluents containing heavy metals and dyes which had a direct impact on the environment and human health. Hence, an increased interest has been focused on removing such pollutants from wastewater. In recent years, many methods including physical, chemical and biological treatment have been developed for treating dyes containing in wastewaters. Among various treatment technologies, adsorption technique has gained interest due to its simplicity and high efficiency. Activated carbon is the common used adsorbent due to its high capacity to retain organic and inorganic matters. However, its preparation, processing and regeneration remain very expensive and difficult. Recently, the search for natural adsorbent materials as alternative adsorbents of activated carbon has gained attention in the scientific community. Non- living microorganisms or dead biomasses including yeast, fungus, bacteria and seaweeds are one of the most interesting biological materials showing a notable efficiency to remove pollutants from contaminated waters due to the presence of functional groups on their cells wall allowing a high binding with the dye molecules. This work aims to evaluate the potential of a locally available biological waste as adsorbent material undergoing zero pretreatment steps. In this work a dead fungal biomass is collected as a waste from an antibiotic production plant and tested as a biosorbent for the removal of Methylene blue dye (MB) from an aqueous solution in agitated batch reactor. For this, several assays were conducted in laboratory in order to determine the optimum conditions ensuring biosorbent efficiency of a dead biomass. Effect of contact time, initial concentration of the dye, biosorbent dose, pH, velocity of agitation and particle size of the adsorbent were considered to evaluate the maximum sorption of the dye. The results indicates that equilibirium is reached after 120 min and 80 min of contact time for particle size ranging between 200 and 250 µm and 160 and 200 µm respectively. For the same operating conditions, it was observed that the velocity of agitation had no effect on the equilibirium time for all biomasses particle size tested. The effect of the biosorbent dose was also considered, the capacity of retention of the dye molecules onto biosorbent surface increases slightly with the increase of the dose. The capacity of biosorption is more important for pH values exceeding 10. Kinetic parameters of the pseudo second order revealed its conformity with the experimental data compared to pseudo first order model. The Freundlich and Temkin models gives a best description of the isotherm compared to those of Langmuir and Elovich.

Keywords: Biosorption, cationic azo dye, biosorbent

TRIBULUS TERRESTRIS METHANOLIC EXTRACT MODULATES SPIROTETRAMAT INDUCED LIVER TOXICITY IN DOMESTIC PIGEONS (COLUMBA LIVIA DOMESTICA)

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ABSTRACT

The aim of this work is to evaluate the possible protective effects of Tribulus terrestris methanolic extract against females domestic pigeons **(**Columba livia domestica) intoxicated by the spirotetramat. The experiment was carried out on twinty individuals divided into four groups of five pigeons each. A group (C) saved as control, a SP group treated with 25mg/kg/d of spirotetramat, a TB group treated with 50mg/kg/d of the plant extract and a final group SP+ TB treated with the mixture of spirotetramat and Tribulus extract. The treatment was applied orally for a period of 70 days. The determination of some biochemical parameters, the estimation of liver enzymes activity and the histological study of the livers are used as biomarkers of the effect of Tribulus terrestris and spirotetramat on the metabolism of pigeons. The obtained results revealed that the intoxicated pigeons showed a decrease in the body weights, an increase in TGP and PAL activities, increased in albumin, total proteins and TG levels and decreased in cholestrol levels. However, the co-treatment of TT with SPT has restored body and liver weights, TGP, PAL, and all other examined biochemical parameters. The histo-pathological examination of the livers showed a disorganization of the tissue architecture by the presence of congestions, inflammatory infiltrations and hepatic necroses. However, combined treatment has reduced the hepatic tissue injury induced by SPT alone. To conclude, the present study demonstrated that TT possesses potential effects against hepato-toxicity caused by SPT in females pigeons.

Keywords: females pigeons, spirotetramat, tribulus terrestris, liver, biochemical markers

INNOVATIVE LOCAL MATERIAL IN WATER FILTRATION

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ABSTRACT

The FILTREXPAN medium, made from expanded clay, stands out for its porous structure, large specific surface area, and rough texture. Its advantages, including high particle retention capacity and low head losses, increase filtration cycles and reduce energy costs. FILTREXPAN, the sole manufacturer of expanded clay aggregates, exploits the only clay deposit with expansion properties in Algeria. In this study, a specific range of local FILTEXPAN sands was selected, with the choice linked to the requirements of Algerian seawater desalination plants: This selected range of FILTEXPAN sands was compared to Filtralite HC (0.8-1.6) and a classic filtration sand (EQIOM Granulat). The following parameters selected during the characterization study were based on the BS EN 12902:2004 standard: Bulk density,Absolute density, Acid attack (HCl), Porosity Additional analyses and characterizations were carried out in the research laboratory FUNDAPL at the University of Blida-1. These analyses include: Optical microscopy and scanning electron microscopy (SEM),X-ray fluorescence (XRF) analysis,X-ray diffraction (XRD) This FILTREXPAN filter medium is prepared from Algerian-made expanded clay. The physical characteristics of this new material improve filtration performance by providing higher porosity, longer filtration times, reduced backwash water, and energy savings. Furthermore, this same filter material can be used in the implementation of a dual-layer filter by modifying its physical characteristics. At this stage of the study, the local FILTREXPAN material appears to be a promising option for water filtration, as it offers characteristics and performance comparable to those of the more widely recognized FILTRALITE products. The use of FILTREXPAN in water filtration will contribute to both reducing impurities and contaminants and improving water quality using a highly efficient local material.

Keywords: Filtration, expanded sand, porosity, SEM, Filtralite

SALT STRESS :ASSESSMENT OF SALT CONTENT IN THE WATERS OF THE DEVOLL RIVER, ALBANIA, FOR PLANT IRRIGATION

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ABSTRACT

The water of the Devoll River, Albania, it is the main source for plant irrigation in the Korça region. The productivity of agricultural crops depends not only on the quantity of water, but also on its quality. The quality of irrigation water affects the physico – chemical qualities of the soil and the quality of products and also the security of the soil-plant-animal/human food chain. The increase of temperature in recent years has increased the intensity of the negative impact of salt content in water used for irrigation. The study conducted a dynamic assessment of the water quality of the Devoll River used for irrigation of the Korça region, Albania. The quality of irrigation water is mainly determined by the concentration and composition of soluble salts in water. The analysis of the salt content was carried out according to standard methods in the Agro-Food Laboratory of the Faculty of Agriculture, Fan Noli University, Korce. The indicators resulting from the analysis were compared with the standards set by the FAO for irrigation water quality and EU Regulation 2020/741. The pollution of the ecosystem of these rivers has led to a degradation of their quality indicators. The assessment of the source of water pollution is necessary for intervention to improve the aquatic ecosystem in particular and the agroecosystem in general.

Keywords: Water quality, Devolli River, irrigation of agricultural crops, phsico-chemical indicators of water, salt content in water

VALORIZATION OF MORINGA OLEIFERA BIOFLOCCULANTS FOR THE TEXTILE DYES BY COAGULATION-FLOCCULATION

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ABSTRACT

This study aims to exploit Moringa oleifera seeds and use them for industrial wastewater treatment. The seeds were used as a liquid (extracts) as biocoagulants. The objective of to optimize the factors influencing the removal of textile dyes by a physicochemical treatment, coagulation- flocculation, using an experimental design. By carrying out the tests and analysing the data, the screening of the factors made it possible to identify the optimum conditions necessary to obtain better elimination. These operating conditions are pH, coagulant dose, the concentration of initial solutions, and stirring speed. Our study demonstrated the importance of applying the design of experiments methodology, particularly the response surface methodology (RSM). A full factorial design allowed the optimization of operational parameters affecting flocculation coagulation. Green chemistry offers a sustainable and responsible approach to dye coagulation-flocculation, contributing to a more environmentally friendly future while meeting industrial needs. Integrating green chemistry into dye coagulation-flocculation offers a sustainable advantage that meets today's environmental challenges while optimizing industrial processes

Keywords: Optimization, Response Surface Methodology, Textile Dye, Coagulation-Flocculation, Green chemistry.

THE EFFECTS OF GLOBAL WARMING ON THE WATER QUALITY OF LAKES AND RIVERS

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ABSTRACT

Global warming has emerged as a critical driver of change in freshwater ecosystems, exerting multifaceted influences on the physical, chemical, and biological characteristics of freshwater systems. Rising air temperatures cause to increase in surface water temperatures, which reduces the solubility of dissolved oxygen and intensifies thermal stratification, promoting hypoxic or anoxic conditions in deeper layers. Enhanced evaporation rates and altered precipitation patterns exacerbate seasonal and annual fluctuations in water levels, concentrating contaminants and reducing the self-purification capacity of lotic systems. Concurrently, elevated runoff during extreme rainfall events transports greater loads of nutrients and associated agrochemicals into water bodies, fueling harmful algal blooms and promoting toxin production by cyanobacteria. Intensified drought periods further increase pollutant concentrations and facilitate the proliferation of invasive or opportunistic species, weakening local biodiversity and destabilizing trophic interactions. These changes collectively threaten aquatic ecosystem services, compromise drinking-water quality, and increase treatment costs, while also posing direct risks to human and animal health through exposure to algal toxins and waterborne pathogens. This review synthesizes recent findings on the mechanisms by which climate warming is changing freshwater quality and identifies key knowledge gaps. Finally, it outlines adaptive management strategies such as enhanced monitoring networks, watershed-scale nutrient management, restoration of riparian buffers, and controlled flow regimes to mitigate adverse outcomes and enhance the resilience of inland water resources in a warming world.

Keywords: Global warming, lakes, rivers, water quality

ENVIRONMENTAL IMPACTS OF GREENHOUSE GAS EMISSIONS AND PROPOSED SOLUTIONS FOR THEIR REDUCTION

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ABSTRACT

Greenhouse gas (GHG) emissions are among the primary causes of global warming and climate change. Gases such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxides (N_2O) originate from human-induced activities, including fossil fuel consumption, industrial processes, agriculture, and deforestation. The accumulation of these gases in the atmosphere leads to rising temperatures, glacier melting, sea level rise, and an increase in extreme weather events. This study explores various solutions to mitigate greenhouse gas emissions. Transitioning to renewable energy sources, such as solar, wind, and hydroelectric power, enhancing energy efficiency, promoting the widespread adoption of electric and hybrid vehicles in transportation, implementing sustainable agricultural practices, and initiating forest conservation projects are among the key strategies. Additionally, carbon capture and storage (CCS) technologies, alongside changes in individual consumption habits such as opting for low-carbon footprint products and increasing recycling efforts play a crucial role in reducing emissions.

Keywords: Greenhouse gas, global warming, industrial process, renewable energy

IMPROVING THE EFFICIENCY OF BIO-COAGULATION AND FLOCULATION FOR TURBIDITY CONTROL IN WASTEWATER TREATMENT

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ABSTRACT

The process of coagulation and flocculation is a common method used in the water treatment process. Coagulants used in this study were chemical coagulants i.e. Aluminum Sulfate (Al2(SO4)3) as reference of chemical coagulant and biocoagulants (i.e. pineapple peels, Araucaria hyterophylla). The aim of this study was to examine the impact of biocoagulants on their performance, which is marked by the decrease in turbidity, suspended matter (SM), and electrical conductivity (EC). A wide range of coagulant dosage (0.1– 0.4 g/500 mL) and synthetic turbid water at pH 8 were used to evaluate the coagulation process. The results showed that the highest turbidity removal for Araucaria hyterophylla and AS achieved at the dosage of 0.1 g as much as 84.97% and 97.62 % respectively and the optimal dose of pineapple peels was 0.4g.

Keywords: Water treatment, coagulation-flocculation, turbidity removal, biocoagulant.

REMOVAL OF METHYL VIOLET DYE FROM AQUEOUS SOLUTION USING ECO-FRIENDLY TREATED KAOLIN AS ADSORBENT

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ABSTRACT

In this study, Algerian kaolin (KM) was used to remove the cationic dye methyl violet from an aqueous solution. Prior to this, the adsorbent was subjected to acid activation with hydrochloric acid (0.1 M). A variety of characterization techniques, including infrared spectroscopy (FTIR) and X-ray fluorescence analysis, were employed to determine compositional and textural properties of the treated kaolin. Batch adsorption tests were conducted to optimize numerous experimental parameters, including contact time, adsorbent dose, temperature, and starting pH solution. The results of the experiment demonstrate the efficacy of the adsorbent in degrading methyl violet (MV). The greatest adsorption capacity of MV dye was achieved at 16.94 mg/g within 20 min. Standard enthalpy (ΔH◦), entropy (ΔS◦), and free energy (ΔG◦) were evaluated as thermodynamic parameters. The endothermic character of the adsorption contact was established. In addition with a quantity of Qe reaching 51 mg/g, the adsorption isotherms are found to conform to the Langmuir model.

Keywords: Kaolin, adsorption, methyl violet, dye

REMOVAL OF METHYL ORANGE DYE FROM AQUEOUS SOLUTIONS USING KAOLIN-SUPPORTED ZINC NANOPARTICLES AS AN EFFECTIVE CATALYST UNDER SUN LIGHT IRRADIATION

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ABSTRACT

In this study, inexpensive, locally available kaolin (KT)-supported zinc nanoparticle (Zn-NPs) composite was synthesized via a facile wet impregnation method. The composite was employed for the photocatalytic degradation of methyl orange (MO). In order to identify the optimal conditions for decolorization, the variables, including the catalyst dose and the initial concentration of MO in the reaction system, were investigated. The structure of the synthesized material was analyzed using Fourier transform infrared spectroscopy for surface functional groups, and XRD for crystallinety. To evaluate the catalyst's efficacy in photocatalytic degradation, batch experiments were conducted using MO as a model dye. Reduction tests confirmed the essential role of Zn-NPs in exhibiting high catalytic activity of Zn-NPs/KT. The removal efficiency was 89.1%, indicating that the material exhibited outstanding activity. In conclusion, the Zn-NPs/KT has demonstrated remarkable activity.

Keywords: kaolin, dye, catalyst, impregnation

QUALITATIVE MANAGEMENT OF WATER RESOURCES THROUGH THE USE OF TREATED WASTEWATER IN AGRICULTURE

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ABSTRACT

Advances in water and irrigation technologies for agriculture represent an unbelievable evolution towards a positive change in productivity while addressing water issues. Surface irrigation, sprinkler irrigation and drip irrigation are conventional methods that have certain drawbacks, such as wasting water and increasing labor costs. These conventional methods need to be accompanied by intelligent irrigation technologies, such as soil moisture sensors, weather-based controllers, precision irrigation systems and remote sensing. They enable crops to be supplied with a specific amount of water, and water to be used rationally, since it is supplied according to the needs of the crop or weather conditions. The adaptation of measures such as strategic watering, wastewater recycling, rainwater harvesting and the use of water-stress resistant crops are also presented as measures to cope with water scarcity. Clear examples of applications of these technologies are presented, which have helped to save water and increase agricultural yields worldwide. Since the 2020s, Algeria has been affected by climate change. These changes have resulted in increasingly hot summers, milder winters, less frequent and less intense rainfall, which has heightened the risk of drought. In addition, surface water quality has been compromised by various factors such as pollution, generating public health concerns. These challenges are projected to become even more frequent and intense in the future, so it is crucial to be prepared. As a result, adaptation is becoming crucial to meeting these growing challenges and ensuring community resilience in the face of future climate change. Preventive measures are needed to cope with variations in raw water quality, diversify supply sources, promote water conservation and wastewater reuse as a sustainable source of water and a substitute for chemical fertilizers for soil improvement. The objective of this communication is to present a general overview on the management of treated wastewater in Algeria with a specific emphasis on irrigation water supply for agriculture.

Keywords: Water resources Management; wastewater reuse; agriculture; sustainability;

HISTOLOGICAL STUDY OF THE EFFECT OF THE ENTOMOPATHOGENIC FUNGUS METARHIZIUM ANISOPLIAE (VAR. ACRIDIUM) "GREEN MUSCLE" ON THE GASTRIC CAECUM OF SCHISTOCERCA GREGARIA (DESERT LOCUST)

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ABSTRACT

The desert locust (Schistocerca gregaria) is a major threat to agriculture, causing significant crop losses during swarming periods. Until now, anti-locust control strategies have relied primarily on the use of synthetic insecticides, which can be harmful to the environment and human health. To address these concerns, research is increasingly turning toward environmentally friendly alternatives, particularly biological control, and more specifically microbiological control. In this context, our study focused on evaluating the effects of two entomopathogenic fungi Metarhizium anisopliae var. acridium (commercially known as "Green Muscle") on the histological structure of the crop, a section of the digestive tract, in L5 larvae of the desert locust. The experiment was conducted in the laboratory. The larvae were divided into three groups: The first group was treated orally with the LD_{50} of M. Anisopliae. The second served as a control and received 2sterile distilled water after a 24-hour starvation period. The digestive tracts were then dissected and subjected to histological sectioning. Macroscopic examination revealed no visible lesions or pathological malformations in the treated individuals. However, microscopic analysis showed clear structural disruptions and histological changes in the crop of the treated locusts compared to the control group. These results suggest that M. anisopliae can induce internal histological alterations without external signs, supporting their potential use as targeted biological control agents against the desert locust.

Keywords: Biological control, microorganisms, Green Muscle, Schistocerca gregaria, histology.

ELABORATION AND CHARACTERIZATION OF UNMODIFIED FUMED SILICA NANOPARTICLES FILLED NEAT AND RECYCLED HDPE POLYMER USING STEARIC ACID AS INTERFACE MODIFIER

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ABSTRACT

This research investigated the effect of untreated fumed silica (SiO2) as nanofillers on recycled high density polyethylene (HDPE) properties in presence of unmodified and modified recycled PET fiber. PET materials were treated with aqueous solutions of sodium hydroxide in a different concentration. The stearic acid (SA) was used as an interface modifier in order to overcome the incompatibility problems with the HDPE Matrix. The nanocomposites were prepared by melt blending and compression molding with 3 and 5 wt% filler loading rates. Thermal, structural, and morphological tests were conducted to analyse the performance of the silica and the compatibilizing agent on the dispersion and properties of the studied composites. Results revealed that 3 wt% of unmodified silica filler reinforced the obtained nanocomposites. Untreated PET fiber has significantly improved the modulus and Izod impact strength of the composite. The treatment of the fiber as well as the interface modifier caused a slight increase in stress. Some formulations were found to be the ideal combinations which could provide novel mechanical applications to meet industrial requirements at a larger scale.

Keywords: recycled HDPE matrix, Silica, Stearic acid, PET fiber, polymer nanocomposites.

MICROBIAL INTERVENTIONS FOR SUSTAINABLE FARMING: LINKING NUTRIENT SOLUBILIZATION WITH PESTICIDE BIODEGRADATION

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ABSTRACT

The growing global population and shifting climate conditions are placing unprecedented demands on agricultural production to ensure food security. Conventional farming practices, which heavily depend on chemical fertilizers and pesticides, have led to serious environmental and health concerns. The misuse and excessive pesticide usage, however, not only compromise food quality but also develop pest resistance and residual contamination of pesticides in diverse ecosystems, that enter the food chain and lead to health and ecosystem concerns. Chemical fertilizers are another crucial component of modern agriculture that improves growth and crop yield and helps in meeting the world's food security. However, due to the dramatic expansion in global fertilizer consumption, the health and quality of soil deteriorates including the accumulation of heavy metals. Addressing these challenges requires sustainable solutions to mitigate soil and environmental pollution. One promising approach is the use of microorganisms that can solubilize nutrients and degrade pesticide residues. These microbes enhance nutrient availability to plants while simultaneously breaking down harmful agrochemicals, offering a cost-effective and eco-friendly strategy for soil remediation. Plant-associated bacteria with their abilities to promote plant growth hold great promises for the effective removal of agrochemicals and contributing significantly to increased plant biomass and crop yield. This study provides a comprehensive overview of pesticide pollution and the role of soil bacteria as pesticide degraders, nutrient mobilizers, and plant growth promoters. This study emphasizes on the potential of microbial remediation to support sustainable agriculture and reduce dependence on chemical inputs. **Acknowledgment:** This work has received funding support from the European Union's Horizon Europe research and innovation program under the Marie Skłodowska Curie Grant Agreement No. 101126655, and the Scientific and Technological Research Council of Turkiye under the scope of Agreement No. 123C459.

Keywords: Pesticide, Biodegradation, Biofertilizers, Nutrient Solubilization, Pollution

UNRAVELLING MICROPLASTIC POLLUTION: SURFACE WATER CONTAMINATION, MICROBIAL REMEDIATION, AND DEGRADATION PATHWAYS

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ABSTRACT

Plastics have revolutionized modern life, offering convenience and versatility in countless applications. However, their widespread use has led to an escalating global crisis: plastic pollution. As plastic waste accumulates in the environment, it breaks down into microplastics—tiny, persistent particles less than 5 mm in size—which are now found in nearly every corner of the planet. These particles not only resist degradation but also accumulate harmful chemicals, pollutants, and pathogens, posing serious risks to ecosystems and human health. This study provides a comprehensive overview of the current state of microplastic pollution, with a focus on surface waters. It highlights recent research on the microbial degradation of microplastics, examining how environmental conditions influence this process and exploring the potential mechanisms involved. Furthermore, it categorizes microorganisms—such as bacteria, fungi, and algae—that have demonstrated the ability to degrade different types of microplastics. By synthesizing the latest scientific findings, this study aims to support future efforts to mitigate microplastic pollution through biologically driven solutions.

Keywords: Microplastics, Contamination, Microorganisms, Biodegradation mechanism

OPUNTIA FICUS INDICA MUCILAGE: A NATURAL, SUSTAINABLE AND VIABLE WATER TREATMENT TECHNOLOGY TO REDUCE TURBIDITY IN DRINKING WATER

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ABSTRACT

Opuntia ficus-indica provides a range of ecosystem benefits. Its provisioning resources include human food, livestock feed and medicines, as well as raw materials for bioenergy. In terms of contributions to ecosystem services, this cactus promotes biodiversity by providing wildlife with food, pollen, habitat and shelter. It can also be used for phytoremediation of soils and clarification of contaminated water. In this study, we show that Opuntia ficus-indica produces a gum-like substance, cactus mucilage, which has excellent flocculation properties and is an economically viable alternative for low-income communities. The use of Opuntia ficus-indica in the treatment of drinking water is rapidly gaining interest due to their inherently renewable character and low toxicity. Flocculation studies showed that mucilage was a flocculation agent comparable to Al2(SO4)3, with efficiency increasing with mucilage concentration. Jar tests revealed that lower concentrations of mucilage provided the optimal effectiveness for supernatant clarity, an important factor in determining the potability of water. Jar tests revealed that lower concentrations of mucilage provided the optimal effectiveness for supernatant clarity, an important factor in determining the potability of water. This study provides fundamental and quantitative information on the necessary and minimum requirements for innovative, environmentally-friendly and cost-effective natural flocculants.

Keywords: Cactus; flocculation; turbidity; mucilage; bioenergy; phytoremediation

ENVIRONMENTAL RISK ASSESSMENT RELATED TO SURFACE EXPOSURE OF MINING WASTE: THE CASE OF PHOSPHATE WASTE FROM DJEBEL ONK

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ABSTRACT

Mining, while essential for economic development, generates large amounts of solid and liquid waste (such as waste rock, tailings, and overburden), often stored on the surface. When exposed to weathering, these wastes can release toxic substances like heavy metals and acids, posing risks to soils, water sources, biodiversity, and human health. Assessing the environmental risks associated with surface-exposed mining waste is crucial to anticipate impacts, prevent pollutant dispersion, and avoid technological accidents. This study aims to identify and analyze key environmental risks, with a focus on water and soil contamination, pollutant dispersion, and risk management, in order to promote safer and more sustainable waste handling.

Keywords: Mining activities, solid waste, environmental risks, phosphate,

THE VALORIZATION OF PHOSPHO-LIMESTONE FROM ECONOMIC AND ENVIRONMENTAL PERSPECTIVES

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ABSTRACT

Algerian phosphates, the country's most extensively exploited mineral resource, play a vital role in generating foreign currency and supporting the national mining economy. To render phosphate products commercially viable, the valorization of waste materials generated during extraction and beneficiation is essential. This is effectively achieved through a combination of calcination—carried out at 700 to 1000 °C to decompose carbonate gangue—and subsequent washing, which hydrates and removes calcium oxide (CaO) and magnesium oxide (MgO) formed during heating. These treatments significantly increase the phosphorus pentoxide (P_2O_5) concentration, reaching up to 31% in fine particle fractions, while reducing MgO and CO_2 levels. Experimental results confirm that finer particles (-0.50 to +0.20 mm) yield higher P_2O_5 contents (30.70% to 31.20%) and improved purity. This approach is simple, cost-effective, and requires minimal industrial investment, making it a practical and sustainable method for enhancing the economic and environmental value of phosphate waste within Algeria's mining sector.

Keywords: Keywords: Temperature, waste; Phosphate; Calcination; washing.

A PASSIVE BIOMONITORING APPROACH TO ATMOSPHERIC ACIDITY USING OLEA EUROPAEA BARK IN EASTERN ALGIERS, ALGERIA

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ABSTRACT

Urban air pollution influences the pH of tree bark, which can serve as a reliable bioindicator of air acidity. This study was conducted at thirty sites distributed across three regions east of Algiers, using the bark of Olea europaea as the biomonitoring substrate. Monthly samples were collected during both winter and summer, and each was analyzed for pH, as well as for calcium (Ca), magnesium (Mg), and sulfur (S) content, using X-ray fluorescence (XRF) spectrometry. Statistical analysis using ANOVA revealed significant spatio-temporal variations in bark pH across sites and seasons ($P < 0.05$). The results indicated that olive tree bark generally exhibited a moderately to slightly acidic character. During the winter, pH values ranged from 4.58 to 5.4, while in summer they increased slightly, ranging from 5.0 to 5.86. In contrast, bark samples from the control site, located in a less polluted, peri-urban area, displayed sub-neutral pH values, typically between 5.9 and 6.2. Significant correlations were observed between bark pH and the concentrations of sulfur, calcium, and magnesium. In urban environments, bark pH is influenced by opposing factors: acidifying agents such as sulfur dioxide (SO_2) and nitrogen oxides (NO_x), and alkalinizing compounds including alkali and alkaline-earth metals, soot particles, nitrates, and marine aerosols. These competing influences result in variable pH responses, which may, in turn, affect the composition and richness of epiphytic lichen communities. Taken together, these findings support the use of Olea europaea bark as a practical and sensitive biomonitor for evaluating the impact of acidic gaseous pollutants in Mediterranean urban environments

Keywords: Urban, air pollution, biomonitoring, tree bark, pH, metals, X-ray fluorescence

EVALUATION OF THE POTENTIAL FOR RAINWATER HARVESTING IN THE AGRO-INDUSTRY: A CASE STUDY OF THE TABLE OLIVE INDUSTRY

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ABSTRACT

Rainwater harvesting (RWH) has been proposed as a viable solution to address water scarcity issues in various regions. This approach offers a number of benefits, including the provision of an additional water supply, flood mitigation and a reduction in environmental footprint. Harvested rainwater is used for a variety of applications such as toilet flushing, laundry, car washing, irrigation of green areas and fire fighting. Despite the documented success of this technology in urban settings, such as supermarkets, schools and office buildings, its use in industrial contexts remains limited. However, harvested water can be used in a variety of industrial applications. These include process water, cooling water, garden irrigation and firefighting. The utilization of collected rainwater for non-potable purposes has the potential to markedly reduce industries' reliance on municipal water supplies. This approach has the advantage of reducing water costs, as the use of rainwater eliminates the need to purchase water. Furthermore, rainwater is characterized by its natural softness and absence of chemical constituents, making it well-suited for a wide range of non-potable applications, including irrigation, toilet flushing and cooling systems. Additionally, the implementation of rainwater harvesting has been demonstrated to enhance a company's sustainability performance and its commitment to corporate social responsibility. By adopting such green initiatives, businesses can enhance their reputation among environmentally conscious consumers and stakeholders. The present paper evaluates the potential for rainwater harvesting in the olive sector. The reasons for focusing on the olive sector are: (i) olive oil and table olives are important products for Türkiye; (ii) olive farming is particularly widespread in the Aegean, Marmara and Southeastern Anatolian regions, where water stress is high; and (iii) the olive harvesting and processing periods coincide with periods of high precipitation. Therefore, a rainwater harvesting system has been analysed for two table olive production companies in the Manisa-Akhisar region of Türkiye. In the manuscript, the information about the table olive production processes and the amount of water consumed in olive production is introduced, as first. Technical information is then presented for the design of rainwater harvesting system. In order to determine the amount of rainwater to be harvested, the region's rainfall data is collected from the General Directorate of Meteorology and analyzed. The amount of rainwater that could be collected was calculated based on the rooftop area of the studied olive factories. The required storage tank volume was determined by considering the (monthly) water consumption of the facilities. The cost of the designed RWH system was determined and the period of economic return (i.e. payback period) on investment was calculated. The analysis showed that the investment is more feasible for companies where the amount of rainwater that can be collected from the roof is close to the monthly water consumption.

Keywords: Rainwater Harvesting, Water reuse, Water Scarcity, Table Olive Industry, Rainfall

BLACK CARBON CONTENT IN AIRBORNE PM2.5 DURING THE WINTER – BURGAS, BULGARIA

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ABSTRACT

To study the black carbon (BC) concentration in outdoor airborne fine particles with an aerodynamic diameter of 2.5 microns (PM2.5), samples were collected from Burgas State University (42°31'41.6"N 27°26'58.7"E) during the winter period of 2023 (6 February – 5 March). The contents of BC were analysed by a sequential sampler with a Black Carbon analyzer in real time directly on the sampling filter. The analysis equipment is supplied with an optical module, measures the reflectivity of the laser beam. 28 samples of PM2.5 were collected on a 47 mm fiberglass filter according to standard EN 12341:2023 with a sampling duration of 24 hours, with a debit of 2,3 m3.h-1 or 55 m3 air passed through each filter. The concentration of black carbon is being recorded every 15 minutes. The detection limit of the method is 0.001µg.m-3. The average concentration for the studied period is 1.05 µg.m-3, and the maximum is 8.45 µg.m-3. Out of 2763 measurements for black carbon, 726 (26.28%) are below the detection limit. The percentage content of BC in PM2.5 is in the range from 1.57% to 13.17%, with an average value of 5.18%. The highest recorded concentration of BC was on February 16, when a wind speed of up to 5.7 m.s-1 was recorded from the northeast, east, and an atmospheric stability class of F (highly stable). This indicates a mobile source of emissions - intensive car traffic near the monitoring point, i.e., rather than a local source. The highest percentage of BC in PM2.5 was on February 28. On that day, a high wind speed was recorded - up to 8.8 m.s-1 and atmospheric stability class - D (neutral), which suggests long-distance transport of pollutants, and the direction from southwest west coincides with the urban area, for which, during the heating season, the main source of emissions is the domestic heaters. On February 25, the most measurements below the detection limit were recorded – 37 out of a total of 97 (38.14%) – this day was characterized by very high values of wind speed up to 8,8 m.s-1, which suggests better dispersion of atmospheric pollutants. The highest concentration of BC during the day was recorded on February 11 – a day with very low wind speed (up to 2.1 m.s-1), with direction from the northeast east and a strongly stable atmosphere - F. The highest nighttime concentration of BC was on February 21 – a night with high wind speed from the east (up to 11.1 m.s-1) and a neutral atmosphere - C, where a large residential district is located. The days with higher daytime and higher nighttime average concentrations of BC are completely equal (14 for each of the cases out of 28 24-hour samples), and the average value of all recorded BC concentrations during the day and night is the same for the studied period – 1.04 µg.m-3.

Keywords: Black carbon, PM2.5, Air pollution, Air quality, Meteorology

THE CORRELATION BETWEEN BLACK CARBON CONTENT IN AIRBORNE PM2.5, CONCENTRATION OF OTHER AIR POLLUTANTS, AND METEOROLOGICAL CONDITIONS DURING THE WINTER – BURGAS, BULGARIA

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ABSTRACT

Emissions of gaseous air pollutants and particulate matter from anthropogenic and natural sources contribute to global climate change, which in turn leads to health and environmental risks. Air quality guidelines focus on fine particulate matter with an aerodynamic diameter of 2.5 μm (PM2.5), nitrogen oxides (NOx), sulfur dioxide (SO2), and other pollutants to reduce air pollution. The Gothenburg Protocol recognizes black carbon (BC) as a major component of PM2.5. However, air quality standards do not specifically target it, and it is not part of any climate protocol, revealing a significant gap in strategies. The data on the concentration of BC and both PM fractions – 2.5 and 10 microns were analysed by the scientific team on the territory of Burgas State University "Prof. Dr. Asen Zlatarov" (42°31'41.6"N 27°26'58.7"E). PM sampling was carried out according to the EN 12341:2023 standard, and BS was analysed by measuring the reflectivity of the laser beam. The meteorological data is from the Burgas Airport station, which provides high quality data representative of the studied territory and measures atmospheric pressure (hPa), air temperature and dew point (ºC), relative air humidity (%) and wind speed (m.s-1), taking average values for 24 hours, which is the duration of PM sampling. The concentrations of other atmospheric pollutants were recorded at the DOAS monitoring station, which operates on the principle of Differential Optical Absorption Spectroscopy and records the concentrations of ozone (O3), nitrogen dioxide (NO2), sulphur dioxide (SO2), and benzene. The processing of the data from the correlation analysis between the concentrations of BC and PM shows a strong degree of correlation with PM2.5 (0.69) and a moderate with PM10 (0.49). One of the reasons is that the 10-micron fraction also contains the 2.5-micron fraction, which in turn contains condensable particles (secondary aerosols) to a higher degree. This is also the reason why BC is analysed primarily in the 2.5-micron fraction. A positive moderate degree of correlation was recorded between the concentrations of BC and nitrogen dioxide (0.66), which is an indicator of high-temperature emission sources (industrial factories and vehicles during warm start). The negative moderate degree of correlation with ozone (- 0.61) shows probable absorption of secondary atmospheric pollutants obtained during chemical processes in the atmosphere, as this also applies to benzene, although the correlation with it is negative and very weak (- 0.06). No correlation with sulfur dioxide was recorded, which indicates that the emission sources do not use fuels containing sulfur (coal or diesel cars). A strong degree of correlation is recorded between aircraft and wind speed (-0.79). Its average value for the studied period is 5.06 m.s-1, which is the reason for the dispersion of local emission sources and does not show the impact of distant ones. Although the weak degree of correlation with air temperature (- 0.23) is characteristic of the reduction of the amounts of solid

fuels used in residential stoves when temperatures rise. The correlations with dew point and relative humidity are very weak (- 0,15 and 0,14).
Keywords: Black carbon, PM, Air pollution, Air quality, Meteorology, Correlation

REFLECTION OF NATURE ON LIFE: BIOMIMICRY AND SUSTAINABILITY

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ABSTRACT

While human beings struggle to survive in a globalizing world, nature has managed to exist on its own and has solved its problems within itself. Animals, plants, decomposers and even microbes have found their place in this order and become part of the solution. Thanks to this harmony of nature, studies conducted over the last twenty years have yielded information that can guide ecosystems, cities, architects and interior designers. Although the operation of biomimicry design may sound complicated, it is actually quite simple. Biomimetic design includes inventions and designs that are inspired by solutions developed by nature and provide sustainable solutions. Especially as we move into an ecological age that embraces nature rather than overcoming it, looking at it from a biomimicry perspective becomes meaningful. This perspective suggests acting like nature and approaching problems like nature, beyond simply coexisting with nature. In this study, the importance and examples of biomimicry, which encourages innovation in design and brings new perspectives to existing problems, are discussed.

Keywords: Biomimicry, Inspiration from nature, Sustainability

WHAT HAPPENS WHEN PLASTICS ARE DISPOSED INTO THE ENVIRONMENT? MICROPLASTIC IN POLLUTION THE OCEANS

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ABSTRACT

Plastics are indispensable materials in daily life due to their properties such as being easy to process, durable, lightweight and cheap. Due to its widespread use, it is also one of the biggest pollutants in terms of the environment today. It is known that the increasing use of plastic creates serious pollution, especially in oceans and seas. One of the most important plastic groups that pose a problem is microplastics, which have a high probability of being ingested into living bodies due to their size. Microplastics can be directly incorporated into aquatic ecosystems, or they can emerge when large-sized plastics break down and disperse as a result of natural processes. Microplastics have become a major threat to both aquatic organisms and human health. The interdisciplinary nature of microplastics research necessitates an approach that requires integrity that transcends scientific fields. The aim here is to raise awareness of the possibility that plastic waste that is used and thrown away and whose outcome is not considered may eventually return to the human body as microplastic. To achieve this goal, the history, classification, sources, contamination with nature, disposal methods, effects on the food chain and environmental risks of microplastics were investigated.

Keywords: Plastics, Microplastics, Ecosystem pollution, Living organisms

SAFE RECYCLING OF WASTEWATER SLUDGE IN AGRICULTURE: A CASE STUDY ON WHEAT CULTIVATION IN ALGERIA

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ABSTRACT

The agricultural reuse of sewage sludge offers a sustainable solution for nutrient recycling and soil enrichment. However, the presence of trace metals raises concerns regarding their potential transfer into crops and associated risks to food safety. This study evaluates the impact of soil amendment with sewage sludge from the Ferdjioua wastewater treatment plant in northeastern Algeria on the elemental composition of soft wheat (Triticum aestivum L.) grains. Experimental plots were treated with increasing sludge doses (10, 20, 30, and 40 tons per hectare), and the harvested wheat grains were analyzed using X-ray fluorescence spectroscopy, a rapid, non-destructive technique capable of providing a broad elemental profile. The analysis revealed significant increases in key nutrients such as sulfur, potassium, and zinc, indicating their effective uptake and translocation to the grains. Conversely, elements like copper, iron, and calcium, despite being present in the sludge at high levels, showed limited accumulation, suggesting restricted mobility or plant-level regulation. Importantly, no toxic heavy metals (e.g., lead,) were detected in the edible part of the plant, even at the highest sludge application rate. These results suggest that, under controlled conditions, the application of sewage sludge can enhance the nutritional quality of wheat without introducing immediate contamination risks. Nonetheless, complementary analyses using more sensitive methods and long-term monitoring are recommended to ensure the continued safety and viability of this practice.

Keywords: sewage sludge, agricultural reuse, wheat cultivation, elemental composition, soil amendment

EVIDENCE FOR TWO PLOIDY LEVELS IN A RELICT OLIVE POPULATION OF HOGGAR (ALGERIA)

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ABSTRACT

Polyploidy was recently reported in two endangered olive subspecies from North-West Africa. The origin of this phenomenon remains unclear. In the present study, 107 genotypes of a relic Laperrine's olive population form Hoggar (Algeria) were analysed using eight nuclear microsatellites. Diploid and triploid genetic profiles were observed. A flow cytometry analysis confirmed that trees displaying three alleles at several loci are effectively triploid. This report constitutes the first evidence for the coexistence of two ploidy types in an olive population. The triploid genotypes, probably in mean more vigorous than diploid trees, may be positively selected in the absence of sexual regeneration since a very long time, explaining their relative high frequency (2.8%) in the investigated population.

Keywords: Hoggar, Laperrine's olive, Microsatellite, Polyploidy

VERTICAL STRATIFICATION OF SOIL ORGANIC CARBON UNDER DIFFERENT VEGETATION TYPES IN THE KARAVASTA LAGOON (ALBANIA)

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ABSTRACT

Vegetated coastal wetlands are considered a nature-based climate mitigation solution, since they can capture and store organic carbon for centuries to millennia. It is necessary to quantify the amount of stored organic carbon to calculate their sequestration capacity over time and include them in the context of international climate agreements. In this study, the distribution of organic carbon in the soils of Karavasta Lagoon has been determined. Also, the carbon stock of different vegetation types is compared while taking into account abiotic environmental variables that could influence their storage potential. 26 points have been sampled, up to a depth of 20 cm, dividing them systematically into depth intervals of 0-5 cm, 5-10 cm and 10-20 cm and measuring pH, EC, carbonates, and LOI for each depth. Total organic carbon (TOC) content was calculated by applying a conversion factor of 0.71 (TOC = 0.71 × LOI), which was obtained from a study conducted in a lagoon with similar ecological conditions on the coast of Albania (the Kune-Vain Lagoon). Furthermore, different types of vegetation have been mapped in order to overlap them with the chemical-physical characteristics of the sampling points. The results indicate that the organic carbon concentration is comparatively uniform across all three vegetation types: halophytic vegetation, wooded dunes with Pinus species, and abandoned agricultural land. A decrease in organic content was observed with increasing depth, from 33.35 g/kg to 15.78 g/kg. This study with its results highlights the essentiality of the vegetated coastal lagoons and their significant contribution to blue carbon strategies for climate change mitigation.

Keywords: soil organic carbon, vegetated coastal wetland, floristic composition, land use impact, blue carbon, Karavasta Lagoon

ANALYSIS OF THE REPELLENT EFFICACY OF TEUCRIUM POLIUM ESSENTIAL OIL IN THE CONTROL OF ADULT FEMALE CULEX PIPIENS

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ABSTRACT

Mosquitoes, particularly Culex pipiens, transmit serious diseases such as West Nile Virus, posing a significant public health risk. Although chemical control is widely used in Algeria, it presents several drawbacks, including the development of resistance and environmental damage. The use of medicinal plants offers a promising alternative, as they are effective, biodegradable, and less toxic. Teucrium polium L., a medicinal plant rich in bioactive compounds, is known for its antioxidant, antibacterial, and insecticidal properties. This plant represents a promising alternative to chemical insecticides, which are often associated with resistance and environmental pollution. The aim of this study is to evaluate the repellent efficacy of this plant against adult females of Culex pipiens in the context of sustainable and environmentally friendly vector control. The essential oil of T. polium exhibited strong repellent activity against Culex pipiens, with efficacy proportional to the concentration applied. High concentrations (≥ 5%) induced an immediate 100% repellency, with notable persistence at 15%, reaching 97.77% repellency after 90 minutes. Intermediate concentrations (8% and 10%) maintained over 90% effectiveness for up to 60 minutes. In contrast, lower concentrations (2% and 5%) showed less persistent repellency, decreasing to 68.88% and 82.22%, respectively, after 90 minutes. Based on these findings, T. polium essential oil demonstrates strong repellent activity against adult females of Culex pipiens, highlighting its potential as a natural and sustainable alternative to chemical repellents.

Keywords: Culex pipiens, Teucrium polium, Essential oil, Repellent effect

SPATIOTEMPORAL PATTERNS OF TRACE ELEMENTS (LI, MN, NI, BA) IN RIVERS FEEDING THE ISTANBUL STRAIT, TURKIYE

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ABSTRACT

Sediments in freshwater ecosystems are crucial reservoirs of both essential and toxic elements. While some elements are vital for life, prolonged or high-level exposure, much like with non-essential toxic elements, can be detrimental. The Istanbul Strait, a globally significant marine habitat in northwestern Türkiye, receives substantial input from numerous rivers and lakes. This study investigated the spatiotemporal variations and accumulation of lithium (Li), manganese (Mn), nickel (Ni), and barium (Ba) in the sediments of rivers flowing into the İstanbul Strait. It this research, sediment samples were collected from three key fluvial habitats (Göksu, Kağıthane and Alibeyköy streams) during the dry and wet seasons of 2022–2023. The findings of the study reveal that the average annual concentrations of these elements in the river sediments followed the order: Mn (542.585 ppm) > Li (33.905 ppm) > Ni (21.598 ppm) > Ba (0.425 ppm). Furthermore, significant seasonal differences were observed in trace element accumulations. Notably, average concentrations of Li, Mn, Ni, and Ba in the sediments increased approximately 11, 3, 1.5, and 2 times, respectively, during the wet season.

Keywords: İstanbul Strait, Riverine habitats, Sediment quality, Trace elements

DEVELOPMENT OF SUSTAINABLE PRETREATMENT COUPLED WITH MAGNETIC FILTRATION-ION EXCHANGE IN THE DESALINATION PROCES

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ABSTRACT

Climate change is significantly influencing both the salinity of seawater used in desalination and the environmental impact of concentrated brine streams generated by the process. A wider adoption of a technology that is needed for zero/minimal liquid discharge and the development of sustainable pretreatment, such as coupled ion exchange, magnetite nanoparticle filtration processes, could reduce brine discharges from reverse osmosis desalination (RO) for containing a low concentration of dissolved salts and a concentrated brine stream which presents several significant environmental challenges. The RO process requires energy and cost treatment optimization to desalinate, and the performance of pretreatment improves specifically energy consumption, brine disposal, and detrimental effects on marine ecosystems necessitate meticulous management and continuous innovation to guarantee long-term sustainability and environmental preservation. Coupled ion exchange, magnetic nanoparticles, filtration process performance in laboratory scale (elimination of hardness 99.2%; elimination of hardness carbonate 75%, flux of 15,922 ml/min), and the 5% of magnetic nanoparticles contribute over 80% of the state's produced water. The changes in pH and conductivity during treatment show the direct impact of adsorbent mass on ionic interactions (Conductivity 44 μS/cm, pH 7.98), necessitating significant changes in Cation exchange capacitance (CEC) as a function of reuse cycles pre-treatment process.

Keywords: Ion exchag, desalination, seawater, water hardness

ENHANCING ENERGY EFFICIENCY IN AGRICULTURAL PRACTICES

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ABSTRACT

Energy efficiency is one of the areas that must be carefully addressed in the agricultural sector because of its direct relationship to the long-term viability of economic growth and social development goals, as well as its critical role in lowering greenhouse gas emissions. Energy efficiency is the process of determining how to use less energy while maintaining the same level of production and service. This study discusses the importance of energy efficiency in the agricultural sector, as well as energy efficiency practices that can be implemented in accordance with the stages of agriculture. Understanding of energy consumption is essential before assessing energy efficiency initiatives in agriculture. Agriculture uses energy either directly or indirectly. Determining and documenting the company's energy inputs is essential, as is creating the required energy plans. Efficiency studies on the locations where energy consumption takes place must then be conducted. The use of tractors and other agricultural equipment, irrigation systems, greenhouse heating and cooling systems, and the application of fertilizer and pesticides are examples of energy-intensive activities in the agricultural sector. Furthermore, educating producers about energy efficiency and the importance of tracking and disclosing energy consumption raises awareness and helps efficiency initiatives succeed. Increasing energy efficiency on farms typically costs less than installing new energy production systems. Energy-saving innovations in agriculture should be developed and implemented. Developing and implementing integrated energy efficiency measures is also critical for production sustainability. Energy efficiency on farms and throughout the supply chain will help to offset rising energy costs for heat, electricity, gas, and liquid fuels. This is also critical for increasing profits while protecting natural resources, minimizing environmental impact, and ensuring agricultural production's long-term viability.

Keywords: Energy, Smart farming, Energy-saving techniques, Sustainable food systems, Energy efficiency

PRODUCTION AND CHARACTERIZATION OF A MESOPOROUS ACTIVATED CARBON FROM CAROB TREE BIOMASS FOR ENVIRONMENTAL APPLICATIONS

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ABSTRACT

This study investigates the transformation of Ceratonia siliqua (carob tree) pods into activated carbon through chemical activation with phosphoric acid, with a focus on agricultural waste valorization and environmental applications. The preparation method involved washing, drying, grinding, impregnation with H_3PO_4, sonication, carbonization at 450 °C, and purification by Soxhlet extraction. The resulting material was characterized using advanced techniques to assess its physicochemical properties. TGA/DSC analysis revealed four key thermal stages: water evaporation (20–120 °C), decomposition of unstable organic matter (120–300 °C), pyrolysis and H_3PO_4-catalyzed activation (300–450 °C), and stabilization of the carbonaceous structure (>450 °C). FTIR spectroscopy identified oxygenated functional groups (hydroxyl, carbonyl, aromatic), which are essential for adsorption. X-ray diffraction confirmed an amorphous structure typical of low-temperature activated carbons, with no crystalline impurities. Finally, BET analysis revealed a high specific surface area of 724 m^2/g and a mesoporous texture (H3-type hysteresis). The results highlight the potential of this activated carbon for applications in adsorption, catalysis, or pollution control, owing to its well-developed porosity and functional surface groups. This circular approach, combining biomass valorization and carbon sequestration, offers promising prospects for sustainable agriculture and waste management.

Keywords: Activated carbon, Ceratonia siliqua, porosity, adsorption, waste valorization.

ASSESSMENT OF THE IMPACT OF SURFACE WATER TABLE IRRIGATION ON THE PHYSICOCHEMICAL PROPERTIES OF SOILS IN OUED M'ZAB (ALGERIA)

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ABSTRACT

This study focuses on evaluating the quality of surface water table in the Oued M'Zab region to determine its suitability for agricultural use. The adopted methodology is based on spatial analysis of water salinity and sodicity, as well as classification according to irrigation standards. The results indicate that the groundwater exhibits poor quality for irrigation, with significant risks of soil salinization. This calls for strict irrigation management to promote salt leaching. Additionally, the alkalinization risk ranges from low to moderate, with potential sodium toxicity for sensitive crops.

Keywords: Risk, Irrigation, Surface water table, Soils, Oued M'Zab, Algeria.

EFFECTS OF TREATED WASTEWATER ON SOIL QUALITY DOWNSTREAM OF THE OUED M'ZAB, ALGERIA

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ABSTRACT

This study focuses on evaluating the quality of treated wastewater and its impact on soil characteristics downstream of the Oued M'Zab. The adopted approach involves a physicochemical analysis of the wastewater before and after treatment through natural lagooning, in comparison with established standards. The analysis also includes an examination of the soils in the receiving environment. The results indicate notable treatment efficiency in reducing organic load, with average removal rates of 62.01% for BOD_5, 62.43% for COD, and 7.10% for TSS. Moreover, soil samples taken both near and far from the final discharge point show increased acidity and significant salinity levels. These treated waters are considered of medium quality for irrigation but may pose a risk of soil salinization. Therefore, additional treatments and appropriate management strategies are necessary to safeguard the local ecosystem and promote a sustainable development approach in the M'Zab Valley.

Keywords: Impact, treated wastewater, quality, soil, Oued M'Zab.

ENVIRONMENTAL AWARENESS AND PRACTICES AMONG UNIVERSITY STUDENTS: A CASE STUDY FROM SKIKDA, ALGERIA

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ABSTRACT

This study aims to explore the state of environmental culture among university students, emphasizing its role in individual adaptation to the surrounding environment through awareness of opportunities and risks. Conducted at the University of Skikda, Algeria, the research focused on three dimensions: environmental awareness, environmental practices, and environmental education. Using a descriptive survey method, data were collected from a representative sample of students via a structured questionnaire. The data were analyzed using SPSS (version 25). Findings reveal a satisfactory level of environmental awareness and cultural understanding among students. However, their environmental practices remain below the desired threshold. The study recommends strengthening the role of environmental associations and promoting scientific research in environmental fields to enhance ecological engagement within the university. This would contribute to transforming the academic environment into a space that aligns with standards of cleanliness, aesthetics, and sustainability.

Keywords: Environmental culture; university students; environmental awareness; Skikda; higher education; sustainability

EVALUATION OF SEASONAL VARIATIONS IN THE PHYSICO-CHEMICAL WATER QUALITY OF THE BENI HAROUN RESERVOIR, ALGERIA'S MAIN WATER SOURCE

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ABSTRACT

The Beni Haroun reservoir is a crucial water resource in Algeria, serving domestic, agricultural, and industrial needs. Seasonal variations driven by climatic and hydrological factors significantly influence its physicochemical characteristics, impacting water quality and ecosystem health. The aim of this study is to evaluate the physico-chemical water quality parameters to assess the reservoir's suitability for various uses, including drinking, agriculture, and industry, and to detect potential pollution. Water samples were collected and analyzed seasonally from 2023 to 2024 for eight key parameters: temperature, dissolved oxygen (DO), conductivity, pH, salinity, total dissolved solids (TDS), biochemical oxygen demand (BOD5), and chemical oxygen demand (COD). Results indicate that water temperature peaked in summer (29,12 °C) and was lowest in spring (19,42 °C), influencing biological and chemical dynamics. Dissolved oxygen levels were minimal in autumn (1,84 mg/L) and highest in winter (7,25 mg/L), reflecting varying oxygen consumption and aeration conditions. Conductivity and TDS increased from autumn to summer, with summer values reaching 2356 µS/cm and 1623 mg/L respectively, suggesting enhanced mineral dissolution or concentration effects under warmer and drier conditions indicating rising mineralization. pH remained slightly alkaline throughout the year, fluctuating between 7,4 and 8,4, while salinity rose gradually to 1,69 PSU in summer. BOD5 and COD values, indicators of organic pollution, showed maximum levels in summer (5,68 mg/L and 43,25 mg/L respectively), likely due to elevated biological activity, pollutant influx and anthropogenic inputs during this season. These findings highlight the influence of seasonal climatic changes and hydrological inputs on the reservoir's water chemistry and quality. The study underlines the necessity of continuous monitoring and appropriate water treatment strategies to ensure safe and sustainable water resource utilization.

Keywords: Water Quality, Physicochemical Parameters, Seasonal Variation, Pollution, Reservoir, Algeria

SOCIO-ECONOMIC IMPACTS OF REDUCING AIR PARTICULATE MATTER (PM10) POLLUTION IN KOCAELI USING BENMAP-CE MODEL

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ABSTRACT

Air pollution has long been a significant factor affecting both human and environmental health. With increasing human population and industrialization, various pollutants have been released into the atmosphere. Among these, particulate matter is one of the most critical pollutants and poses a serious threat to living organisms. In particular, it contributes to various health problems, such as respiratory and cardiovascular diseases. Long-term exposure can lead to workforce loss and, in severe cases, even death. Each year, deaths related to air pollution also have a negative impact on national economies. To address these challenges and minimize potential harm, researchers have developed various approaches and models. One such tool is the Benefits Mapping and Analysis Program – Community Edition (BenMAP-CE), developed by the U.S. Environmental Protection Agency (EPA). BenMAP-CE enables health and economic risk assessments based on regional data. It utilizes air quality data, along with mortality, hospital admission, and economic metrics, to estimate improvements in quality of life and potential economic benefits resulting from better air quality. In this study, air quality monitoring data and WRF-Chem model simulations of particulate matter concentrations were used for the Kocaeli region. While the Kocaeli region is one of Türkiye's most industrialized and densely populated areas, it is also exposed to severe air pollution. Therefore, poor air quality can lead to serious health problems and even death. Cause-specific mortality data related to cardiovascular, respiratory, and other diseases were incorporated, and the BenMAP-CE model was applied to assess potential improvements in quality of life and associated economic gains under a scenario of a 50% reduction in particulate matter concentrations. The results estimate that more than one hundred deaths from cardiovascular and respiratory causes could be prevented, and the economic benefits could exceed one billion dollars. As a result of the Kocaeli districts, Izmit, Gebze and Darica within the Kocaeli province demonstrated the highest potential for benefit, whereas Dilovasi yielded relatively lower benefit, a more limited impact compared to the other districts.

Keywords: Air pollution, PM10, BENMAP-CE, Health benefit, Economic benefit, Kocaeli, Türkiye

MICROBIOLOGICAL ANALYSIS OF THE CHELIFF RESERVOIR (NORTHWEST ALGERIA): POLLUTION INDICATORS AND SANITARY IMPLICATIONS

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ABSTRACT

The Cheliff reservoir, located in a strategic region of northwestern Algeria, represents a vital source of drinking water and agricultural irrigation. Given its crucial role in water supply, microbiological monitoring of its waters is essential for preserving the aquatic ecosystem and protecting public health. The bacteriological study carried out has highlighted the impact of human activities such as agriculture, domestic discharges, and industrial waste, on the reservoir's water quality. Analyses revealed a high presence of fecal pollution indicator bacteria, notably total coliforms, Escherichia coli, enterococci, and sulfite-reducing anaerobic bacteria (ASR). These findings indicate significant microbiological contamination of the aquatic environment. Conversely, no traces of Salmonella were detected in the samples, which is a positive indicator from a sanitary perspective. The measured concentrations reinforce these observations: coliforms reached 130 CFU/100 ml, enterococci 120 CFU/100 ml, and ASR 45 CFU/100 ml. These values reflect substantial organic pollution, likely due to untreated agricultural runoff and domestic or livestock-related effluents. The presence of anaerobic bacteria such as Clostridium suggests organic sedimentation and a decline in water quality. According to the SEQ-Eau evaluation grid (2003 version), the bacteriological quality of the dam's water is classified as moderately contaminated in terms of fecal pollution. The collected data are essential for guiding water treatment decisions, developing sustainable water management policies, anticipating pollution episodes, and ensuring ongoing sanitary monitoring of the reservoir.

Keywords: Water quality, microbial contamination, sanitary implications, Cheliff reservoir, Algeria

THE CARBON BORDER ADJUSTMENT MECHANISM (CBAM) AND TURKISH AGRICULTURE: A SUSTAINABLE TRANSITION

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ABSTRACT

The European Union introduced the Carbon Border Adjustment Mechanism (CBAM) in 2023 to prevent "carbon leakage" and ensure fair competition under its Emissions Trading System (ETS). While initially covering carbon-intensive sectors like cement and iron-steel, CBAM's inclusion of nitrogenous fertilizers already impacts agricultural production costs. Furthermore, ongoing EU consultations suggest a high probability of CBAM's direct expansion to processed or new product groups, explicitly mentioning agricultural commodities. France's 2025 impact analysis projects an additional 3-12% cost for non-EU exporters under a potential "Agriculture-CBAM" regime. For Turkey, a major agricultural exporter to the EU, this presents a critical challenge. Product-specific analyses reveal significant variations in carbon intensity; for instance, heated greenhouse tomatoes can have a footprint of 1.7 kg CO_2e/kg, leading to an estimated €136/ton CO_2e certificate cost at current ETS prices, translating to a 6-8% price increase for Turkish exports. Key emission hotspots identified in Turkish agriculture include synthetic fertilizers and energy consumption. To manage this pressure, the paper proposes a dual approach. First, implementing data-driven emission reduction strategies such as precision fertilization, nitrification inhibitors (reducing N_2O by 15-30%), biochar application (long-term carbon storage), and renewable energy integration in greenhouses. Second, establishing robust digital Monitoring, Reporting, and Verification (dMRV) infrastructure, leveraging satellite imagery and IoT sensors to streamline compliance and reduce costs by up to 40%. Turkey's national ETS, set to expand to a voluntary pilot phase for agriculture by 2026-2028, offers a crucial opportunity for data standardization and method development. Developing a "digital carbon passport" platform, integrated with TARBİL, could facilitate CBAM declarations and green finance access. In conclusion, while CBAM does not yet directly cover agricultural products, its indirect effects are already felt, and direct inclusion is increasingly likely. Proactive adoption of low-emission technologies, institutionalizing digital traceability, and aligning national policies with CBAM are imperative for Turkey to maintain competitiveness and achieve climate goals, transforming the "carbon wall" into a catalyst for sustainable agricultural transition.

Keywords: Agriculture, Carbon Border Adjustment Mechanism, Emissions Trading System, Greenhouse Gas Emissions.

CARBON FOOTPRINT OF AGRICULTURAL ACTIVITIES AND THE EMISSION REDUCTION POTENTIAL OF WIND ENERGY IN ALIAGA DISTRICT

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ABSTRACT

This study aims to calculate the carbon footprint of agricultural activities in Aliağa, a district of İzmir, using the Life Cycle Assessment (LCA) methodology, and to evaluate the potential of wind energy in reducing these emissions. In Aliağa, a total of 37,135 tons of agricultural products are produced over 11,370 hectares of farmland. The total carbon footprint resulting from these agricultural activities was calculated as 6,410.38 tons of CO_2 equivalent (CO_2e). Of these emissions, 81.9% originate from fertilizer use, and 18.1% are due to diesel fuel consumption related to mechanization and field operations. In particular, nitrogen-based fertilizers (especially urea and ammonium nitrate derivatives) are responsible for 65.6% of total emissions, making them the dominant source. Fertilizer-related emissions consist of 34.0% from the production processes and 31.6% from N_2O released due to microbial activity in the soil. The significant impact of nitrogen fertilizers on greenhouse gas emissions stems from both direct (soil emissions) and indirect (energy consumption during production and transportation) contributions. In terms of product groups, emission distribution in the Aliağa region is as follows: cereals 43.8%, fruits 21.3%, vegetables 5.5%, and other crops 29.5%. On a product basis, the highest emissions are attributed to wheat (1,458.52 tons CO_2e; 22.8%), silage corn (1,179.54 tons CO_2e; 18.4%), and olives (1,137.36 tons CO_2e; 17.7%), largely due to their extensive cultivation areas and high input demands in terms of fertilizer and fuel. The average emission per hectare was calculated as 0.56 tons CO_2e/ha, a figure that aligns with both regional values for the Aegean Region (0.5 - 1.2 tons CO_2e/ha) and global averages (0.6 - 0.9 tons CO_2e/ha). While this situation shows that the carbon intensity of agricultural production in the region remains within acceptable limits, it also reveals the need for improvement strategies. To explore possibilities for emission mitigation, wind energy was selected as an alternative renewable energy source to assess its potential impact on reducing emissions from agricultural activities or offsetting them within the framework of carbon trading mechanisms. Wind energy's role in emission reduction was analyzed through four different scenarios. The most effective scenario, involving a 5 MW wind turbine, achieved a reduction of 1,206 tons CO_2e (16.5%) through combined use in irrigation and mechanization, demonstrating strong emission mitigation performance. In conclusion, the study reveals that the reduction or optimization of nitrogen fertilizer use, the integration of wind energy in irrigation and mechanized processes, the adoption of low-emission crop varieties, the use of organic fertilizers, and farmer education programs are viable strategies to reduce the agricultural carbon footprint in Aliağa. The district possesses the potential to serve as a model region for sustainable agriculture through the implementation of precision farming techniques and the integration of renewable energy systems.

Keywords: Agriculture, Carbon Footprint, Greenhouse Gas Emissions, Life Cycle Assessment (LCA), Renewable Energy

DETECTION OF ELEMENTAL POLLUTION IN THE ERGENE RIVER USING CHIRONOMID LARVAE (CHIRONOMIDAE, DIPTERA)

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ABSTRACT

The Ergene River and its tributaries are subjected to significant and multifaceted pollution pressures, primarily stemming from industrial activities and agricultural practices within the basin. There are hundreds of industrial facilities in the region, and the discharge of inadequately treated industrial wastewater contributes substantially to pollution in the Ergene River. Moreover, intensive rice cultivation in the area further deteriorates water quality, placing additional stress on the aquatic ecosystem. Chironomid larvae, owing to their sediment-dwelling habitat and responsiveness to ecological stressors, are widely recognized as effective indicators of freshwater pollution. In this study, chironomid larvae were used to determine and evaluate the elemental pollution load in the Ergene River. For this purpose, chironomid larvae were collected during the rainy season (in spring) from five designated stations along the Ergene River and its tributaries. The collected larvae were rinsed with distilled water to remove sediment, and then wet weights were measured separately for each station. The samples were subsequently dried at 105 °C for 24 hours. The dried larvae were placed into separate tubes and digested in a mixture of 5 ml HNO_3 and 0.5 ml H_2O_2, then diluted to 25 ml for elemental analysis. Elemental analysis was performed in triplicate using an Agilent Technologies 7700 XX ICP-MS system at Trakya University Technology Research Development Application and Research Center (TÜTAGEM). A total of 17 elements were identified in the chironomid larvae. The obtained elemental concentrations were evaluated, and the importance of investigating the accumulation of elemental pollution found in water and sediment within aquatic organisms living in the ecosystem was emphasized.

Keywords: Bioindicators, Chironomidae, Element Pollution

MACRO ELEMENTAL RISK ANALYSIS OF WATER IN TWO MAJOR DAM LAKES OF THE MARMARA REGION, TURKEY

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ABSTRACT

Reservoirs play a crucial role in freshwater ecosystems, serving key functions such as irrigation, drinking water supply, and flood control. Despite their importance, these artificial lakes are increasingly threatened by anthropogenic pollution. Macro elements like sodium (Na), magnesium (Mg), potassium (K), and calcium (Ca) are essential for both aquatic life and human health, and their elevated levels may indicate ecological stress or contamination. Atikhisar and Alibey Dam Lakes, located in the Marmara Region of Türkiye, are among the region's most vital reservoirs, supplying water to the provinces of Çanakkale and İstanbul. In this study, surface water samples were collected during the dry season of 2022 from both the inlet and outlet zones of each reservoir (a total of four sites). The concentrations of major macro elements —sodium (Na), magnesium (Mg), potassium (K), and calcium (Ca)—were measured, and potential macro elemental risks were assessed. Results indicated that Alibey Dam exhibited higher average concentrations of these elements compared to Atikhisar Dam. Overall, the elemental abundance in both reservoirs followed the trend: Na (81.066 µg/L) > Mg (31.434 µg/L) > Ca (21.867 µg/L) > K (6.353 µg/L).

Keywords: Atikhisar Dam Lake, Alibey Dam Lake, Macro elements, Water quality

SUSTAINABLE TOURISM IN TURKIYE AND THE BALKAN COUNTRIES: POLICY EVOLUTION AND KEY CHALLENGES

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ABSTRACT

This study examines the development process of sustainable tourism policies implemented in Türkiye and the Balkan countries, along with the key challenges encountered, through a comparative approach. The historical development of the concept of tourism and the policies developed in line with sustainability principles are evaluated in terms of the economic, social, and environmental dimensions of current tourism activities in Türkiye and the Balkan countries. Through this approach, both theoretical and practical perspectives are presented by analyzing academic studies and other sources published between 2010 and 2025. The Balkan countries, compared to Türkiye, stand out in terms of geographical features, historical and cultural heritage, and natural beauties. However, it has been observed that challenges stemming from issues such as infrastructure and superstructure problems, due to wars and political instability experienced in their recent history, significantly hinder the development and implementation of sustainable tourism policies. The study emphasizes the significance of regional cooperation and the strategic objectives set by the European Union in the formulation of sustainable tourism policies. Through a detailed comparison between Türkiye and the Balkan countries, it evaluates the current state of sustainable tourism policies and presents proposed solutions to potential obstacles and issues. As a result of this research, it has been observed that sustainable tourism policies are generally determined by central authorities, with limited public participation in this process. The most significant barriers to achieving sustainable tourism goals have been identified as a lack of long-term planning, weak evaluation mechanisms, insufficient local capacity, and gaps in coordination among stakeholders. According to the findings obtained from the research, sustainable tourism policies in the Balkan countries are generally developed in alignment with the processes of EU membership. However, it is understood that challenges are faced in accessing the necessary financing for the implementation of these policies, that planning has a centralized structure, and that certain barriers have been encountered in the integration of local communities. This study offers recommendations and advice to decision-makers, researchers, and all stakeholders involved in the tourism sector in Türkiye and the Balkan countries.

Keywords: Tourism Enterprises, Sustainable Tourism, Tourism Policy.

A PRELIMINARY ANALYSIS OF FUNCTIONAL TRAIT COMPOSITION IN ADRIATIC SEA FISHERIES

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ABSTRACT

Natural and anthropogenic drivers have both impacted marine ecosystems over the years, altering ecosystem structure and functionality. These external drivers can affect multiple levels of biological organizations, disrupting species interactions, recruitment dynamics and trophic structure, potentially leading to cascading effects throughout the ecosystem. In this context, trait-based approaches are becoming more widely acknowledged as useful instruments enhancing current ecosystem-based fisheries management. In this study, we investigated the temporal dynamics in the functional traits in the Adriatic fisheries landings over 5 decades (1970-2020). A landings dataset comprising 27 taxonomic groups was transformed into 18 functional trait categories related behaviour, ecology, distribution and biology. Dirichlet regression was applied to all trait categories in order to investigate the dynamics of individual traits. Over the last five decades, the community's trait composition has undergone notable transformations. Traits such as zoobenthivore, stenobathic, and winter spawning have become more prominent, whereas features like short lifespan, piscivore, and summer spawning have steadily diminished. Meanwhile, other characteristics including thermal tolerance and distribution range have remained largely stable, reflecting resilience to broader ecological shifts. Expanding the application of trait-based analyses may offer valuable insights for refining fisheries management strategies and safeguarding ecosystem functionality in the face of ongoing change.

Keywords: functional traits, fisheries landings, Adriatic Sea

CHEMICAL ASSESSMENT AND BIOMONITORING OF TREATED WASTE WATER QUALITY BEFORE RELEASE INTO THE ENVIRONMENT

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ABSTRACT

The objective of the present study is to assess periodically the physical and chemical quality of treated waste water in the municipal waste water treatment plant (WWTP) in Chenoua, district of Tipaza (North West of Algeria) to define whether the treatment was efficient and to avoid the negative impact on aquatic biomass when release into the environment. Daphnia magna species was used as pollution bioindicator and an acute toxicity test was carried out. The results of the physicochemical analyses revealed a pH value of 8.03, concentrations of total nitrogen and phosphorus of 35.54 and 3.96 mg/L, respectively, higher values than WHO discharge standards. The determination of the pollution indicator parameters gives an average of DBO5, DCO and MES at 9.47, 50.86 and 15.87 mg/L, respectively. These concentrations are in line with the WHO and JORADP standards. The results obtained following the acute toxicity test using Dapnia magna showed an effect of the effluent on the mobility and survival of the daphnia and mortality was noted. The results obtained at the WWTP of Chenoua reveal a major problem concerning the elimination of salts, nitrates and phosphates, thus denitrification and dephosphatation are necessary at this plant.

Keywords: Wastewater; treatment; pollution; bioindicator, Daphnia magna

THE IMPACT OF AVAILABLE NICKEL ON METAL ACCUMULATION IN FOOD PLANTS

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ABSTRACT

The accumulation of nickel (Ni) i food plants is a growing concern due to its potential toxicity and ability to enter the food chain. Nickel can be taken up by the plants and accumulate in various tissues, including edible parts, with concentrations influenced by factors such as soil characteristics, plant species, and eviromental conditions. Elevated nickel levels in some soils in Albania resulting from natyrally nickel-rich (ultramafic) soils can increase the risk of plant uptake and subsequent human exposure. This study evaluates the effect od available nickel in soil on its accumulation in food plants cultvated in the ultramafic zones of Pojske, Rrajce, Prrenjas. The mehlich-1 extraction method was used to determine available nickel concentrations in the soil, which were then analyzed using Atomic Adsorption Spectrophotometry (AAS). To measure the nickel concentrations in edible parts of plant, samples were disgested and the resulting solutions were likewise analyzed using AAS. Results indicate a general trend where higher concentrations of extractable nickel in the soils increased nickel content in the edible parts of food plants. For instance, in Pojska, alfalfa grown in the soil with 94.61 mg/kg of extractable nickel accumulated 75 mg/kg in its edible tissues, whille oats in the same area showed similar uptake (95.28 mg/kg i soil and 76.8 mg/kg in plant tissues.) However, exceptions to this trend were observed. some corps, such as union fro Rajce and tomato from Rajce, sowed low nickel acculation relatived to soil, levels, suggesting that plant species have diefferent capacities for nickel uptake and internal distribution. Leafy food plants, such as salad, onion, and alfalfa generally exhibited higher nickel accumulation compared to fruiting plants like tomato and papper. Additionally, crops such as tomato and corn appeared to limet nickel translocation to edible parts, possibly as a protective mechanism. Overall, while a positive correlation exists between extractable soil nickel, and nickel content in food plants, the degree of accumulation is clearly species-dependent. These findings highlight the importance of monitoring soil nickel levels, especially in areas affected by industrial activity or naturally high in nickel, to reduce potential risk to food safety and public health.

Keywords: Available nickel, Ultramafic soils, Food Plants, Edible plant parts, nickel accumulation in plants

LIFE CYCLE ASSESSMENT OF DESSALINATION PROCESS IN ENVIRONMENT MANAGEMENT

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ABSTRACT

A new planning technique for development, environmental preservation, and climate impact assessments is life-cycle assessment (LCA), which has emerged in environmental management. The challenges of environmental management include quantitative impact assessment and the establishment of environmental quality goals for industrial systems based on this new facts. Setting objectives, obtaining information on materials and energy consumption, analyzing the effects, and interpreting the findings are the four primary steps of the rigorous life-cycle assessment process in environmental management. As a comprehensive strategy to tackling environmental issues and encouraging the concurrent accomplishment of more general social and economic goals, the Sustainable Development Goals (SDGs) form the basis for policies meant to reduce pollution. In environmental management and life cycle assessment (LCA), data analysis is essential because it offers a thorough framework for locating, measuring, and reducing pollutant sources. An all-encompassing strategy that incorporates community involvement, technological innovation, and sustainable practices is needed to manage our environmental issues. Algeria must implement environmental restrictions and a re-economy to reduce the total amount of pollutants released into the atmosphere and maximize the use of resources in order to manage the severity of our environmental issues. less than 0.5 percent of global greenhouse gas emissions, which contributes to global warming. the adaption techniques into its development plans by investing in renewable resources and giving priority to eco-friendly projects.

Keywords: full sustainability assessments, ecological footprint, Biodiversity, Brine discharge, Life Cycle Assessment

A COMPARATIVE STUDY ON THE TOXIC EFFECTS OF LEAD AND COPPER IN DAPHNIA MAGNA

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ABSTRACT

Freshwater ecosystems face increasing threats from heavy metal pollution, posing risks to biodiversity and ecological stability. This study compared the acute toxicity of lead (Pb) and copper (Cu) in Daphnia magna. Neonates (24 h old) were exposed to 0.78–8.89 mg L^{-1} Pb and 0.03–0.44 mg L^{-1} Cu for 48 h. Survival and body length were measured post-exposure. According to the study results, the 48-hour LC50 value was determined as 2.34 (2.08-2.63) mg L-1 for Pb and 0.124 (0.106-0.146) mg L-1 for Cu. The results indicate that copper exhibits significantly higher toxicity than lead, even at much lower concentrations.

Keywords: Lead, Copper, Daphnia magna, pollution

TOXICITY SCREENING OF CONTAMINATED FRESHWATER SEDIMENT USING THE OSTRACOD CRUSTACEAN HETEROCYPRIS INCONGRUENS

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ABSTRACT

Sediment contamination poses significant environmental problems for aquatic ecosystems under severe anthropogenic pressure. Contaminated sediments contain a wide range of chemical substances such as heavy metals, polycyclic aromatic hydrocarbons, and polychlorinated biphenyls that degrade water quality and adversely affect aquatic organisms, particularly benthic organisms. Given that benthic organisms are the most likely to be in direct contact with and ingest the sediments, evaluating the effects of sediment-associated contaminants on benthic organisms is a direct measure of sediment quality and toxicity. The main objective of this study is to assess the quality of sediments collected from rivers in the Northeast of Algeria. A dual approach, including trace metals assessment as well as chronic toxicity test using Heterocypris incongruens in laboratory conditions, was conducted. The endpoints being mortality, growth inhibition and IC50. Results showed that surface sediments were contaminated with Cd, Cr, Cu, Pb and Zn. Heterocypris incongruens chronic toxicity test showed that sediments with the highest trace metal contents reduced ostracod growth, and appear to be potentially ecotoxic. These results confirm the usefulness of these approaches in sediment quality assessment especially when using H. incongruens which is very sensitive to heavy metal contamination.

Keywords: Freshwater sediments, heavy metals, chronic toxicity test, Heterocypris incongruens.

ENHANCED TREATMENT EFFICIENCY OF VERTICAL FLOW CONSTRUCTED WETLANDS AMENDED WITH KILN-DERIVED ALMOND SHELL BIOCHAR FOR MUNICIPAL WASTEWATER TREATMENT

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ABSTRACT

Water scarcity and pollution are pressing global challenges, exacerbated by population growth, urbanization, and climate variability. Sustainable wastewater treatment technologies are critical for safeguarding water resources and promoting reuse. Constructed wetlands (CWs) are widely recognized as cost-effective and environmentally friendly systems for municipal wastewater treatment; however, their nutrient removal efficiency remains limited. This study investigates the integration of kiln-derived biochar produced from locally sourced almond shells into vertical flow constructed wetlands (ASKB-CWs) to enhance treatment performance. The almond shell biochar was prepared via a low-cost, oxygen-limited pyrolysis process and characterized for its physicochemical properties. Two parallel sets of CWs were operated: almond shell kiln biochar-amended systems (ASKB-CWs) and unamended control CWs, all planted with Canna indica. Results showed that ASKB-CWs achieved significantly higher removal efficiencies for COD (88.19%), PO_4^{3-} (43.61%), total phosphorus (51.78 %), NH_4^+ (87.36%), and NO_3^- (66.60%) compared to control CWs (74.37%, 32.40%, 40.25%, 72.05%, and 43.73%, respectively). These findings demonstrate the potential of almond shell kiln biochar as a value-added product from agricultural waste and an effective substrate for improving CW performance. The approach offers a scalable, low-cost, and sustainable solution for municipal wastewater treatment and reuse, contributing to enhanced water security.

Keywords: Kiln-derived biochar, almond shell, constructed wetlands, municipal wastewater treatment

PREVALENCE OF ANTIBIOTIC-RESISTANT ENTEROBACTERIACEAE ISOLATED FROM BEEF CATTLE IN THE STATE OF TLEMCEN "WEST OF ALGERIA"

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ABSTRACT

The misuse of antibiotics in cattle breeding is a phenomenon that still exists on some farms in the northwest of Algeria. The aim of this study is to try to determine the antimicrobial resistance patterns of some Enterobacteriaceae to antibiotics in healthy cattle. Samples were collected from differents butcher shops in the region, between 2022 and 2024 and prepared for culture using conventional microbiological techniques. Isolates were identified biochemically using API 20E. In accordance with nccls guidelines, all isolates were tested against 20 antibiotic disks using the Kirby Bauer disk diffusion technique. A total of 356 distinct species of E. coli were isolated. Twenty two agglutinable E. coli isolates with O157:H7 were found using serotyping. E. Coli resistance to nalidixic acid (85.7%), tetracyclin (68.2%), streptomycin (53.5%), nitrofurantoin (75.4%), ampicillin (48.6%), ticarcillin (37.4%), and chloramphenicol (19.2%). Some Serratia species present a resistance of 55.9% to nalidixic acid and ofloxacin, 52.3% to ciprofloxacin and 29.54% to streptomycin. Enterobacter isolated were resistant to ampicillin, and cefazolin, however no resistance was observed for gentamicin, amikacin and kanamycin. The Klebsiella species shows no resistance for gentamicin, amikacin and kanamycin, but 69% ciprofloxacin 42% ofloxacin, and a total resistance to tetracyclin and ampicillin. Resistance to more than four antibiotic classes, was present in 75.6% of the isolates. The PCR technique showed that all the twenty two E. coli O157:H7 carried the stx2 and the ehxA genes, 5 isolate carried stx1 genes and 3 both stx1 and stx2.

Keywords: Bovine, antimicrobial resistance, Enterobacteriaceae, E. coli O157:H7

PROTECTIVE EFFECT OF EXTRA VIRGIN OLIVE OIL AGAINST EXERCICE-INDUCED OXIDATIVE STRESS IN CYCLISTS DURING TRAINING

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ABSTRACT

This work aimed to evaluate the effects of supplementation with extra virgin olive oil on the biomarkers of blood antioxidants following training in cycling players. sixteen players were divided into two groups – supplemented with extra virgin olive oil from Tablout variety (S) and not supplemented control group (C). Participants from group S were supplemented with 20 millilitres of extra virgin olive oil for 30 days. Blood samples were assayed for GSH, SOD, CAT enzyme activities and MDA level. Training significantly increased the level of MDA in group C. However there was a significant effect of supplementation ($p < 0.01$) on blood antioxidant defense system. Supplementation with extra virgin olive oil decreased the level of MDA in cycling players and significantly influenced the activity of SOD, GSH and CAT, ($p < 0.001$). Supplementing extra virgin olive oil in the diet of cycling players, significantly reduced lipid peroxidation by increasing antioxidant defense system.

Keywords: oxidative stress, exercise, supplementation, antioxidants, olive oil, phenolic products

THE ASSOCIATION BETWEEN FOOD PREFERENCES, EATING BEHAVIOR, AND BODY WEIGHT AMONG UNIVERSITY STUDENTS

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ABSTRACT

Objectives: To assess food preferences and eating behavior among university students and then to appreciate their associations with body weight. **Materials and methods:** A cross-sectional descriptive study was conducted among university students in Algeria, between January and May 2024. Food preferences, meals timing, snacking patterns, skipping meals and cooking methods were collected. Weight and height were measured and body mass index was calculated and classified according to the WHO recommendations. Statistics were performed using StatviewTM and SPSS softwares. **Results:** Underweight students were more likely to have meals at irregular times during the day (92.6 %, p = 0.01) and to often skip meals (96.3 %, p = 0.01). Snacking was significantly (p = 0.03) more common in overweight students in comparison to normal weight ones (84.1 % vs 72.3 %). For snacking composition, overweight students were the most likely to snacking sugary (61.9 %; p = 0.02) and junk foods (39.8 %; p=0.05). Concerning cooking methods, frying was the most method used by overweight students (74.3 %, p = 0.03). **Conclusion:** This study highlighted key eating behaviors associated with underweight and overweight students, emphasizing the impact of meal timing, snacking habits, and cooking methods on weight status.

Keywords: Food preferences, snacking patterns, skipping meals, cooking methods, body weight, university students.

APPLICATION OF BOVINE BIOACTIVE LACTOFERRIN AS A NATURAL BIO-PRESERVATIVE OF FRESH DAIRY AND FRUIT-BASED LIQUID PRODUCTS

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ABSTRACT

This study investigates the potential of bovine lactoferrin extract as a natural bio-preservative to extend the shelf life of various liquid food products, including cow's milk, camel milk, yogurt, fresh cream, and different types of natural fruit juices (orange, strawberry, and lemon). The results demonstrate that lactoferrin exhibits significant antimicrobial and preservative effects, effectively prolonging product freshness at refrigeration temperature (18°C). Fresh cow's milk showed a shelf life extension of 3 days with 20 µg/mL and 7 days with 100 µg/mL of lactoferrin. Camel milk shelf life increased by 5 days at 15 µg/mL and 10 days at 50 µg/mL. In natural orange juice, shelf life was extended by 3 days at 20 µg/mL and 5 days at 50 µg/mL. Strawberry juice showed an increase of 2 days at 20 µg/mL and 5 days at 200 µg/mL. Lemon juice shelf life was prolonged by 6 days at 20 µg/mL and 8 days at 100 µg/mL. These findings highlight the significant preservative potential of bovine lactoferrin as a bioactive compound suitable for enhancing the shelf life of various fresh liquid food products, offering a safe and natural alternative to synthetic preservatives for human consumption

Keywords: Bovine Lactoferrin - Bioactive - Shelf-life extension - Bioactive compounds - Food preservation

ARTFICIAL SWEETENERS IN FOOD PRODUCTS ON THE ALGERIAN MARKET: WHAT ARE RISKS FOR CONSUMERS?

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ABSTRACT

Artificial sweeteners are used by the food industry to reduce added sugar content and associated caloric intake. They offer the possibility of maintaining sweetness while avoiding the harmful effects of sugar. But are they safe and healthy? Experimental studies have been controversial since their introduction, and human data remain debated and insufficient. This work consists of a screening of various categories of food products carried out in the Wilaya of Annaba, where different food additives were identified. We focused on sweeteners, which were especially found in beverages, yogurts, and confectionery. The most commonly used were: Acesulfame potassium (E950)**,** Aspartame (E951)**,** Sucralose (E955)**,** and Maltitol (E965)**.** Regarding aspartame, we noted its absence in imported "light" products; however, it was present in all local products. It is often considered a slow-acting poison, with numerous side effects such as weight deregulation, cancer induction, and nervous system impairment (Laudisi et al., 2018). Maltitol (E965)**,** found in imported candies, is in high demand by the food industry due to its low cost. However, according to Gallen and Pla (2013), in high doses, it can cause gastrointestinal disorders. Artificial sweeteners, considered highly toxic, are currently under close scrutiny by the World Health Organization (WHO)**.** Scientific debates about their carcinogenicity are ongoing. These sugar alternatives may also be involved in the etiology of other diseases, such as cardiovascular conditions, and their consumption could disrupt the gut microbiota and induce glucose resistance.

Keywords: Survey, sweetners, toxicity, food products, diseases

ULTRASONIC EXTRACTION and ANTIOXIDANT ACTIVITY of ELAEAGNUS UMBELLATA FRUIT

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ABSTRACT

Natural antioxidants are becoming increasingly important in functional food and pharmaceutical applications. Increasing concerns about synthetic antioxidants and consumer trends towards naturally derived components encourage the use of herbal extracts. In this context, Elaeagnus umbellata (Thunb.) fruit is rich in phenolic and flavonoid compounds and stands out as a natural source with high antioxidant potential. However, the extraction yield of these biologically active components is highly dependent on the method and process parameters used. In this study, the effects of ultrasonic power, extraction time and sample amount on antioxidant capacity were investigated by FRAP (Ferric Reducing Antioxidant Power), total phenolic content (TPC), total flavonoid content (TFC) and DPPH radical scavenging capacity analyses and optimized using Response Surface Methodology (RSM). The results show that temperature, extraction time and sample amount have statistically significant effects on antioxidant properties. In FRAP analysis, temperature was found to be the most determining factor ($p<0.05$) and the increase in extraction time and sample amount increased the FRAP value. In TPC analysis, temperature was found to be an important variable ($p<0.05$), but phenolic compounds were observed to degrade after a certain temperature threshold. In TFC analysis, temperature was determined as the most important parameter affecting the extraction of flavonoid compounds ($p<0.05$), but the effect of variables such as water content and molar ratio was not statistically significant ($p>0.05$). In DPPH analysis, temperature was effective at a very high level of significance ($p<0.05$), while increasing ultrasonic power and extraction time increased the radical removal capacity. However, excessive application of temperature or ultrasonic power led to degradation of some components and decreased the capacity. In conclusion, the determination of optimum extraction parameters may lead to extracts with high antioxidant activity for functional food and pharmaceutical applications. This study provides a scientific basis for the effective utilization of natural antioxidant resources and contributes to sustainable and healthy product development processes.

Keywords: Elaeagnus umbellata, Antioxidant activity, Optimization

STABILITY OF IODINE IN IODIZED SALT: INFLUENCE OF STORAGE CONDITIONS AND PHYSICOCHEMICAL CHARACTERISTICS OF SALT

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ABSTRACT

Iodization of salt with potassium iodate is a key public health strategy for preventing iodine deficiency disorders. However, the effectiveness of this approach depends strongly on storage conditions and the physicochemical characteristics of the salt. This study aimed to evaluate the stability of iodine content in commercially available iodized salts. For the stability assessment, samples were stored over a three-month period under controlled conditions of temperature and humidity. Potassium iodate levels were measured at regular intervals to track degradation. The impact of salt granulometry and purity was also considered. The results showed a gradual decline in iodine content over time, exacerbated by moisture and storage at room temperature. Cooking, especially boiling, contributed to significant iodine loss. Salt granulometry and quality played a critical role in iodine retention: fine, purified salts maintained their iodine levels better than coarse or unrefined varieties. Light exposure, however, did not have a notable degrading effect. These findings underscore the importance of optimizing storage practices and selecting high-quality salt to ensure adequate iodine intake for consumers.

Keywords: Iodized salt, iodine stability, potassium iodate, humidity, temperature, salt granulometry.

FUNCTIONAL YOGURT PRODUCTION WITH ADDITION OF BAYBURT WILD SOUR APPLE (MALUS SYLVESTRIS MILLER) SAUCE

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ABSTRACT

In this study, the changes in some chemical, physical, microbiological and sensory properties of yogurts produced using classic yogurt culture, 2 different sugar (20% and 25%) added Bayburt Wild Sour Apple (Malus sylvestris MİLLER) sauce combination (30%) and 2 types (set and whipped) production methods were determined during the storage period. It is of unique value as it is the first study to investigate the effect of using Bayburt Wild Sour Apple (Malus sylvestris MİLLER) sauce with different sugars added in yogurt production on technological quality and sensory parameters. As a result of the research, a new type of functional fruit yogurt formulation was developed and a product was created that will contribute to the economy of wild apples grown abundantly in the region. It was determined that the use of Bayburt Wild Sour Apple (Malus sylvestris MİLLER) sauce with the determined sugar composition did not cause any negative effects on the quality characteristics of yogurts during the 14-day storage period.

Keywords: Bayburt, Functional yogurt, Malus sylvestris MİLLER,

PHYTOCHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITIES OF GINGER (ZINGIBER OFFICINALE)

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ABSTRACT

Secondary plant metabolites are rich sources of bioactive substances, which have shown to possess several beneficial health effects including antioxidant, antihemolytic and anti inflammatory activities. This study aimed to evaluate the phytochemical composition and antioxidant activities of plants extracts from the ginger (Zingiber officinale). Polyphenols were estimated by the Folin-Ciocalteu method, total flavonoids by the AlCl3 method, and total tanins in the aqueous and hydro-methanolic extracts. The antioxidant capacity was determined by the DPPH and FRAP tests. The results showed that the ginger extract in maceration, by methanol, is very rich in triterpenes, steroids, and the decoction, by distilled water, is rich in starch. The antioxidant activity of our extracts indicated that the polyphenols were more present in the maceration extract (1.46 ± 0.006 µg EAG/g) compared to the decoction (1.40 ± 0.003 µg EAG/g), as well as flavonoids in maceration (0.72 ±0.000) and decoction (3.57 ±0.422 mg EAG/g). Methanolic extract reveals a very great antioxidant activity compared to the decoction. The analysis of the toxicity of Zingiber officinale demonstrated an average rate which does not exceed a percentage of hemolysis of 58% for the two extracts. The study of anti-inflammatory activity of human red blood cells has been proven by the calculation of the percentage of inhibition of hemolysis very high in all extracts. The findings suggest that Zingiber officinale possess large antioxidant properties, a lower percentage of cytotoxicity and a very good anti-inflammatory activity and could serve to protect human from oxidative damage caused by free radicals.

Keywords: Zingiber officinale, phytochemical screening, DPPH, TFC, FRAP

BIOACTIVE SYNERGY OF CINNAMON -TURMERIC: IN VITRO EXPLORATION OF ANTIOXIDANT, ANTI-HEMOLYTIC AND ANTI-INFLAMMATORRY EFFECTS AND THEIR IMPLICATIONS FOR HUMAN HEALTH

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ABSTRACT

Inflammatory and hemolytic disorders linked to oxidative stress represent an increasing public health challenge, thereby justifying the investigation of natural therapeutic alternatives that are effective, stable, and better tolerated. This study aims to evaluate, in vitro, the antioxidant, anti-hemolytic, and anti-inflammatory properties of a combination of Cinnamomum verum (cinnamon) and Curcuma longa (turmeric), prepared as aqueous (decoction) and methanolic (maceration) extracts, and compared with two reference standards: gallic acid and diclofenac sodium. Phytochemical screening revealed a marked (+++) presence of tannins, flavonoids, terpenoids, and anthraquinones in the aqueous extract, whereas the methanolic extract exhibited moderate to high (++ to +++) levels of these compounds, except for terpenoids, which were present in lower concentrations. The decoction showed a high total polyphenol content (178.46 ± 21.66 mg GAE/g DW), while the maceration was richer in flavonoids (35.43 ± 1.25 mg QE/g DW). Anti-hemolytic activity assessed on human erythrocytes demonstrated a stable and dose-dependent inhibition for the decoction (from 74.22% to 85.91% at 500 µg/ml), approaching the efficacy of diclofenac (89.35% at 500 µg/ml). The methanolic extract showed a peak effect at 150 µg/ml (86.17%), followed by a marked decrease at higher concentrations. Regarding anti-inflammatory activity, measured by the inhibition of protein denaturation, a moderate dose-dependent response was observed: from 31.85% to 57.42% for the decoction, and from 28.73% to 52.38% for the maceration. Diclofenac demonstrated a stronger inhibition of 71.63% at 500 µg/ml. **Conclusion:** The cinnamon–turmeric synergy, especially in decoction form, stands out for its dual protective bioactivity, highlighting its potential in the formulation of phytopharmaceuticals targeting oxidative and inflammatory conditions.

Keywords: Cinnamon-turmeric synergy, Antioxidant, Anti- Hemolytic, Anti-Inflammatory activity, In vitro study.

DEVELOPMENTAL NEUROTOXICITY OF CHLORPYRIFOS IN VIVO: STUDY OF CHOLINESTERASE ACTIVITY AS A BIOLOGICAL INDICATOR

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ABSTRACT

Acute poisoning by organophosphates chlorpyrifos is responsible for heavy mortality worldwide, especially in developing countries with high agricultural potential. These products are responsible for poisoning of varying severity depending on the nature of the compound and feed intake. The present work focuses on the study of the effect of toxicity on cholinesterase activity and some parameters of liver function in male rats “Wistar” gavaged with insecticide «chlorpyrifos ". Adult rats received three months chlorpyrifos by gavage at dose DL50/10. At the end of the experiment blood is recovered to determine the activity of butyrylcholinesterase by the colorimetric method of Ellman, and liver function parameters. The brain is taken for the activity of the brain butyrylcholinesterase and proteins contents. The results revealed that chlorpyrifos induced a significant perturbation in all biochemical profiles. These alterations were accompanied by marked hepatic, and renal dysfunctions. Notably, there was a substantial inhibition of blood and brain cholinesterases activities, along with an increase in brain protein levels indicating neurotoxic effects. These findings suggest that sub-lethal, repeated exposure to chlorpyrifos at $LD_{50}/10$ induces clinical signs of cholinergic toxicity and significantly impairs both central and peripheral cholinesterase activities. The observed toxic effects appear to be dose-dependent, underscoring the health risks associated with excessive or uncontrolled use of chlorpyrifos.

Keywords: insecticide, rat, cholinesterase activity, biochemical parameters

BEETROOT WASTE ENCAPSULATE AS FUNCTIONAL FOOD ADDITIVE

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ABSTRACT

Nowadays, many consumers exhibit a significant preference for functional foods to enhance their dietary habits and support their health maintenance. Due to their potential for treating and preventing multiple diseases as a result of the presence of biologically active phytonutrients, beetroots (Beta vulgaris L.) have gained great attention from consumers and food producers. It is especially interesting if a nutritional supplement can be made from fruit or vegetable by-products, such as the one used in this study. Fresh beetroot pomace was acquired from the fruit and vegetable processing industry (Zdravo Organic d.o.o., Selenča, Serbia). In order to optimize the encapsulation process of beetroot pomace with pumpkin protein as a carrier, a Box-Behnken experimental design was used for three variables at three levels. The three independent variables were core-to-wall ratio, extract dilution, and mixing time, while experimental outputs were encapsulation efficiency of phenolics and betalains in prepared encapsulates. For the optimal encapsulation, the physical properties and effect of in vitro simulated gastrointestinal digestion on bioactive compounds and biological (antioxidant, anti-inflammatory, and antihyperglycemic) activities were determined. The highest encapsulation efficiencies for both phenolics and betalaines were observed in the samples prepared with the lowest wall–core ratio, without extract dilution, and with a mixing time of 15 minutes, reaching 74.37% and 80.75%, respectively. The technique and formulation tested in this study are appropriate for obtaining betalaine- and phenolic-rich additives in encapsulated form, particularly for the development of functional foods with enhanced nutritional, color, and bioactive properties.

Keywords: beetroot waste; encapsulation; food additive; phytochemicals; biological activities

CHARACTERIZATION OF NUTRIOSOMES LOADED WITH SUPRAMOLECULAR MICROGREEN EXTRACTS- FUNCTIONAL ADDITIVES FOR FUTURE FOOD APPLICATIONS

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ABSTRACT

Microgreens are a rich source of nutrients and bioactive compounds, contributing to the diversity and sustainability of modern food systems. Their unique combination of nutritional and functional properties makes them ideal candidates for the development of health-promoting food ingredients. However, their extremely short post-harvest shelf life limits broader application. To address this, bioactive compounds can be extracted and encapsulated to create stable, functional additives. In this study, bioactives from kale and Sango radish microgreens were extracted using supramolecular solvents composed of octanoic acid, ethanol, and distilled water. This is an environmentally friendly method capable of isolating compounds with diverse polarities. The extracts were then encapsulated using nutrisomes, a modified liposomal system combining phosphatidylcholine and Nutriose® soluble fiber. This method enables encapsulation of both hydrophilic and lipophilic compounds while enhancing stability, offering controlled release, and providing prebiotic benefits due to dietary fiber content. Nutrisomes and their controls were thoroughly analysed. High encapsulation efficiencies were observed (98.7% for kale, 95.9% for Sango). Physicochemical properties such as moisture content, solubility, hygroscopicity, flowability, and cohesiveness were also assessed and compared with control liposomes. In vitro digestion simulations demonstrated that nutrisomes retained antioxidant activity across oral, gastric, and intestinal phases. Among all evaluated samples, kale nutrisomes demonstrated the highest initial antioxidant activity, with DPPH reaching 93.1 μmol TE/g, ABTS 92.0 μmol TE/g, and FRAP 93.5 μmol TE/g. This enhanced performance indicates that the structural integrity of nutrisomes offers effective protection for polyphenols and carotenoids, minimizing their early degradation. Release studies showed more controlled and sustained release of phenolics and carotenoids compared to liposomes. Phenolic release in nutrisomes was lower during the first six hours (35–45%) but reached 80.5–81.6% after 72 hours, slightly lower than in liposomes (84.5–86.4%). Carotenoid release peaked at 24 hours in nutrisomes (81.8% for kale, 79.5% for Sango), while liposomal formulations peaked earlier at 12 hours.

Keywords: microgreens; supramolecular extraction; nanoencapsulation; nutriosomes

ANTIOXIDANT EFFECTS OF MAGNESIUM SUPPLEMENTATION IN RATS WITH TYPE 2 DIABETES

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ABSTRACT

The effect of magnesium supplementation in a high-fat diet (HFD) was studied on blood pressure and pro/antioxidant balance, in Wistar rats with type 2 diabetes (T2D).Diabetes was induced by HFD for 10 weeks, followed by injection of a low dose of streptozotocin (35 mg/kg body weight).The T2D rats were then divided into 2 homogeneous groups and consumed each for 30 days, the HFD supplemented with magnesium at a rate of 50 mg.kg1of diet (HFD-Mg group) or not supplemented (HFD group).After 1 month of nutritional experimentation, evaluation of lipid peroxidation showed a reduction TBARS in VLDL (-20%), LDL-HDL1 (-23%), HDL3 (-35%) and erythrocytes (-37%) in the HFD-Mg group compared with HFD. Protein oxidation evaluation revealed that magnesium decreased carbonyl levels in serum (-32%), erythrocytes (-38%) and some tissues (muscle -44% and kidney -27%) levels. In treated T2D group, the reduction of pro-oxidant markers was concomitant with increased activities of serum antioxidant enzymes (glutathione peroxidase (GSH-Px) and catalase (CAT)) ($p<0.05$); of erythrocytes (superoxide dismutase (SOD) and CAT) and tissues (SOD in aorta, muscle and adipose tissue); GSH-Px (liver, heart, muscle, kidney and adipose tissue) ($p <0.05$).In conclusion, in rats with T2D and exposed to a diet enriched in lipids, Mg supplementation, seems to have interesting nutritional, functional and therapeutic properties (hypoglycemic and antioxidant).

Keywords: T2D, Wistar rats, pro/antioxidant, magnesium

COMPARATIVE STUDY OF THE NUTRITIONAL PROFILE OF FARMED MUSSELS (MYTILUS GALLOPROVINCIALIS) AND WILD MEDITERRANEAN MUSSELS: ANALYSIS OF MACRONUTRIENT, MINERAL AND ANTIOXIDANT CONTENT

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ABSTRACT

Mussel farming (mytiliculture) is a widely practiced aquaculture activity, particularly along the Mediterranean coasts. It offers several advantages, including ecological, economic, and nutritional benefits. Mussels (Mytilus galloprovincialis) are an important source of protein, minerals, and bioactive compounds beneficial to health. This study aims to compare the nutritional profiles of farmed and wild Mediterranean mussels, focusing on their content of macronutrients, essential minerals, and antioxidants. After cleaning the mussels, the flesh was separated from the shells, the byssus was removed, and several analyses were subsequently carried out. The results show that farmed mussels have a higher lipid (+35%) and protein (+5%) content than wild mussels. In contrast, wild mussels exhibit slightly higher levels of essential minerals, notably calcium (+5.2%), magnesium (+4.3%), and iron (+13.6%). Furthermore, the antioxidant activity assessed using the DPPH radical scavenging method revealed a lower IC50 value in wild mussels, indicating stronger antioxidant capacity than that of farmed mussels. In conclusion, wild mussels display a slightly superior nutritional profile in terms of mineral and antioxidant content, while farmed mussels are richer in protein and lipids. This study highlights the influence of habitat and environmental conditions on the nutritional quality of mussels. Although the differences are moderate, these findings may help guide consumer choices regarding the biological and nutritional quality of seafood.

Keywords: Farmed mussels, Wild mussels, Macronutrients, Antioxidants

FORMULATION AND EVALUATION OF CHIA SEED ENRICHED ENERGY BALLS

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ABSTRACT

In a context where consumers seek food alternatives that are nutritious, natural, and environmentally friendly, chia seeds (Salvia hispanica L.) stand out due to their richness in proteins, fibers, omega-3 fatty acids, and antioxidants. Incorporating them into products like energy balls addresses a dual objective: enhancing the nutritional quality of snacks while promoting functional plant-based ingredients. This study aligns with this approach by exploring the addition of chia seeds in the formulation of energy balls intended for human consumption. It evaluates the impacts of this incorporation on the physicochemical, microbiological, and sensory aspects of the final product. Analyses reveal that chia-enriched energy balls exhibit improved nutritional composition, notably containing 7.70 g of proteins, 53.42 g of carbohydrates, and 15.84 g of fats per 100 g of dry matter, offering an energy value of 387.04 kcal. Furthermore, taste tests indicate excellent sensory acceptance, characterized by a balanced flavor and a crunchy texture. These results suggest that integrating chia seeds into food products can contribute to developing healthier and more sustainable options for consumers.

Keywords: energy balls, Chia seeds, Formulation

EFFECT OF NATURAL SOURDOUGH FERMENTATION ON PHYTIC ACID REDUCTION IN WHOLE WHEAT FLOUR

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ABSTRACT

Sourdough bread making is one of the earliest methods of cereal fermentation**.** Thanks to its unique chemical composition, sourdough also lowers the glycemic index of bread. The wild yeasts and lactic acid bacteria present in the mixture absorb part of the starch and begin to break down the dough, making it more digestible and enhancing the body's ability to utilize carbohydrates. This study examined how this natural fermentation reduces phytic acid, a mineral-blocking compound, in whole wheat flour. A healthy bread was prepared using a traditional technique, mixing Algerian MAWOUNA flour, water, and fresh dates as an additional sugar source. The sourdough fermented at room temperature (approximately 22 °C) and was refreshed daily with fresh ingredients over a week. Researchers monitored pH and phytic acid levels from day 1 to day 7. By the end of the study, phytic acid had decreased by approximately 74%, while pH had dropped by 44%, from 6.8 to 3.8. The results showed a strong inverse correlation between acidity level and pH during fermentation. Overall, wild fermentation appears to be a simple and cost-effective way to increase the mineral value of whole wheat bread by breaking down phytic acid.

Keywords: Whole wheat bread, natural sourdough, phytic acid degradation, fermentation, pH reduction

FORMULATION OF HIGH-PROTEIN BISCUITS THROUGH SPIRULINA INCORPORATION: A TECHNOLOGICAL AND NUTRITIONAL STUDY

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ABSTRACT

This work aims to develop a dietetic biscuit enriched with spirulina and to evaluate its effects on the technological, physicochemical, microbiological, and sensory characteristics of the final product. The methodology involved the production of three types of biscuits: a control sample without spirulina, and two formulations enriched with 1% and 2% spirulina, respectively. Physicochemical analyses of spirulina showed a high protein content (61.07% dry matter) and ash content (10.79% DM), along with low levels of fat (1.08% DM) and cellulose (0.53% DM). Its energy value was estimated at 366.28 kcal/100 g. Microbiological analyses showed no contamination or significant variation in either the spirulina or any of the biscuit samples (control, 1%, and 2%). Spirulina enrichment led to a notable improvement in the nutritional quality of the biscuits: protein content increased to 11.62% DM in the 1% formulation and to 12% DM in the 2% formulation. A slight increase in ash content and a higher energy value were also recorded. Sensory evaluation indicated overall acceptability in terms of taste and color. Additionally, the production cost remained relatively affordable, positioning spirulina as a promising ingredient for the development of functional foods.

Keywords: Cookie, Spirulina, Enrichment, Nutritional quality, Sensory acceptability

FORMULATION OF A FOOD PASTA BASED ON CAROB FLOUR"

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ABSTRACT

The quality of pasta encompasses a range of characteristics, from the quality of the semolina used to the final product. Objective of the Study: This study focuses on incorporating carob flour into the production of "Tagliatelle"-type pasta and determining its impact on the physicochemical, chemical, technological, and culinary qualities of the final product, compared to a non-enriched control (100% semolina). Three incorporation levels were examined: 2%, 5%, and 10%. **Key Findings: Ash Content:** The ash content of the semolina was within standard limits (0.92%). With the addition of carob flour, the ash content increased proportionally: 0.98% (2%), 1.00% (5%), and 1.06% (10%). **Moisture Content:** The moisture levels of the raw materials were acceptable and met applicable standards. A decrease in moisture content was observed following the incorporation of carob flour. **Culinary Quality:** Analytical results for the enriched pasta indicated good culinary quality, characterized by high water absorption capacity and higher cooking losses compared to the control. **Technological Properties:** Tests on the finished "Tagliatelle" products revealed that incorporating carob flour affected cooking times, cooking losses, surface condition, swelling, and color parameters (brown index, yellow index, brightness index). **Conclusion:** Statistical analysis indicated that a 2% incorporation rate of carob flour yielded the most satisfactory pasta quality.

Keywords: Carob, Incorporation, Food pasta

PARTIAL REPLACEMENT OF WHEAT FLOUR BY MELON (CUCUMIS MELO L.) PEEL POWDER ON BAKERY PRODUCTS. EFFECT ON CAKES QUALITY

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ABSTRACT

Fruit peels are by-product that accumulate during fruit industrial processing with a direct impact on the economy and environment. The valorization of such waste is an advantageous approach to face the increase in food waste and to develop a new food product with health benefits. Melons (Cucumis melo L.) are highly sought worldwide due to their delectable taste and nutritional qualities. However, the peels of these fruits are generally discarded, since they are rich source of phytochemicals, nature bioactive and fiber compounds. This study explored the potential of melon peel powder (MPP) as a functional ingredient in food applications by incorporating into wheat flour cakes for innovative bakery products. Therefore, cake formulations containing melon peel flour were developed by replacing a wheat flour in different percentages (10, 20 and 30%). Findings show that peel flour exhibited technological properties as water holding and oil binding capacities. Baking with 10%, 20% and 30% melon peel powder boosted textural profile revealing an improvement of the cake quality, leading to the decrease of hardness (by 20.96%, 35.93% and 37.73%, respectively), adhesion and breaking force. Moreover, partial substitution of wheat flour with the MPP led to decrease of crumb redness (a*) and an increase of cake yellowness (b*) in comparison with control cake. The sensory analysis revealed that the panelists preferred the taste, odor and tenderness of enriched cakes containing 10% MPP. These findings highlight the value of melon peels as sustainable ingredients, promoting waste reduction and enhancing the dietary and functional benefits of food products.

Keywords: Melon peel flour, phytochemicals, valorization, cake formulation, textural properties, sensory attributes.

IMPROVEMENT OF CORN OIL STABILITY DURING ACCELERATED STORAGE USING POMEGRANATE (PUNICA GRANATUM L.) PEEL EXTRACT

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ABSTRACT

This research aimed to assess the antioxidant efficacy of Punica granatum peel extract (PGE) in comparison to the synthetic antioxidant butylated hydroxytoluene (BHT) in inhibiting the oxidation of corn oil after accelerated storage for 24 days at 65 °C. The level of oxidation is measured using the peroxide value (PV), free acidity (FA), p-anisidine value (PAV), specific extinction coefficients K 232 and K 270, and total oxidation (TOTOX). Additionally, we assessed the concentrations of total polyphenols (TP) and ortho-diphenols, along with the antioxidant activity, in the samples both before and during storage.
The results showed that oils treated with pomegranate peel extracts had less oxidation damage than the control oils and those improved with BHT. The efficiency was dose-dependent; hence, the degree of oxidation was inversely related to the concentration of pomegranate peel extract. Storing oil samples with EPG at a concentration of 1000 ppm for 24 days showed a greater reduction in the growth of the tested factors than what was seen in the control oil. Research results suggest that EPG may serve as a viable natural antioxidant to enhance the oxidative stability of corn oil during storage or heating processes.

Keywords: Peel pomegranate extract, Polyphenol, antioxydant activity, oxydative stability, corn oil, accelerated storage.

SHIFT WORK AND ITS EFFECT ON NURSES' BODY COMPOSITION (KHENCHELA, 2023)

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ABSTRACT

Introduction: Societal changes have led to the emergence of shift and night work. However, this type of work can have harmful effects on health. One of the causes of these issues lies in the desynchronization of circadian rhythms. The aim of our study is to assess the impact of night work on the body weight of healthcare personnel in the Khenchela province during the year 2023. **Materials and Methods:** A descriptive cross-sectional study was conducted in three hospitals in the municipality of Khenchela. A questionnaire was distributed, and anthropometric measurements (weight and height) were taken. Body Mass Index (BMI) was used to estimate the weight status of the study population. **Results**: Our survey included 100 participants (57% women). The average age of the respondents was 27.3 ± 5.4 years (ranging from 20 to 54 years). Workers had an average work experience of 4.9 ± 4.7 years, with no significant difference between genders. Overweight affected 49% of the population (including 6% obesity). Women were more affected (28% overweight, including 5% obese). A correlation was found between BMI/weight and years of work experience among female nurses, but not among male nurses. More male nurses engaged in physical activity than female nurses (44.2% vs. 14%, $p < 0.000$). A link was found between BMI and the number of hours spent awake ($p = 0.03$, $r = 0.22$). Confounding factors, such as participants' age and years of work experience, may have contributed to the low correlation coefficient. **Conclusion:** It is strongly recommended to implement regular medical monitoring, ideally annually, for night shift workers as part of occupational health care. It is essential that this be accompanied by regular physical activity.

Keywords: Night work – Nurses – Health – BMI – Sleep

DIETARY HABITS AND NUTRITIONAL STATUS OF STUDENTS RESIDING IN UNIVERSITY DORMITORIES (CONSTANTINE – ALGERIA, 2024)

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ABSTRACT

Introduction: The transition to university life leads to autonomous decision-making regarding food choices, often influenced by the availability of fast food and a lack of nutritional knowledge, which can negatively impact students' nutritional status. **Objective:** To assess the nutritional status and eating habits of a sample of students living in two university residences in Constantine. **Materials and Methods:** A descriptive cross-sectional survey using a questionnaire, combined with anthropometric measurements and stress level evaluation, was conducted from February 26 to March 10, 2024. A 24-hour dietary recall was performed both in the university residence and at home. **Results:** Overweight affects 15.5% of the students and obesity 0.9%, while underweight affects 7.3%. Students tend to skip meals more frequently at the university residence (70.9%) than at home (10.9%). Snacking is reported by 81.8% of the population, and 96.4% frequent fast-food outlets. The average sleep duration among the surveyed population is 6.9 ± 1.8 hours. Of these, 36.4% go to bed between 1 a.m. and 6 a.m., and 39.1% wake up after 9 a.m. At the university residence, smokers consume an average of 13.7 ± 7.7 cigarettes per day, compared to 7.5 ± 6.8 cigarettes per day at home ($p=0.00$). At the residence, 66% of students engage in regular physical activity, while only 25.8% do so at home. The average calcium intake is 644.5 ± 319.2 mg/day at the university residence, which is significantly higher ($p<0.05$) than the intake at home (547.4 ± 170.5 mg/day). The average sodium intake is 3,130.6 ± 926.0 mg/day at the residence and 2,743.1 ± 586.6 mg/day at home. A total of 87.3% of students at the residence and 88.2% at home exceed the recommended sodium intake. **Conclusion:** Student life presents unique challenges that warrant special attention from both nutritional and health perspectives.

Keywords: Students, dietary habits, body composition, stress, physical activity

PHYTOCHEMICAL PROFILING AND ANTIOXIDANT POTENTIAL OF SILENE EXTRACTS FOR DAIRY FORTIFICATION

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ABSTRACT

Many food products are inherently perishable and require protective measures during processing, storage, and distribution to ensure an adequate shelf life. As consumers increasingly prefer natural foods over synthetic-preserved alternatives, there has been a growing shift toward natural preservatives due to their antioxidant and antimicrobial properties. This study examines Silene vulgaris, a wild mediterranean plant, for its preservative potential in yogurt. Silene vulgaris (Moench.) Garcke or "bladder campion" is a perennial herb belonging to the pink family (Caryophyllaceae). We assessed its antioxidant and antimicrobial properties to determine its viability as a natural functional ingredient that maintains yogurt quality while enhancing stability. The extract was obtained through maceration and analyzed for bioactive compounds (total phenolics, flavonoids, tannins, and sugars). Its antioxidant capacity was assessed using multiple assays (DPPH, ABTS, FRP, and Phenanthroline), while its antimicrobial activity and phytochemical composition were also examined. Results revealed that Silene vulgaris is a rich source of polyphenols and flavonoids, contributing to strong antioxidant and antibacterial effects. When added to yogurt, moderate concentrations did not significantly alter physicochemical or sensory properties, though higher doses slightly increased pH. Notably, the extract exhibited antimicrobial activity and even assisted in milk coagulation, suggesting potential as a natural stabilizer. Lactic acid bacteria counts remained within safe limits ($< 10^7$ CFU/ml), complying with food safety standards. Additionally, the extract could serve as a plant-based coagulant, offering a sustainable alternative to animal-derived rennet.

Keywords: Food additive, Silene vulgaris, Dairy productst, Antioxidant activity, Antibacterial properties, Nutraceuticals

NUTRITIONAL FEASIBILITY OF WHEAT PURIFICATION: A CASE STUDY OF JORDAN

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ABSTRACT

Due to improved nutrition awareness by consumers, there has been a growing interest in whole grain foods worldwide. Mills and bakeries are increasing their production of whole grain wheat flour and bread. However, despite its benefits, there is hesitation by consumers about acceptance of whole grain bread due to its sensory quality. The aim of this work was to estimate the amount of losses of the different nutrients upon production of different extraction flours, as well as saving when higher extraction flour is used in the production of flat Arabic bread (Pita). The economic as well as protein, vitamins, minerals, dietary fiber and energy losses as a result of flour purification, was calculated based published work by two researchers on the effect of the various extraction flours milled from hard red winter. The results showed that increasing the extraction rate of flour used in Jordan bakeries by 1% results in saving of about 9 million dollars of wheat imports annually. It also resulted in more vitamin and protein retention in the higher extraction flour. Based on these results, it is recommended to increase the extraction rate of the flour used in the production of flat bread to about 81-82% which would save on wheat imports and improve the nutrient content of the bread without compromising its quality, and minimize the adverse effect of phytic acid when higher extraction flour is used.

Keywords: Whole grain, Flat bread, Dietary fiber, nutrients.

FASTING AND ITS IMPACT ON MICROBIOTA, METABOLISM AND WELL-BEING: A PHYSIOLOGICAL AND NUTRITION APPROACH

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ABSTRACT

Introduction: The modern lifestyle, characterized by uncontrolled eating, fast rithym and lack of regular periods of metabolic rest, has significantly influenced the increase in chronic morbidity and the destabilization of the intestinal microbiota. Together with environmental pollution and constant stress, these factors have contributed to the deterioration of the population's health, prompting the search for natural and effective alternatives for rehabilitation. Fasting, known for centuries as a spiritual and physiological practice, has gained increasing interest in recent decades as a possible strategy for metabolic regeneration, increasing insulin sensitivity, stimulating autophagy and significantly improving the intestinal microbiota. Numerous studies at the global level in animal and human models clearly demonstrate the potential of fasting for cell regeneration, reducing inflammation and increasing the body's protective capacities. **Aim:** The aim of this study is to investigate the impact of fasting on the remodeling of thegut microbiota and the improvement of metabolic and mental functions. Special attention is givento the distinction between the microbiota inherited at birth and the one gradually shaped throughout life by nutrition and lifestyle. **Methodology:** The analysis is structured around a theoretical framework developed step by step, unraveling the biological mechanisms triggered during fasting and their effects onthegut microbiota. A multidisciplinary perspective is adopted, incorporating insights on autophagy, stem cells, ketone body production, and refeeding phases in relation to the intestinal flora. Complementary laboratory data are included, primarily from the scientific literature, along side selected original food analyses. These are not only for their nutritional value alone, but to better understand how specific foods promote or hinder the growth of beneficial gut microbe. **Results and Discussion:** Fasting, through temporary suspension of food intake, activatesmetabolic pathways that support the regeneration of the gut microbiota and enhance insulinsensitivity. Reduced oxidative stress, increased mental clarity, and a more stable microbial composition were observed. **Conclusions:** Fasting represents a natural and controlled mechanism for rebalancing the body–microbiota relationship, offering significant benefits for metabolism, cognition, and long-termwell-being.When applied carefully and adapted to individual needs, it can serve as a powerful preventive and supportive health strategy.

Keywords: fasting, microbiota, metabolism, refeeding, well-being

NUTRITIONAL EVALUATION OF PLAN-BASED MILK ALTERNATIVES WITH EMPHASIS ON PROTEIN CONTENT: A FOCUS ON SOY-BASED BEVERAGES

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ABSTRACT

Over the past few years, consumers all over the world, especially in south Asia and Western Europe, have increasingly adopted plant-based diets. Indeed, plant-based milk alternatives are becoming one of the fastest-growing sectors of food industry, as the consumption of these substitutes has surged, thus it is quickly becoming more and more popular, mostly because of their high nutritional value and many other positive impacts on human health. Approximately 65% of the world's population suffers from poor lactose digestibility or lactose intolerance, making plant-based milk an ideal solution to meet these consumers' daily nutritional needs. The results show that dairy products are regarded essential protein sources with a high Digestible Indispensable Amino Acid Score (DIAAS) ranging from 100 to 200. Plant proteins, on the other hand, are likely to contain lower levels of essential amino acids and DIAAS than dairy proteins. In this case pea and rice proteins have medium and low DIAAS values of 62 and 47, respectively. The current evaluation focuses on studying the nutritional quality of plant-based milk alternatives with an emphasis on protein content and quantity. Several studies examine multiple brands of almond-, oat-, rice-, coconut-, and soy-based drinks in a comparison analysis, revealing that most contain lower levels of total protein, lipids, amino acids, and minerals than cow and goat milk. Soy-based beverages were the lone exception, as their protein content (3.47%) exceeds that of cow (3.42%) and goat milk (3.25%). In addition, soy-based drinks exhibit a similar amino acid profile and a high mineral content. Soybeans are widely consumed on globally because of their nutritional richness and adaptability. However, soy is also recognized as a possible allergen capable of causing IgE-mediated hypersensitivity reactions in allergic individuals. soy allergy is estimated to affect 0.27% of the general population, with symptoms ranging from mild gastrointestinal discomfort to severe anaphylaxis. This underlines the need to develop alternative processing methods or formulations that reduce soy allergenicity while maintaining practical and nutritional qualities. Soybeans are widely consumed globally due to their nutritional richness and adaptability. A recent analysis of 219 plant-based milk alternatives indicates that these products generally contain lower levels of protein and saturated fatty acids than dairy milk and exhibit considerable variability in the content of added sugar. Soy-based products, particularly unsweetened and fortified variants, were found to offer the closest nutritional profile to dairy milk.

Keywords: plant-based milk, soy milk, protein quality, DIAAS, nutritional evaluation, lactose intolerance, alternative dairy, amino acid profile, soy allergenicity,

EVALUATION OF THE CHEMICAL AND NUTRITIONAL COMPOSITION OF LEGUMES AND THEIR CONTRIBUTION TO DIETS

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ABSTRACT

Legumes constitute a food group with significant nutritional and economic value worldwide. A large portion of the world's population depends on them as an important and affordable source of protein. Given this importance, the objective of this study was to evaluate the chemical and nutritional properties of legumes. Eight species commonly consumed in the Albanian diet were analyzed: beans, lentils, chickpeas, soybeans, faba beans, green beans, peas, and okra. The moisture, fat, protein, selected vitamins, and polyphenol contents were determined in the collected samples. The results revealed that dried legumes exhibited higher nutritional values for most parameters compared to fresh ones (peas, okra, and green beans). The vitamin content was satisfactory, especially for vitamins B1, B2, and E. In conclusion, the findings highlight the importance of including legumes in a balanced diet as valuable nutritional sources and underscore the need to promote their consumption in the context of sustainable nutrition.

Keywords: Legumes, Chemical composition, Nutritional Values, Vitamins.

PREVALENCE AND VIRULENCE PROFILING OF STAPHYLOCOCCUS AUREUS IN RAW MILK AND CHEESE SAMPLES SOLD IN EDIRNE PROVINCE

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ABSTRACT

Enterotoxigenic Staphylococcus aureus remains a significant threat to the microbial safety of these products, being responsible for staphylococcal food poisoning cases. The aim of the study is to determine the microbial safety of milk and cheese products sold in Edirne, the adequacy of food controls and the potential for staphylococcal foodborne diseases. The presence of S. aureus was investigated in raw milk (n=50) and cheese (n=50) samples sold in Edirne Province. Confirmation of S. aureus isolates was performed by polymerase chain reaction (PCR) targeting the species-specific 16S rRNA region. The presence of nine staphylococcal enterotoxin genes (sea, seb, sec, sed, see, seg, seh, sei, sej) in the isolates was determined by multiplex PCR. Antimicrobial resistance profiles of the isolates were assessed using the disk diffusion method. Methicillin resistance was evaluated through cefoxitin disk screening and the detection of the mecA gene. The biofilm-forming capacity of the isolates was determined using the microtiter plate method. Additionally, the presence of the icaA gene, which is involved in biofilm formation, was examined by PCR. S. aureus was detected in 23 (46%) of the raw milk samples and in 5 (10%) of the cheese samples. All isolates (100%) carried the sec and seg enterotoxin genes, while 11 (39%) harbored sed, 2 (7%) seh, and only one isolate each (4%) carried sea and sei. A total of 19 isolates (67%) were resistant to at least one of the tested antibiotics, and 7 isolates (25%) exhibited multidrug resistance. The highest resistance rate was observed against penicillin (39%), followed by kanamycin (18%), tetracycline (14%), clindamycin (11%), chloramphenicol and rifampin (7%), and trimethoprim-sulfamethoxazole and gentamicin (4%). The highest rate of intermediate resistance was observed against kanamycin (36%), with a few isolates showing intermediate resistance to ciprofloxacin (7%) and erythromycin (4%). Methicillin resistance was identified in 3 isolates (11%) via the disk diffusion method, and the mecA gene was detected in two of these isolates. All isolates formed biofilms at both 22°C and 37°C. At 22°C, 43% of isolates produced weak biofilms, while 39% and 18% produced strong and moderate biofilms. At 37°C, 86% of the isolates formed strong biofilms, with 7% forming moderate and 7% forming weak biofilms. The icaA gene was detected in 89% of the isolates. Detection and characterization of S. aureus and its virulence traits are critical for public health, as they contribute to reducing the emergence of this pathogen, as well as aid in the monitoring and treatment of related infections. **Acknowledgement:** This study was financially supported by the Research Foundation of Trakya University with the project number TUBAP 2024/111

Keywords: Staphylococcus aureus, raw milk, cheese, antibiotic resistance, staphylococcal enterotoxin, biofilm

USE OF HYDROCOLLOID-BASED OLEOGELS IN CHOCOLATE AND SPREADABLE COCOA CREAMS

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ABSTRACT

The type of fat used in chocolate and spreadable cocoa creams plays a critical role in determining the textural properties, melting behavior, and flavor profile of the final product. Among these properties, texture, mouthfeel, melting range, influence on viscosity, and imparting a glossy appearance are especially important. In particular, cocoa butter and other solid fats used in such products facilitate particle binding and contribute to a smooth mouthfeel. Cocoa butter contains more than 50% saturated palmitic and stearic acids. In recent years, the growing production of cocoa butter-based products such as chocolate has significantly increased global demand for cocoa butter. Consequently, the production and utilization of cocoa butter equivalents (CBEs) and substitutes (CBSs) have also risen. These fats, which possess melting and flow characteristics similar to cocoa butter, are generally obtained by modifying various vegetable oils—primarily palm oil and its derivatives. Given the similar saturated fatty acid profiles of these fats and the growing environmental sustainability concerns associated with palm oil, the search for alternative fat sources has become increasingly relevant. In this context, oleogels—structured systems in which liquid oils are physically entrapped within a three-dimensional network—have emerged as promising functional and structural fat replacers. In oleogel systems, hydrocolloid-based structuring agents such as pectin (high- or low-methoxyl), xanthan gum, carrageenan, agar, and methylcellulose are commonly employed. These agents enhance interfacial stability between water and oil phases, thereby increasing the system's overall stability. Their gel-forming capabilities allow oleogels to achieve the desired viscoelastic characteristics of fats. With the aid of gel-forming carriers, oleogel-based systems can mimic the solid or semi-solid consistency of traditional fats, achieving desirable textural and sensorial properties. Structuring agents such as high-methoxyl pectin, low-methoxyl pectin, xanthan gum, and carrageenan—commonly used in the food industry—can be employed as gelling agents in oleogel formulations. While cocoa butter and other solid fats in conventional chocolate or cocoa cream formulations tightly bind particles, alternative oleogel systems can achieve a similar structural integrity with the help of gel carriers. In various product formulations, the replacement of cocoa butter or its equivalents with oleogels has shown comparable sensory and rheological outcomes, including similar mouthfeel and melting behavior. However, crystallization properties may differ depending on the oleogel composition. Studies have shown that products containing oleogels exhibit sensory and rheological performances comparable to those of traditional fat-based products. Moreover, oleogel systems may offer lower total fat and saturated fat contents. The natural antioxidant contents of oils used in oleogel formulations may also contribute to oxidative stability, thereby extending product shelf life. All these advancements indicate that oleogels represent a promising, health-oriented alternative for use in chocolate and spreadable cocoa creams.

From an industrial perspective, this technology not only aligns with contemporary health trends but also enables the development of more sustainable and functional products through the use of alternative raw materials. The large-scale production of oleogels, their integration into processing technologies, and their consumer acceptance are strategically important issues for the future of the food sector. Therefore, advancing oleogel technology at the academic level and modeling it in collaboration with industry can make significant contributions to both product diversification and public health.

Keywords: Oleogel, Hydrocolloid, Spreadable cocoa cream, Functional fat replacer

COMPLIANCE OF ALBANIAN FISHERIES LEGISLATION WITH EU REGULATIONS: A CRITICAL ASSESSMENT AND HARMONIZATION PERSPECTIVE

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ABSTRACT

The Albanian fisheries sector is currently grappling with significant structural and legal challenges that hinder its alignment with European Union standards. This analysis seeks to evaluate the inconsistencies between Albanian legislation and EU regulations concerning the production and trade of fishery and aquaculture products, while also pinpointing essential measures for harmonization. Drawing on national strategic frameworks and pertinent EU regulations (notably Regulations 2020/2235, 2020/692, and 2021/617), the findings highlight that Albania has made strides in areas related to food safety and veterinary oversight. However, considerable deficiencies persist within the legal framework, particularly regarding molluscs, crustaceans, international transport, and aquaculture health management. These deficiencies pose significant barriers to export opportunities and the sustainable advancement of the sector. Statistical analyses indicate a marked decline in lagoon production and the cultivation of Mytilus galloprovincialis, exacerbated by high pollution levels in coastal waters linked to unregulated urbanization and tourism pressures. To address these challenges, this study advocates for the enhancement of institutional capacities, the modernization of the fishing fleet and port infrastructure, and the establishment of a sustainable legal framework by 2026, thereby aligning with the EU acquis.

Keywords: Fisheries, aquaculture, Albanian legislation, EU compliance, water pollution, molluscs, export

NUTRITIONAL VALUE OF TEFF SEED AND ITS USAGE IN FOOD INDUSTRY

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ABSTRACT

Teff seed (Eragrostis tef (Zuccagni) Trotter) is the most important cereal crop in Ethiopia and Eritre and its production is greater than the sum of all other cereal crops produced. Although teff seed has been a staple food for many people in Ethiopia and Eritrea for centuries, it has recently begun to gain prominence as a food crop in other parts of the world. This is due to its gluten-free nature and its better or similar nutritional composition compared to other cereals. The chemical composition of teff seed varies widely depending on soil, fertilizer, and environmental conditions. The proximate composition and flour-starch amylose content of teff seed are about 10.53 % moisture, 10.4 % protein, 2.45 % ash, 2.3 % crude fat, 3.3 % crude fiber, and 23.0 % amylose from its flour. The starch content of teff seed is higher than that of most other cereals. Therefore, it is a potential gluten-free cereal that can replace them in applications where wheat and other grains are used. Teff seed contains all of the essential amino acids. Its lysine and isoleucine contents are relatively low. Teff seed is rich in minerals such as calcium, magnesium, zinc, iron, copper and phosphorous compared to other cereals. It includes good levels of vitamins such as vitamin C (88 mg/100 g), niacin (2.5 mg/100 g), vitamin A (8 retinol equivalent (RE)/100 g) and riboflavin (0.2 mg/100 g) although its thiamin content (0.30 mg/100 g) is typically lower compared to that of wheat (0.43 mg/100 g), and barley (0.37 mg/100 g). Teff seed is very suitable for gluten-free diet. It can be used as an alternative ingredient in gluten-free bread, pasta, cookies, cakes and crackers sold in markets. However, more detailed studies are needed to use teff seed for gluten-free diet and production of gluten-free foods.

Keywords: Celiac disease, Chemical composition, Gluten-free diet, Teff seed.

STUDY OF INCORPORATION OF SOFT WHEAT GERM FLOUR INTO BISCUIT FLOUR

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ABSTRACT

The search for sustainable nutritional solutions has led to growing interest in the use of nutrient-rich cereal by-products. The aim of this study is to investigate the effect of the gradual incorporation of soft wheat germ flour on the physicochemical properties of the flour and the sensory characteristics of biscuit dough. A series of five formulations (F1–F5) was developed by progressively increasing the proportion of wheat germ, in order to assess its impact on the quality parameters of the flour (pH, moisture, ash content, and total lipids) as well as on the sensory attributes of the biscuit doughs prepared from these formulations (P1–P5), using a hedonic scoring test. The recorded results showed a consistent and significant increase in pH values (from 6.72 to 6.95), ash content (from 0.52% to 1.20%), and total lipids (from 1.41% to 2.32%), accompanied by a decrease in moisture content (from 12.4% to 11.52%) as the proportion of wheat germ flour increased across formulations F1 to F5. The dough used for biscuit production was characterized by a soft texture, with a progressive change in color depending on the level of wheat germ flour incorporation. Indeed, a color transition was observed, shifting from a yellow hue in the control dough to a light brown in the dough of the first formulation (P1), and then to a dark brown in the fifth formulation (P5). Among the 30 members of the sensory panel, a significant proportion detected a moderate cereal-like aroma in samples P1 and P2. This aroma became more pronounced with increasing incorporation levels, reaching a typical cereal character in samples P3 to P5. The sensory analysis of the biscuit dough revealed a limited variation in crumbliness, with scores ranging from 6.03 for sample P2 to 6.6 for P5. This innovative approach meets current demands in the biscuit industry by combining nutritional enhancement with the preservation of technological performance. The results highlight the potential of wheat germ as a functional ingredient.

Keywords: wheat germ, flour, biscuit formulation, incorporation, physic-chemical properties

TOMATO SKIN/WASTE USAGE AS ALTERNANTIVE FOOD PRODUCT USING TOMATO PEEL POWDER AS A NATURAL ANTIOXIDANT AND COLORING AGENT IN KEFIR

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ABSTRACT

The tomato processing industries produce a considerable number of by-products, including tomato peel and seeds. Typically, these byproducts are disposed of or used as animal feed. It was observed that these by-products are enriched lycopene, phenolics and flavonoids having antioxidant properties. The present study aims to evaluate the potential of tomato peel powder as a functional ingredient to produce kefir enriched with tomato peel powder. The processing went through washing, and the peels were dried in a laboratory oven at 70 °C for 5 hours to obtain a stable, usable powder. DPPH radical scavenging assay was used to evaluate the antioxidant activity of the powder, while the total phenolic and flavonoid contents were determined using spectrophotometric methods. To study the sensory, physicochemical and nutritional impact of tomato peel powder (TPP) in kefir at different concentrations (%0,6%,10%, and 15%) incorporation into the product.

Keywords: Food waste, Functional food, Kefir, tomato peel

COMPARATIVE MICROBIOLOGICAL ASSESSMENT OF LOCAL AND IMPORTED BEEF IN BISKRA (ALGERIA)

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ABSTRACT

This study aims to evaluate and compare the microbiological quality of local and imported beef sold in Biskra, Algeria, based on standardized ISO methods. Six beef samples three local and three imported from Brazil were analyzed for aerobic mesophilic bacteria, Salmonella spp., coagulase-positive staphylococci, and Escherichia coli. Results revealed significantly higher levels of microbial contamination in local meat, with aerobic bacteria counts reaching up to 500,000 CFU/g, compared to lower and more consistent levels in imported meat. Coagulase-positive staphylococci were also more prevalent in local samples. In contrast, no Salmonella spp. were detected in any of the samples. Escherichia coli levels were low overall, although imported meat showed slightly higher counts. Despite all values falling below Algerian regulatory thresholds, the findings highlight a clear disparity in hygiene practices. The results emphasize the need to reinforce hygiene standards throughout the local meat production and distribution chain to ensure consumer safety.

Keywords: Microbiological quality, beef, food safety, imported meat, local meat, hygiene practices.

PHYSICO-CHEMICAL COMPARISON OF LOCAL AND IMPORTED BEEF IN BISKRA (ALGERIA), NUTRITIONAL AND TECHNOLOGICAL IMPLICATIONS

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ABSTRACT

This study aimed to compare the physico-chemical properties of local and imported beef sold in Biskra, Algeria. Six samples (three local and three imported) were analyzed for moisture, dry matter, ash content, pH, water retention capacity (CRE%), protein, fat, and mineral composition (Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}). No significant differences were found in moisture, dry matter, and ash contents between the two meat types, indicating similar basic composition. However, significant variations were observed for pH, protein content, fat, water retention, and mineral levels. Local beef, especially sample local2, showed higher protein and fat content, and elevated potassium and calcium levels, suggesting superior nutritional quality. Conversely, imported meat exhibited higher water retention and magnesium content, with notably higher pH values (>6.0), potentially indicating reduced shelf life or DFD (Dark, Firm, Dry) characteristics. These findings reveal distinct profiles for each meat type. Local beef excels in nutritional density, while imported beef may offer better technological processing traits. Such insights can guide consumer choice, processing methods, and strategies to enhance local meat quality.

Keywords: Beef quality, local meat, imported meat, physico-chemical analysis, food safety, food technology.

FUNCTIONAL NOODLES ENRICHED WITH BELL PEPPER POWDER: EFFECTS ON COLOR, TEXTURE, AND COOKING QUALITY

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ABSTRACT

This study aimed to evaluate the effects of green and red bell pepper (Capsicum annuum) powders, in combination with celery (Apium graveolens) powder, on the quality characteristics of wheat-based noodles. Two control samples were prepared: one using only refined wheat flour and the other by substituting 10% of the wheat flour with celery powder. In enriched formulations, the celery-containing base was further fortified with 1%, 3%, or 5% green or red bell pepper powder. All samples were analyzed for raw and cooked color attributes (L*, a*, b*, Hue, SI), cooking performance (weight and volume increase, cooking loss), and cooked noodle firmness. The incorporation of red bell pepper powder significantly decreased lightness while increasing redness (a*) and SI, resulting in vivid orange-red noodles. Green bell pepper powder, in contrast, maintained higher lightness and shifted a* values toward the green spectrum, especially at higher substitution levels. Cooking yield increased with the addition of both vegetable powders, while firmness decreased proportionally. Cooking loss remained low in all enriched samples compared to the wheat flour control. Overall, the combined use of celery and bell pepper powders enhanced the nutritional profile and visual appeal of noodles without compromising cooking quality. The results suggest that vegetable powder blends can serve as functional and natural fortification agents in clean-label cereal-based formulations.

Keywords: Vegetable powder, Bell pepper, Celery, Noodles, Functional food, Clean label.

EFFECTS OF FUNCTIONAL OILSEED POWDERS ON THE QUALITY ATTRIBUTES OF CRACKERS

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ABSTRACT

This study aimed to evaluate the effects of different oilseeds (sesame, black cumin, blue poppy seed, and flaxseed) and their incorporation at various substitution levels (0%, 3%, 6%, and 9%) on the quality characteristics of crackers. The crackers were evaluated for color, physical, textural, and sensory properties. The addition of oilseed flours significantly affected the product's lightness (L*), yellowness (b*), and hue angle depending on the type and level of incorporation. In terms of physical attributes, increasing oilseed content tended to decrease diameter and thickness while increasing spread ratio. Texture analysis showed that hardness values increased with higher substitution levels, particularly at 9%. Sensory evaluation revealed that oilseed enrichment at moderate levels (3–6%) improved taste, crispness, and overall acceptability, while high levels (9%) led to a slight decrease in sensory scores. Among the samples, 6% blue poppy and sesame additions yielded the most favorable sensory and structural outcomes. The results suggest that oilseed-enriched crackers can serve as a valuable source of functional ingredients and improve consumer acceptability without compromising product quality.

Keywords: Snack, Oilseed, Functional food, Bakery product.

APPLICATION OF METSCHNIKOWIA PULCHERRIMA IN SEQUENTIAL FERMENTATIONS FOR THE PRODUCTION OF PILSNER-STYLE CRAFT BEER

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ABSTRACT

Previous studies have demonstrated promising potential and interest in the application of Metschnikowia pulcherrima in sequential fermentations in co-culture with Saccharomyces cerevisiae for the production of ale-style craft beer. This technique has yielded favorable results for top-fermenting beers, while its application in lager-style fermentations remains more limited. For this purpose, the indigenous S. cerevisiae 31 and M. pulcherrima 62 strains, isolated respectively from the grape varieties Shesh i Zi and Kallmet, were used to ferment a Pilsner-style beer in sequential inoculation. As a reference, a fermentation was prepared using the commercial lager strain S. pastorianus S-23 as a single starter. Fermentation kinetics and key physicochemical parameters were evaluated. The results showed that co-inoculation with M. pulcherrima 62 facilitated the completion of fermentation of S. cerevisiae 31, unlike the fermentation carried out with S. cerevisiae 31 alone. Furthermore, the co-cultures exhibited similar final alcohol content and pH values to those observed with the commercial strain S-23. However, higher levels of L-lactic acid and acetaldehyde were detected in beer obtained by sequential inoculation, while, glycerol concentrations were lower compared to beer obtained with S. pastorianus S-23. These preliminary findings suggest that the use of local non-Saccharomyces yeasts in Pilsner-style bottom fermentations is technologically feasible. Although not yet equivalent to commercial strains in performance, these findings are promising and provide a basis for the development of novel beer profiles using locally isolated starter cultures.

Keywords: Saccharomyces cerevisiae, Metschnikowia pulcherrima, fermentation characteristics, sequential inoculation, Pilsner style, craft beer.

SOUS-VIDE: AN INNOVATIVE APPROACH TO COOKING AQUATIC PRODUCTS

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ABSTRACT

Cooking is a heat treatment used to make food edible, ensure microbial safety, and enhance flavor. To achieve these goals, foods are prepared using various cooking methods. Traditional techniques such as frying, baking, grilling, and boiling are widely used for cooking seafood. Cooking transforms food into more easily edible and digestible products with improved taste and extended shelf life through various physical and chemical processes. However, depending on the cooking method and conditions, it can also result in the loss of nutritional value and sensory properties, as well as the formation of undesirable compounds. For example, frying can lead to health problems such as obesity, hypertension, and cardiovascular diseases. Grilling may result in the formation of toxic substances while baking and boiling can cause the loss of essential nutrients. Today's consumers tend to prefer healthy foods that retain their nutritional value. In recent years, sous-vide, a cooking method that addresses these preferences, has emerged as an innovative technique for preparing aquatic products. Sous-vide technology, also known as "cooking under vacuum," involves cooking vacuum-sealed products in a water bath with precise control of time and temperature. This method helps preserve the product's nutritional value and flavor, prevents undesirable changes, particularly the formation of off-flavors and odors caused by oxidation, and extends shelf life. In this presentation, information will be provided on sous-vide cooking of fish and other seafood, which are nutritionally valuable but highly perishable.

Keywords: Sous-vide, cooking, fish, seafood

STUDY OF THE STABILITY AND QUALITY OF STRAWBERRY POWDER FROM THE PALMARITA VARIETY DURING STORAGE

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ABSTRACT

Strawberry cultivation in the Larache region and in Morocco in general has become a key activity for the development of the agricultural sector and contributes to the increase in exports to various countries. Due to overproduction and the postharvest fragility of strawberries, innovative solutions are required to ensure their valorization and transformation into other forms. Therefore, drying and powder processing methods were tested at the National Institute for Agricultural Research in Tangier. The originality of this study lies in the monitoring and evaluation of the physicochemical and nutritional quality of strawberry powder from the "Palmarita" variety, cultivated in the Larache region, during forty days of storage under three different conditions: vacuum storage, storage under light, and storage in the dark. The parameters assessed include acidity, Brix, color, vitamin C, and contents of polyphenols, flavonoids, and anthocyanins. Vacuum-stored powder showed more satisfactory results compared to powders stored in the dark and under light, particularly for most of the analyzed physicochemical parameters. Over the storage period, vacuum storage proved effective in preserving the nutritional properties throughout the entire conservation time. Results also indicated an acidic pH, reflecting increased acidity due to the rising citric acid content in the powder (6.93 ± 0.09 g CA/100g). As for the evolution of vitamin C, anthocyanins, and flavonoids, all powders stored under the three conditions showed significant degradation over time. However, vacuum and dark storage better preserved higher levels of these compounds compared to storage under light. Ascorbic acid and phenolic compound contents in the vacuum-stored powder reached values of approximately 23.81 ± 2.17 mg/100g and 454.50 ± 9.00 mg GAE/100g, respectively, by day 40. In conclusion, storing strawberry powder in the dark or under vacuum better preserved its nutritional quality over the forty-day storage period compared to light exposure.

Keywords: strawberry powder, storage, vacuum, dark, light, polyphenols, flavonoids

SOME QUALITATIVE PROPERTIES, MINERALS AND HEAVY METALS IN JUICE AND MADZUN (GRAPE MOLASSES) PRODUCED FROM STANUSHINA GRAPE VARIETY

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ABSTRACT

In this study, it was analyzing some chemical characteristics and mineral composition of juice and madzun (grape molasses) produced from Stanushina grape variety by traditional method. Madzun (grape molasses) is a natural sweetener widely consumed in the R. N. Macedonia in the past decade and mostly in Eastren Mediterranean countries. It is an important food for humans in terms of mineral content and high energy content (carbohydrates). Comparative analyses have been conducted to one sample juice (S1) and two (S2, S3) samples madzun. As a result of research: soluble dry matter 29.41% (juice)-82.98% (madzun), total sugar 28.04% (juice)-67.99% (madzun), total phenols 875 mg/L (madzun)-1212 mg/L (juice) and HDM (hydroxymethyl furfural) were detected in the range of 5.25 mg/kg (juice) to 723.05 mg/kg (madzun). In the samples, the macro minerals K, Ca and Mg are ranged from 386-640 mg/kg (S1)- 111.7-375 mg/kg (S3), 111.7 mg/kg (S3) –375 mg/kg (S1) and 205.5 mg/kg (S2)-297 mg/kg (S1), respectively. Of the microminerals Fe 11.26-15.18 mg/kg, Mn 2.42-4.90 mg/kg, Zn 7.34-17.47 mg/kg, B 35.2 – 39.9 mg/kg and Ba were found between 0.35-0.84 mg/kg. Regarding the content of heavy metals (Pb and Ni), sample C1 and C2 are above the permissible limits for this type of food. Concentration of metals in grapes is influenced by the microregion of origin and type of soil.

Keywords: grape juice, madzun (grape molasses), chemical copmosition, minerals, heavy metals

VALORIZATION OF FOOD INDUSTRY WASTES FROM CEREALS AND PULSES INTO FUNCTIONAL FOOD ADDITIVES

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ABSTRACT

The rising demand for sustainable food systems has led to increased interest in the valorization of agro-industrial waste, especially from cereals and pulses. Despite their abundance of bioactive components, these staple crops produce significant by-products during processing, such as bran, husks, hulls, and seed coats, which are frequently underutilized. The residues comprise valuable constituents, such as dietary fibers, proteins, lipids, vitamins, minerals, and phytochemicals exhibiting antioxidant, antibacterial, and anti-inflammatory effects. Efficient recovery procedures, ranging from traditional techniques such as solvent extraction and alkaline hydrolysis to innovative green technologies including enzyme-assisted extraction, ultrasound, and pulsed electric fields, enable the isolation of functional components. Recent studies highlight their successful applications in food systems, nutraceutical formulations, and biodegradable packaging. For instance, protein hydrolysates from rice husk exhibit anticancer activity, while arabinoxylans from bran display promising prebiotic effects. Furthermore, fermentation and enzymatic processes enhance the bioavailability and functionality of these compounds, while encapsulation technologies safeguard sensitive molecules throughout storage and processing. The processing residues of cereals and pulses have also been investigated for their potential to improve gluten-free product formulations, augment the nutritional and functional properties of baked goods and dairy products, and act as meat and fat replacers in processed foods. However, challenges remain, including the presence of anti-nutritional factors, microbial instability, and undesirable changes in sensory and physicochemical properties. Ultimately, the valorization of cereal and pulse waste offers a promising strategy for resource-efficient, sustainable food production. This review provides an overview of recent developments in recovery technologies, practical applications, and current limitations, while highlighting future directions for incorporating these underutilized materials into high-value food and packaging innovations.

Keywords: Bioactive, By-products, Cereal and pulses, Food waste valorization, Functional food additives, Sustainability.

A COMPARATIVE STUDY OF PARTIAL REPLACEMENT OF TRITICALE FLOUR WITH TWO TYPES OF FERMENTED BREWERS' SPENT GRAIN ON THERMOMECHANICAL CHARACTERISTICS OF DOUGH

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ABSTRACT

The objects of study in this research were wholemeal flours, obtained from 5 variates of triticale (Ingen 33, Ingen 35, Ingen 40, Ingen 54 and Ingen 93) cultivated in the Republic of Moldova. The aim of this study was to analyze the effect of addition of two brewer's spent grain on triticale dough rheological properties during mixing and heating. The brewer's spent grain resulted from the blonde (BSGB) and dark (BSGD) lager beer brewing process, received from the "Efes Vitanta Moldova Brewery" S.A. (Chisinau, the Republic of Moldova) were dried and milled, then mixed with water and wholemeal triticale flour and fermented up to an acidity of 8–10 degrees and used in a 10% addition level in wholemeal flours form mentioned triticale varieties. The Mixolab device (KPM, Tripette et Renaud, Paris, France) has been used according to the ICC No. 173 standard method. The data of analysis demonstrated an influence of the addition of BSGB and BSGD on the dough behavior in the stages of hydration, mixing and heating of dough. The results of this research can be used to develop recipes and establish technological parameters for the manufacture of bakery products, pasta and other flour products. **Acknowledgments:** This work was supported by a grant from the Ministry of Research, Innovation and Digitization, CNCS-UEFISCDI, project number PN-IV-P8-8.3-ROMD-2023-0078, within PNCDI IV.

Keywords: Mixolab device, dough behavior, hydration, mixing and heating

THE IMPACT OF ULTRASOUND TREATMENT ON THE TECHNOLOGICAL AND FUNCTIONAL MODIFICATION OF PLANT-BASED PROTEINS

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ABSTRACT

With the growing interest in sustainable protein sources within the food industry, next-generation processing technologies aimed at enhancing the technological and functional properties of plant-based proteins have gained increasing attention. This study evaluates, based on current literature, the effects of ultrasound treatment—an environmentally friendly technology that has become increasingly popular in recent years—on plant-based proteins. Ultrasound improves protein extraction efficiency by disrupting cell structures through cavitation and modifies the functional properties of proteins. As a result of ultrasound applications, significant changes have been observed in protein solubility, emulsification capacity, gelation behavior, foaming ability and stability, as well as water and oil holding capacities. For example, notable improvements in emulsifying properties have been reported in protein isolates derived from black beans, millet, and peanuts following ultrasonic treatment. Furthermore, ultrasound-assisted extraction from certain plant-based by-products—such as sesame bran and chickpea cooking water—has yielded favorable results in terms of both extraction efficiency and functional performance. When applied at appropriate frequencies and durations, ultrasound can induce protein denaturation, aggregation, and alterations in surface properties, thereby enhancing functional performance. However, it is important to note that prolonged exposure at high intensities may have adverse effects. In conclusion, ultrasound technology stands out as a promising approach for the valorization of plant-based proteins in terms of sustainability, functionality, and innovation.

Keywords: Ultrasound, Plant-Based Proteins, Functional Properties, Protein Modification, Food Technology

APPLICATION OF SOUS-VIDE PROCESSİNG ON SELECTED FRUITS AND EVALUATION OF ITS EFFECTS ON QUALITY CHARACTERISTICS

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ABSTRACT

In this study, the aim was to determine the effects of sous-vide processing on the quality characteristics of apple, quince and pumpkin, which are widely consumed fruits in Turkey. The sous-vide method is a gentle cooking technique that uses low temperatures and long cooking times in vacuum-sealed packaging to preserve nutritional value, color, texture and sensory quality. In this research, sous-vide cooking was applied at predetermined temperature-time combinations and the results were compared with the conventional steaming method. Additionally, the changes during storage were also evaluated. The findings revealed that, compared to conventional cooking, sous-vide processing helped to better preserve the color and texture of fruits, reduced cooking losses, and improved consumer sensory acceptance.

Keywords: Sous-vide, fruit, color, texture, sensory analysis, storage

EFFECT OF TRITICALE VARIETY AND ORIGIN ON BREAD COLOR: A CASE STUDY FROM THE REPUBLIC OF MOLDOVA

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ABSTRACT

Color parameters directly influence the sensory quality of bread, as visual appearance is the first criterion by which consumers evaluate a food product. The aim of this study was to assess the influence of flour from different triticale varieties on the color parameters of bread. For this research, the CIELab color parameters—brightness (L*), red-green parameter (a*), and yellow-blue parameter (b*)—were analyzed for flours obtained from five Ingen-type triticale varieties (33, 35, 40, 54, and 90), as well as for the corresponding bread samples. In the case of the bread, the browning index (BI) was also determined. The bread samples were prepared using triticale flour, 3% Saccharomyces cerevisiae yeast, 1.5% salt, and water, with the amount of water adjusted according to the absorption capacity determined using the Mixolab device. It was demonstrated that the color of triticale flour is influenced by the pigments present in its composition. This may be attributed to the yellowish-white endosperm particles, which contain carotenoid pigments, and the darker bran particles, which are rich in flavone pigments. The L* values ranged from 81.08 (Ingen 40) to 82.62 (Ingen 54). A decrease in brightness may suggest a lower concentration of flavone compounds, while higher a* values may indicate a greater presence of red pigments, such as xanthophylls. The highest a* value was recorded for the Ingen 40 variety (2.39), while the lowest was observed for Ingen 35 (2.01). The b* parameter values reflect the yellow coloration of the flour, likely due to the presence of carotenoids. The Ingen 93 and Ingen 40 varieties showed the highest b* values, at 12.18 and 12.39, respectively. In the case of bread samples made from different triticale varieties, the lightness (L*) values ranged from 37.82 (Ingen 33) to 58.08 (Ingen 35). This variation was attributed to the presence of natural pigments inherently found in triticale grains. The a* and b* values were positive in all analyzed samples, indicating a predominance of red over green and, respectively, a strong predominance of yellow over blue. The BI reflects the intensity of browning in bread samples and serves as an important indicator of their visual quality. Elevated BI values result from browning and Maillard reactions, which are influenced by the presence of reducing sugars and proteins on the surface of the bread. In our samples, BI values ranged from 228.34 to 270.33. Color parameters are critical for the sensory quality of bread, as they influence not only its visual appeal, but also consumer perceptions of freshness, doneness, flavor, and even healthiness. **Acknowledgments:** This work was supported by a grant from the Ministry of Research, Innovation and Digitization, CNCS-UEFISCDI, project number PN-IV-P8-8.3-ROMD-2023-0078, within PNCDI IV.

Keywords: Triticale flour, Color parameters, Ingen, Bread Color

INFLUENCE OF TEMPERATURE ON FERMENTATION RATE IN PRODUCTION OF DIFFERENT WINE TYPES

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ABSTRACT

Wine production is a complex process that integrates traditional methods with modern scientific approaches. The quality, variety, and processing methods of grapes are among the key factors determining wine characteristics. Grapes, with their natural content of sugars, organic acids, and phenolic compounds, are considered an ideal raw material for producing various wine types. The quality attributes of wine are directly influenced by grape cultivation conditions, the maceration process, harvest maturity, and production techniques. Additionally, control parameters such as temperature during the fermentation process significantly affect both production efficiency and the sensory and chemical properties of the final product. This study investigates the effects of temperature control and maceration on the fermentation process in the production of different wine varieties. Specifically, the impact of temperature on fermentation rate was statistically analyzed using red, rosé, and white wines produced from the Papaskarası grape. The study was conducted based on experimental design principles, and statistical analysis revealed that both wine type and temperature significantly influenced fermentation rate ($\alpha = 0.05$), with wine type having a greater effect than temperature. Red wine completed fermentation in the shortest time, particularly at 25°C, due to enhanced yeast activity from phenolic and nitrogenous compounds during maceration, while rosé and white wines required longer durations. Higher temperatures (25°C) reduced fermentation time compared to 15°C, and lower temperatures preserved aromatic properties in rosé and white wines. The findings are discussed in the context of different wine types, highlighting the critical role of temperature and maceration in optimizing production efficiency and wine quality.

Keywords: Wine, Fermentation, Maceration, Phenolic compounds, Density

THE ECOLOGICAL FOOTPRINT OF MEAT PRODUCTION, THE GREEN TRANSFORMATION APPROACH, AND ITS IMPLICATIONS FOR THE MEAT INDUSTRY

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ABSTRACT

The process of industrialization and humanity's growing needs have placed significant pressure on nature, resulting in multidimensional environmental threats, such as air, water, and soil pollution; noise pollution; and biodiversity loss. The meat industry is one of the most controversial sectors in terms of environmental sustainability due to its substantial greenhouse gas emissions, intensive land use, deforestation, and water consumption. Mitigating these environmental impacts requires improving production processes, promoting alternative protein sources, adopting sustainable agricultural and livestock practices, integrating technological innovations, and implementing effective policy frameworks. Key strategies include integrating green technologies into industry, transforming consumer dietary habits, and developing production models aligned with the principles of the circular economy and minimizing waste. However, this transformation process faces structural challenges, including economic constraints, traceability issues and cultural resistance to changing dietary behaviours. This study addresses the environmental impacts of the meat industry and evaluates sustainable livestock management, national and international policy frameworks, green technologies, and alternative protein sources in light of current scientific research.

Keywords: Meat production, sustainability, green transformation, ecological footprints

PREVALENCE OF COLLECTIVE FOOD FOODBORNE DISEASES IN THE BLIDA REGION DURING THE TWO LAST YEARS

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ABSTRACT

Collective foodborne diseases (CFD) represent a major public health problem. In order to assess the epidemiological situation and the risk of CFD in the Wilaya of Blida, a retrospective study was carried out over the two-last years period (2022-2024). Analysis of data, collected from the Public Health Directorate of the Wilaya, showed that 160 were declared in 2023-2024 with annual fluctuations in the number of cases with two peaks during the summer period. Children aged [0 -10 years] are the least affected (20 cases). however, the age group [20-39 years] is the most affected (158 cases). While, a slight female dominance (61% of cases) was recorded. Furthermore, familial incidence were 30% high. Among the 7 episodes of TIAC treated, only two had confirmed etiology; by the isolation of Bacillus cereus (observation 4) and Faecal Streptococci (observation 3) from the incriminated foods, but minor salmonella was suspected in both observations 1 and 2. These results highlight the importance of strengthening awareness efforts to improve public awareness regarding hygiene rules and prevention measures to limit the occurrence of CFD.

Keywords: Collective foodborne diseases, Blida, Food contaminations, hygiene

OPTIMIZATION OF ULTRASOUND ASSISTED ENZYMATIC EXTRACTION YIELD FROM RED ONION PEEL USING RESPONSE SURFACE METHODOLOGY

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ABSTRACT

In this study, the extraction yield of bioactive compounds, particularly phenolic substances found in red onion peel (ROP), was evaluated and optimized. For this purpose, an environmentally friendly technique, ultrasound assisted enzymatic extraction (UAEE), was employed, and process parameters were optimized using Response Surface Methodology (RSM). Red onion peel, considered a waste product in the food industry, has great potential for functional ingredient production due to its high antioxidant capacity and phenolic content. Therefore, developing efficient, rapid, and sustainable extraction techniques beyond traditional methods is of significant importance. The Box-Behnken Design (BBD) was used to examine four independent variables (enzyme concentration, extraction time, solid-to-solvent ratio, and pH) at three levels. A total of 27 experimental conditions were applied, with extraction yield selected as the response variable. Based on analysis of variance (ANOVA), the quadratic model was found to be statistically significant ($p < 0.0001$). The coefficient of determination (R^2) was 0.9439, the adjusted R^2 was 0.8785, and the predicted R^2 was 0.6841, with a difference less than 0.2, indicating the reliability of the model. Adequate precision was 12.7583 and the coefficient of variation (CV) was 8.58%, both indicating a strong predictive ability. According to ANOVA, the solid-to-solvent ratio (C) had a significant positive effect on extraction yield, while pH (D) had a significant negative effect. Additionally, the quadratic terms C^2 and D^2 were also found to be significant. Graphical analysis revealed that the highest predicted extraction yield was approximately 65.90 g / 100 g dry matter (DM) at a solid-to-solvent ratio of 1:40 g/g and pH 4.5; another high value of 62.99 g / 100 g DM was observed at 1:20 g/g and pH 5.5. Optimization using the desirability function yielded a maximum predicted value of 69.77 g / 100 g DM under the conditions of 1.480% enzyme concentration, 58.801 min extraction time, 1:37.403 (g/g) solid-to-solvent ratio, and pH 4.501. Experimental validation under these conditions resulted in an actual extraction yield of 63.67 ± 2.39 g / 100 g DM. Overall, the UAEE method was found to be an effective and environmentally friendly approach for recovering phenolic compounds from red onion peel. This study is expected to contribute to the development of sustainable extraction technologies and the valorization of food processing waste as a source of functional ingredients.

Keywords: Red onion peel, waste valorization, ultrasound assisted enzymatic extraction, optimization

COMPARISON OF GREEN EXTRACTION METHODS FOR ANTHOCYANIN RECOVERY FROM BLACKCURRANT (RIBES NIGRUM L.)

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ABSTRACT

Blackcurrant (Ribes nigrum L.) is a fruit with functional properties that stands out with its high anthocyanin and polyphenol content. Anthocyanins, responsible for the fruit's dark purple color, have strong antioxidant, anti-inflammatory and anticancer potentials, making them valuable for applications in the food, pharmaceutical and cosmetic industries. Rising concerns about the potential toxic and behavioral effects of synthetic food colorants, in particular, have directed consumers to natural ingredients, which has made the industrial use of anthocyanins more attractive. In recent years, heightened consumer sensitivity toward synthetic additives has considerably boosted interest in naturally derived bioactive compounds, particularly anthocyanins. Different extraction methods are used for the recovery of anthocyanins from blackcurrant. While the traditional solvent extraction method is a common and simple method, it has environmental and economic disadvantages due to its long processing time and high solvent consumption. In contrast, Innovative and environmentally friendly technologies such as ultrasound-assisted extraction, microwave-assisted extraction, and supercritical fluid extraction provide higher yields in shorter periods, reducing energy and solvent consumption, and allowing the preservation of heat-sensitive compounds such as anthocyanins. This study compares traditional and innovative extraction methods used to obtain anthocyanins from blackcurrants, evaluating the advantages and applicability of each method. The findings demonstrate that innovative techniques offer a strong alternative for sustainable and effective anthocyanin recovery while preserving product quality. Thus, the production of high-value-added compounds that can be used as natural colorants in the food and pharmaceutical industries is encouraged, and the scientific and economic potential of blackcurrants for agricultural production and industrial use is highlighted. Furthermore, the potential use of anthocyanins as pH indicators in smart packaging technologies provides the scientific basis for studies on the development of sustainable and biofunctional products.

Keywords: Blackcurrant, Anthocyanin, Extraction methods, Natural food colorants, Antioxidant activity, Bioactive compounds

THE EFFECTS OF N-ACETYLCYSTEINE ON ACRYLAMIDE-INDUCED APOPTOSIS IN LEYDIG CELLS

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ABSTRACT

Acrylamide (ACR) is a toxic compound commonly found in the environment, formed via the Maillard reaction when carbohydrate-rich foods are exposed to high temperatures. ACR is abundantly present in various commonly consumed food products such as fried foods, coffee, biscuits, and infant formulas, and is also extensively used in industrial and laboratory applications. It has been reported that even at low doses, ACR can exert harmful effects on various tissues, including hepatotoxicity, neurotoxicity, genotoxicity, and reproductive toxicity. Recent studies have particularly demonstrated that ACR can induce apoptosis in the male reproductive system through oxidative stress and DNA damage. In this study, the potential protective role of N-acetylcysteine (NAC), a thiol-derived compound with strong antioxidant properties, against ACR-induced toxic effects in TM3 Leydig cells was evaluated for the first time. TM3 cells were exposed to 1 mM ACR for 24 h and simultaneously treated with NAC at concentrations of 1 and 2 mM. Cell viability was assessed using the MTT assay, while oxidative stress levels were measured by determining total reactive oxygen species (ROS). Additionally, the effects of ACR and/or NAC on apoptotic cell rates were evaluated using the Hoechst/PI double staining method. The findings revealed that ACR decreased cell viability, increased ROS production, and significantly elevated apoptosis. NAC treatment resulted in a concentration-dependent improvement in these parameters, reduced cellular damage, and lowered apoptotic cell rates. These results suggest that, due to its antioxidant properties, NAC may serve as a potential protective agent against ACR-induced reproductive toxicity in Leydig cells.

Keywords: Acrylamide, N-acetylcysteine, Leydig cells, oxidative stress, apoptosis.

QUERCETIN MITIGATES ACRYLAMIDE-INDUCED CYTOTOXICITY IN LEYDIG CELLS

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ABSTRACT

Acrylamide (ACR) is a chemical byproduct formed during the high-temperature processing of carbohydrate-rich foods. It is also a widespread environmental contaminant found in cigarette smoke, industrial processes, and wastewater. Numerous studies have demonstrated that ACR toxicity leads to oxidative stress, DNA damage, and apoptosis at the cellular level. In recent years, considerable attention has been directed toward exploring natural compounds capable of reducing the toxicological impact of environmental pollutants. Secondary metabolites such as flavonoids—known for their potent antioxidant properties—have shown protective roles by reducing oxidative stress and preventing cellular damage. Quercetin, a flavonoid belonging to the flavonol group, is widely found in foods such as strawberries, apples, and onions. It has been widely reported to strengthen the cellular antioxidant system and protect against oxidative damage. Although the cytoprotective effects of quercetin against oxidative damage and apoptosis have been well documented in various cell types, its potential role in protecting Leydig cells against ACR-induced toxicity remains unclear. In this study, TM3 Leydig cells were exposed to 1 mM ACR and/or co-treated with quercetin at concentrations of 1 and 5 μM for 24 h. Cell viability was assessed using the MTT assay to evaluate the cytotoxic effects of ACR. Apoptotic and dead cell populations were analyzed by Hoechst 33342/Propidium Iodide dual fluorescent staining. Intracellular oxidative stress levels were quantified by measuring the production of reactive oxygen species (ROS). Exposure to ACR led to a concentration-dependent reduction in cell viability in TM3 Leydig cells, whereas co-treatment with quercetin significantly improved cell viability. The findings revealed that quercetin reduced the percentage of apoptotic cells induced by ACR exposure. Furthermore, ROS analysis indicated that quercetin effectively attenuated ACR-induced intracellular oxidative stress. These results suggest that quercetin possesses strong protective potential against ACR-induced cellular damage in Leydig cells.

Keywords: Acrylamide, Quercetin, Cytotoxicity, Apoptosis, Reactive oxygen species.

SMART BIOPOLYMER-BASED PACKAGING SYSTEMS AND CURRENT APPLICATIONS IN FOOD QUALITY TRACEABILITY

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ABSTRACT

Recently, sustainable packaging technologies have become an important research area in response to the growing demand for food safety and quality monitoring systems. Within this context, smart biopolymer-based packaging systems offer innovative solutions for monitoring quality and safety in food industry due to their eco-friendly structures and superior functional properties. Biopolymers derived from renewable resources (starch, cellulose, etc.) are being integrated with advanced sensor and indicator technologies, to create smart packaging systems. These systems respond to environmental changes and provide real-time information to consumers, thus significantly enhancing food safety and reducing food waste. Smart biopolymer-based packaging systems essentially consist of two basic components: the packaging material and the smart mechanism. Edible sensors and indicators, which provide consumers with information about the food's storage conditions, quality, and packaging environment, are integrated into the packaging as the smart mechanism. Edible sensors detect parameters such as temperature, pH, and freshness in foods and transmit data to control systems, while indicators provide direct visual information about the current state of the food. Such integrations enhance the functionality of packaging and support informed consumer decisions by providing more information. Current studies have focused on developing smart packaging tools such as time-temperature indicators for monitoring freshness and shelf life of frozen foods, gas-sensitive indicators for perishable products like meat and fish, and color-changing films that respond to pH changes. Additionally, advanced technologies such as biosensors, barcodes, and electronic noses monitor chemical and microbiological properties of foods, enabling early detection of potential risks and timely intervention. Smart biopolymer-based packaging offers sustainable and innovative solutions for meeting the quality and safety monitoring requirements of the food industry, thanks to its advantageous properties and superior performance. This study highlights the significance of smart biopolymer-based packaging systems in food quality traceability, current technological applications, consumer expectations, challenges, and future opportunities.

Keywords: Smart biopolymer-based packaging, food quality, traceability, biosensors, shelf life

DEGUMMING PROCESS OPTIMIZATION OF CRUDE PALM OIL WITH CITRIC AND PHOSPHORIC ACIDS

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ABSTRACT

Crude palm oil contains triglycerides and phospholipids, which can lead to rancidity. Acid degumming using phosphoric and citric acids is an effective approach to improve oil stability by removing phospholipids. This study investigates the impact of degumming on red palm oil quality, comparing citric and phosphoric acids at at concentrations of 0.3%, 0.6%, 0.9%, and 1.2%. Key quality parameters analyzed include color, moisture content, free fatty acids (FFA), iodine value, peroxide value, and beta-carotene. Results showed that degumming retained 95.51% of beta-carotene, maintained iodine values at 4–5 g I_2/100 g, reduced peroxide values by 65%, and decreased FFA levels by 89.7%. Moisture content increased slightly due to the washing step. Phosphoric acid yielded better performance in reducing FFA, peroxide value, and moisture content, while citric acid was more effective in preserving beta-carotene. Optimal concentrations varied by parameter: 0.6% for FFA and beta-carotene, 0.9% for iodine value, and 1.2% for peroxide value. The 0.3% concentration showed minimal effect compared to sample oil control.

Keywords: Crude Palm Oil; Degumming; Citric Acid; Phosphoric Acid

PHYSICOCHEMICAL PROPERTIES AND FLAVOR PROFILE OF COCOA BEANS (THEOBROMA CACAO L.) FERMENTED WITH LACTOBACILLUS PLANTARUM

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ABSTRACT

Cocoa (Theobroma cacao L.) is a high-value commodity in the food industry. The fermentation process can improve the flavor and aroma of cocoa beans with the addition of microbial starter cultures, which can be a solution to accelerate the fermentation process and improve the quality of cocoa beans. This study aims to (1) analyze the effect of adding Lactobacillus plantarum liquid starter on the physicochemical characteristics and flavor profile of cocoa beans, and (2) identify the best treatment to improve the quality of cocoa beans. This study used the fermentation method with 4 treatments: A1 (no fermentation), A2 (spontaneous fermentation), A3 (addition of 1% Lactobacillus plantarum at 0 hours), and A4 (addition of 1% Lactobacillus plantarum at 48 hours). The results show that the addition of microbial culture can accelerate and control the fermentation process and can improve the quality of cocoa beans. All treatments complied with the Indonesian national standard number 2323:2008 on cocoa beans for moisture content (5.03% - 5.53%) and number of beans per 100 grams (63.67 - 71.67). Physicochemical properties obtained pH: 6.71 - 5.37, total soluble solids: 1.8 - 2.57, DimGray color, fermentation index increased significantly in fermented samples, total phenolic content was 96.43 - 145.75 mg GAE/g, and antioxidant activity with IC50 values ranging from 26.53 - 127.47 ppm. In addition, the flavor profile showed that the chocolate/cocoa flavor score increased in the fermented samples, while the bitter and astringent flavor scores decreased in the samples fermented using Lactobacillus plantarum. The addition of Lactobacillus plantarum significantly affected the parameters of moisture content, number of seeds per 100 grams, pH, color intensity, fermentation index, total phenolic, and antioxidant activity. The best results were obtained in the treatment with the addition of Lactobacillus plantarum, especially in improving aroma and flavor.

Keywords: Cocoa beans (Theobroma cacao L.), fermentation, Lactobacillus plantarum, physicochemical properties, flavor profile

ASSESSMENT OF THE MICROBIOLOGICAL QUALITY OF READY-TO-EAT FOODS: THE CASE OF CANNED SARDINES (LOCAL AND IMPORTED)

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ABSTRACT

Microbiological quality control of food is a critical issue to ensure that food products do not contain microorganisms, their toxins, or metabolites in quantities that pose an unacceptable risk to human health. This study aims to assess the microbiological quality and safety of ready-to-eat foods, focusing on canned sardines (both locally produced and imported), which were randomly sampled from various retail outlets in the Guelma region. The evaluation was based on microbiological analyses, including the detection and enumeration of total microbial flora, total aerobic mesophilic flora (TAMF), total and fecal coliforms, streptococci, sulfite-reducing Clostridium spores, Salmonella, Pseudomonas, yeasts, and molds. The results obtained showed that the total mesophilic flora values were within acceptable limits according to regulatory standards. However, the total coliform counts were unsatisfactory. Fecal streptococci were also detected, with microbial loads exceeding the limits recommended by Algerian standards. Fecal coliforms, sulfite-reducing anaerobic spores (SRAS), yeasts, and molds were absent, as were all tested pathogenic bacteria (Pseudomonas, Salmonella) in all analyzed samples. Ready-to-eat foods are considered high-risk in terms of microbiological safety. Therefore, effective control measures must be implemented to prevent cross-contamination and to improve the microbiological quality of such products.

Keywords: Ready-to-eat foods; Food safety; Hygienic and microbiological quality.

FRUIT SEED OIL : NEW PROMISING UNCONVENTIONAL BIO-OIL FOR NUTRITIONAL, AND COSMETIC AND PHARMACEUTICAL USES

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ABSTRACT

Non-edible plant seeds are abundant as fruity plants, but they are yet to get the required attention and they are usually discarded after consuming their mesocarp, contributing to environmental waste. In this study, the use of melon (Cucumis melo L.) seeds after processing to obtain unconventional oil was investigated with determining of the chemical composition and the bioactive compounds of melon seed oil including fatty acids, polyphenols, phytosterols and tocopherols. The findings reveal an average 30.65% oil yield from melon seeds (on a dry weight basis), and considerable amounts of antioxidant substances as carotenoids, phenolic compounds, phytosterols and tocopherols. The fatty acid composition was unique for melon seed oil which is dominated by linoleic acid and oleic acid. These fatty acids may have favorable beneficial physiological effects in the prevention of diseases such as coronary heart disease and cancer. Besides, the chromatographic analysis of phenolic compounds showed that flavonoids were the most important group with predominance of amentoflavone (32.80 μg/g). Among the phytosterols, β-sitosterol was the major phytosterol accounting for 206.42 mg/100 g. Also, the seed oil was found to be rich in tocopherols with a predominance of β+γ-tocopherol fraction. The results suggested that Cucumis melo L. seed oil could be used successfully as an alternative source for nutritional, cosmetic and pharmaceutical applications as a functional ingredient.

Keywords: Cucumis melo L., seed oil, fatty acids, polyphenols, phytosterols, bioactive compounds.

THE IMPACT OF A CAROTENOID-ENRICHED DIET ON THE COLORATION AND GROWTH OF GREEN TERROR "ADINOACARA RIVULATUS"

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ABSTRACT

In the context of the development of fish feed manufacturing ornamental and in order to develop the aquarium sector in Algeria, our study focuses on the formulation of foods rich in pigments intended for a species of ornamental fish Andinoacara rivulatus "green terror". The food production process involves: milling, weighing and dosing, homogenization, pigment addition, pressing, drying, and packaging. The formulation includes two sources of animal protein: sardine and shrimp, and other vegetable protein sources : soybean, gluten, algae, corn, spinach, and fish oil. Biochemical analyses confirmed that the formulated feed provided adequate protein and lipid levels to meet the nutritional requirements of the Andinoacara rivulatus. The zootechnical performances obtained with this feed showed a significant effect on fish growth and pigmentation, with a feed conversion ratio of 1.85%, an average specific growth rate of 4.05 with an optimum of 5.91, and a weight gain of 0.11g/day. Our feed significantly improved the skin color of the fish, resulting in a 2.9% increase in green pigmentation. The vibrant green, yellow, red, purple, and turquoise colors of 'green terror' fish are due to the presence of carotenoids. The addition of spinach meal and a green algae blend resulted in the development of new green and turquoise hues in the Adinoacara revulatus. The yellow-orange coloration was enhanced through the inclusion of zeaxanthin and lutein from corn flour and freeze-dried shrimp."

Keywords: Ornamental fish, Andinoacara rivulatus, growth, pigmentation, nutrition, fish farming

A NATIONAL SURVEY OF FOOD INTOLERANCE: STATISTICAL EVIDENCE AND IMPLICATIONS FOR DIAGNOSIS AND PUBLIC AWARENESS

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ABSTRACT

In Albania, where structured health data are scarce, food intolerance remains poorly understood and underdiagnosed. This study aimed to assess the prevalence of self-reported food intolerance symptoms and to explore key demographic and behavioral predictors associated with diagnosis and symptom burden. A cross-sectional survey was conducted with 200 adults across various Albanian regions. Statistical analysis included Chi-square tests, ANOVA, and logistic regression using SPSS to examine associations between symptoms and factors such as gender, BMI, stress, education, and awareness levels. Half of the participants reported experiencing symptoms linked to certain foods. And just 22% of them had been formally diagnosed by a healthcare professional. Abdominal bloating was the most frequently reported symptom, significantly associated with female gender ($p < 0.05$). Higher stress levels and lower BMI correlated with increased symptom reporting, while higher educational attainment was positively associated with awareness and self-management practices. BMI was a significant negative predictor of symptom frequency ($p < 0.001$), while age was not. Despite high symptom prevalence, most participants had not consulted a specialist or used dietary monitoring tools. Supplement and probiotic use was limited, and only a small proportion reported a substantial impact on quality of life. Notably, participants with higher income levels were significantly more likely to have received a formal diagnosis ($p = 0.031$). This study exposes a significant discrepancy between the widespread presence of food-related symptoms and the limited clinical attention they receive. The findings emphasize the necessity for strategic public health interventions, improved diagnostic infrastructure, and educational efforts tailored to the Albanian context.

Keywords: Self-reported symptoms, Food intolerance, Diagnostic gap, Abdominal bloating, Body Mass Index (BMI), Stress, Awareness, Albania, Dietary management.

SUSTAINABLE VALORIZATION OF DATE SEED OIL AS A NATURAL PRESERVATIVE FOR FOOD AND PHARMACEUTICAL APPLICATIONS

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ABSTRACT

The date palm (Phoenix dactylifera L.) industry generates substantial seed waste that remains largely underexploited, despite its rich phytochemical content. This study aims to valorize date seed oil, extracted using Soxhlet with hexane, by evaluating its potential as a natural antimicrobial and antifungal agent for use in food preservation and pharmaceutical formulations. Antimicrobial activity was assessed using the disk diffusion method against five microbial strains: Gram-positive Staphylococcus aureus and Bacillus subtilis; Gram-negative Escherichia coli and Listeria monocytogenes; and the opportunistic yeast Candida albicans. For antifungal activity, the oil was tested against filamentous fungi from the Fusarium genus: F. graminearum, F. oxysporum f. sp. albedinis, and F. culmorum. Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were determined for the bacterial strains. The oil exhibited clear antimicrobial activity, notably against S. aureus, E. coli, and C. albicans, and showed measurable antifungal effects against all tested Fusarium species. These findings highlight the potential of date seed oil as a broad-spectrum, plant-based antimicrobial agent. The extraction process using Soxhlet reinforces a cost-effective valorization route for agricultural byproducts. This study contributes to sustainable innovation by promoting the green transformation of agro-waste into high-value bioactive compounds. Its relevance spans food safety, natural preservation, and pharmaceutical development, aligning with circular economy strategies and eco-conscious product innovation in life sciences.

Keywords: Phoenix dactylifera L., date seed oil, disk diffusion, Candida albicans, Fusarium, MIC, MBC, antimicrobial, antifungal, natural preservative, green extraction, waste valorization

DAIRY SECTOR VALUE CHAINS IN BOSNIA AND HERZEGOVINA

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ABSTRACT

Dairy farming in Bosnia and Herzegovina is a key branch of agriculture, but it faces numerous challenges within its value chain. Although the sector has significant potential, there are problems such as low efficiency, market fragmentation and informal business relationships. This paper analyses the structure of the value chain in dairy farming, identifies key actors and production phases, and proposes measures to improve the efficiency and competitiveness of the sector. The following methods were used in the research: survey method, analysis and synthesis method, description method and comparison method. As a challenge in managing and establishing a more efficient market chain, the question arises of how to include small producers in modern market chains. Milk production should be primarily focused on cheaper and higher quality products. This is possible with new technologies, especially in the way animals are kept and treated, nutrition, hygiene, etc. Preference should be given to systems that make maximum use of cheaper inputs - fodder from grassland and arable crop rotation. The intensity of milk production per head should be contrasted with the intensity, i.e. profit per unit of area, i.e. invested capital. The basis for the development of milk production should be on voluminous fodder. Milk production on smaller farms should gradually take on characteristics – organic, indigenous. In the future, greater importance should be given to longer-lasting dairy products and products with added value. Therefore, traditional production should be preserved and measures should be taken to standardize and protect the geographical origin and originality of some types of cheese. Cheese and cream are mainly sold at the markets as traditional domestic products.

Keywords: Dairy sector, Value chain, Milk production, Small farmers

PRODUCTION AND MODES OF ACTION OF BACTERIOCINS PRODUCED BY ENTEROCOCCAL STRAINS

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ABSTRACT

Bacteriocins are ribosomally synthesized peptides that typically exhibit antimicrobial activity against closely related bacterial species. Their production is considered a significant biochemical feature, particularly due to their role in biopreservation applications, such as the prevention of food spoilage and contamination. Various bacterial species, including enterococci, are capable of producing bacteriocins. In recent years, increasing attention has been directed toward the identification of novel bacteriocin-producing strains, their characterization, and the exploration of the potential applications of these peptides. In this study, the bacteriocin production capacities of Enterococcus faecium DP8.3, DP9.3, and E. mundtii DP35.1 strains, previously isolated from traditional Turkish cheeses, as well as the modes of action of the bacteriocins produced by these strains, were evaluated. The analyses revealed that all strains began producing bacteriocins at the 5th hour of incubation at 37 °C, reaching maximum production levels by the 8th hour. Bacteriocin production exhibited a positive correlation with cell density. The modes of action of the bacteriocins were tested against vancomycin-resistant E. faecium ATCC 51559. The bacteriocins produced by E. faecium DP8.3 and DP9.3 exhibited bactericidal effects, whereas the bacteriocin produced by E. mundtii DP35.1 demonstrated a bacteriostatic effect. The results demonstrate the potential application of E. faecium DP8.3 and DP9.3 strains in food systems due to their inhibitory effects. Additionally, the bacteriocin produced by E. mundtii DP35.1 appears to be a promising candidate for further investigation, particularly regarding its potential synergistic effects when combined with various antibiotics or other antimicrobial bacterial strains. Moreover, further studies are recommended to evaluate the applications of the bacteriocins produced by E. faecium DP8.3, DP9.3, and E. mundtii DP35.1 in the food industry.

Keywords: Enterococcus, Bacteriocin production, Mode of action

FROM GLOBAL ORIGINS TO LOCAL FIELDS: FIRST COMPREHENSIVE PROFILING OF NIGELLA SATIVA L. NUTRITIONAL AND FATTY ACID COMPOSITION IN ALBANIAN AGROECOLOGICAL CONDITIONS

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ABSTRACT

Herbal medicines have been integral to human health care since ancient times, and Nigella sativa L. (black cumin, kalonji) is among the most widely used medicinal plants worldwide. Non-conventional seeds are gaining increasing scientific and commercial interest due to their unique chemical properties, which can expand the supply of nutritional and functional products. N. sativa L. seeds, along with their crude and essential oils, have long been utilized in traditional diets and medicinal practices for their diverse bioactive compounds, including essential fatty acids, minerals, and antioxidants. Despite its global importance, no scientific studies have been conducted to characterize the nutritional and chemical profile of N. sativa L. grown under the agroecological conditions of Albania. This study is the first to provide a comprehensive evaluation of N. sativa L. cultivated in Tirana, with the objective of determining its fatty acid composition and macronutrient content. The results aim to inform breeding strategies, functional food development, and sustainable crop diversification in the region. Eight Nigella sativa L. varieties, sourced from different countries, were cultivated at the Experimental Didactic Field of the Agricultural University of Tirana. Seeds harvested at full maturity were analyzed for fatty acid composition, after derivatization to fatty acid methyl esters (FAMEs), using gas chromatography GCMS-QP2010 Ultra, while macronutrient concentrations (Na, K, Ca, Mg, P) were determined via inductively coupled plasma mass spectrometry (ICP-MS) The fatty acid profile revealed notable inter-varietal differences. Among the evaluated varieties, T7 stood out as the most valuable, combining the highest monounsaturated fatty acids (MUFA) content (21.9%) with the greatest calcium concentration (2,012.31 ppm). T8 showed the highest saturated fatty acids (SFA) level (17.2%) and sodium content (128.58 ppm), while T4 excelled in polyunsaturated fatty acids (PUFA) (63.0%). In terms of minerals, T3 led in potassium (11,450.19 ppm) and magnesium (2,904.45 ppm), and T5 recorded the highest phosphorus content (9,309.01 ppm). This variation demonstrates clear opportunities for selecting Nigella sativa L. genotypes that combine desirable fatty acid profiles with high essential mineral content. These findings demonstrate substantial intra-specific variability in both lipid and mineral nutrient profiles, reflecting the genetic diversity and adaptability of N. sativa L. under Tirana's agroecological conditions. The observed variation offers opportunities for selecting genotypes with superior nutritional traits, which could be promoted for high-value applications in functional food production, nutraceuticals, and sustainable agriculture.
From a broader perspective, the results are relevant to global markets, where the demand for nutrient-dense, plant-based products is expanding rapidly due to growing consumer awareness

of health and wellness. By identifying varieties with optimal fatty acid composition and mineral content, this research supports the integration of N. sativa L. into both local farming systems and international value chains, contributing to agricultural diversification, farmer income generation, and the promotion of traditional crops in modern food systems.

Keywords: Nigella sativa, fatty acid composition, macronutrients, Albania, crop diversification, nutritional quality, functional foods, sustainable agriculture

FROM THE BRONTLAND REPORT TO FOOD SECURITY IN THE SUSTAINABLE DEVELOPMENT GOALS

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ABSTRACT

The world today produces more food per capita than ever before in human history. Amidst this abundance, millions of people lack sufficient nutrition to sustain a fully productive working life. There are places where very little agriculture is done; there are places where many people cannot afford to buy food. The fifth chapter of the Brontland Report, published in 1987, addresses the potential for food security and its sustainability. The Sustainable Development Goals, developed in 2015, emphasized food security. This study examines food security through the annual reports of the Sustainable Development Goals, based on the Brontland Report. There are large areas for increases in food production in both industrialized and developing countries, parallel to climate change. These areas can be increased through global collaborative efforts.

Keywords: Food Security, Brontland report, Sustainable development goals, SDG, Our future

TRUE COST ACCOUNTING (TCA) FOR THE TRANSITION TO SUSTAINABLE FOOD SYSTEMS: OPPORTUNITIES AND CHALLENGES

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ABSTRACT

The global food system is increasingly being questioned not only for its economic outputs but also for its environmental, health, and social impacts. True Cost Accounting (TCA) is a holistic approach that aims to reveal the true value of food by making all externalities associated with its production and consumption visible. With its framework encompassing natural, human, social, and produced capital, TCA emerges as a critical tool for achieving sustainable development goals. This study is based on a comprehensive literature review and an examination of selected pilot applications to assess the current status, applicability, and potential improvements of the TCA methodology. The analysis was grounded in a standard process that includes defining the scope of the assessment, identifying indicators, collecting data, conducting economic valuation, and reporting the results. The capital-based approach supported the holistic nature of the methodology by enabling the integration of environmental, health, and socio-economic dimensions. TCA holds strong potential for the design of sustainable food systems; however, it faces challenges such as data gaps, methodological inconsistencies, and the lack of a common terminology. The reviewed pilot studies demonstrate the applicability of the approach in various agricultural contexts. In this regard, the study emphasizes the necessity of developing standardized indicators and methodologies to ensure global comparability, systematically incorporating human and social capital into TCA, and designing accessible decision-support tools for policymakers and producers. These recommendations will facilitate the integration of TCA into policy and market decisions, thereby strengthening food security and contributing to the widespread adoption of sustainable production and consumption patterns.

Keywords: True Cost Accounting, Sustainable Food Systems, Externalities, Capital-Based Approach

AI AGAINST HONEY ADULTERATION: EFFECTIVE AND RELIABLE HONEY BOTANICAL ORIGIN AUTHENTICATION

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ABSTRACT

Honey is a highly valued, nutritious natural product with healing benefits. Due to their unique features and limited availability, monofloral honeys (from one predominant floral source) are highly demanded and prized. Unfortunately, this economic incentive brings along fraudulent activities, such as misrepresenting a common honey as a rarer monofloral type or adulteration with sugar syrups and low-grade honey. Therefore, authentication of botanical origin and accurate detection of adulteration are critical for consumer trust and regulatory compliance. Although there are several approaches, such as physicochemical profiling, organoleptic evaluation, and spectral analysis, melissopalynology (microscopic pollen analysis) is the gold standard for verifying floral origin. Nevertheless, traditional methods of examining pollen in honey are slow, prone to human error, and subjective. In recent years, deep learning (DL) methods (particularly convolutional neural networks, CNNs) have achieved significant performance at microscopic pollen authentication. Along with study domains such as allergology, archeology, and forensics, honey authenticity analysis also benefits from these techniques. This study aims to evaluate the current status and future trends of these techniques to identify new opportunities to improve effective and reliable honey botanical origin authentication.

Keywords: Monofloral honey classification, Pollen classification, Melissopalynology, Spectroscopy, Deep learning, Explainable AI,

EFFECT OF SPACING AND SOIL NUTRIENT ON GROWTH OF GREVILLEA ROBUSTA A. CUNN. EX R.BR. IN THAILAND

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ABSTRACT

Grevillea robusta A. Cunn. ex R.Br. or Silky oak, originally from Australia, is a widely cultivated multipurpose tree in agroforestry systems worldwide. In Thailand, it is primarily planted for ornamental purposes due to its distinctive crown form, leaf shape, and flower color. This study aimed to determine the optimal spacing and soil nutrient requirements for Silky oak plantations in northeastern Thailand. Seventeen plots across five areas, consisting of 1- to 6-year-old trees and three different spacing treatments, were established to assess tree height and diameter at breast height (DBH). The results indicated that spacing significantly influenced both height and DBH, whereas slope and aspect had no significant effect. Additionally, potassium had a significant impact on DBH, while nitrogen and phosphorus did not. Based on these findings, the optimal spacing for Silky oak plantations is 2 m × 2 m, and potassium fertilization is recommended to promote productive growth.

Keywords: Silky Oak, Potassium, Tree Plantation, Ornamental Tree, Silviculture

KNOWLEDGE ABOUT THE GENETICAL, MORPHOLOGICAL AND PHENOLOGICAL DIVERSITY OF THREE LINDEN SPECIES (TILIA CORDATA MILL., TILIA PLATYPHYLLOS SCOP. AND TILIA TOMENTOSA MOENCH.) IN BOSNIA AND HERZEGOVINA AND POTENTIAL FOR BETTER MANAGEMENT OF LINDEN FORESTS

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ABSTRACT

The paper presents an analysis of the first report on molecular studies of the Tilia genus complex in Bosnia and Herzegovina, with brief information on some measured morphological parameters of leaves in lindens in Bosnia and Herzegovina. Based on the literature search process on the genetic diversity of the species T. cordata Mill., T. platyphyllos Scop. and T. tomentosa Moench., it was noted that genetic studies had not been conducted before 2020. As part of the study of the genetic diversity of the three dominant linden species from Bosnia and Herzegovina, a significant level of diversity was discovered. However, it seems that the full results of the research have not been published and that only some partial results have been published, and that on the website of the research sponsor, which is the German Federal Environmental Foundation. It is worth noting that the research focuses on the species T. tomentosa, which has been identified as the "tree of the future". Resistance to high droughts and lack of moisture in the soil makes the silver-leaved linden very valuable for establishing commercial plantations in the future, but also important for the survival of beneficial insect species and strengthening overall biodiversity. This tree can significantly help improve the climate of cities and municipalities where linden trees are planted, as they provide shade and protection from harmful ultraviolet rays for human health. Since climate change significantly threatens to disrupt the balance of everyday life, wood markets and local economic conditions, further research into the benefits of linden trees is very necessary for the forestry industry and for the general good of the bosnian-herzegovinian community. To this end, it is of great importance to present to the public that there is molecular research on the genus Tilia in Bosnia and Herzegovina and that it indicates that linden can be used for various purposes, as well as that it has a prosperous future in planting.

Keywords: Tilia in Bosnia and Herzegovina, Tilia cordata in Bosnia and Herzegovina, Tilia platyphyllos in Bosnia and Herzegovina, Tilia tomentosa in Bosnia and Herzegovina, lime forests in Bosnia and Herzegovina, Bosnian lime morphology, Bosnian lime genetics

TESTING THE CYTO- AND GENOTOXIC EFFECTS OF THE FUNGICIDE MANCOZEB ON THE ROOT MERISTEM OF PISUM SATIVUM

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ABSTRACT

The extensive use of pesticides underlines the need to evaluate their potential harmful effects on non-target organisms. This study examines the cytotoxic and genotoxic impacts of the fungicide mancozeb on the root meristematic cells of Pisum sativum. Results revealed a marked decrease in the mitotic index with increasing pesticide concentration, confirming its cytotoxic effects. Phase indices indicated a delay in mitosis, particularly during prophase. Genotoxicity was evidenced by an increase in chromosomal aberrations, including C-mitosis, acentric chromosomes, chromosome fragments, and anaphase/telophase bridges. The frequency of chromosomal aberrations in treated groups was significantly higher than in the control, with the highest concentration showing a fourfold increase. These findings suggest that mancozeb disrupts normal cell division and compromises genomic stability in plants, emphasizing its potential risks to non-target organisms.

Keywords: mancozeb, cytotoxicity, genotoxicity, chromosomal aberrations, Pisum sativum

DEVELOPMENT OF UKRAINIAN WINTER COMMON WHEAT LINES WITH DIFFERENT STEM RUST RESISTANCE GENES (SR33, SR39 AND SR40)

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ABSTRACT

Stem rust**,** caused by Puccinia graminis, remains a major threat to wheat production worldwide, especially with the emergence of virulent races like Ug99. One effective approach to control the disease is the introduction of resistance (Sr) genes. The Sr33 gene, derived from Aegilops tauschii, provides broad resistance, including against Ug99. To develop winter wheat with Sr33, a cross between DH31 (the spring wheat with Sr33) and cv. Myrkhad was performed. Marker-assisted selection (MAS) using the Sr33A marker identified resistant F_3–F_5 plants. DH31 also contributed favorable storage protein alleles (e.g., Glu-B1al, Glu-D1d) associated with good dough quality. Yield analysis showed no productivity penalty from Sr33, making these lines promising for breeding. To broaden resistance**,** Sr39 and Sr40 were introduced using MAS in crosses involving RL5711 (Sr39) and RL6089 (Sr40). Several SSR and gene-specific markers (e.g., Sr39#50, Sr39#22, Xwmc344) were tested. Marker analysis revealed lower frequencies of Sr39/Sr40-positive plants, likely due to reduced overwintering viability of lines with 2B chromosome introgressions. Still, these genotypes are valuable for developing wheat cultivars with broad-range resistance to stem rust.

Keywords: bread wheat, race Ug99, Triticum aestivum, Puccinia graminis, genes Sr33, Sr39 and Sr40, molecular markers, marker-assisted selection (MAS).

MRC1 AS A NOVEL TARGET IN FLT3-POSITIVE AML IDENTIFIED VIA INTEGRATIVE BIOINFORMATICS AND QPCR VALIDATION

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ABSTRACT

Acute myeloid leukemia (AML) is a malignancy of immature myeloid progenitors with high genetic heterogeneity. FLT3-ITD mutations cause aberrant proliferative signaling and are linked to poor prognosis and relapse, and elements within the bone marrow microenvironment, such as immune-modulatory macrophages, also play a role in resistance to therapy. The development of co-targets cooperating with FLT3 signaling is therefore critical with a view to improving treatment outcome. In this study, an integrative bioinformatics approach was applied to the GSE15434 dataset, which consists of 90 FLT3+ and 161 FLT3- AML samples. Normalized gene expression data were analyzed using differential expression tools with a threshold of Padj < 0.05 and $|\log_2$ fold change$| > 1$. Dimensionality reduction via UMAP exhibited distinctive transcriptional separation of FLT3+ and FLT3– subsets. Overall, 5,068 dysregulated genes were observed, as illustrated in volcano and MA plots. Among the most upregulated genes, MRC1 (CD206) emerged as a key candidate. MRC1 encodes the mannose receptor, a marker of M2-polarized macrophages that supports tumor-associated immunosuppression and niche remodeling [3]. Functional annotation positioned MRC1 at the interface of microenvironmental signaling and leukemic progression, suggesting a role in maintaining the aggressive phenotype of FLT3+ AML. Experimental validation was conducted using quantitative PCR (qPCR) in HL-60 (FLT3 wild-type) and MOLM-13 (FLT3-ITD) cell lines. The expression levels were normalized to GAPDH, and relative quantitation showed a significant overexpression of MRC1 in the MOLM-13 cells, validating the computational findings. This concordance of wet-lab and bioinformatics data strengthens MRC1 as a strong biomarker and drug target candidate in FLT3+ AML. Future studies will apply drug repurposing strategies to identify approved drugs targeting the MRC1 pathway. Prioritized candidate drugs will undergo testing in FLT3+ AML models with preclinical and co-culture assays to determine their therapeutic effects and synergy with current treatments.

Keywords: Acute myeloid leukemia; FLT3-ITD; MRC1; bioinformatics; qPCR; tumor microenvironment.

GENETIC AND SPECIES DIVERSITY OF FISH IN ALBANIA'S MAJOR LAKES

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ABSTRACT

Lake Shkodra, shared between Albania and Montenegro; Lake Ohrid, located between Albania and North Macedonia; and the two Prespa Lakes, which span the borders of Albania, North Macedonia, and Greece, together form the most remarkable lake complex in Europe in terms of habitat, species, and genetic diversity. This publication presents the unique characteristics that sustain the stable and resilient condition of each lake, as well as one of their most important features — the genetic and species diversity of their fish populations. The main characteristics of Albania's large lakes should be at the center of management activities. Particularly important is the fish community, especially endemic species threatened by pollution and unregulated fishing.

Keywords: Genetic diversity, Lake Shkodra, Lake Ohrid, Prespa Lakes, species diversity

EVALUATION OF NECK MASSES IN THE PATIENTS OF DIR DISTRICT (PAKISTAN) USING NON-INVASIVE DETECTION TOOLS

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ABSTRACT

Background: Neck masses whether benign or malignant are abnormal growths or lumps that develop in the neck area, and are a common clinical concern. Organized and accurate diagnostic methods are essential for their proper evaluation and management. **Aim:** This study was conducted to determine the types of neck masses and their association with multiple neck-related diseases using various diagnostic tools among patients belonging to Lower Dir Pakistan. **Methodology**: A comprehensive evaluation of neck masses was conducted in 242 patients including males and females of different ages by using physical examination, ultrasound imaging, fine needle aspiration cytology (FNAC), ultrasound-guided FNAC, and gene Xpert analyses. **Results:** Among total patients, 50.83% were males while 49.17% were females. Furthermore, acute, sub-acute, and chronic neck masses were observed in patients 10-70 years old. The ages of 31.40% patients were 10-20 years old, 47.93% were 21-40 years and 20.66% were 41-70 years old, reported with neck masses. Abscesses and benign thyroid diseases were more common in the 21-40 years age group. However, metastatic squamous carcinoma was predominantly detected in patients from 41-70 years. Furthermore, malignancies were more frequent in patients over 50 years, whereas neck masses in younger patients were typically non-malignant. The patients diagnosed with neck mass through physical examination, ultrasonography, FNAC, Gene Xpert and ultrasound-guided FNAC were 24.79, 27.27, 21.90, 15.70, and 9.91%, respectively. Among physically diagnosed patients, further neck-related diseases were detected as a dermoid cyst (25%), preauricular sinus (11.66%), cervical lymphadenitis (25%), hematoma pinna ear (11.66%), seroma pinna ear (5%), thyroiditis (10%) and lipoma (11.66%). In addition, diseases like thyroglossal duct cysts (15.15%), abscesses (72.72%), pharyngeal pouch (1.51%), and bronchial cysts (10.60%) were identified with ultrasonography. The patients diagnosed with FNAC have benign thyroid carcinomas (70.37%), pleomorphic adenoma (27.77%), and cystic hygroma (1.85%). Similarly, the patients diagnosed with ultrasound-guided fine needle aspiration cytology (USG-FNAC) have medullary thyroid carcinoma (25%), metastatic squamous carcinoma (33.33%), papillary thyroid carcinoma (8.33%), lymphoma (29.16%) and adenoid cystic carcinoma (4.16%). **Conclusion:** Our findings highlight the age-related incidence of malignancies in neck masses in the local population of the Dir district. Additionally, ultrasound-guided FNAC emerged as the most sensitive diagnostic method for evaluating neck masses.

Keywords: Neck masses, Ultrasound, Fine needle aspiration cytology, Carcinoma, District Dir/Pakistan

EVALUATION OF THE ANTI-INFLAMMATORY ACTIVITY OF THE AQUEOUS EXTRACT OF URTICA DIOICA

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ABSTRACT

Urtica dioica, commonly called stinging nettle, is a plant belonging to the Urticaceae family, it is perennial, herbaceous and ubiquitous (Zhang et al., 2014). In Algeria Urtica dioica is used in traditional medicine in the treatment of several diseases, notably inflammation. Urtica dioica was collected in March 2023 in the region of the wilaya of Guelma (eastern Algeria). The experiment was carried out on 20 female rats of the Albino Wister strain, weighing between 230 and 300g and which were randomly divided into 5 groups with 4 individuals per group. Each group received experimental solutions such as, acetic acid (5%), sulfasalazine (100mg/Kg) and plant extract (400 mg/Kg and 600 mg/Kg). These solutions were applied to the groups for 5 days, once a day (2 hours after the induction of colitis) orally. The weight, length, macroscopic and microscopic appearance of the colon were analyzed. Rats receiving doses of 400 mg/kg and 600 mg/kg of the extract showed improvement in clinical symptoms of acetic acid-induced colitis with restoration of colon length. Rats treated with aqueous extract of Urtica dioica showed no significant difference compared to those treated with the reference drug (Sulfasalazine).

Keywords: Urtica dioica, evaluation, inflammatory

THE POLLEN-SENSITIZATION-POLLINOSIS RELATIONS IN JAPANESE CEDAR (CRYPTOMERIA JAPONICA) IN JEJU, KOREA

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ABSTRACT

Background: Japanese cedar trees (JC) have become the dominant tree species while used widely to provide windbreaks for the tangerine orchard industry in Jeju, Korea. It is commonly hypothesized that exposure to allergens leads atopic sensitization, resulting allergies. However, it is rarely confirmed. We investigated the JC pollen counts, sensitization to JC pollen, and JC pollinosis. **Methods:** Jeju is an island with population of 0.65 million, located in temperate climate zone, with two cities (Jeju city and Seogwipo city). Schoolchildren were invited to have skin tests with common aeroallergens and answer a questionnaire regarding pollinosis symptoms. The JC pollen counts were monitored in two regions. **Results:** Among 1,225 schoolchildren (49.6% boys, median age 13 years), 566 (46.2%) were atopic. JC pollen season in Jeju was defined as extending from late January to mid-April. JC pollen season started earlier and lasted longer in Seogwipo city. The rate of sensitization to JC (17.6%) was in the third place following house dust mites, which is significantly different in the participants from two cities (23.8% vs. 10.4%, $p < 0.001$). A significant increment in the rate of sensitization to JC pollen with age was observed only in Seogwipo city. The prevalence of JC pollinosis was estimated to be 8.5%. The prevalence differed in those from two cities (5.3% vs. 11.3%, $p < 0.001$). **Conclusions:** JC pollen is the major outdoor allergen for early spring pollinosis in Jeju, Korea. More prevalent in pollinosis is influenced by higher sensitization rates, related to longer pollen season. Climate difference during the flowering season may influence the pollen scattering in the atmosphere, resulting in the difference of sensitization in atopic individuals and, consequently, making JC pollinosis more prevalent.

Keywords: Japanese cedar, Allergic rhinitis, Sensitization

ACUTE TOXICITY DUE TO DELAYED ELIMINATION OF METHOTREXATE IN CANCER THERAPY: A CASE REPORT

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ABSTRACT

Introduction: High-dose methotrexate (HD-MTX) is widely administered in cancer therapy, and generally includes doses of 500 mg/m² or higher. Administration of such high doses of methotrexate is followed by Leucovorin rescue therapy. The leucovorin rescue is intended to minimize damage to healthy cells; otherwise, Delayed elimination of methotrexate can lead to serious adverse events and even death, despite of the preventive measures. **Method:** We report herein a case of a 25-year-old woman having Acute Lymphoblastic Leukemia (ALL) who showed delayed elimination of MTX associated with functional kidney failure, bone marrow aplasia, persistent ulcers of the oral cavity and liver damage. This patient received a cumulative dose of 906mg / m² (1.315g) over 43 hours followed by Leucovorin (Folinic Acid) rescue at 4H after the end of MTX infusion. **Results and discussion:** The monitoring of MTX plasma levels showed a high concentration at 72 H (2.45µmol/L) and at 96H (2.23µmol/L). In fact, MTX levels remained above 0.2µmol/L until H144. Elevation of creatinine and transaminases has been reported in the first 24 H post-infusion and reaching their maximum (Creat=337µmol/L, ASAT= 85UI/L, ALAT= 155IU/L) at 72 H leading to the readjustement of the Leucovorin rescue to 800mg/D at 96H.Once the MTX levels are below the cytotoxic threshold (0.01µmol/L), the folinic acid rescue was interrupted and the outcome was favorable with a decrease of creatinine and transaminases levels**. Conclusion:** This case clearly demonstrates the role of therapeutic drug monitoring, particularly in long period infusions, where the toxicity of HD-MTX may be more prominent causing kidney damage which can lead to delayed elimination and liver damage responsible of the elevation of MTX levels, a condition which requires precise dosage of folinic acid because conventional doses are no longer covering the real needs to limit MTX toxicity.

Keywords: MTX-HD, Delayed eliminatio, kidney failure, drug monitoring, leucoverin rescue

HELICOBACTER PYLORI INFECTION IN ALBANIA: A TWO-YEAR RETROSPECTIVE STUDY USING ENDOSCOPIC BIOPSY FINDINGS

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ABSTRACT

Helicobacter pylori is a chronic bacterial infection that affects a large portion of the global population and plays a central role in the pathogenesis of chronic gastritis, peptic ulcer disease, and gastric malignancies. Although its burden is well-documented internationally, there is a notable lack of updated epidemiological data on H. pylori infection in Albania, where no national screening or surveillance program currently exists. This retrospective cross-sectional study aimed to investigate the pattern of H. pylori infection over a two-year period, by analyzing histopathological results from gastric biopsies taken during routine upper gastrointestinal endoscopies. A total of 1,440 patients aged 20 to 65 years were included in the analysis. Biopsy samples were assessed microscopically to identify the presence of H. pylori and to categorize the underlying gastric pathology. The findings revealed that 60.4% of patients (870/1,440) had histological evidence of H. pylori infection, corresponding to active Type B gastritis. In contrast, 29.2% (420/1,440) of patients exhibited reactive, non-H. pylori-related gastritis (Type C), while 10.4% (150/1,440) presented with normal gastric mucosa. The high infection rate observed in this study underscores the ongoing clinical relevance of H. pylori in the Albanian population and suggests the need for improved access to diagnostic tools, standardized eradication therapies, and physician awareness. These findings serve as a valuable contribution to the limited body of national data and may support the development of future evidence-based strategies for infection control, early detection, and long-term gastrointestinal health promotion.

Keywords: Helicobacter pylori, biopsy, histopathology, infection trends, gastritis, endoscopy, Albania, retrospective study

MDMA POISONING IN INFANTS : A CASE REPORT

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ABSTRACT

Introduction: Accidental poisoning with psychoactive substances in young children is a medical emergency that requires prompt and accurate diagnostic confirmation for appropriate management. We report a case of 3, 4-methylenedioxy-methamphetamine (MDMA, ecstasy) intoxication in a 14-month-old infant, emphasizing the role of rapid toxicological screening in guiding timely intervention. **Case Report:** A 14-month-old infant was brought to the pediatric emergency department after experiencing seizures. According to the mother, the child had ingested an unidentified substance found at home. Approximately 30 minutes after the presumed ingestion, the infant developed seizures, prompting immediate medical consultation. **Results:** A rapid urine drug screening test detected the presence of amphetamines. Thin-layer chromatography (TLC) confirmed MDMA intoxication, and further validation was performed using the Marquis Reagent test, which yielded a characteristic color reaction for MDMA. **Conclusion:** This case highlights the critical importance of early toxicological diagnosis in pediatric intoxications. The combination of rapid drug screening and TLC provided a reliable identification of MDMA, enabling timely medical intervention. Additionally, this report underscores the need for stronger prevention strategies, including parental education on minimizing household exposure to toxic substances.

Keywords: MDMA poisoning; Pediatric intoxication; Toxicological screening; Seizures.

THE EVALUATION OF FATAL VEGETABLE OIL POISONING IN FORENSIC MEDICINE

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ABSTRACT

Fatal poisonings, commonly encountered in forensic medicine, can be of several types: caustic, medicinal, gaseous, but rarely plant-based. This case illustrates a typical picture of poisoning from a vegetable oil called "Harmel"; prescribed and used inappropriately by a young woman. Our objective is to provide a descriptive analysis of the clinical picture of the toxic impregnation of this oil and its after-effects on the body, both ante- and post-mortem, highlighting the value of multidisciplinary work. This case involves a woman of good intellectual level who suffered from joint pain. Unfortunately, instead of consulting a doctor, she was suggested to take a preparation based on a mixture of vegetable oils prepared by a herbal seller. A few days after taking and applying these oils, and unaware of the dangers of wild rue "harmel," the woman fell into a coma and died almost a week later. We will present the typical fatal picture of this poisoning during life and after this woman's death, from a clinical, macroscopic, microscopic, and especially toxicological perspective.

Keywords: poisoning, Harmel, clinical, toxicology, death.

OCCUPATIONAL EXPOSURE TO AMMONIA AND DELAYED SUDDEN DEATH; REGARDING AN OBSERVATION

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ABSTRACT

The development of the chemical industry is constantly increasing the number of new chemicals that are harmful or aggressive to the human body. Industrial toxicology is therefore becoming increasingly important today, as legislators seek to compensate victims of occupational poisoning. Industrial poisons and forensic poisons are often confused; the courts therefore call upon a forensic pathologist, who must be able to determine whether the poisoning was work-related. Ammonia is a colourless gas with a pungent, irritating odour. It enters the human body through the respiratory, digestive and skin routes, and its toxicity manifests itself in a caustic effect that causes haemorrhaging and pulmonary oedema, as well as oedema of the digestive tract, skin and ocular mucous membranes. The aim of this study is to describe a case of occupational ammonia poisoning followed, after a certain period of time, by sudden death, the cause of which must be determined: natural or otherwise? We report here the case of a young adult, aged 37, a maintenance worker at FERTIAL (Annaba fertiliser factory), who suffered massive ammonia inhalation at work on 12/10/2016, resulting in hospitalisation in the intensive care unit and then in the pulmonology department for respiratory distress due to bronchopneumopathy. On the night of 11/08/2018, he died suddenly after an episode of haemoptysis and respiratory distress. A forensic autopsy was ordered by the public prosecutor to determine the cause and circumstances of death. The forensic autopsy shed light on the natural cause of this rapid and seemingly suspicious death. The commemorative events, the study of the medical file, the precise thanatological examination and the toxicological and histological studies made it possible to differentiate between occupational poisoning and judicial poisoning.

Keywords: occupational poisoning, long-term effects, respiratory failure, death

IN VITRO ASSESSMENT OF THE ANTIPROLIFERATIVE PROPERTIES OF ROSA CANINA L. ROSE HIPS AGAINST MESOTHELIOMA

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ABSTRACT

Rosa canina L. (dog rose), a wild climbing species from the Rosaceae family, is native to Europe, North Africa, and Western Asia. It grows widely across Türkiye, particularly along forest edges, near ponds, and in shrublands and grasslands. Its fruit, rosehip, is rich in nutrients and has traditionally been used to manage conditions such as kidney stones, gastroenteritis, hypertension, and respiratory infections. In this study, wildly growing fresh rose hips collected from Sivas in mid-September were sun-dried and extracted using a methanol–water mixture (5:1, v/v). The extract was tested at various concentrations for in vitro cytotoxic effects on healthy lung epithelial (MeT-5A) and two malignant pleural mesothelioma cell lines, i.e., biphasic (NCI-H2452) and sarcomatoid (NCI-H2052). Healthy epithelial cells (MeT-5A) showed no significant cytotoxicity at the tested concentrations, with increased proliferation observed at 15.625 and 31.25 µg/mL. The strongest antiproliferative effects were observed in NCI-H2052 and NCI-H2452 cells at 500 µg/mL, reducing cell viability to 68.25% and 77.52%, respectively.

Keywords: Rosa canina L., Rose hips, Human mesothelioma, MTT assay, Antiproliferation

RADIOGRAPHIC EVALUATION OF THE ROLE OF TITANIUM SCAFFOLD POROSITY ON BONE REGENERATION AND IMPLANT STABILITY IN TTA

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ABSTRACT

Advances in Tibial Tuberosity Advancement (TTA) techniques for cranial cruciate ligament rupture (CrCLR) in dogs rely on the selection of different implant material designs that balance strength, biocompatibility, and osseointegration. Porous titanium scaffolds have emerged as a transformative option, offering a unique combination of structural stability and improved bone regeneration. This study evaluates the impact of scaffold porosity on bone healing and implant stability, focusing on their radiographic performance over an eight-month postoperative period. The study included 15 cases, treated with TTA using porous titanium scaffolds. Radiographic evaluations were performed immediately postoperatively and at months 3, 6, and 8 to assess bone remodeling and scaffold integration. Radiographic evaluations revealed progressive osseointegration, with complete osseointegration achieved in all cases by eight months. Smaller scaffolds promoted faster callus formation and higher trabecular density, while weight-based variations highlighted the importance of tailoring implant designs to individual patient profiles. These radiographic findings confirm the critical role of porous titanium scaffolds in osseointegration in advancing TTA procedures, enhancing short-term outcomes.

Keywords: Tibial Tuberosity Advancement, Titanium Scaffold Porosity, Bone Regeneration, Implant Stability

EVALUATION OF THE EFFECT OF FENUGREEK SEEDS (TRIGONELLA FOENUM GRAECUM L) ON NEUROBEHAVIORAL ALTERATION IN MALE RATS

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ABSTRACT

Fenugreek is an annual herb belonging to the Fabaceae family. It is found all over the world, but it is of Mediterranean origin. The whole fenugreek plant can be used in herbal medicine, but it is mainly the seeds that are of therapeutic interest. This study aims to strengthen the scientific data on the interest of using an aromatic plant which is fenugreek in the medical field.The administration of 2ml of the aqueous extract of fenugreek seeds for thirty successive days by the method of oral gavage at a dose of 250g/l of water aims to assess, firstly, the neurohavioral effects and secondly on body weight and blood sugar levels and in rats.The behavioral tests are the elevated plus maze test and the open field test. This work indicates that the consumption of fenugreek seeds is beneficial for stimulating appetite and gaining weight, it has a hypoglycemic effect with a decrease in anxiety.

Keywords: Wistar rat, Fenugreek, anxiety, weight, blood sugar.

CONTRIBUTION TO THE PHYTOCHEMICAL AND BIOLOGICAL STUDY OF A MEDICINAL PLANT OF THE GENUS RUTA (RUTA CHALEPENSIS)

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ABSTRACT

Medicinal plants constitute an important source of biologically active natural molecules including essential oils which are complexes of powerful volatile and odorous molecules often sought in the medical, phytopharmaceutical and agro-food fields. Our study aims to evaluate the antibacterial activity and the antioxidant activity of the essential oil of Ruta chalepensis L. from the region of Hammam nbail (Guelma). Our study made it possible to know the organoleptic characteristics of essential oils, to obtain different yields according to the harvest periods, and to know the content of polyphenols and flavonoids contained in the methanolic extract of the plant. The results obtained for antioxidant activity by the DPPH method reveal that the methanolic extract has a strong antioxidant activity compared to the essential oil, the antibacterial activity of EO was performed on three bacterial strains (Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa), the results showed strong HE activity with regard to Pseudomonas aeruginosa.

Keywords: Ruta chalepensis, essential oil, methanolic extract, antioxidant activity, antibacterial activity

PHYTOCHEMICAL STUDY AND EVALUATION OF THE BIOLOGICAL ACTIVITIES OF MYRTLE (MURTUS COMMUNIS)

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ABSTRACT

Myrtus communis L, is a medicinal plant of the Myrtaceae family represents a therapeutic source thanks to its natural bioactive compounds, extracts, essential oils and secondary metabolites. In order to contribute to the evaluation of Myrtus communis L. of the region of Ouled Driss (Wilaya of Souk-Ahras), we were interested in determining the chemical composition and evaluating the biological activity of this plant. Our study made it possible to know the organoleptic characteristics of essential oils, to obtain different yields according to the harvest periods, and to know the content of polyphenols and flavonoids contained in the methanolic extract of the plant. The results obtained for antioxidant activity by the DPPH method reveal that the methanolic extract has a strong antioxidant activity compared to the essential oil, the antibacterial activity of EO was performed on three bacterial strains (Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa), the results showed significant HE activity with regard to Pseudomonas aeruginosa.

Keywords: Myrtus communis, essential oil, methanolic extract, antioxidant activity, antibacterial activity.

EFFECT OF GAVAGE OF FENUGREEK EXTRACT ON RENAL FUNCTION PARAMETERS IN WISTAR RATS

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ABSTRACT

Fenugreek (Trigonella foenum-graecum L.) is an annual herb belonging to the Fabaceae family. It is found worldwide but is of Mediterranean origin. The whole fenugreek plant can be used in herbal medicine, but it is primarily the seeds that are of therapeutic value. The aim of this study is to strengthen the scientific evidence supporting the medical benefits of using fenugreek seed aqueous extract. Our study aims to evaluate the effect of fenugreek on several biochemical parameters of renal function in male Wistar rats. The administration of fenugreek seed aqueous extract (Trigonella foenum-graecum L.) by gavage for 30 consecutive days was performed at a dose of 250 g/l of water. In this study, we used 21 male rats, divided into three groups: a control group (T), a group treated with fenugreek aqueous extract (F), and a group (G) force-fed with water alone for 30 days using the oral gavage method. Our results showed a significant decrease in both blood urea nitrogen (BUN) and creatinine levels, mainly in group (F) compared to group (T). We also found a significant decrease in serum uric acid (UA) concentration in the fenugreek-treated group (F) compared to the control group (T). Our results also showed a highly significant decrease in blood glucose levels, as well as increased appetite and weight gain in group (F) compared to group (T). The results revealed that the aqueous extract of fenugreek seeds plays a nephroprotective and even prophylactic role in nephropathologies by improving renal function parameters while maintaining serum levels within the normal range.

Keywords: Fenugreek; Wistar rats; Urea; Creatinine; Uric acid; Weight

POLYPHENOLS, ANTIPROLIFERATIVE AND ANTIDIABETIC PROPERTIES OF STACHYS MIALHESII

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ABSTRACT

This study examined the antidiabetic and antiproliferative effects of the n-butanol extract from the aerial parts of Stachys mialhesii (BESM). LC-HRMS/MS analyses of the BESM revealed a diverse chemical profile with chlorogenic acid, isoscutellarein-7-O-(6'''-O-acetyl-β-D-allopyranosyl-(1→2)-β-D-glucoside), luteolin, luteolin 7-O-β-D-glucoside and panasenoside as the major components. The BESM demonstrated a good inhibition of □-amylase (IC50:3.25±0.33 mg/mL) close to the standard acarbose (IC50:3.68±5.01mg/mL) and antiproliferative activity against PC3 and MDA-MB-231 cancer cells growth, with IC50 values of 156.02±6.09 µg/mL (PC3) and 162.11±3.13 µg/mL (MDA-MB-23) respectively. These findings highlight the BESM's potential as a natural antidiabetic and anticancer agent.

Keywords: Stachys mialhesii; Antiproliferative; Antidiabetic; LC-HRMS/MS; Phytochemicals

CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF ACCACIA TORTILIS SUBSP. RADIANA TAR FROM BECHAR REGION, ALGERIA

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ABSTRACT

Antimicrobial activity of medicinal plants have been recognized for a long time. This study has been concerned with determining the chemical composition and antimicrobial activity of Tar extracted from Accacia radiana subsp.radiana wood growing wild in Bechar region, (South West of Algeria). This tar was extracted by traditional method and then was analyzed by gas chromatography coupled with mass spectroscopy technique (GC-MS technique) and calculation of Kovats Retention Indices values. Exactly 69 components were recognized that components having the highest percent are as follow: Syringol (6.86%),2,6-Dihydroxy-4 methoxyacetophenone (5.94%) ,2,3-Dimethoxybenzyl alcohol (5.06%), p-Ethylguaiacol (3.68%). Antimicrobial effects of this tar were tested against six strains of bacteria and five strains of fungi. All strains were inhibited (Minimal Inhibition Concentration)a t the concentration of 0.1mg/ml, Escherichia coli ATCC 25922 and Enterococcus feacalis ATCC 29212 were the most sensitive with CMI of 0.008 mg/ml. for Fungi, the Tar shows that the best CMI (0.006 mg/ml) was obtained against Alternaria alternata and Fusarium oxysporum f. sp. albedinis.

Keywords: Accacia tortilis subsp.radiana, Tar, Chemical Composition, Antimicrobial activity, Bechar.

CONSUMPTION OF AFLIBERCEPT IN THE OPHTHALMOLOGY DEPARTMENT CENTRAL PHARMACY, ABDELKADER HASSANI UNIVERSITY HOSPITAL, SIDI BEL ABBES, ALGERIA

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ABSTRACT

Introduction: Biotherapy sheds light on the complexity of biological mechanisms, revolutionizing medicine with tailored treatments to combat previously incurable diseases. The role of hospital pharmacy is to ensure the safety, availability, and meticulous monitoring of medications. Its main priority is patient well-being, combined with the responsible and efficient management of medical treatments. The aim of this study was to evaluate the use of Aflibercept in the ophthalmology department of the Sidi Bel Abbes University Hospital. **Materials and Methods:** Data were collected from patients treated with Aflibercept, including their diagnoses and the frequency of use. The effectiveness of care was assessed based on the regularity of the injections. **Results:** The findings show that among the individuals examined, 112 were diagnosed with macular disorders (DME), 20 with age-related macular degeneration (AMD), 16 with central retinal vein occlusion (CRVO), 8 with branch retinal vein occlusion (BRVO), and 11 with choroidal neovascularization (CNV). However, it is important to note that a large majority of these patients did not maintain regular treatment, which complicates the evaluation of the economic effectiveness of this therapy. **Conclusion:** Our comprehensive study conducted in the ophthalmology department highlights the vital role of biotherapy, represented by the drug Eylea, in the management of specific diseases. Nevertheless, it is essential to address the challenges related to treatment adherence in order to maximize the overall effectiveness of these therapeutic approaches.

Keywords: Biotherapy, monitoring, cost-effectiveness, regularity.

FORMULATION AND CHARACTERIZATION OF AN ANTI-BURN CREAM BASED ON SAPONINS EXTRACTED FROM CLIMBING IVY (HEDERA HELIX)

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ABSTRACT

This work focuses on the extraction and characterization of tri-terpenic saponins from the leaves of Hedera helix, with the aim of developing an anti-burn cream. Saponins, recognized for their therapeutic properties, were extracted using cold maceration with ethanol. The presence of saponins was confirmed through spectroscopic analyses (IR) . The formulation of the cream was carried out in two phases: an oily phase (including paraffin oil, beeswax, and cetyl alcohol) and an aqueous phase (containing xanthan gum, glycerol, Tween 80, and the saponin extract). The optimization of formulation parameters was conducted using an experimental design methodology, allowing the determination of the effects of various ingredients on the rheological properties and stability of the cream. Rheological characterizations were performed using a rheometer, showing that the formulated cream exhibits viscoelastic behavior and good stability. Centrifugation tests confirmed the cream's homogeneity, while pH measurements ensured its suitability for topical application. The results obtained demonstrate that the formulated cream has promising properties for therapeutic use as an anti-burn product. This work paves the way for further studies on the use of ivy extracts in cosmetic and pharmaceutical applications.

Keywords: Hedera helix, saponins, anti-burn cream, formulation, characterization, rheology

ANTIOXIDANT, ANTI-INFLAMMATORY AND PROCOAGULANT POTENTIAL OF LEAF AND FLOWER EXTRACTS FROM A PERRALDERIA SPECIES

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ABSTRACT

Nowadays, aromatic and medicinal plants play a crucial role in healthcare, as well as in various fields of application. The diversity of their chemical compounds offers a wide range of biological activities. This study aimed to conduct phytochemical and biological investigations of the butanol extracts from the leaves and flowers of Perralderia coronopifolia. High-performance liquid chromatography analysis of the chemical composition revealed the presence of quercetin in the butanol leaf extract and citric acid in the butanol flower extract. The antioxidant activity of both extracts was evaluated using two methods (DPPH and ABTS). The results confirmed good antioxidant capacity in both organs. The ABTS test showed a strong antioxidant effect for the butanol leaf extract (IC50 = 0.09 ± 0.11 mg/mL) compared to that of ascorbic acid (IC50 = 0.03 ± 0.01 mg/mL). The butanol extracts from flowers and leaves were particularly rich in total polyphenols and flavonoids, which supports the strong antioxidant activity observed in these extracts. Evaluation of the hemostatic activity showed that the butanol extracts from the leaves and flowers promoted plasma coagulation. The anti-inflammatory activity test revealed good activity for the butanol flower extract (IC50 = 0.23 ± 0.01 mg/mL), while the butanol leaf extract showed moderate activity (IC50 = 0.94 ± 1.05 mg/mL) compared to sodium diclofenac (IC50 = 0.15 ± 0.01 mg/mL). This plant can be considered as a promising source of antioxidants, anti-inflammatory, and anti-hemorrhagic agents.

Keywords: Perralderia Coss, antioxidant activity, anti-inflammatory activity, hemostatic activity.

MULTIFUNCTIONAL DEXTRAN-CHITOSAN-STABILIZED ZINC OXIDE NANOCOMPOSITES FOR ANTIBACTERIAL EFFICACY AND TISSUE REGENERATION

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ABSTRACT

Recent advances in nanomedicine have highlighted the role of polymeric-metallic nanocomposites in improving wound care by enabling targeted and sustained drug delivery. This study explores the synergistic potential of neomycin-loaded zinc oxide nanocomposites synthesized using natural polymers—dextran and chitosan—for enhanced antibacterial activity and tissue regeneration. The combination of biocompatible polymers with zinc oxide nanoparticles creates a multifunctional matrix suitable for controlled neomycin delivery to infected and chronic wounds. The synthesized nanocomposites were thoroughly characterized by UV-Vis, FTIR, SEM, XRD, DLS, and TGA-DSC techniques to determine their structural integrity, particle size, surface charge, and thermal stability. Controlled and prolonged release behavior of neomycin was observed through dialysis-based drug release studies, evaluated using mathematical release models. Antimicrobial efficacy was assessed against clinical strains including E. coli, S. aureus, and P. aeruginosa, where the nanocomposites demonstrated notable zones of inhibition, indicating potent antibacterial properties. Cytotoxicity was evaluated via MTT assay on mouse fibroblast cells, confirming cellular safety and biocompatibility. Further, in vivo wound healing was analyzed in excision wound models in Wistar rats. The treated groups showed accelerated wound closure, enhanced collagen deposition, and minimized scar formation compared to controls. This research supports the therapeutic relevance of dextran-chitosan-based zinc oxide nanocomposites as dual-functional platforms—offering both antimicrobial protection and tissue repair benefits—making them promising candidates for future wound care innovations.

Keywords: Zinc oxide, dextran, chitosan, nanocomposite, neomycin, wound healing, antibacterial activity

DIETARY SUPPLEMENT MANUFACTURING TECHNOLOGY"

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ABSTRACT

Comparison of Industrial and Natural Zinc Supplements: Nova Zinc Ultra 30 mg vs. Bio Zinc Plus

Dietary supplements serve as concentrated sources of essential nutrients, with zinc playing a pivotal role in numerous biological functions. This study aims to compare an industrial zinc supplement, Nova Zinc Ultra 30 mg, with a novel natural formulation, Bio Zinc Plus, crafted from pecan nuts, cashew nuts, honey, and thyme—all recognized for their high zinc content.

A series of physicochemical, microbiological, and organoleptic analyses were conducted on both products. For Nova Zinc Ultra 30 mg, parameters evaluated included the average tablet weight, zinc content, and disintegration time. For Bio Zinc Plus, zinc content was determined in mg/kg. Microbiological tests were performed to detect specific pathogens such as Escherichia coli, and to assess the levels of aerobic bacteria, yeasts, and molds. An organoleptic analysis, including a taste test, was conducted with 20 participants to evaluate the acceptability of both products.

Nova Zinc Ultra 30 mg:
Average tablet weight: 221.59 mg
Zinc content: 98.84%
Disintegration time: 2.22 minutes

Bio Zinc Plus:
Zinc content: 118.19 mg/kg

Microbiological Analyses:
Escherichia coli: Not detected in either product
Levels of aerobic bacteria, yeasts, and molds: Within acceptable standards for both products

Energy Value:
Bio Zinc Plus: 1883.37 Kcal
Nova Zinc Ultra 30 mg: 21.08 Kcal

Organoleptic Analysis: Bio Zinc Plus received excellent acceptability ratings from participants, surpassing Nova Zinc Ultra 30 mg. The natural formulation, Bio Zinc Plus, demonstrates satisfactory physicochemical and microbiological characteristics, a high energy value, and superior sensory acceptability. These findings suggest that Bio Zinc Plus could serve as a viable alternative to the industrial supplement Nova Zinc Ultra 30 mg, offering a natural and palatable source of zinc.

Keywords: Bio Zinc plus, Food supplement, Nutrients, Taste test, Zinc.

EVALUATION OF THE ANTIFUNGAL ACTIVITY AND PHYTOTOXICITY OF ZIZYPHUS LOTUS L.

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ABSTRACT

This study contributes to the search for alternative solutions based on plant extracts to combat phytopathogenic fungi. The objective is to test the effectiveness of the methanol-water (70/30%) extract of Zizyphus lotus L. leaves on the mycelial growth of five species of phytopathogenic fungi. Additionally, the toxicity of the extract on the germination of wheat and tomato seeds and the growth of their seedlings was evaluated. The results showed that the methanol extract inhibits mycelial growth. This extract significantly inhibited the growth of three fungi: Fusarium oxysporum, Alternaria alternata, and Botrytis spp. Among these fungi, F. oxysporum was the most sensitive, with an inhibition rate of 72.55% after four days of incubation at a concentration of 10 mg/ml. After seven days of incubation, the extract proved to be even more effective, reaching an inhibition rate of 80.10% on Fusarium spp at the same concentration. The phytotoxicity test did not show any inhibitory effect on the germination of wheat seeds and the growth of wheat seedlings. In contrast, the extract significantly reduced the germination of tomato seeds and the growth of tomato seedlings. The methanol extract of Z. lotus L. leaves from Tamanrasset exhibits antifungal properties and does not inhibit the growth parameters of wheat, which could allow for its use in wheat seed treatment. Further research could also be conducted on its herbicidal properties against certain invasive legumes.

Keywords: Antifungal activity; extract of Zizyphus lotus L.; Phytopatogenic fungi; Phytotoxicity.

EXTRACTION, PHYSICOCHEMICAL, ORGANOLEPTIC AND MICROBIOLOGICAL CHARACTERIZATION OF MARRUBIUM VULGARE ESSENTIAL OIL, APPLICATION: PREPARATION OF A MOISTURIZING CREAM

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ABSTRACT

Marrubium vulgare is a medicinal plant belonging to the Lamiaceae family. It has been traditionally used for many purposes, including the treatment of stomach diseases, diabetes mellitus, and respiratory and pulmonary infections. It has been shown to possess neuroprotective, antispasmodic, antihypertensive, and cholesterol-lowering properties. In addition, it exhibits strong antioxidant and antimicrobial activity, particularly against Gram-negative bacteria such as Staphylococcus aureus and Listeria monocytogenes, as well as fungi. Due to its pharmacological properties, Marrubium vulgare essential oil represents an important natural resource for the pharmaceutical and pesticide industries. Our work focuses on the extraction of Marrubium vulgare essential oil by Soxhlet, the development of a moisturizing cream, the physicochemical characterization such as pH, acidity index, HPLC, IR and UV and organoleptic and microbiological characterization of the EO and the cream obtained.

Keywords: Marrubium vulgare, cream, antimicrobial activity, essential oil, IR, Soxhlet.

VALORIZATION OF FOOD WASTE AS A CULTURE MEDIUM FOR GROWTH AND ANTIBIOTIC PRODUCTION BY ACTINOKINEOSPORA MZABENSIS

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ABSTRACT

In the last few years, a lot of measures addressing food waste have been proposed and implemented. Recent literature reviews call for more evidence on the effectiveness or food waste reduction potential of these measures. Furthermore, very little information is available on the extent to which food waste measures have been evaluated based on their economic, environmental, and social performance. Our study aims to use food waste in the production of antibiotics by the strain Actinokineospora mzabensis in the semi-synthetic medium supplemented with natural sources such as peanut shells, date pits, molasses, used coffee grounds, and tea leaves, the extracted antibiotics showed powerful antibacterial activity, especially with molasses and peanut shells. However, the addition of coffee grounds residues and date pits did not yield antibiotics. The use of unconventional substrates not only promotes environmental sustainability by reusing residual materials but also enhances the diversity of available nutrients. Comparing the results, our study indicates that the most suitable medium for antibiotic production is the semi synthetic medium (SSM) supplemented with molasses.

Keywords: food waste, culture medium, Actinokineospora mzabensis, Antibiotic production

DEVELOPING AND EVALUATING ROSEMARY ESSENTIAL OIL NANOSYSTEMS: ENHANCING STABILITY AND ANTIOXIDANT EFFICACY

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ABSTRACT

Nanotechnology offers innovative solutions to improve the delivery and effectiveness of bioactive compounds like rosemary essential oil (REO), known for its antioxidant, antimicrobial, and anti-inflammatory properties. However, REO's low water solubility and chemical instability limit its practical applications. This study focuses on the development of lipid-based nanocarriers—specifically nanoemulsions and liposomes—to enhance REO's stability, bioavailability, and controlled release. Nanoemulsions were prepared through high-pressure homogenization, producing stable, nanosized droplets. Liposomes were formulated using the ethanol injection method with phospholipids Lipoid S75, PC3, and S100 to optimize encapsulation efficiency and membrane fluidity. Physicochemical analysis showed that formulations using Lipoid S75 and PC3 achieved smaller particle sizes (85%), and better antioxidant preservation than those with Lipoid S100. Stability tests at 4°C and 25°C confirmed that REO-loaded nanoemulsions and liposomes maintained their structural integrity and antioxidant activity over time, effectively protecting REO from oxidative degradation. Overall, this study demonstrates that lipid-based nanoformulations—particularly those incorporating unsaturated phospholipids—offer promising strategies to enhance the therapeutic potential of rosemary essential oil for pharmaceutical and industrial use.

Keywords: Rosemary essential oil, nanoemulsions, liposomes, lipid-based delivery systems, stability

FORMULATION AND PHYSICOCHEMICAL CHARACTERIZATION OF LIPOSOMAL NANOCARRIERS FOR CARVACROL AND THYMOL USING LIPOID® PHOSPHOLIPIDS

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ABSTRACT

Carvacrol and thymol are potent phenolic compounds with broad-spectrum antimicrobial properties. However, their volatility and poor aqueous solubility limit their direct application. This study aimed to formulate liposomal nanocarriers using three Lipoid[X] phospholipids (85G, PC-3, S-75) and evaluate their physicochemical performance for the encapsulation of carvacrol and thymol. Liposomes were prepared by the organic solvent injection method, incorporating payloads of 1, 2.5, and 5 mg/mL of either carvacrol or thymol. Particle size, polydispersity index (PDI), and zeta potential (ZP) were measured using dynamic light scattering (DLS), while encapsulation efficiency (EE%) was determined spectrophotometrically. Carvacrol-loaded S-75 liposomes displayed the most favorable characteristics, with particle diameters of 82–92 nm, narrow distribution (PDI 370 nm, PDI > 0.8), while 85G formulations demonstrated moderate stability (size ~ 100–120 nm, PDI ~ 0.20–0.24, EE% 74–79%). Thymol-loaded S-75 liposomes exhibited similar performance, with particle sizes of ~80–84 nm and EE% up to 88%. Lipoid[X] S-75 proved to be the most effective lipid matrix for producing stable, monodisperse nanocarriers with high loading capacity for both carvacrol and thymol. These formulations offer promising potential for controlled delivery in antimicrobial, biomedical, and food preservation applications.

Keywords: Carvacrol, Thymol, Liposomes, Nanocarriers, Encapsulation efficiency, Lipoid phospholipids

PHYTOCHEMICAL STUDY AND EVALUATION OF THE ANTI-INFLAMMATORY ACTIVITIES OF DIFFERENT EXTRACTS OBTAINED FROM RHAMNUS ALATERNUS L.: A COMPARATIVE STUDY

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ABSTRACT

This study investigates the extraction yields, phytochemical composition, and anti-inflammatory potential of Rhamnus alaternus L. extracts derived from root bark, leaves, and stem bark. The aqueous extract of root bark yielded the highest extraction rate (16.98%), followed by stem bark (12.14%) and leaves (9.5%). Phytochemical analysis revealed notable quantities of primary metabolites (carbohydrates) and secondary metabolites, including tannins (++), saponins (+), and flavonoids (+).However, anthraquinones are detected only in root bark (+++), suggesting a distinctive phytochemical profile. Quantitative analysis confirmed that the root bark extract had the highest total polyphenol content (89.82 ± 8.30 mg GAE/g), followed by stem bark extract (49.11 ± 7.68 mg GAE/g) and leaves extract (37.32 ± 7.23 mg GAE/g). The flavonoid content was also highest in root bark extract (30.71 ± 5.65 mg QE/g). Acute toxicity tests indicated that all extracts were safe at doses up to 2,000 mg/kg. The in vitro anti-inflammatory testing showed that the aqueous root extract achieved a 32.00% inhibition of protein denaturation at 200 µg/ml, while the standard drug diclofenac reached 89.22% inhibition with the same concentration. In vivo, carrageenan-induced paw edema was significantly reduced in a dose-dependent manner, with all extracts at 50, 100, and 200 mg/kg achieving comparable or superior effects to 100 mg/kg aspirin, demonstrating Rhamnus alaternus's potential as a natural anti-inflammatory agent.

Keywords: Rhamnus alaternus L., polyphenol, flavonoids, anti-inflammatory activity, BSA, carrageenan, acute toxicity.

NUTRACEUTICAL POTENTIAL OF ACHILLEA MILLEFOLIUM. HEALTH BENEFITS, DERMATOLOGICAL USE AND SAFETY

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ABSTRACT

Achillea millefolium L. (Asteraceae), commonly referred to as yarrow, is a medicinal plant with extensive ethnopharmacological use and increasing scientific interest due to its diverse phytochemical profile and broad-spectrum bioactivity. This review evaluates the current literature on the phytoconstituents, pharmacological properties, cosmetic applications, nutraceutical potential, toxicological considerations, and commercial viability of A. millefolium, with emphasis on its integration into contemporary dermatological formulations. The plant is characterized by a rich composition of bioactive compounds, including flavonoids such as apigenin, luteolin, quercetin, phenolic acids (chlorogenic acid, caffeic acid), sesquiterpene lactones (achillin, millefolide), and volatile constituents (camphor, borneol, linalool,cineole). These metabolites exhibit significant antioxidant, anti-inflammatory, antimicrobial, and cytoprotective activities, as demonstrated in both in vitro and in vivo models. In cosmetic science, A. millefolium extracts have shown efficacy in mitigating oxidative stress, modulating inflammatory pathways, enhancing wound healing, and inhibiting melanogenesis via tyrosinase suppression, thereby supporting their use in anti-aging and depigmenting formulations. In the nutraceutical domain, A. millefolium demonstrates therapeutic potential in gastrointestinal modulation, hepatoprotection, and glycemic control. Preclinical studies suggest its utility in managing metabolic syndrome and inflammatory conditions, although clinical trials remain limited. Toxicological assessments conducted by regulatory bodies, including the Cosmetic Ingredient Review (CIR) and European Medicines Agency (EMA), affirm its safety within defined concentration thresholds, with caution advised for individuals with Asteraceae sensitivities and during pregnancy. The plant's favorable regulatory status, sustainable cultivation profile, and multifunctional bioactivity underscore its commercial relevance. Future research should prioritize phytochemical standardization, advanced delivery systems, and translational studies to substantiate its efficacy and optimize its application in integrated cosmetic-nutraceutical formulations. This review consolidates the scientific foundation for A. millefolium as a promising candidate in evidence-based natural product development.

Keywords: Achillea millefolium, phytochemicals nutraceutical, dermatology. safety assessment

POLYPHENOLIC PROFILE AND EVALUATION OF THE ANTIPROLIFERATIVE ACTIVITY OF THE N-BUTANOL EXTRACT AND A VLC FRACTION OF STACHYS MIALHESIII

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ABSTRACT

This study investigates the antiproliferative, effect of the n-butanolic extract (BESM) and a VLC fraction (BF1SD) of Stachys mialhesii, an endemic species collected from Constantine (Algeria). The antiproliferative activity was evaluated on PC3 and MDA-MB-231 cell lines via MTT assay (72h). LC-HRMS/MS was used for phytochemical analysis. The BESM showed higher antiproliferative activity (IC50:200.01±5.80 µg/mL for PC3, 178.87±6.20 µg/mL for MDA-MB-231) than the BF1SD (IC50:275.09±4.98 µg/mL and 266.13±3.34 µg/mL, respectively). Glycosylated flavonoids which were mainly detected may contribute to this effec. thus, the n-butanolic extract and a VLC fraction of Stachys mialhesii, exhibited antiproliferative properties, indicating potential therapeutic use of S. mialhesii against cancer. Further studies are needed to isolate active compounds and confirm their effects in vivo

Keywords: Stachys mialhesii, Antiproliferative, LC-MS/MS, Polyphenols

PHYTOCHEMICALS USED IN CANCER THERAPY

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ABSTRACT

Phytochemicals have gained significant attention for their potential role in cancer therapy. Many of these compounds have shown anticancer properties by interfering with the growth and spread of cancer cells, inducing apoptosis (programmed cell death), and enhancing the body's natural defense systems. Taxol, which was the first anticancer agent, was isolated from the pacific tree, Taxus brefifolia and its total synthesis and biosynthesis are well documented. Other bioactive compounds, isolated from diverse medicinal plants, like Thapsigargin, Visnagin, Khellin, Berberin, Sulforaphane, ... have also shown anticancer activity.

Keywords: Cancer, Taxol, Phytochemicals, Medicinal plants

POLYPHENOLIC PROFILE AND EVALUATION OF THE ANTIOXIDANT AND CYTOTOXIC ACTIVITIES OF STACHYS DURIAIE

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ABSTRACT

Stachys duriaie is an endemic species of Stachys genus from which 14 species are found in Algeria. Polyphenols, iridoids, diterpenoids and triterpenoids are the most important secondary metabolites of this genus. This study investigates, for the first time, the antioxidant and cytotoxic activities of the n-butanolic extract (BESD) of Stachys duriaie, collected from Constantine (Algeria). The antioxidant activity was tested against the radicals DPPH and ABTS whereas the antiproliferative activity was evaluated on PC3 and MDA-MB-231 cell lines via MTT assay. LC-HRMS/MS was used for phytochemical analysis. The BESD showed an excellent antioxidant activity with DPPH (IC50: 2.98 ± 0.19 µg/mL) and ABTS (IC50: 29.32 ± 0.79 µg/mL) and a good antiproliferative activity on PC3 (IC50: 196.4 ± 6.2 µg/mL) and MDA-MB-231 (IC50: 182.4 ± 8.1 µg/mL) cell lines which can be be explained by the high polyphenols content.

Keywords: Stachys duriaie, Antioxidant, Antiproliferative, LC-HRMS/MS, Polyphenols

TSALLIS STATISTICS AND THE DECONFINING PHASE TRANSITION TO A QUARK GLUON PLASMA

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ABSTRACT

The present work aims to analyze the impact of the non-extensive formalism of statistical mechanics given by Tsallis on the Deconfinement Phase Transition (DTP) in Quantum Chromodynamics (QCD). To achieve this, we consider a mixed system comprising hadronic and quark-gluon plasma (QGP) phases within a finite volume. Employing a phenomenological approach with two-phase matter equations of state, we analyze the occurrence of DTP while varying temperature and/or Tsallis parameter q, at a vanishing chemical potential. Our analysis includes the consideration of massive particles in both phases, and we calculate several physical quantities that effectively describe the system at the phase transition. We investigate the behavior of these quantities by examining their variations with temperature and Tsallis parameter q, at a vanishing chemical potential.

Keywords: Quark-Gluon Plasma, Tsallis statistics, Tsallis parameter q

NONLINEAR WAVES AND MODULATIONAL INSTABILITY IN COLD QUARK-GLUON PLASMA

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ABSTRACT

In this work, we investigate the influence of key parameters characterizing a zero-temperature quark-gluon plasma (QGP) on the modulational instability of wave packets propagating through such a medium. Based on the nonlinear Schrödinger equation governing this modulation instability, we find that the QGP can sustain both bright and dark envelope solitons. Notably, parameters such as the equilibrium density, the dynamical mass of the hard gluon, and the coupling constant play a significant role in the formation and excitation of these nonlinear structures. Furthermore, we examine how these same parameters affect rogue waves in the QGP. Our findings reveal that increasing the equilibrium density or the coupling constant leads to a reduction in both the amplitude and the width of the envelope, indicating a damping effect on rogue waves. Conversely, an increase in the dynamical mass results in a substantial rise in both the amplitude and the width of the envelope. The outcomes of this study provide deeper insight into wave phenomena in strongly interacting environments, particularly in astrophysical settings. The exploration of nonlinear wave dynamics in hadronic matter remains a vibrant and compelling field of research.

Keywords: Nonlinear Schrödinger Equation, Bright and Dark envelope Solitons, Quark-Gluon Plasma (QGP), Modulational Instability

NONLINEAR WAVES AND MODULATIONAL INSTABILITY IN COLD QUARK-GLUON PLASMA

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ABSTRACT

In this work, we investigate the influence of key parameters characterizing a zero-temperature quark-gluon plasma (QGP) on the modulational instability of wave packets propagating through such a medium. Based on the nonlinear Schrödinger equation governing this modulation instability, we find that the QGP can sustain both bright and dark envelope solitons. Notably, parameters such as the equilibrium density, the dynamical mass of the hard gluon, and the coupling constant play a significant role in the formation and excitation of these nonlinear structures. Furthermore, we examine how these same parameters affect rogue waves in the QGP. Our findings reveal that increasing the equilibrium density or the coupling constant leads to a reduction in both the amplitude and the width of the envelope, indicating a damping effect on rogue waves. Conversely, an increase in the dynamical mass results in a substantial rise in both the amplitude and the width of the envelope. The outcomes of this study provide deeper insight into wave phenomena in strongly interacting environments, particularly in astrophysical settings. The exploration of nonlinear wave dynamics in hadronic matter remains a vibrant and compelling field of research.

Keywords: Nonlinear Schrödinger Equation, Modulational Instability, Quark-Gluon Plasma (QGP), Bright and Dark envelope Solitons

APPLICATION OF WIGNER-VILLE DISTRIBUTION FOR ANALYSIS VIBRATORY REGIME IN SERIES RLC CIRCUIT

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ABSTRACT

Most interesting signals contain many non-stationary or transient characteristics: evolution, abrupt change, start and end of an event. These characteristics are often the most important part of a signal, and the Fourier transform is notable for detecting time localized information. As against the Wigner-Ville distribution can provide important solutions to this problem because it measures the variations of the frequency components in time of a signal. In our work, we perform the Wigner-Ville distribution to analyze and detect singularities in vibratory regime in series RLC circuit.

Keywords: Wigner-Ville Distribution, RLC circuit, Fourier transform.

EFFECT OF SURFACE FREE ENERGY ON NUCLEATION OF QUARK GLUON PLASMA DROPLETS FROM A HOT HADRONIC GAS

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ABSTRACT

In this work, we study the nucleation of quark-gluon plasma (QGP) droplets in a hot hadronic gas phase (HG). This process is driven by statistical fluctuations, which are determined by the difference in free energy in the QGP and hadronic gas phases. We investigate this difference in free energy by modeling it in two cases; when considering the surface free energy of the quark-gluon/hadron interface and without considering it. We calculate the free energies of both hadronic gas consisting of massive pions and plasma droplet with up, down and strange quarks additionally to gluons, for different SU(3) color representations of the QGP, namely the color singlet, color octet, and color 27-plet. The behavior of the obtained change in free energy is examined with varying radius of the QGP bubble, in the two cases. The results obtained with and without the surface tension contribution are compared, and the effect of surface tension on the nucleation of QGP (uds) droplets from a pionic gas is investigated.

Keywords: Quark-Gluon Plasma, Nucleation, Color Symmetry of SU(3) Group, Free energy, Surface Tension

CRYSTAL STRUCTURE AND DFT CALCULATIONS OF C, P-CHLOROPHENYL-N-PHENYL NITRONE

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ABSTRACT

C,p- Chlorophenyl -N-phenyl nitrone (C13H10ONCl) has been synthesized and characterized by single-crystal X-ray diffraction at 293 K. The title compound crystallized in the Triclinic system (P-1 space group) with Z = 2. The structure of this compound was optimized by density functional theory (DFT) with the three-parameter hybrid functional (B3) for the exchange part and the Lee–Yang– Parr (LYP) correlation function, using B3LYP/6-31G(d,p) and B3LYP/6-31G(d) basis set with Gaussian 09 program package. The calculations converged to an optimized geometry which corresponds to an energy minimum. To compare calculated bond lengths and angles with experimental results, mean relative error of the calculated bond lengths and angles for each basis set was calculated and show that the calculated values obtained by B3LYP/6-31G(d,p) basis are in much better agreement with the experimental data than those obtained by B3LYP/6- 31G(d). The Molecular Frontiers Orbitals (FMOS) calculation is also carried out to determine the charge transfer within the molecule.

Keywords: Crystal structure, DFT, Chlorophenyl, nitrone

METALLIC ELEMENTS ANALYZED VIA A NON-EXTENSIVE VERSION OF THE SOMMERFELD MODEL

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ABSTRACT

The phenomenon of electron transport in metals is among the most extensively studied topics in solid-state physics. The Drude model, developed in 1900, is based on the kinetic theory of gases and treats electrons as classical point particles confined within the volume defined by the atomic lattice. In this framework, electrons follow Maxwell-Boltzmann statistics. Later, Sommerfeld introduced a semi-classical model that incorporated the quantum nature of electrons, which obey Fermi-Dirac statistics. This advancement notably accounted for the temperature dependence of the electronic specific heat—an effect the Drude model failed to capture, as it predicted a constant value. While the Sommerfeld model lacks complete precision, it remains a useful tool for describing many metallic phenomena. Nonetheless, it does not fully succeed in explaining all the electronic properties observed in solids. To enhance its accuracy, we propose incorporating Tsallis' non-extensive statistics into the model. Our approach begins with a generalization of Sommerfeld's method, replacing the standard fermionic distribution with a generalized version derived from non-extensive statistical mechanics. We then compute the electronic specific heat for various metallic elements and compare our theoretical predictions with experimental data.

Keywords: Sommerfeld model, Maxwell-Boltzmann statistics, Sommerfeld model, Tsallis' non-extensive statistics

ACTIVATION ENERGY AND GROWTH RATES OF NANOCRYSTALS YP0.5V0.5O4: 1% TB3+ DURING CALCINATION

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ABSTRACT

The nanocrystalline powders of YP0.5V0.5O4: 1% Tb3+ were synthesized using the sol-gel method, which relies on a series of hydrolysis-condensation reactions. Several parameters influence the kinetics of these reactions and the quality of the powders, with the pH of the aqueous solution and the calcination temperature identified as the most critical factors in the preparation of Nanocrystals powders. This study investigates the growth rate of nanocrystals in YP0.5V0.5O4: 1% Tb3+ powders synthesized using the sol-gel method, focusing on the effects of pH and calcination temperature. Using Scott's equation. Two distinct activation energy phases were identified. For low temperatures (T < 900°C), activation energies were around 10.76 and 49.26 kJ mol−1 for acidic conditions, and 6.72 kJ mol−1 for neutral conditions, indicating interfacial reaction growth. At higher temperatures, activation energies increased significantly, reaching up to 111.27 kJ mol−1, suggesting rapid crystal growth through boundary shifts. In basic environments (pH 9 and 11), a single growth phase was observed with moderate activation energies, indicating uniform growth behavior.

Keywords: Activation Energy, YP0.5V0.5O4: 1% Tb3+, Annealing temperature, Sol-Gel

DISLOCATION DENSITY AND STACKING FAULTS PROBABILITY ANALYSIS OF COAL MILLED POWDERS

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ABSTRACT

Nanostructured Al-Co powders were elaborated by high-energy mechanical milling in P7 planetary ball mill a for several milling times. The structural study resulting from the Rietveld refinement of the X-Ray diffractograms revealed the formation of intermetallic phases, including B2 -CoAl, Al5Co2 And Co(Al) solid solution. Microstructure of different phases is characterized in terms of several microstructure parameters like, crystallite size, <L>, microstrains, stacking faults probability (SFP), dislocation density (ρ). The result of the study showed the maximum values of microstrains and dislocation density is recorded for the Al5Co2 phase. The phase transformations are related to the increase of dislocation density and accumulation of stacking fault.

Keywords: Mechanical alloying, X-ray diffraction, Rietveld method, Intermetallic, stacking faults.

NUMERICAL ANALYSIS OF A SOLAR GREENHOUSE'S THERMAL PERFORMANCE USING A PCM-METAL FOAM COMPOSITE ON CHARGING/DISCHARGING PROCESS

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ABSTRACT

This study proposes a new method of synergetic release of short- and long-term phase change material (PCM) heat storage to address the issue of low greenhouse temperatures at night in northern Algeria. Specifically, supercooled salt hydrate units are activated to release latent heat that has been stored for the season after the organic PCM (RT25) north wallboard with daily storage is unable to provide the necessary indoor temperature. In order to implement this strategy, a microclimate model that takes into account a variety of greenhouse elements, such as solar radiation, crops, indoor air, water vapor, soil, and PCMs, is created. Two-dimensional computational fluid dynamic (CFD) simulations are then used to analyze the strategy's thermal performances in the Batna climate. The results showed that combining the north PCM wall with a paraffin wax storage unit embedded with metal foam resulted in a reduction in the average daytime temperature by 2.0 °C to 3.8 °C compared to without the use of metal foam. The system has the ability to control the greenhouse's temperature, release energy in a synergistic manner throughout the seasons, days, and nights, and increase crop yields in both quantity and quality.

Keywords: Phase change material, Greenhouse, Modeling, Thermal Regulation

A THERMODYNAMIC STUDY OF A SOLAR ADSORPTION AIR-CONDITIONING SYSTEM

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ABSTRACT

Due to increasing concerns with the environmental problems caused by CFCs and the huge energy consumed by conventional refrigeration systems, sorption refrigeration and ai-conditioning systems driven by low temperature heat sources have been developed as an economic and environmental friendly alternative. Absorption and adsorption cycles are the two types of sorption cooling systems. In all these systems, the mechanical energy consumption is kept to a minimum or null and they can operate with low-grade heat from different sources such as waste heat or solar energy. Absorption cooling systems such as those using LiBr-H2O or H2O-NH3 pairs present many advantages for specific applications. They give better system efficiency than adsorption cooling systems. However, these systems also possess many limitations in operating conditions. The great advantage of adsorption systems over absorption ones is that they can operate without moving parts, having then lower costs of maintenance. Other advantages in comparison with the compression systems are: simple construction, environmentally benign and noiseless. A lot of applications for sorption cooling systems have been viewed in both developed and developing countries such as: storage and conservation of vaccines and medical products, food conservation, refrigeration, air conditioning, chillers and ice production. The description of the performance of the adsorption air-conditioning systems involves different modelling techniques with various simplifications, and the corresponding results are significantly different. In this paper, a numerical thermodynamic and parametric analysis of a simple adsorptive air-conditioner system using the zeolithe /water as adsorbent/adsorbate pair is given. The basic fundamentals of the adsorption process are discussed. In the model, variable physical properties with temperature, such as specific heat of the adsorbate and isosteric heat of adsorption or desorption are particularly considered. All thermal contributions occurring in cycles are also determined, especially the sensible heat of the adsorber which is neglected in the majority of done works on such problems. A relationship between the performance of the system and many factors is initially investigated.

Keywords: Air conditioner system; Adsorption; Thermodynamic analysis; Thermal performance coefficient; zeolithe/water and Simulation.

HEAT TRANSFER ENHANCEMENT IN A DIFFERENTIALLY HEATED ENCLOSURE USING TERNARY HYBRID NANOFLUID

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ABSTRACT

Convective cooling plays a major role in many applications including electronic cooling, solar energy, heat exchangers, food processing, nuclear reactors, etc. Improving the thermal efficiency in these systems has captured the attention of researchers for decades. One such method is the use of hybrid nanofluids. Hence, the current study investigates heat transfer and fluid flow in a differentially heated enclosure. The enclosure is filled with ternary hybrid nanofluid. The enclosure's sidewalls, which are exposed to varying temperatures, move at a steady velocity in opposite directions, while the top and bottom walls are thermally insulated. The finite volume method is used to solve the differential equations that govern the problem, and the code developed for this purpose is based on the SIMPLER and TDMA algorithms. Numerical simulations are carried out for different regimes convection (Richardson number, Ri) and concentration of solid ternary hybrid-nanoparticles (ϕ). The results indicate that the heat transfer rate rises with Ri, and THNF concentrations. These results provide aids in improving the performance of cooling systems.

Keywords: Ternary hybrid nanofluid, Asymmetric Heating, Convection, Enclosure, Nanoparticles, Heat Transfer Enhancement, FVM.

INVESTIGATION OF COOLING NANOFLUIDS FLOWING DOWNWARD IN A VERTICAL CHANNEL

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ABSTRACT

The growing worldwide demand for energy and the resulting environmental issues are behind the research effort to designing efficient thermal systems such as solar thermal energy storage and cooling/heating applications. In these systems, heat transfer fluid (HTF) such as water is widely used. However, its low thermal conductivity limits its efficiency. Therefore, nanoparticles are investigated to enhance thermal performance of water HTF. This paper numerically investigates the symmetry breaking in laminar mixed convection of water-based nanofluids flowing downward between two identical isothermal heat sources. Water is used a base fluid dispersed with three nanoparticle types (Cu, Al2O3, and TiO2) at different volume fractions. A home-built code based on finite volume method is developed to solve the conservation equations describing fluid flow and heat transfer. The effect of nanoparticle (NP) type and volume fraction as well as Richardson number (Ri) on fluid flow and heat transfer (Nusselt number) was examined. The results show bifurcation in the flow and thermal field when Ri exceeds a critical value (Ricritic) which depends on the NP type and volume fraction. This bifurcation enhances heat transfer but with alternative increasing peaks of average Nusselt number on the right and left heat source.

Keywords: Heat Transfer, Heat source, Mixed Convection, Nanofluid, Nanoparticle, FVM.

SIMULATION STUDY ON THE DIELECTRIC BEHAVIOR OF MATERIALS AS A FUNCTION OF FREQUENCY

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ABSTRACT

In this work, we propose a theoretical study of the relative permittivity of dielectric materials as a function of frequency, in order to determine their electromagnetic behaviorOur study is based on the calculation of the real and imaginary components of the relative permittivity using Mathematica software. We first calculated the composite permittivity for crude oil, methanol, and water (both distilled and tap). Then, we examined the effect of temperature and the number of carbon atoms on the electromagnetic behavior of water and methanol. The results show polar behavior, characterized by the phenomenon of dielectric relaxation. As the water temperature increases, the thermal agitation of dipoles intensifies, facilitating their movement and resulting in a decrease in relaxation time. In alcohols, the relaxation time is influenced by the number of carbon atoms: the higher this number, the more difficult the movement of molecular chains becomes, leading to an increase in relaxation time.

Keywords: Relative permittivity, Electromagnetic behavior, Mathematica software

THE EFFECT OF THE □-RADIATION DOSE IN THE MICROPLASMA ELECTRONIC DEVICES WITH ZEOLITE CATHODE

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ABSTRACT

The influence of β-radiation (from 1-kGy β to 2-kGy β doses) on the transport properties, charge trapping effects in porous surfaces, and breakdown voltage (UB) in atmospheric microplasmas are investigated for the bases of structural changes that may occur in the material based on electrical and radiation-induced. We measured the current-voltage characteristics of zeolite material irradiated with different b-radiation doses for various pressures in DC-driven microplasma electronic devices. This is because zeolite cathode (ZC) exposure to β-radiation causes the material's porosity to grow, which in turn causes significant drops in UB, discharge currents, and conductivity. The results showed that the release of trapped electrons that are caught by the defect centers after β-irradiation increased the plasma light intensity and electron emission from the ZC surface. The electrical and optical characteristics of the devices made on its foundation are significantly impacted by the porosity of the ZC and radiation defect centers. We use optical stimulated luminescence (OSL) techniques, which describe material imperfections, to uncover the conductivity properties of ZC. When illuminated, the OSL is mainly caused by the transfer of charge from deeper traps to shallower traps. Three natural ZC samples exposed to radiation dosages of 1, 1.5, and 2 kGy underwent measurements. After that, the microplasma electronic devices current-voltage characteristics were compared between the irradiated and non-irradiated ZC. Because of their ion exchange selectivity, zeolites have been viewed as an alternative essential component of radio-chemical process applications at nuclear plants, as well as the cleanup of circulating and low level liquid wastes. Furthermore, their high emissive features of pores, low supply voltage and power consumption, and availability in nuclear radiation applications, likely their resistance to b-radiation, make them highly desirable for microplasma electronic devices. Zeolite nanopores are efficient electron emitters that require little power to provide a plasma light source. For these reasons, from the perspective of microplasma electronic devices optimization, it is crucial to understand the relationship between the discharge characteristics for irradiated and non-irradiated ZC and the discharge production in nanoporous.

Keywords: β-radiation, Microplasma, breakdown voltage, nanoporous zeolite, nonthermal plasma generation, pressure

SOL-GEL SYNTHESIS AND LUMINESCENT PROPERTIES OF GREEN-EMITTING TB-DOPED Y(V0.5,P0.5)O4 PHOSPHOR

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ABSTRACT

Terbium-doped yttrium phosphate-vanadates Y(V0.5,P0.5)O4:1%Tb3+ were successfully synthesized as a phosphorescent powder using a sol-gel method. X-ray diffraction analysis confirmed the formation of a crystalline zircon/xenotime-type tetragonal structure. Scanning electron microscopy revealed that the material consisted of agglomerated particles with a range of morphologies, from spherical to wire-like. Spectroscopic analyses were conducted to characterize the material's optical properties. The UV-visible absorption spectrum showed a strong band at 200 nm, attributed to the charge transfer within the VO43- group, in addition to weaker f→f transition bands from theTb3+ ions. Under excitation, the phosphor exhibited characteristic green luminescence. The photoluminescence spectrum showed two main emission peaks corresponding to the5D4→7Fj transitions of Tb3+ . The most prominent peak, responsible for the strong green emission, was observed at 545 nm (5D4→7F5), while a weaker peak was detected at 492 nm (5D4→7F6).The study concludes with a discussion of the structure of Y(V0.5,P0.5)O4:1%Tb3+ the underlying mechanism of its photoluminescence.

Keywords: Sol Gel, Y(V0.5,P0.5)O4, luminescence

ANTIBACTERIAL ACTIVITY OF TERPENES AND TERPENOIDS PRESENT IN ESSENTIAL OILS

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ABSTRACT

The goal was to examine the antibacterial activity of 15 free terpenes that are frequently found in essential oils and assess the cellular ultrastructure to confirm potential damage to the cellular membrane. Hundreds of studies have reported the antimicrobial activity of essential oils, but the vast majority of these studies attribute the activity to the most prevalent compounds without analyzing them independently.

Keywords: Essential oils, terpenes, terpenoids, antibacterial activity.

IN VITRO ANTIBACTERIAL ACTIVITY OF SEVERAL PLANT EXTRACTS AND OILS AGAINST SOME GRAM-NEGATIVE BACTERIA

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ABSTRACT

Medicinal plants are thought to be new sources of compounds that could be used to treat germs that are resistant to antibiotics. Examining the antibacterial properties of 05 plant extracts and oils against four Gram-negative bacterial species was the goal of this investigation.

Keywords: Plant, extracts, oils, antibacterial activity, gram-negative bacteria.

PHYTOCHEMICAL STUDY AND ANTIBACTERIAL ACTIVITY OF LAVENDER (LAVANDULA OFFICINALIS) ESSENTIAL OIL

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ABSTRACT

True lavender (Lavandula officinalis) is a medicinal and aromatic plant used for a long time in traditional Algerian medicine. Our work is focused on two axes;
1. A phytochemical study of:
The aqueous extract of the stems, leaves and flowers of Lavandula officinalis, which revealed the presence of some chemical groups; tannins, flavonoids and alkaloids.
Essential oil; yield, organoleptic characteristics, physicochemical indices, chemical and spectral profile.
2. Study of the antibacterial power of the essential oil, the antibacterial tests prove positive.

Keywords: True lavender, Lavandula officinalis, aqueous extract, essential oil, organoleptic characteristics, physicochemical indices, chemical and spectral profile, antibacterial activity.

ALGERIAN ARTEMISIA HERBA-ALBA (ASSO): AQUEOUS EXTRACT AND ESSENTIAL OIL INVESTIGATION

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ABSTRACT

White mugwort (Artemisia herba-alba Asso) is a medicinal and aromatic plant used for a long time in traditional Algerian medicine. Our work is focused on two axes;
1. A phytochemical study of:
The aqueous extract of the stems and leaves of Artemisia herba-alba Asso, which revealed the presence of some chemical groups; flavonoids, saponosides, alkaloids and tannins.
Essential oil; yield, organoleptic characteristics, physicochemical indices, chemical and spectral profile.
2. Study of the antibacterial power of the essential oil, the antibacterial tests prove positive.

Keywords: White mugwort, Artemisia herba-alba Asso, aqueous extract, essential oil, organoleptic characteristics, physicochemical indices, chemical and spectral profile, antibacterial activity.

PHYTOCHEMICAL AND ANTIBACTERIAL EVALUATION OF STEVIA REBAUDIANA GLYCOSIDES CULTIVATED UNDER MEDITERRANEAN CLIMATE CONDITIONS IN ORAN-ALGERIA

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ABSTRACT

A phytochemical study was conducted on Stevia rebaudiana seeds cultivated in northwestern Algeria to improve their growing conditions**.** The research focused on seed germination, antioxidant activity, and antibacterial properties of steviol glycoside extract, aiming to assess its therapeutic potential in treating inflammation, type 2 diabetes, cardiovascular diseases, gastrointestinal disorders, and dermatological issues. Experiments demonstrated that proper transplanting at the optimal stage significantly accelerated the growth of Stevia rebaudiana, allowing the plants to reach up to 40 cm in height under favorable Mediterranean climate conditions." Phytochemical screening confirmed the plant's richness in **a**lkaloids, flavonoids, tannins, and saponins, with strong antioxidant activity. Among the tested extraction methods, decoction provided the highest yield after liquid-liquid purification. The steviol glycoside extract exhibited antibacterial effects against Staphylococcus aureus and Bacillus cereus, with mild inhibition of Pseudomonas aeruginosa and Escherichia coli, but no impact on Klebsiella pneumoniae. These findings highlight the suitability of Algeria's Mediterranean climate for Stevia rebaudiana cultivation, enhancing its pharmacological value and potential organic fertilizer applications**.**

Keywords: Pytochemical, Stevia rebaudiana, Antibacterial, Steviol glycoside, cultivation of Stevia.

PHENOLOGICAL DISORDERS IN FRUIT TREE CULTIVARS UNDER CLIMATE CHANGE

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ABSTRACT

Climate change is increasingly disrupting the phenology and fruiting success of temperate fruit tree cultivars such as apple, (Malus domestica Suckow, Borkh.,), pear, (Pyrus communis L.,), plum, (Prunus domestica L.,), cherry (Prunus avium L.,) and walnut (Juglans regia L.,). These species rely on well-defined seasonal cues-including sufficient winter chilling, gradual warming in spring and stable pollination periods-for proper bud dormancy release, flowering and fruit development. However, rising global temperature, erratic weather patterns and increased frequency of extreme events have led to a range of productive disorders including insufficient chilling premature bud break followed by frost damage mismatched in pollination timing, heat-induced fruit abortion, heightened pest and disease pressure. These changes are already affecting fruit quality across various production regions, threatening food security and economic sustainability. This article synthesizes current scientific findings on physiological and ecological mechanism behind climate induced fruiting failure and highlights adaptive strategies such as breeding low-chill cultivars and utilizing climate-smart technologies.

Keywords: Climate change, phenology, pollination, ecological mechanism, climate-smart technologies.

PHYTOTOXICITY ASSESSMENT OF SILVER NANOPARTICLES ON WHEAT SEEDS AND SEEDLINGS

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ABSTRACT

Metallic nanoparticles, particularly silver nanoparticles (AgNPs), are increasingly used in various sectors, including agriculture. However, their potential phytotoxic effects, especially during the early stages of plant development, raise growing concerns.
In this study, we investigated the effects of silver nanoparticles on wheat seed germination by applying different concentrations to assess their impact on germination rate, root elongation, and shoot development. The results revealed a dose-dependent inhibition of both germination and seedling growth. Root and shoot lengths were significantly reduced at higher concentrations, while early germination was also affected at low doses. These findings suggest a marked cytotoxicity of AgNPs, likely associated with their ability to generate oxidative stress and impair cell division processes. Such physiological disturbances result in reduced vigor and developmental delays in the seedlings. This study highlights the need for careful evaluation of AgNPs in agricultural applications. Their impact on seed germination and early plant growth, even at low concentrations, could compromise crop establishment and productivity, warranting thorough risk assessment before large-scale use.

Keywords: Silver, nanoparticles, Phytotoxicity, Wheat, Germination, Oxidative stress

CHARACTERIZATION BY GC-MS AND IN VITRO EVALUATION OF ANTIOXIDANT AND ANTI-INFLAMMATORY ACTIVITIES OF ESSENTIAL OIL FROM LAVANDULA ANGUSTIFOLIA L. COLLECTED IN THE SOUK AHRAS REGION (NORTHEASTERN ALGERIA)

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ABSTRACT

The objective of this study was to determine the chemical composition and to evaluate the in vitro antioxidant and anti-inflammatory activities of the essential oil extracted from the dried leaves of Lavandula angustifolia L., harvested in the Souk Ahras region (Northeast Algeria). The chemical analysis of the essential oil was performed using gas chromatography coupled with mass spectrometry (GC-MS), allowing the identification of 56 compounds. The major constituents identified were linalool (33.96%) and linalyl acetate (33.07%). The in vitro evaluation of the antioxidant activity revealed a notable capacity for free radical scavenging. Furthermore, the anti-inflammatory activity was also assessed, highlighting the potential of Lavandula angustifolia L. essential oil as a natural alternative to synthetic antioxidants and anti-inflammatory agents. These findings suggest that this essential oil could be valorized for its therapeutic applications in the management of oxidative stress and inflammatory disorders.

Keywords: Biological activity, GC/MS, essential oil, Lavandula angustifolia, Souk-Ahras.

BIOPESTICIDES CONTROL BACTERIAL PATHOGENS ON GREENHOUSE GROWING PEPPER PLANTS

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ABSTRACT

Pepper (Capsicum annum) is one of the valuable Solanecea plants, is widely growing either in greenhouses or in fields in Turkiye. We have been producing several varieties of pepper seeds for commercial production in our experimental greenhouses. Recently there have been bacterial and fungal diseases problems occurring and have been managing chemical applications. We found that excessive use of pesticides and chemical fertilizers on long-term large-scale pepper seed production of the single crop, has destroyed the greenhouses ecological environment allowing plant diseases. We aimed to re-store beneficial microorganisms using Bacillus spp and Trichoderma spp. Pepper plants were tested with randomized complete block design (RCBD), with 8 treatments and 2 replicates. For testing commercial Bacillius substilis, Bacillus amyloliquefaciens and Trichoderma harzianum preparates have applied as suggested (1×), half, 1.5 and double concentrations with only distilled water as control. During a month time, all tested plants were monitored every 7-day intervals with 0 to 3 disease scale. The time studies have revealed that all commercial biological preparats affected positively at suggested and higher concentrations against foliar diseases such as pepper bacterial spot diseases. Additionally, the applied antagonistic microorganisms have established induced systemic resistance (ISR) in pepper plants during a month period.

Keywords: Antagonistic effect, Biological control, Capsicum annum

POLYPHENOL CONTENT AND ANTIOXIDANT POTENTIAL OF LEAVE EXTRACTS OF MARRUBUIM VULGARE L. COLLECTED IN TWO REGIONS OF NORTHERN ALGERIA

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ABSTRACT

The white horehound (Marrubium vulgare L.) is widely used medicinal plant for acute bronchial infections and throat inflammation, and it is also used as a condiment. This plant was collected in two different localities in northern Algeria: Blida with a sub-humid climate and Ain Defla with a semi-arid climate. variations in phenolic compounds and their antioxidant potential between leaf extracts of M. vulgare L from Blida (BE) and Ain Defla (AE) has been investigated. Phytochemical screening of Marrubium vulgare L. leaf extracts revealed the presence of polyphenols, flavonoids and coumarins, alkaloids and saponosides in EA compared to BE. On the other hand, very low yields of essential oils were observed with M. vulgare L. from Blida (0.18%) and Ain Defla (0.012%). No glucosides, condensed tannins, hydrolyzable gallic tannins, anthocyanins or anthraquinones in the extracts from both regions. The methanolic AE is five times higher in total polyphenols content (185 ± 0.12 mg Gallic acid Equivalent /g of extract) and twice higher in flavonoids content (40± 0.07 mg Quercetin Equivalent/g of extract) compared to methanolic BE. For the free radical DPPH scavenging activity, an inhibition concentration (IC50) of 70 µg/ml is obtained with AE and is half that of BE (140 µg/ml). Marubium vulgare L. leaves collected in semi-arid region exhibited a greater antioxidant potential than those collected in sub-humid region.

Keywords: Marubium vulgare L., phytochemical screening, secondary metabolites, antioxidant potential.

ANTICANCER PROPERTIES OF INULA VISCOSA: A PROMISING MEDICINAL PLANT

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ABSTRACT

Inula viscosa (L.) Aiton, recently reclassified as Dittrichia viscosa Greuter (Asteraceae), is a perennial, evergreen, and highly branched herbaceous plant characterized by sticky leaves and yellow flowers. Native to the Mediterranean basin and North Africa, it is also considered invasive in regions such as Australia and North America(Seglab et al., 2024) Traditionally, I. viscosa has been extensively used in folk medicine to treat a wide range of conditions, including hypertension, gastrointestinal issues, microbial infections, skin disorders, diabetes, inflammation, cancer, and for promoting wound healing. Contemporary studies have validated many of these uses, demonstrating that extracts and essential oils of I. viscosa exhibit diverse biological activities, such as antipyretic, analgesic, antiviral, antibacterial, antifungal, antiproliferative, antidiabetic, neuroprotective, and antioxidant effects (Chahmi et al., 2015) This review aims to synthesize current evidence on the anticancer effects of I. viscosa, based on 15 peer-reviewed articles selected from major scientific databases, including Scopus, ScienceDirect, Web of Science, and PubMed. Inclusion criteria focused on original studies published in English between 2010 and 2025 that investigated the anticancer activity of I. viscosa extracts, isolated compounds, or essential oils in vitro or in vivo. Exclusion criteria included review articles, studies lacking experimental evidence of anticancer activity, studies focusing on unrelated pharmacological properties, or those not specifying I. viscosa as the tested plant. The findings indicate that I. viscosa exhibits significant antiproliferative, pro-apoptotic, and cytotoxic effects across various cancer cell lines, mediated primarily through its rich content of sesquiterpene lactones, flavonoids, and polyphenols. These results support its therapeutic potential and call for further preclinical and clinical investigations to evaluate its safety and efficacy in cancer treatment.

Keywords: Inula viscosa, Dittrichia viscosa, Anticancer activity, Phytochemicals, Cancer

EFFECTS OF CHITOSAN COATED IRON OXIDE AND SILVER NANOPARTICLES ON GROWTH AND BIOCHEMICAL CHARACTERISTICS OF SNAPDRAGON (ANTIRRHINUM MAJUS)

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ABSTRACT

Snapdragon (Antirrhinum majus) with a colorful flowers and aesthetic appeal, is a perennial plant belonging to the Scrophulariaceae family. Factorial arrangement based on a completely randomized design with four replications were conducted to investigate the effects of chitosan coated iron oxide nanoparticles (chitosan coated IONPs) (0, 50, 100, and 150 µM) and silver nanoparticles (AgNPs) (0, 50, 100, and 150 mg/L-1) on morphological and biochemical traits of the ornamental Snapdragon plant under greenhouse conditions. Measured indices included plant height, Branches Number, flower number and diameter, stomatal conductivity, total phenolic content, and chlorophyll fluorescence indices (Fv/Foand Fm). The results indicated that the interaction effects of chitosan coated IONPs and AgNPs, especially at the concentrations of (100–150 µM) and (100–150 mg/L-1) mg/L respectively, significantly improved vegetative growth, flower production, and physiological indices. Increases in Fv/Foand Fm enhanced photosynthetic efficiency and overall plant growth. Additionally, phenolic content was increased under AgNP treatments by activating the antioxidant defense system. These findings revealed that individual and combined use of nanoparticles can enhance Snapdragon performance, with potential applications in sustainable and high-quality ornamental plant production. Snapdragon (Antirrhinum majus) with a colorful flowers and aesthetic appeal, is a perennial plant belonging to the Scrophulariaceae family. Factorial arrangement based on a completely randomized design with four replications were conducted to investigate the effects of chitosan coated iron oxide nanoparticles (chitosan coated IONPs) (0, 50, 100, and 150 µM) and silver nanoparticles (AgNPs) (0, 50, 100, and 150 mg/L-1) on morphological and biochemical traits of the ornamental Snapdragon plant under greenhouse conditions. Measured indices included plant height, Branches Number, flower number and diameter, stomatal conductivity, total phenolic content, and chlorophyll fluorescence indices (Fv/Foand Fm). The results indicated that the interaction effects of chitosan coated IONPs and AgNPs, especially at the concentrations of (100–150 µM) and (100–150 mg/L-1) mg/L respectively, significantly improved vegetative growth, flower production, and physiological indices. Increases in Fv/Foand Fm enhanced photosynthetic efficiency and overall plant growth. Additionally, phenolic content was increased under AgNP treatments by activating the antioxidant defense system. These findings revealed that individual and combined use of nanoparticles can enhance Snapdragon performance, with potential applications in sustainable and high-quality ornamental plant production.

Keywords: Chlorophyll fluorescence, Nanoparticles, Snapdragon, Stomatal conductivity

RECYCLING ORGANIC WASTE INTO HAIR COLORING

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ABSTRACT

A potential alternative to conventional chemical dyes has been created using walnut and Atlas pistachio leaves, hibiscus flowers, and organic plant-based waste (pomegranate and orange peels) to obtain a natural hair coloration, as well as oxalis as a natural fixative. In our work, we prepared a powder from a mixture of dried plants (walnut and Atlas pistachio leaves, hibiscus flowers, pomegranate and orange peels, and oxalis), then incorporated it into oxidants (hydrogen peroxide at different concentrations). The preparation was applied to hair strands with varying processing times, ranging from 8 to 24 hours. A comparison was made with henna and turmeric, which are traditional dyeing plants, and an evaluation of color intensity, hold, and uniformity was conducted using IR spectroscopy. We then tested the toxicity of the mixture on blood and even on the skin of a healthy human being. The results obtained show the potential of organic waste (pomegranate and orange peels) as sources of natural hair coloration, as well as walnut and Atlas pistachio leaves and hibiscus flowers as plants that have a coloring effect and can be considered as dyeing plants. Our results also show that oxalis has the ability to fix hair color. The toxicity results indicate that the prepared coloration has no side effects or allergenic properties. This hair coloration is considered a sustainable alternative in the cosmetic industry, replacing conventional dye.

Keywords: Coloration, plant-based, waste valorization, alternative

QUANTIFICATION OF BIOACTIVE COMPOUNDS AND BIOLOGICAL ACTIVITIES IN URTICA URENS L. EXTRACTS

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ABSTRACT

Urtica urens L. (commonly known as stinging nettle) is an annual herbaceous plant from the Urticaceae family, widely distributed in temperate regions. Traditionally, it has been used in folk medicine for its anti-inflammatory, diuretic, and antirheumatic effects. In the context of promoting local medicinal plants, this well-known species was investigated. The study included morphological and anatomical analyses using a double staining technique, a chemical characterization focusing on certain phytochemicals (polyphenils, flavonoids, tannins, and sugars), and an evaluation of antioxidant activity using the DPPH assay. The antibacterial properties of the prepared extracts were tested by the disk diffusion method on Mueller-Hinton agar. The bacterial strains tested included Gram-negative species (Escherichia coli, Pseudomonas aeruginosa) and Gram-positive species (Staphylococcus aureus, Bacillus subtilis). The morphological and anatomical examination revealed characteristic stinging hairs, vascular tissues, and parenchyma cells, highlighting important physiological adaptations and a defensive role. Phytochemical analysis quantified polyphenols, flavonoids (50.1 µg QE/mg), tannins, and sugars (224.33 µg GE/mg). Regarding antioxidant activity, the ethanolic extracts showed moderate activity (IC_{50}: 284.36 µg/mL), whereas the hexane extracts exhibited weaker activity (IC_{50}: 630.36 µg/mL). Antibacterial tests showed no significant inhibition against the strains studied, supporting its traditional use as an antioxidant source but not as an antimicrobial agent under these conditions. Overall, these findings validate the traditional use of U. urens as an antioxidant, while indicating limited antibacterial effects. Additionally, its anatomical traits and phytochemical profile further support its therapeutic potential and help confirm its taxonomic classification.

Keywords: Urtica urens, Phytochemical screening, Antioxidant activity, Plant anatomy, Antibacterial activity, Traditional medicine, Polyphenols

USE OF DITTRICHIA VISCOSE EXTRACTS IN THE FORMULATION OF NATURAL COSMETIC PRODUCTS

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ABSTRACT

Dittrichia viscosa, is a medicinal plant native to the Mediterranean regions. It belongs to the Asteraceae family and is often recognized for its therapeutic properties and use in traditional medicine. The use of Dittrichia viscose extracts in the formulation of natural cosmetic products is based on its remarkable antioxidant and antimicrobial properties. This plant, rich in flavonoids, phenolic acids, and essential oils, is a promising ingredient for the development of skin care products. Extracts from this plant show a significant ability to neutralize free radicals, which is crucial for protecting the skin against premature aging caused by environmental factorssuch as pollution and UV rays. The essential oils of Dittrichia viscose also demonstrate notable antimicrobial activity against various strains of bacteria and fungi, helping to prevent skin infections and preserve cosmetic formulations. This antimicrobial efficacy is particularly beneficial for products intended for sensitive or problematic skin, providing extra protection against pathogens. Dittrichia viscose represents a valuable resource for the formulation of natural cosmetic products. This plant offers an effective and environmentally friendly alternative to synthetic ingredients, contributing to the growth of more natural and sustainable cosmetics.

Keywords: Dittrichia viscosa, extracts, antioxidant properties, antimicrobial properties, essential oils.

BIOLOGICAL ACTIVITIES AND THERAPEUTIC POTENTIAL OF THE ESSENTIAL OIL OF THE MEDICINAL PLANT "DITTRICHIA VISCOSA"

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ABSTRACT

The valorization of natural resources is a concern that is attracting increasing attention in our country. The Asteraceae family occupies an important place in Algerian flora, including "Dittrichia viscosa," also known as the "sticky plant" or "false yellow head." This perennial plant, native to Mediterranean countries, has spread to several regions in Europe, as well as North America and Western Australia, where it is naturalized and considered invasive. In Algeria, this plant is common in the Tell region, where its vernacular name is Magramen or Amagramen, and it is renowned for its medicinal properties. This plant has been systematically studied in Algeria and the Mediterranean area from a biochemical perspective, through the extraction and identification of secondary metabolites such as essential oils, polyphenols, and lipids, as well as through the evaluation of their biological activities. Furthermore, studies have shown that it possesses several biological activities, including antioxidant, antifungal, anti-inflammatory, antibacterial, antiviral, antitumor, analgesic, and anti pyretic properties. Our country has a significant biomass of this plant, which deserves to be valorized through new approaches.

Keywords: medicinal plant, Dittrichia viscosa, secondary metabolites, biological activities.

ETHNOBOTANICAL, PHYTOCHEMICAL AND ANTI-INFLAMMATORY EVALUATION OF ANASTATICA HIEROCHUNTICA L. FROM SOUTHERN MOROCCO

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ABSTRACT

Anastatica hierochuntica L., traditionally used by local populations in Southern Morocco, particularly in the Dakhla-Oued Eddahab region, plays an important role in women's health. It is commonly employed as a postnatal intimate hygiene plant and is believed to enhance fertility. The aim of this study was to valorize this species by investigating its traditional uses, phytochemical composition, and anti-inflammatory activity. An ethnobotanical survey was conducted using structured questionnaires among traditional healers, herbalists, elders, and shepherds. Information on plant parts used, traditional preparations, and targeted ailments was collected. The aerial parts of A. hierochuntica were extracted with methanol, and the total phenolic and flavonoid contents were quantified. Antioxidant activity was assessed using the DPPH radical scavenging method. The anti-inflammatory effect was evaluated in vivo using the carrageenan-induced paw edema model in male Wistar rats. Doses of 100, 200, and 300 mg/kg of the extract were tested, with indomethacin (10 mg/kg) as the positive control. The results revealed moderate levels of total phenolics and antioxidant capacity. Ethnobotanical data indicated the use of this plant for treating rheumatism, joint pain, and microbial infections of the uterus. The methanolic extract showed a significant anti-inflammatory effect at 200 mg/kg, comparable to indomethacin, with maximum inhibition observed 24 hours after carrageenan injection. These findings support the traditional uses of A. hierochuntica and provide a pharmacological rationale for its application in women's health. Further microbiological investigations are ongoing to explore its antimicrobial potential.

Keywords: Anastatica hierochuntica; Ethnobotany; Anti-inflammatory activity; Carrageenan-induced paw edema; Traditional medicine; Southern Morocco; Antioxidant activity

IN VITRO EVALUATION OF THE ANTIFUNGAL POTENTIAL OF THE ESSENTIAL OIL OF OCIMUM BASILICUM L.

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ABSTRACT

Several natural properties of essential oils make them both very promising conservation agents for the food industry. The use of bioactive molecules from medicinal and aromatic plants turns out to be an adequate choice in the face of a specific risk or the need to reduce or replace chemical or synthetic conservation agents that have shown their limits associated with health problems that the latter can generate. The Ocimum Basilicum L. plant is part of the medicinal and culinary heritage of several Algerian localities, another time used in popular medicine, and phytopharmacy. The analytical study of essential oil has shown that these components belong to the biochemical class of oxygen monoterpenes, with a large share of methylated phenols, as well as sesquiterpenes. Also revealed a predominance of the Linalol constituent. The antifungal effect of oil extracted by hydrodistyllation on pathogens and powerful food contaminants of the Aspergillus and Penicillium genres by has shown that at low concentrations, this oil has shown better fongistatic and fungicide activity.

Keywords: Ocimum basilicum L, essential oil, contamination, antifungal potential

ASSOCIATION OF CHEMICAL ANTIBACTERIALS WITH EXTRACTS FROM MEDICINAL PLANTS

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ABSTRACT

In recent decades, bacteria resistance from anti-infectious agents has been increasing, especially due to the frequent and sometimes inadequate use of broad spectrum antibiotics. This resistance was quick to become a major health problem worldwide. In antibiotic therapy, it is customary and even recommended to use associations of two molecules; This decreases at the same time and sensitively the frequency of appearance of resistance. Faced with this problem, a recent approach is to combine the use of essential oils and antibiotics. This is a new strategy to overcome the growing problems of resistance and side effects associated with drugs. In our work, we have planned to associate Eucalyptus essential oil and the antibiotics most used in human medicine, and seek their synergistic effect on resistant bacterial strains for antibiotics as well as extracted oil; In order to improve antibacterial activity. The association effect of the two molecules on the strains tested was able to improve antibacterial activity, where the said strains have become sensitive in the majority of cases.

Keywords: plant extract, resistance, antibacterial, association

EFFECT OF LOCAL PERFUMES ON THE GROWTH AND YIELD OF POVIRON VARIETY OF SWEET PEPPER (CAPSICUM ANNUM)

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ABSTRACT

Perfumes, typically containing a blend of aromatic compounds, can positively and negatively affect plant growth. This investigation aims to explore the potential influence of fragrant compounds found in everyday perfumes on the growth and productivity of sweet pepper crops. Sweet pepper (Capsicum annuum) seeds were divided into two sets. A set was soaked in water for two hours, and the second set of seeds was soaked for four hours. Each set was soaked in the three types of perfume (male preferred, female preferred, and unisex) for 2 and 4 hours. Parameters like germination percentage, seedling height, plant height, number of leaves, leaf area, and yield were measured. The experiment used polybags and was laid out in a Complete Randomised Design (CRD) with 3 repetitions. Shorter exposure durations (2 hours) generally led to better germination, growth, and yield than longer exposures (4 hours). The best performance was observed in the control and those treated with male perfume (2 and 4 hours). Two hours of exposure, the Unisex treatment resulted in the highest number of fruits per plant (4.33), while the Control (2.66), Male (3.00), and Female (3.33) treatments showed lower but comparable numbers. Those treated with unisex perfume (2 and 4 hours) negatively affected growth and yield. The SE values suggest some variability, and the significant results indicate that local perfumes do have a meaningful effect on sweet pepper growth and yield, despite the inherent variability in the data. The study emphasizes the importance of managing exposure duration to minimize harmful effects and optimize plant performance.

Keywords: Sweet pepper, Local perfume, germination percentage

PHYTOCHEMICAL STUDY OF 03 SPECIES OF CISTUS MONSPELIENSIS, CISTUS SALVIIFOLIUS AND CISTUS ALBIDUS. EVALUATION OF ANTI-INFLAMMATORY AND ANTIFUNGAL ACTIVITIES

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ABSTRACT

This study is part of the development of three Mediterranean medicinal plants (Cistus monspeliensis, Cistus salviifolius and Cistus albidus) . These plants were collected from four regions of the Mitidja Bainem forest, Berrouaghia, Arboretum of El Merdja, Hammam Melouane in order to know the effect of the harvesting provenance on the chemical composition and on their antinflammatory and antifungal activities The phytochemical screening of the three aerial parts (stem, leaf and flower) of these three species of Cistus show a richness in phenolic compounds, namely flavonoids, tanni and terpene compounds (saponosides and terpenoids). The methanolic and acetone extracts were obtained by extraction with a soxhlet, the extraction yields vary from 13.2% to 32.8% for the methanolic extracts and between 9.9% and 21.8% for the acetone extracts. The yield of essential oil obtained by hydrodistillation is low and even unusable for the three species studied and for all the harvesting provenances, on the other hand the yield obtained by steam distillation is appreciable compared to that of hydrodistillation. Some Cistus showed an important anti-inflammatory potency with a percentage of 55.21%, 48.83% and 56.32% respectively. The study of the antimicrobial power of the two methanolic extracts, acetone and the hydrolate of Cistus monspelliensis Berouguiya CMB, Cistus monspelliensis Hamam Melouane CMHM, Cistus albidus BerouaguiyaCABr, Cistus monspelliensis Bainem CMB, by the disc diffusion method showed a good antifungal activity against the five phytopathogenic strains (Colletotrichum gloeosporiodes, showed (Colletotrichum gloeosporiodes, Penicillium digitatum, Penicillium italicum, Alternaria sp, Trichothecium roseum) tested

Keywords: Cistus monspeliensis, Cistus salviifolius, Cistus abidus, methanolic extract, extract acetonic, phytopatogenic, anti-inflammatory activity, antifungal activity

BIOCHEMICAL AND PHYSIOLOGICAL RESPONSES OF MATTHIOLA TRICUSPIDATA AND CAKILE MARITIMA COASTAL DUNE SPECIES OF ZEMMOURI EL BAHRI (ALGERIA)

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ABSTRACT

Species of coastal dunes are subjected to several environmental stress factors such as drought, high temperature, light intensity as well as salinity, which led to development of specific morphological, physiological and biochemical adaptation mechanisms. Studying these strategies allows explaining the survival of these species in such hostile and stressful conditions. In this study we compared some parameters (morphological, physiological and biochemical) of two Brassicaceae species Matthiola tricuspidata (L.) W.T. Aiton, Cakile maritima Scop, harvested from their natural environment in coastal dunes of Zemmouri El Bahri (Algeria), with the aim to understand their mechanisms of adaptation. The leaf traits analyzed include leaf area (LA), leaf dry matter (LDM), leaf mass area (LMA) and succulence index (SI) for the morphological aspect, relative water content and photosynthetic pigments i.e. chlorophyll a, chlorophyll b and carotenoids for the physiological aspect, while the biochemical aspect consisted in evaluating the contents of total phenolic compounds, total flavonoids and anthocyanins. The results revealed that Cakile maritima showed the highest relative water content, leaf area, leaf mass area, and succulence index. Based on the highest levels of total phenols, flavonoids and anthocyanins as well as high contents of photosynthetic pigments, Matthiola tricuspidata can be classified as "homoiochlorophyllous" plant. The dry mass content varied considerably among species, with the highest values observed in Matthiola tricuspidata and the lowest in Cakile maritima. The relatively high levels of total phenols, total flavonoids, anthocyanins and carotenoids implies a biochemical adaptation that allows these plants to maintain necessary photosynthetic activity under a water deficiency condition. The screening of phytochemical compounds of hydroalcoholic extracts obtained from the leaves of the species was carried out electrospray ionization mass spectrometric detection (ESI-MS), which led to identifying forty six (46) phenolics components (7 phenolic acids, 10 flavones, 14 flavonol, 5 Flavan-3ols, 2 isoflavones, 4 flavanone, 1 tannin, 1 anthocyan, 1 dihydrocalcone, 1 coumarin), highlighting a qualitative phenolic profile with similarities and differences in each species.

Keywords: Matthiola tricuspidata, Cakile maritima, Adaptation, Polyphenol, Biochemical content, Physiological responses.

VALORIZATION OF PHENOLIC COMPOUNDS AND ESSENTIAL OILS FROM ALGERIAN CLINOPODIUM NEPETA (L.) KUNTZE: ANTIOXIDANT ACTIVITY AND MOLECULAR SCREENING STUDY

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ABSTRACT

The objective of the study is to evaluate the phytochemical content and antioxidant potential of phenolic compounds and essential oils extracted from Clinopodium nepeta (L.) Kuntze. Total phenolic content was determined using the Folin-Ciocalteu method and essential oils were obtained by hydrodistillation. Antioxidant activity was evaluated using the DPPH, ABTS and FRAP methods. The results showed that the phenolic extract exhibited higher antioxidant activity compared to the essential oils. The activity of phenolic compounds is attributed to their richness in flavonoids and other active polyphenolic constituents. This result show the potential effect of Clinopodium nepeta as a natural source of antioxidants.

Keywords: Clinopodium nepeta, essential oil, flavonoids, antioxidant.

THE EFFECTS OF COLD ATMOSPHERIC PLASMA TREATMENT ON GERMINATION OF HAZELNUT (CORYLUS AVELLANA L.) SEEDS

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ABSTRACT

In this study, the effects of cold plasma treatment using air and nitrogen gases on hazelnut (Corylus avellana L. 'Tombul') seed germination was investigated at the Giresun Hazelnut Research Institute. Treatments were applied using a cold atmospheric pressure plasma jet, with air plasma (AP) exposures of 1, 2, 4, 8, and 12 minutes, and nitrogen plasma (NP) exposures of 2, 4, and 8 minutes. Seeds were recorded as germinated following visible cracking and the emergence of the hypocotyl. Seeds treated with AP began germinating in week 18, three weeks earlier than the control. The highest germination rates were observed in seeds exposed to AP for 2 and 4 minutes. Notably, seeds treated with NP for 4 minutes exhibited an even greater improvement in germination. The dose–response curve indicated that 2–4 minutes of plasma exposure was optimal for enhancing germination. These findings show that cold plasma technology holds significant promise for improving germination and germination speed in hard-to-germinate species like hazelnut and could serve as an effective seed priming technique in agricultural production. To the best of our knowledge, this is the first report on utilizing cold plasma as a pre-sowing seed treatment of hazelnuts.

Keywords: Plasma agriculture, Cold plasma treatment, Seed germination, Seedling growth, Hazelnut

CORRELATION OF BIOMARKERS OF COMBINED STRESS TOLERANCE IN EGGPLANTS AND EVALUATION WITH POLAR HEAT MAP

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ABSTRACT

Abiotic stress factors are among the primary causes of yield losses in agricultural production, with drought and salinity being particularly prominent among these stresses. Drought stress, increasingly felt due to global warming, severely restricts plant production, especially in arid and semi-arid regions. Drought often causes soil salinization, while excessive soil salinity also leads to yield losses in many crop plants. The simultaneous occurrence of both stresses leads to even more serious negative effects on plant development and yield. Therefore, understanding the tolerance mechanisms that plants develop under such combined stress conditions is crucial for developing effective agricultural strategies. This study evaluated the relationships between biological markers that play a role in combined stress tolerance in eggplant under combined drought and salinity stress conditions and that provide concrete indicators of the multifaceted stress responses. As a result of evaluations using correlation analysis and a polar heatmap, strong relationships were identified among shoot dry weight (SDW), malondialdehyde (MDA), proline, total anthocyanins, total phenolic compounds, some antioxidant enzyme activities (SOD, CAT, GR), and the K^+/Na^+ ion ratio. The polar heatmap comprehensively revealed the relationships between biomarkers in stress responses in terms of direction and intensity. These findings demonstrate that these parameters are important biomarkers reflecting the level of tolerance to combined stress in eggplant and provide guidance for selecting genotypes with high stress tolerance or for planning future studies.

Keywords: Antioxidant Enzymes, Biological Markers, Combined stress, Eggplant, Ion Homeostasis

DIFFERENTIAL PROTEOMIC RESPONSES OF TRADITIONAL AND MODERN DURUM WHEAT CULTIVARS WITH BIOCHAR TREATMENT

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ABSTRACT

Biochar, a carbon-rich byproduct of biomass pyrolysis, has emerged as a sustainable soil amendment to increase soil fertility, plant productivity, and stress resilience. To explore its influence at the proteomic level, a comparative study was conducted on two durum wheat (Triticum durum) cultivars, Saragolla (traditional) and Svevo (modern), grown under normal conditions with 5% (w/w) biochar application. A total of 59 differentially expressed spots were investigated in leaf tissues using two-dimensional electrophoresis (2-DE) and nano LC-ESI-LIT-MS/MS-based proteomic analysis. Proteomic profiling revealed significant differences not only between controlled and biochar-treated plants but also between cultivars. The differentially expressed proteins were functionally categorized into key biological processes, including photosynthesis, carbon and energy metabolism, abiotic stress, and oxidative stress. Biochar administration notably upregulated proteins associated with photosynthesis and carbon & energy metabolism in both cultivars, suggesting an enhanced photosynthetic capacity and improved energy production under biochar influence. Simultaneously, proteins involved in abiotic stress and oxidative stress were significantly downregulated in both cultivars with biochar amendment, indicating a reduction in cellular stress levels and a likely restoration of reactive oxygen species (ROS) homeostasis. Gene Ontology (GO) enrichment and KEGG pathway analyses together confirmed that biochar treatment led to a functional reprogramming in plants, highlighting the enrichment of key pathways including photosynthesis, carbon fixation, glycolysis/gluconeogenesis, and pentose phosphate pathway. Overall, this study offered novel insights into significant pathways by which biochar modulated wheat metabolism, with Saragolla further standing out for its consistently higher expression, underscoring its superior physiological responsiveness to biochar amendment. The enhancement of photosynthetic machinery and energy production, coupled with the downregulation of stress-related proteins, indicated that biochar facilitated a more efficient allocation of cellular resources, favoring growth and yield over stress mitigation. These results reinforced the utility of biochar as a strategic input in modern agronomic systems aimed at enhancing crop performance and resilience through metabolic optimization.

Keywords: Wheat, Saragolla, Svevo, Biochar, Proteomics, Photosynthesis, Carbon & energy metabolism, Abiotic stress, Oxidative stress.

ECOLOGICAL DETERMINANTS OF ESSENTIAL OIL VARIABILITY IN TETRACLINIS ARTICULATA: A MIXED PCA APPROACH

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ABSTRACT

This study investigates the impact of ecological factors, including exposure, altitude, and soil pH, on the yield and chemical composition of essential oils (EOs) extracted from the leaves of Tetraclinis articulata (Vahl) Masters, collected from the S'dama Chergui massif in northwestern Algeria. EOs were obtained by hydrodistillation, with yields averaging 0.33 ± 0.13%, 0.29 ± 0.07%, 0.24 ± 0.07%, and 0.20 ± 0.03%, corresponding to south, west, north, and east exposures, respectively. Gas chromatography–mass spectrometry (GC/MS) analysis identified numerous constituents grouped into 22 chemical families. The most abundant compounds across all samples were Bornyl acetate (7.95–11.20%), Limonene (5.03–7.18%), α-Pinene (4.79–5.26%), Camphor (3.01–7.53%), and Borneol (4.93–6.26%). To further explore the relationships between environmental variables and essential oil characteristics, a Mixed Principal Component Analysis (PCA) was performed. This multivariate approach revealed a clear structuring of the samples according to exposure, pH, and altitude, closely associated with both yield variability and specific chemical profiles. The first two dimensions accounted for a significant portion of the total variance, highlighting the strong influence of ecological conditions on EO composition and quantity. These findings underscore the importance of local environmental factors in determining the phytochemical value of wild medicinal species and provide a basis for targeted valorization strategies in natural product research.

Keywords: Tetraclinis articulata, essential oils, ecological variability, GC/MS, mixed PCA, chemotypic diversity

A RESEARCH ON IN VITRO MICROPROPGATION OF GERANIUM (PELARGONIUM GRAVEOLENS)

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ABSTRACT

Geranium (Pelargonium graveolens) is a perennial, herbaceous shrub-like aromatic plant species that contains essential oil in its leaves and flowers. The essential oil of the geranium (Pelargonium graveolens) plant is widely used in the perfume and cosmetics industries. The demand for high-quality geranium essential oil is increasing day by day. However, in Turkey, geranium plants grown for landscaping purposes are not cultivated for the essential oil industry. As a result of verbal discussions with the essential oil industry in Turkey, it has been concluded that the widespread cultivation of geranium plants is necessary. It is understood that the export potential of lavender essential oil currently imported from abroad is also high. The rose-scented "Bourbon" variety of the lavender plant is preferred in the perfume and cosmetics industries. However, since this variety is a hybrid, it does not produce fertile seeds, meaning seed production is not possible. Therefore, the plant is propagated vegetatively. To promote the widespread cultivation of geranium in Turkey, it is necessary to develop and optimize a rapid, healthy, and mass micro-propagation method. This project was conducted to determine the appropriate nutrient medium combination for in vitro propagation of the geranium plant and to identify the suitable rooting medium for in vitro-propagated plantlets. To serve the propose MS medium combined with 1 BAP (g/l) + 0.01 IBA (g/l), 2 BAP (g/l) + 0.02 IBA (g/l) and Vacin &Went medium combined with 0.5 BAP (g/l) + 0.01 IBA (g/l), 1 BAP (g/l) + 0.01 IBA (g/l), 2 BAP + 0.02 IBA (g/l). Results revealed that MS medium supplemented with 0.5 BAP+ 0.01 IBA gave the best result regarding number of shoots, leaves and shoot length.

Keywords: Geranium, micropropagation, in vitro, shoot and leaf formation, number of leaves, shoot length

A RESEARCH ON IN VITRO MICROPROPGATION OF GINGER (ZINGIBER OFFICINALE ROSCOE)

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ABSTRACT

Medicinal plants have long been used to treat various diseases. Ginger (Zingiber officinale Roscoe), a herbal plant from the Zingiberaceae family, is one of these plants. It is used as a spice and medicine in the treatment of cancer; cardiovascular diseases; diabetes; and some other diseases such as colds, nausea, asthma, and coughs. Polyphenols and flavonoids, which are found in high amounts in leaves, stems and rhizomes, play an important role in the pharmacological effect of ginger. These polyphenols and flavonoid compounds are natural sources of antioxidants. Ginger rhizome is a rich source of these antioxidants and is also naturally used in food preservation due to its antimicrobial activity. Due to all these unique properties, the demand for ginger is increasing in the world markets. Due to the rapid increase in soil diseases, the yield of ginger, which is an expensive product, decreases in rhizome production. Tissue culture method provides disease-free plants. In addition, a large number of plants can be obtained in a very short time with tissue culture technique. The present research was aimed to determine the optimum conditions for ginger production by tissue culture. For in vitro shoot multiplication, uncontaminated explants obtained from the culture initiation stage were cultured in MS medium supplemented with 10 µM BAP to provide sufficient explants for the shoot multiplication experiment. After four weeks, multiple shoots were produced, and these shoots were used as explants for shoot multiplication. Before starting the experiment, in vitro-grown shoots were cultured in MS hormone-free medium for two weeks to reduce the effects of the previously used BAP. After two weeks, in vitro-grown shoots were shortened to 1 cm, preserving the shoot base, and then transferred to shoot multiplication medium. MS medium supplemented with different types of cytokinins, BAP, kinetin, and zeatin at 10 µM, TDZ at 5 µM, and medium without MS cytokinin as a control were used for shoot multiplication. MS medium supplemented with 4, 5 g/l BAP was found to be the best media composition regarding number of shoots, leaves and shoot length.

Keywords: Ginger, micropropagation, in vitro, shoot and leaf formation, number of leaves, shoot length

DETERMINATION OF EFFECTIVE DOSES (ED_{90}) OF SOME ACCASE-INHIBITING HERBICIDES FOR WEEDY RICE (ORYZA SATIVA L.) CONTROL

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ABSTRACT

Weedy rice (Oryza sativa L.) is one of the most problematic weeds in rice cultivation. Due to its close genetic relationship with cultivated rice, its chemical control is particularly challenging. While IMI, Provisia, and ROXY herbicide-resistant systems are commonly used for red rice management, there is a need to evaluate the effective doses of alternative herbicides that could be used in the development of new resistance sources. This study aimed to determine the effective doses (ED_{90}) of two ACCase-inhibiting herbicides fluazifop-p-butyl and sethoxydim for the control of weedy rice. Five different weedy rice accessions (1, 2, 3, 4, and 5) collected from California were used in the experiment. The 1× label dose for fluazifop-p-butyl was 210 g active ingredient (ai) ha^{-1}, and for sethoxydim was 322 g ai ha^{-1}. Each herbicide was applied at the following rates: 0× (control), 1/16×, 1/8×, 1/4×, 1/2×, 1×, 2×, 4×, 8×, and 16×. Applications were carried out in a calibrated automated spray chamber at 275 kPa pressure, delivering 187 L ha^{-1} spray volume. A non-ionic surfactant (0.25% v/v) was added to all herbicide treatments. Weedy rice seedlings were grown under greenhouse conditions until the 3–4 leaf stage, and herbicide applications were made accordingly. Biomass was harvested 28 days after treatment and dried for effective dose (ED_{90}) estimation using bioassay analysis. The experiment followed a completely randomized block design with five replications. Dose–response analysis showed variation among the weedy rice accessions. The ED_{90} values of fluazifop-p-butyl for accessions 1, 2, 3, 4, and 5 were 127, 269, 156, 106, and 156 g ai ha^{-1}, respectively. The ED_{90} values of sethoxydim for the same accessions were 190, 173, 97, 135, and 153 g ai ha^{-1}, respectively. In general, the 1× label dose of both herbicides effectively controlled the majority of the red rice populations tested. These findings suggest that fluazifop-p-butyl and sethoxydim may be viable candidates for the development of new herbicide-resistant rice cultivars targeting weedy rice.

Keywords: Dose-response, effective dose, herbicide resistance, weedy rice.

RICE BREEDING PROGRESS IN THE BLACK SEA REGION DURING THE LAST DECADE

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ABSTRACT

The Black Sea Region is one of Turkey's leading rice (Oryza sativa L.) producing site, ranking second in both cultivation area and total production. Rice breeding efforts at the Black Sea Agricultural Research Institute began in the 1980s and have continued ever since. The objective of this study is to evaluate the last ten years of the rice breeding program, outline the variety development processes, and present the characteristics of the varieties developed. The breeding material primarily consists of Japonica-type rice genotypes, along with selected Indica and Javanica types. In addition to the existing genetic stock, the gene pool is expanded by incorporating new genotypes with known characteristics from both domestic and international sources. After hybridization, a modified bulk method is used. According to this method, plants are harvested in bulk up to the F3 generation, followed by pedigree selection until the F7 generation. Selected lines are then evaluated in preliminary yield trials, advanced yield trials, and regional trials. Using this breeding protocol, three rice varieties were released, Kocamaninci (2020), Gizlenci (2021), and İlkeren (2022). Kocamaninci stands out for its high milling yield, with a plant height of 85 cm, 1000-grain weight of 33 g, milling yield of 65%, and a yield potential of 8–9 t ha^{-1}. Gizlenci is notable for its high grain yield, with a plant height of 97–100 cm, 1000-grain weight of 34 g, 60% milling yield, and a yield potential of 8–10 t ha^{-1}. İlkeren is characterized by its earliness and is currently the earliest maturing rice variety in Turkey. It has a plant height of 95–100 cm, 1000-grain weight of 35 g, 58% milling yield, flowering time of 70 days, maturity in 90–95 days in late sowings and 100–110 days in early sowings, and a yield potential of 6–7 t ha^{-1}. These varieties, each possessing unique advantages, are being produced as certified seed and distributed to farmers. In the coming years, the breeding program aims to continue developing high-yielding and high-quality varieties with specific advantageous traits.

Keywords: Early maturity, grain yield, milling yield, modified bulk method, rice breeding

SCREENING AND CHARACTERIZATION OF POTATO CYST NEMATODE RESISTANCE DERIVED FROM SOLANUM AMERICANUM SPECIES

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ABSTRACT

Potato cyst nematodes (PCN) threaten potato production, causing yield losses exceeding 50%. Introgression of resistance from wild Solanum species into modern cultivars is an effective and sustainable PCN management strategy. Given the demonstrated resistance potential of Solanum americanum against Phytophthora infestans, this study aimed to identify its novel genetic sources for durable PCN resistance. Solanum americanum is generally considered resistant to PCN, but to map resistance loci, a susceptible accession needed to be identified for crosses and subsequent mapping. Accordingly, 41 Solanum accessions were initially screened against Globodera pallida, identifying three susceptible, four partially resistant, and two fully resistant accessions for further investigation. Hatching assays using Solanum root exudates determined that susceptibility/resistance was not related to hatching stimulation, implying a role for resistance genes. The physiological response of resistant Solanum accessions was characterised by quantifying reactive oxygen species in inoculated roots. This revealed the intricate and dynamic nature of defence signalling in resistant accession, as demonstrated by both early and late oxidative bursts upon nematode infection. As a first step towards mapping resistance loci, one of the susceptible accessions was crossed with two resistant accessions to generate F1 populations. To optimise resistance evaluation, the susceptible parent accession was tested under various soil types and inoculum levels. The results suggested that root-trainers containing compost and sand-loam mix with high nematode inoculum supplemented with potato root exudates significantly increased G. pallida populations, providing a more robust resistance screening system. Segregation patterns of resistance in F1 populations indicated the presence of two or more highly effective unlinked dominant genes conferring resistance to G. pallida. Our findings confirm the heritability of resistance traits and reveal the genetic diversity within the Solanum populations. The identification of variable resistance to G. pallida in Solanum species provides a strong foundation for future exploitation of PCN-resistant potato cultivars.

Keywords: Globodera pallida, PCN, Solanum americanum, reactive oxygen species, resistance response.

TEMPORAL DYNAMICS OF PHENOLIC ACCUMULATION IN CHENOPODIUM QUINOA ACROSS PHENOLOGICAL STAGES UNDER GREENHOUSE CONDITIONS: INSIGHTS FROM LC-MS FINGERPRINTING

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ABSTRACT

Chenopodium quinoa (quinoa) is globally recognized for its nutritional and functional properties, largely attributed to its rich profile of phenolic compounds. While the phytochemical diversity of quinoa grains is well-documented, temporal shifts in phenolic composition throughout plant development remain underexplored. In this study, we investigated the dynamic accumulation of phenolics in the Royal White cultivar of C. quinoa propagated under conventional greenhouse conditions. Samples were collected at seven distinct phenological stages, from early vegetative growth to seed maturity. Methanolic extracts of freeze-dried tissues were analyzed using liquid chromatography–mass spectrometry (LC–MS), and metabolite fingerprinting was conducted to reveal variations in phenolic profiles. Multivariate statistical analyses demonstrated distinct stage-specific clustering of samples, driven primarily by differences in the abundance of phenylpropanoid-derived compounds and flavonoids. Pre-flowering stages (vegetative and branching phases) exhibited the highest diversity and relative intensity of phenolic compounds, notably including quercetin-based glycosides and hydroxycinnamic acid derivatives. In contrast, a marked decline in phenolic complexity and abundance was observed post-anthesis, suggesting a developmental shift in secondary metabolism. These findings highlight a biosynthetic prioritization of antioxidant phenolics during early growth, potentially linked to photoprotection and defense. This study provides a temporal phytochemical framework for optimizing harvest time based on targeted phenolic content, which could be relevant for functional food, nutraceutical, and breeding applications. Furthermore, the use of LC–MS-based fingerprinting proved a valuable approach for monitoring complex metabolite fluctuations in quinoa tissues throughout plant development. The present study is a product derived from the project INV-CIAS-4252 financed by Vicerrectoria de Investigaciones at UMNG, validity 2025.

Keywords: Quinoa, phenolics, LC-MS fingerprinting, phenological stages, secondary metabolism dynamics

PHYTOCHEMICAL PROFILING AND IN VITRO ANTIOXIDANT EVALUATION OF GREEN COFFEE BEANS OF COFFEA ARABICA

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ABSTRACT

The aim of this study is to investigate the phytochemical profile and evaluate the in vitro antioxidant activity of green bean extracts of Coffea arabica. Qualitative phytochemical screening of the aqueous infusion extract revealed the presence of several classes of secondary metabolites. The extract was found to be particularly rich, exhibiting the presence of polyphenols, flavonoids, tannins, anthocyanins, coumarins, and alkaloids. In contrast, glycosylated flavonoids, saponins, quinones, and steroids were not detected. The quantification of total polyphenols and flavonoids by spectrophotometric methods in the methanolic extract of green beans of Coffea arabica indicated the presence of these compounds, with contents of 136.01 µg gallic acid equivalents per mg of extract (µg GAE/mg) for polyphenols and 1.96 µg quercetin equivalents per mg of extract (µg QE/mg) for flavonoids. The in vitro antioxidant activity of the methanolic extract of green beans of Coffea arabica was evaluated. The results indicate that the extract exhibits moderate radical-scavenging activity against the DPPH radical, with an IC_{50} value of 80.48 µg/mL. These findings highlight the potential of green Coffea arabica beans as a natural source of bioactive metabolites with antioxidant properties. This metabolic composition supports the targeted valorization of this species in the fields of phytotherapy and nutraceuticals.

Keywords: Coffea arabica, polyphenols, flavonoids, antioxidant activity

DEVELOPMENT OF LARGE-GRAIN, SHORT-STATURE RICE (ORYZA SATIVA L.) GENOTYPE

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ABSTRACT

Rice is one of the most important crops in Türkiye, accounting for 20–30% of its imports. Therefore, there is an urgent need to develop high-yielding varieties with superior grain quality. This study was conducted between 2011 and 2024, involving approximately 490 lines derived from 60 hybrid combinations. Out of these, seven promising lines were selected for evaluation in regional yield trials. The objective of this research was to determine the agronomic performance and grain quality of rice genotypes under the ecological conditions of Samsun. A total of 10 rice genotypes-7 candidate lines and 3 standard cultivars were evaluated in regional yield trials conducted in the Bafra and Tekkeköy districts during the 2023 and 2024 growing seasons. The trials were arranged in a randomized complete block design with three replications. The study evaluated grain yield, 1000-grain weight, maturity day, plant height and milling yield. Significant differences were observed among genotypes for these traits. Additionally, both environmental effects and genotype × environment interactions were found to be significant. Among the tested genotypes, 2014-KA009.1 recorded the highest grain yield. The line 2011-KA1035.2 showed higher yield performance than one of the three standard cultivars. Despite its moderate yield and quality performance, this genotype stands out among the tested lines due to its superior 1000-grain weight, large grain size, and short stature. Consequently, due to its superior traits, it was proposed as a candidate for cultivar registration in 2025. This short-statured, large-grained, and high-yielding rice variety has the potential to meet the needs of both producers and consumers.

Keywords: Rice (Oryza sativa L.), rice genotype, large grain, registration

APPLICATION OF ARTIFICIAL NEURAL NETWORKS (ANN) IN YIELD STABILITY AND ADAPTABILITY ASSESSMENT OF WINTER TRITICALE GENOTYPES

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ABSTRACT

Stability of grain yield is a fundamental criterion in the selection and advancement of triticale genotypes for breeding and agricultural production. This study presents a comparative analysis of yield stability for 16 triticale genotypes evaluated across three consecutive years, using three independent approaches: the classical AMMI (Additive Main effects and Multiplicative Interaction) model, a simple artificial neural network (NN) with a single hidden layer, and a deep multilayer perceptron (MLP) neural network. For each method, genotype stability was quantified using the Euclidean distance from the origin in AMMI biplots, and the standard deviation of prediction errors across environments for both neural network models. The AMMI analysis identified genotype G9 as the most stable, while both neural network models consistently ranked G10 and G11 as top performers in terms of stability. Deep learning MLP provided the lowest prediction errors, highlighting its sensitivity to complex, nonlinear genotype × environment interactions. Rank correlations (Spearman's ρ) between the three approaches ranged from moderate to high, with the strongest agreement observed between the two neural network models ($\rho = 0.78$, $p < 0.01$). The results demonstrate that while the AMMI model remains a robust tool for classical stability analysis, neural networks—especially deep MLP architectures—offer improved differentiation and prediction accuracy for genotype stability. The integration of both traditional and modern machine learning approaches is recommended for a more comprehensive assessment of genotype performance and selection in triticale breeding programs.

Keywords: triticale, genotype stability, AMMI, neural networks, deep learning, yield prediction

RESISTANCE RESPONSE OF NEW SUNFLOWER LINES AND HYBRIDS TO PLASMOPARA HALSTEDII

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ABSTRACT

The resistance of newly developed sunflower (Helianthus annuus L.) breeding lines and hybrids to downy mildew caused by Plasmopara halstedii is evaluated under controlled laboratory conditions. Over four consecutive seasons, a total of 3,065 genotypes are screened using the highly virulent pathogen race 777/3. Seedlings are inoculated at the cotyledon stage, and disease reactions are scored according to established phytopathological criteria. Across all testing years, the frequency of highly resistant reactions is consistently low. In the first season (744 entries), only 2.6% exhibit complete resistance to race 777/3 (absence of symptoms), while 84.4% display a fully susceptible reaction, characterized by systemic sporulation and severe stunting. The second season (837 entries) confirms this trend, with 7.2% showing high resistance and 80.8% rated as fully susceptible. In the third season, resistant phenotypes remain rare, with susceptibility dominating irrespective of genetic origin. The fourth season (647 entries) again records only 2.6% with high resistance, while 91.3% exhibit high susceptibility. The results indicate a narrow genetic base for race-specific resistance to P. halstedii within the evaluated germplasm. Although individual genotypes express complete or partial resistance to race 777/3, their frequency is insufficient to ensure stable protection under production conditions. These findings emphasize the need to introgress and combine effective resistance genes from diverse sources into breeding populations to achieve durable, race-specific protection against P. halstedii.

Keywords: Plasmopara halstedii, hybrids, lines, sunflower, resistance, Downy mildew

BIODIVERSITY OF FLORA OF SOME ADRIATIC ISLAND AND ISLETS OF DALMATIA IN THE CROATIA

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ABSTRACT

Floral research was conducted on several islands and islets of the Adriatic Sea, the Eumediterranean zone (Dalmatia) and comparative analysis of the flora was made. A great biodiversity of flora and habitat types was determined. Within the flora of the islands and islets, the highest representation of plants families, life formes, floral elements, endemic taxa, strictly protected and invasive plant taxa was analyzed.

Keywords: Biodiversity, flora, Dalmatia, Croatia, habitat, families, life formes, floral elements, endemic taxa, strictly protected, invasive plant

THE ROLE OF SUPPLEMENTARY IRRIGATION FOR FOOD PRODUCTION IN A SEMI-ARID COUNTRY PALESTINE

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ABSTRACT

Palestine consists of the West Bank and the Gaza Strip. The proclaimed state of Palestine has a land area of 6,657km³. Water is always considered as an essential factor of life and development in arid and semi-arid countries. In Palestine the total per capita water consumption is 139m³. The total available water for Irrigation is 239 MCM which is responsible for irrigating only 330,000 dunums out of 2,314.000 dunums cultivated that can be irrigated if water is available i.e. 5% of the total cultivated land. The average rainfall is 450mm and unfortunately there isn't any water harvesting structures i.e. dams, most of this rainwater flowing towards the Dead Sea or the Mediterranean Sea as waste. So harvesting this water in individual farmer land and using this water for supplementary irrigation to irrigate olive trees, almonds, grapes and cereals will be of a great impact on the Palestinian land for feed production. It should be noted that there are few farmers who practice supplementary irrigation for production of vegetables that are planted in summer as individual initiative. The quantity and quality of production that they have is extremely tangible. Since most of the land in Palestine is planted by olive, grape, and cereals, supplementary irrigation should be introduced and practiced where the production of wheat via irrigation by treated wastewater was three times that under rain fed planting project implemented in a pilot project. Reuse of treated wastewater for irrigation as supplementary irrigation will increase the irrigated area in Palestine and will replace the fresh water that can be used for domestic purposes. Wheat production was trippled when supplementery irrigation used.

Keywords: Palestine, Irrigation, Economics, Supplementary, Irrigation

DYNAMICS IN SOIL PROPERTIES ACROSS DIFFERENT CROPPING SYSTEMS IN SOILS OF DADIN KOWA, GOMBE STATE, NIGERIA

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ABSTRACT

This study aimed at evaluating changes in physical and chemical characteristics of soils across three cropping systems (rice, tomato and mango) in Dadin kowa, Gombe State. To achieve this aim, two soil profile pits were dug in each of the cropping systems, described and sampled. The collected soil samples were then analyzed using standard Laboratory procedures. The results revealed that mean sand content (69.18 - 85.6%) was found to be the dominant particle size, while bulk density, particle density and total porosity values varied between 1.58 - 1.68 g/cm3, 2.45 - 2.67 g/cm3 and 36.02 - 39.09%, respectively. The soil reaction was slightly acidic to neutral (pH 6.51 – 6.72), while organic carbon, total nitrogen and available phosphorus content of the studied soils were rated high, low and low, respectively. The results further revealed that most of the soil properties were rarely influence by differences in cropping systems. It was also observed, that the major agronomic constraint of the studied soils were low nutrient reserve. For sustainable agriculture, management strategies start by mitigating the continuous loss of soil nutrients through continuous cultivation dominantly practiced in rice and tomato cropping system through crop residues retention, crop rotation and agro-forestry practice

Keywords: Cropping Systems, Dynamics, Porosity, Soil Properties, Sustainable

SUSTAINABLE SOIL MANAGEMENT AS ONE OF THE LAND PROTECTION ACTIONS: THE PERSPECTIVE OF THE EUROPEAN UNION GUIDELINES

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ABSTRACT

Soils play a variety of important functions, ecosystem services, and socio-economic roles, the most important of which is their productive ability. Nowadays, soils all over the world are subject to intensive cultivation in order to meet the needs of people for food, feed, fiber, or bio-based energy. Unfortunately, in many cases, the intensification of agricultural production and the lack of sustainable management lead to a number of unfavorable changes, expressed by the reduction of soil health and productivity, and consequently, their degradation. The importance of protecting soils from numerous threats leading to degradative changes has been emphasised in different studies and documents (Thematic Strategy of Soil, 2006). Currently, a new EU Soil Strategy for 2030 has been developed, contributing to the objectives of the European Green Deal (EGD). It is an ambitious vision to have all EU soil ecosystems in healthy conditions by 2050. The key concept of the Strategy is the introduction of sustainable soil management. To achieve this, it is necessary to implement the proposals developed within the EGD, concerning the Biodiversity Strategy 2030, the Farm to Fork strategy, and the European Climate Law, which include actions for sustainable soil management. According to all three policies, the objectives of soil protection and sustainable management can be achieved by reducing the use of pesticides and fertilizers by 50% and 20% respectively, greater control of the nutrient balance by reducing their losses from the soil by 50%, introducing organic farming on 25% of agricultural land, or increasing the protected land area by 30%. The Common Agricultural Policy (CAP), as well as Good Agricultural and Environmental Conditions (GAECs), are central drivers for the sustainable management of soil used for agricultural production. CAP assumptions include GAECs relevant to soil protection, such as the protection of wetlands, a ban on burning arable stubble, the introduction of buffer strips, tillage management to reduce soil erosion, maintaining a minimum soil cover, the addition of organic amendments, and crop rotation including legumes. Implementing these treatments helps minimize potential losses in soil health and therefore protects it from further negative changes. Eco-schemes play an important role in the transformation of European agriculture towards greater sustainability. Eco-schemes are mandatory for EU countries to include in their plans, but voluntary for farmers. Through Eco-schemes, the EU rewards farmers for preserving natural resources, including soils. Eco-schemes are fully financed from EU funds and do not require co-financing from national budgets, which is a significant incentive to implement appropriate programs. Eco-schemes refer to various activities in which farmers can declare their willingness to participate. The most popular practices applied by farmers are: 1. Organic farming; 2. Integrated pest management, including buffer strips with management practices and without pesticides, mechanical weed control, increased use of resilient, pest-resistant crop varieties and species; 3. Agro-ecology, including crop rotation with leguminous crops, cover crops between tree rows on permanent crops, winter soil cover, and catch crops; 4.

Carbon farming, including conservation agriculture, rewetting wetlands/peatlands, appropriate management of residues (i.e., burying of agricultural residues, seeding on residues, establishment and maintenance of permanent grassland); 5. Precision farming, including nutrient management plans use of innovative approaches to minimise nutrient release, control of optimal pH for nutrient uptake, reduced inputs (fertilisers, water, plant protection products), and improved irrigation efficiency; 6. Other practices beneficial for soil, including erosion prevention strips and windbreaks, establishment or maintenance of terraces, and strip cropping. Nowadays, many legal and financial tools have been developed to enable sustainable soil management aimed at maintaining soil health. The implementation of the designated principles for sustainable soil use varies across different Member States. The success of implementing ambitious EU guidelines on soil protection and their sustainable management depends largely on the knowledge and willingness of farmers — this should always be kept in mind.

Keywords: Sustainable soil management, Land protection, EU Soil Strategy, Conservation agriculture, Precision farming

IMPACT OF COMPOST AND BIOCHAR ON THE SOIL AND GROWTH OF A BARLEY CROP

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ABSTRACT

In order to properly valorize date palm waste as compost and biochar to improve soil fertility in the arid region, we carried out a trial in vegetation pots with a capacity of 5kg with a barley crop 8 plants/pot, using different combinations of compost and biochar. The treatments used are: T: Control (without amendment), C1: 100g of compost/pot, C2: 150g of compost/pot, B1: 17g of biochar/pot, B2: 34g of biochar/pot, C1B1 : 100g of compost +17g of biochar, C1B2 : 100g of compost + 34g of biochar, C2B1 : 150g of compost + 17g of biochar and C2B2 : 150g of compost + 34g of biochar. The results obtained show that the highest dose of compost C2 gives the best results in grain yield 10.6g and weight of 1000 grains 42.33g, while the combination of the small dose of compost with the highest dose of biochar C1B2 gives the highest plant height 47.34cm and the highest straw yield 13.66g. This combination gave a high organic matter OM content 3,79% and the lowest pH of the soil 7.4 as well as an acceptable electrical conductivity EC. It should also be noted that the C2B1 treatment gave high grain production, while the C1B1 treatment gave high straw production. It can be concluded that the highest dose of compost C2 can give better results in terms of grain production, while the compost-biochar combination C1B2 is preferable for biomass production.

Keywords: compost, biochar, barley, soil, plant

THE ROLE OF THE WOMEN ON ACHIEVING THE LDN

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ABSTRACT

Land degradation is one of the most significant problems affecting global habitats, leading to a decrease in productivity and food production. Considering these negative and destructive effects, urgent and decisive actions need to be taken on a global scale. Despite there being individual country efforts on this issue, it is also on the agenda of the sustainable development. In this regard, the concept of Land Degradation Neutrality (LDN) is seen as an important tool, aiming to prevent land degradation where possible and to restore degraded land in other cases. There are numerous links between the LDN and the Sustainable Development Goals (SDGs). One of the main ones is the role of women farmers in providing the LDN target. The women farmers are predominantly employed in low-paid and precarious jobs in the agriculture and are therefore disproportionately affected by the socio-economic challenges posed by the land degradation. In order to achieve the LDN objectives, a gender equality perspective needs to be integrated into the process and women's knowledge, labour and leadership must be brought to bear in the agriculture sector. Based on this information, the results of the survey in Türkiye conducted within the scope of the study in order to show the impact of women farmers on achieving the LDN goals are shared.

Keywords: Women, Survey, Sustainability, Degradation, Land Management

SHORT-TERM EFFECTS OF DIFFERENT ORGANIC FERTILIZERS ON SOIL CHEMICAL PROPERTIES AND PLANT GROWTH IN MELON AND WATERMELON CULTIVATION

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ABSTRACT

The integration of organic fertilizers into horticultural systems has gained increasing importance as a sustainable strategy to enhance soil fertility and crop productivity under challenging soil conditions. This study aimed to evaluate the effects of various organic fertilizers including manures from small ruminants, cattle, poultry, and vermicompost on the chemical properties of a sandy-calcareous soil and the growth performance of melon (Cucumis melo L.) and watermelon (Citrullus lanatus Thunb.). The study focused on how recommended fertilizer doses influence soil chemical quality and plant growth. The results indicated that organic fertilization altered soil electrical conductivity (EC) and available phosphorus (P) levels. Poultry and cattle manures led to notable improvements in soil nutrient content. Additionally, plant growth parameters such as stem diameter and fruit weight were positively affected by organic fertilizers, particularly poultry manure. Crop-specific responses were observed: melon plots exhibited higher soil EC and available P, while watermelon plants showed superior performance in stem diameter, fruit flesh thickness, and soluble solid content. In contrast, melon plants recorded higher chlorophyll levels. Overall, poultry manure emerged as the most effective input for enhancing plant growth, while vermicompost and cattle manure also contributed depending on the crop type. These results suggest that organic fertilizers, especially poultry manure, are valuable tools for improving soil fertility and crop productivity in calcareous soils.

Keywords: Calcareous soils, Fruit quality, Mediterranean climate, Organic amendments

ASSESSING THE IMPACT OF GLOBAL WARMING ON SOIL HEALTH AND AGRICULTURAL PRODUCTIVITY

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ABSTRACT

Global climate change imposes increasing and multifaceted pressures on soil health and fertility. Rising temperatures, irregular precipitation patterns, and the accumulation of greenhouse gases in the atmosphere significantly affect the physical, chemical, and biological properties of soils. Elevated temperatures accelerate the decomposition of soil organic matter, reduce soil organic carbon, and increase the risk of salinization and erosion. Intense and erratic rainfall events disrupt soil aggregate stability, lower cation exchange capacity, and enhance nutrient leaching. Conversely, reduced rainfall and drought limit soil moisture availability and nutrient uptake, while suppressing biological nitrogen fixation. Although increased atmospheric CO_2 levels may stimulate microbial activity and nutrient cycling, they can also lead to net carbon losses from the soil. This review explores the complex effects of climate change on soil health, focusing on structural degradation, shifts in pH, salinization, nutrient cycling disruptions, and microbial imbalance. Furthermore, the study discusses mitigation and adaptation strategies (such as conservation agriculture, organic matter management, and integrated nutrient management) that can help reduce climate-related soil degradation. Implementing climate-resilient soil management practices is essential to sustain long-term soil health and agricultural productivity.

Keywords: Climate change, Greenhouse gases, Carbon cycle, Sustainable agriculture

GIS MAPPING OF SOIL MACRONUTRIENTS FOR NUTRIENT MANAGEMENT IN HAZELNUT

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ABSTRACT

The purpose of this study was to determine and to map soil pH and macronutrient content in soils located in Ordu province. For that purpose, soil samples were collected from the study area to evaluate the soil fertility. The soil samples were analyzed to determine soil pH and total N, available P and available K, Ca, Mg. Then, soil nutrient maps were prepared by IDW method with this obtained data results. In the present study, the pH of the soils was between 4.91-6.25 indicating moderately acid to slightly acid. Maps of the soil macronutrients showed that total N content in soils was at sufficient level in the entire study site; available P, Ca and Mg content were found at the low and high level in the soils and available K content of the soils were at high level. In addition to, soil nutrients were significantly positively correlated with each other. Maps showed that soil nutrients were at the high level in the study site. Soil nutrient maps indicated that macronutrients in soils were found at different levels in the study site and nutrient level was differ widely in the map. Soil nutrient maps revealed that study site should be managed differently according to the nutrient and it is important.

Keywords: Macronutrient, pH, acid soil, interpolation, GIS

STUDY OF THE ROOT ARCHITECTURE OF PHOENIX DACTYLIFERA IN THE HYDRO-EDAPHIC CONDITIONS OF OUARGLA (NORTHERN ALGERIAN SAHARA)

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ABSTRACT

Hydro-edaphic constraints in Ouargla constitute an abiotic stress for the palm groves of this Saharan region of Algeria. It presents different biotopes in relation to topographic levels, water tables and gypsum-limestone and saline accumulations. The study aims to highlight the effect of biotopes on the root architecture of Phoenix dactylifera of the Déglet Nour type, with plantation ages between 16 and 44 years. It consists of defining the spatial configuration of the root system, including the distribution of roots in depth, their morphology, and the emission of aerial roots. The research results show that the soil profiles at the bottom of the Ouargla basin are very saline, with an estimated E.C.e1:5 of 3.37±0.84 dS.m-1. They contain superficial water tables, 125.55±88.32 cm deep. Also, strong gypsum-limestone accumulations with superficial crusts, 73.76 ±12.19 cm deep. However, the eastern slope of the basin is characterized by a low-salt soil of E.C.e1:5 estimated at 1.12±0.11 dS.m-1 where the water table exceeds 3 m in depth and the accumulations of poorly soluble salts are diffuse. The surface crusts and water tables have negative effects on the root architecture. Root depth exceeds 3 m in deep water table soils, without mechanical obstacles. It decreases with increasing crust and water table levels in soils where it fluctuates between 0.88 and 2.01 m. The diameter Ør, root density Dr and aerial root height H.r. range from 0.18 to 13.7 mm, from 0 to 68.06 kg.m-3 and from 15.3 to 90 cm respectively. The diameter of coarse roots and root density increase in the center of the profiles, especially above the crusts and surface water tables, and the latter also favors the emission of aerial roots as well as the increase in planting age. These hydro-mechanical stresses produce root trauma in date palms, particularly young, vulnerable roots with thin to medium diameters. Stress levels determine geotropism and root morphological alteration. Root damage presents as bark tears, sinusoidal bends, flattening, shrinkage, rot, and eventually complete root deterioration. Dead roots provide a transit sheath for young roots, facilitating their penetration through hydro-mechanical obstacles. It appears that excessive mechanical and water stress limits root growth and alters its architecture in the soil. This will hinder the mineral nutrition and water supply of date palms, and thus promote the decline of palm groves in Ouargla.

Keywords: root architecture, soils, water table, Phoenix dactylifera, Ouargla, Algeria,

MODELING OF RELATIVE DATE PALM YIELD IN SALINE HYDRO-EDAPHIC CONDITIONS OF THE ALGERIAN SAHARA

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ABSTRACT

Relative yield modeling is essential for understanding and optimizing agricultural systems, particularly in hyper-arid and infertile Saharan areas. For this, we chose to model the yield of the date palm, a key element of the oasis ecosystem, in the diverse hydro-edaphic environment of Ouargla, located in the northern Algerian Sahara. The approach adopted consists of studying the weight yield (Yp) in different existing hydro-edaphic biotopes and classified in relation to the edapho-mechanical constraints of crusts and water table hydric constraints. Four biotopes have been identified: surface water tables, surface crust-water tables, deep crust-water tables, and deep-water tables. This involves measuring Yp of the "Déglet Nour" date palm and determining by statistical relationship its tolerance to salinity induced by irrigation water (E.C.w), groundwater (E.C.wt), soils (E.C.e1:5), gypsum-limestone crusts (C.E.ec1:5), depths of water table (Dwt) and those of gypsum-limestone crusts (Dc). Based on the relative yield fall equation (Yr) of Maas and Hoffman, we proceeded to establish predictive yield models in relation to the limiting hydro-edaphic parameters. To this end, we defined the kinetics of the fall in average weight yields of date palms and established linear models adapted to the abiotic stress conditions existing in the biotopes studied. Finally, four forecast tables are produced, where relative yields vary between 100 and 0% depending on the water, salt, and mechanical stress encountered. The tables assess the impact of agricultural management and environmental conditions on date palm yields. They enable the simulation and optimization of operations by making informed decisions to improve the productivity and sustainability of Saharan agricultural systems.

Keywords: Modeling, relative yield, date palm, salinity, water, soil, Sahara, Algeria,

ASSESMENT OF INCEPTISOL AND ENTISOL SOIL CLASSES COMMONLY FOUND IN TURKEY IN TERMS OF FERTILITY

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ABSTRACT

Inceptisols and Entisols each possess unique attributes concerning soil fertility. The management of these soils through appropriate agricultural practices such as the application of organic amendments, monitoring nutrient levels, and understanding soil texture and composition can play a crucial role in optimizing agricultural outputs. Given their moderate fertility levels, Inceptisols can be enhanced further through strategic fertilization, while Entisols, being less fertile, typically require more intensive management practices to improve their productivity. In summary, while both Inceptisols and Entisols present distinctive fertility profiles affected by their parent material and organic matter content, Inceptisols exhibit a greater potential for fertility improvements through management practices. This underscores the need for targeted soil management strategies to balance nutrient availability, particularly in areas where either soil type predominates.

Keywords: Inceptisol, entisol, soil properties, fertility

THE ROLE OF SOIL CONDITIONERS IN CEREAL PRODUCTION

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ABSTRACT

Soil conditioners are crucial for improving soil quality and sustaining cereal production in the face of mounting environmental and agronomic challenges. This study examines the various types, mechanisms and effects of organic, inorganic and synthetic soil conditioners on soil physical properties, water retention, nutrient availability, microbial activity and soil structure as a whole. Through a comprehensive review of recent research and experimental evidence, we evaluate the influence of conditioners on short- and long-term cereal crop productivity, considering factors such as improved soil fertility, reduced compaction, and mitigation of the effects of salinity and erosion. Organic amendments, such as compost, manure and humic acids, improve aggregation and biological activity, whereas inorganic agents, such as gypsum and lime, enhance ion exchange and pH balance. Synthetic polymers contribute to erosion control and moisture conservation. Furthermore, integrating conditioners with slow-release fertilisers and sustainable management practices has demonstrated synergistic effects on yield improvement and soil health. Our findings emphasise the importance of judicious application of soil conditioners for achieving resilient and sustainable cereal production systems, particularly in degraded or marginal soils.

Keywords: Soil Conditioners, Cereal Crops, Sustainable Agriculture, Soil Health

INTERPRETABLE MACHINE LEARNING FOR SOIL FERTILITY ASSESSMENT IN PRECISION AND SUSTAINABLE AGRICULTURE

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ABSTRACT

Soil fertility plays a crucial role in determining agricultural productivity, influencing crop yields, nutrient management, and long-term sustainability. Accurate and timely soil fertility assessments enable farmers to optimize fertilizer use, enhance resource efficiency, and implement targeted interventions for sustainable agriculture. While traditional soil testing methods are generally reliable, they are often time consuming, costly, and limited in scalability. Recent advancements in machine learning (ML), particularly when integrated with explainable artificial intelligence (XAI) techniques that enhance model transparency, offer data-driven solutions for rapid and interpretable soil fertility prediction. In this study, soil fertility indicators covering nutrient properties were used to develop an interpretable ML framework for the binary classification of soil fertility levels. The dataset comprised key parameters, including nitrogen (N), phosphorus (P), potassium (K), pH, electrical conductivity (EC), organic carbon (OC), sulfur (S), zinc (Zn), iron (Fe), copper (Cu), manganese (Mn), and boron (B). Multiple classification algorithms—Logistic Regression, Random Forest, Gradient Boosting, Extra Trees, and Support Vector Machines—were systematically evaluated under both a baseline scenario and a Synthetic Minority Over-Sampling Technique (SMOTE) scenario to address class imbalance. Model performance was assessed using weighted F1-score, precision, recall, accuracy, and the area under the receiver operating characteristic curve (AUC), ensuring a comprehensive evaluation across different performance metrics. The highest performance was observed with the Gradient Boosting model trained with SMOTE, achieving the best weighted F1-score. SHapley Additive exPlanations (SHAP) analysis revealed that N had the most pronounced negative influence on soil fertility predictions, whereas P, Fe, Mn, and B emerged as the most influential positive contributors. pH, Zn, K, and EC also showed measurable, though weaker, effects. These findings highlight the complex interactions between nutrients in determining soil fertility and provide actionable insights for targeted soil management strategies, such as adjusting nutrient composition and pH levels. The presented approach demonstrates that integrating ML with XAI can achieve both high predictive accuracy and interpretability, making it suitable for deployment in precision agriculture decision support systems. By combining robust predictive modeling with interpretable insights, this research supports sustainable farming practices and promotes resource efficient agricultural management.

Keywords: Soil fertility, Precision agriculture, Sustainable farming, Interpretable machine learning, Explainable artificial intelligence

QUANTITATIVE AND QUALITATIVE ANALYSIS OF MYCORRHIZAL COLONIZATION IN THE ROOTS OF AN AROMATIC PLANT ENDEMIC TO THE MIDDLE ATLAS REGION, MOROCCO

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ABSTRACT

Mycorrhizal colonization of plant roots establishes a beneficial symbiotic relationship between the plant and the fungus. In our work, this relationship applies to a species of thyme endemic to Morocco. Indeed, the evaluation of this mycorrhizal colonization is an essential analysis that highlights the fundamental ecological role of mycorrhizae in the resilience, adaptation, and survival of this endemic aromatic plant. This evaluation is based on a quantitative approach and qualitative analysis. Rhizospheric soil samples were examined by microscopic observation and morphological characterization to identify and evaluate the diversity of arbuscular mycorrhizal fungi. The results reveal the importance of this fungal symbiosis in improving nutrient uptake and enhancing tolerance to environmental stresses, particularly in semi-arid Mediterranean contexts. Furthermore, this research opens up new perspectives for identifying fungal communities beneficial to cultivation and for considering future bioinoculation trials aimed at promoting sustainable development and the domestication of this thyme in its natural environment.

Keywords: thyme, arbuscular mycorrhizal fungi, endemic aromatic plant, quantitative and qualitative analyses, Middle Atlas region, Morocco

EFFECTS OF LINOLEIC ACID SUPPLEMENTATION ON CRYOPRESERVED OULED DJELLAL RAM SEMEN: MOTILITY AND KINEMATIC ANALYSIS

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ABSTRACT

Cryopreservation is an important biotechnology used for preserving sperm, though the freezing and thawing processes can harm sperm membranes, potentially leading to a viability loss of up to 50%. Ram sperm show a particular sensitivity to the stress of cryopreservation when compared to other livestock species. Polyunsaturated fatty acids (PUFAs), including linoleic acid (LA), are essential for maintaining sperm membrane integrity, motility, and fertilization capability. Animals need to eat or add PUFAs to semen extenders because they can't make them. While research in pigs, roosters, and bulls has demonstrated the advantages of PUFA supplementation, the findings in ruminants have been mixed and inconsistent. This study investigated how different concentrations of LA (5, 10, and 15 ng/ml) influenced the post-thaw quality of Ouled Djellal ram semen. Semen was collected from rams fed a 40GO diet, known for producing optimal sperm quality. A methyl-β-cyclodextrin-LA complex was created and mixed into a Tris-based freezing extender. The post-thaw analysis revealed that the highest concentration of 15 ng/ml LA significantly reduced both total motility (23.8% compared to 53.49% in the control group) and progressive motility. Conversely, the lower doses of 5 and 10 ng/ml did not exhibit any negative effects. Furthermore, kinematic parameters (VCL, VSL, LIN, STR, WOB) were adversely affected at the highest concentration, indicating that elevated levels of LA may hinder sperm functionality. These findings support earlier research indicating that high levels of polyunsaturated fatty acids (PUFAs) can lead to increased lipid peroxidation, which harms sperm membranes. Nevertheless, the 10 ng/ml dosage showed promise, suggesting a need for more studies involving antioxidants or adjusted equilibration times. Variations in existing research may be attributed to differences in membrane compositions among species, equilibration times, or interactions with seminal plasma. Future investigations should focus on refining protocols to improve the cryopreservation of ram semen, potentially through dietary PUFA supplementation or enhanced extender formulations.

Keywords: Cryopreservation, ram semen, linoleic acid, sperm motility, PUFAs, lipid peroxidation.

POST MORTEM AND ELISA DIAGNOSIS OF CYSTIC ECHINOCOCCOSIS IN SOUTHERN ALGERIA

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ABSTRACT

Cystic Echinococcosis (CE) remains a significant parasitic disease in livestock, with diagnostic challenges in endemic regions. This study aimed to evaluate the prevalence of CE in some south Algerian departments using post-mortem examination and ELISA serological testing. A total of 192 animals were examined, comprising 40 cattle, 96 sheep, and 56 goats. Two diagnostic methods were applied: necropsy examination and ELISA test. Statistical analysis assessed the correlation between diagnostic techniques. The results show that the prevalence rates varied across species; Cattle: 30% (necropsy) vs. 35% (ELISA), Sheep: 21.8% (necropsy) vs. 36.4% (ELISA) and Goats: 14.3% (necropsy) vs. 19.6% (ELISA). A statistically significant correlation was observed between diagnostic methods ($p<0.05$), with an 81% concordance rate. The ELISA test consistently detected higher infection rates compared to post-mortem examination. The study reveals a substantial CE prevalence in southern Algerian livestock. The ELISA test demonstrates potential as an effective immunodiagnostic tool for epidemiological surveillance and research, offering improved detection capabilities compared to traditional necropsy examination.

Keywords: Cystic Echinococcosis, Livestock, Diagnosis, ELISA, Necropsy, Prevalence, Algeria

PREVALENCE AND RISK FACTORS OF SUBCLINICAL MASTITIS IN GOATS REARED IN SOUTHERN ALGERIA

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ABSTRACT

Subclinical mastitis, a frequently unnoticed udder infection, poses a significant health concern for consumers due to the potential presence of harmful microorganisms in milk. This study focuses on evaluating the prevalence and identifying risk factors associated with subclinical mastitis in goats raised in the department of Ghardaia (Algeria). A survey was conducted using the California Mastitis Test (CMT) on 120 goats aged between 2 and 9 years, with lactation numbers ranging from 1 to 8. The findings revealed a notable prevalence of subclinical mastitis in goats from the Ghardaia department, reaching 27.5%. Statistical analysis highlighted a strong correlation between the occurrence of subclinical mastitis and factors such as age and lactation rank. A significant difference ($P < 0.05$) was observed based on age, with the highest prevalence (60%) in goats aged over 7 years, followed by goats aged 4 to 7 years (36.7%), while the youngest goats (1–3 years) showed the lowest occurrence (10%). Additionally, a significant difference ($P < 0.05$) was noted across lactation ranks, with goats having 6 or more lactations being the most affected (60%), followed by those with 4 to 5 lactations (32.5%), and finally those with 1 to 3 lactations (13.3%). In contrast, no significant difference ($P > 0.05$) was found between breeds, despite a prevalence of 24.4% in the Arbia breed and 36.7% in crossbred goats. Poor hygiene conditions were linked to the majority of diagnosed mastitis cases. In conclusion, this study underscores the high prevalence of subclinical mastitis in goats reared in Ghardaia department and emphasizes the need for improved management practices.

Keywords: Goat, Ghardaia, subclinical mastitis, prevalence, risk factors

EFFECTS OF ARTEMISIA ABSINTHIUM ON EIMERIA SPP EXCRETION: A META-ANALYSIS

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ABSTRACT

Coccidiosis, a recurrent disease in broiler farms, has been shown to cause significant economic losses. The present study aims to evaluate the effect of Artemisia absinthium on coccidiosis in broilers through a systematic review and meta-analysis. The selection of articles was conducted through a comprehensive search, encompassing the years from 2000 onwards, without imposing any restrictions based on geographical location or country. Only six (06) studies achieved the systematic review objective. The meta-analysis was performed using the metafor package in R via RStudio (version 1.1.383; RStudio, Inc.). A systematic review of in vivo studies demonstrated the efficacy of various plant extracts (essential oil and methanolic extract) administered in feed or drinking water on the parameters considered (oocyst excretion, bloody diarrhoea, mortality rate, weight gain, conversion index, lesion score). Furthermore, in vitro studies demonstrated a positive impact on oocyst numbers, LC50 (lethal concentration), sporulation rate (%), and sporulation inhibition rate (%). A meta-analysis of the four (04) studies included in this analysis revealed that the inclusion of Artemisia absinthium extract resulted in a significant reduction in oocyst excretion (SMD = -1.64, 95% CI: -2.72 to -0.55; $P < 0.0001$). However, the efficacy of Artemisia absinthium extract was not as significant as that of antibiotics (SMD = 0.57, 95% CI: -0.19 to 0.95; $P < 0.01$). The antiparasitic activity of various forms of Artemisia absinthium extracts administered was demonstrated against Eimeria spp, thus supporting its use as natural anticoccidial agents.

Keywords: Meta-analysis; coccidiosis; plant extracts; Artemisia absinthium; Eimeria spp; broiler chicken

NEUTRALIZING BASED SEROPREVALENCE STUDY OF TOSCANA VIRUS IN LIVESTOCK FROM ALGERIA

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ABSTRACT

Toscana virus is a sandfly-borne human pathogen belonging to Phlebovirus genus into Phenuiviridae family. It is emerging in north Africa posing a complex threat to public health. TOSV is heavily affecting sandfly-exposed people in northern Algeria. A larger distribution has recently been stated in Algeria by using dog sera. Dog exposure to TOSV was repeatedly identified in north Algeria, with 4.56% lately detected to possess respective neutralizing antibodies. However, evidence for TOSV has only been observed in dogs among various species of domestic animals. Therefore, we attempted to assess sera from 221 livestock comprising cattle, sheep, goats, rabbits and horses, to identify the presence of TOSV neutralizing antibodies. The study was conducted during 2017, in 11 areas from the governorates of Blida, Medea, Algiers, Tipaza, Ain Defla, Tissemsilt in the north center, and Setif, Mila, Tizi Ouzou, Jijel in the northeast of Algeria. Positive results were obtained in 14.6% (12/ 82) cattle, 17.18% (11/64) sheep, 15% (3/20) horses and 3.33% (1/30) goats, whereas rabbits remained negative. Positive samples originated mainly from the north centre, with new areas being first-ever detected. The seroprevalence was noticed to be very strongly related to sample origin ($p < 0.01$). Females (OR=4.09) were observed to be more likely infected. Our findings represent a further proof of TOSV circulation in Algeria. Moreover, they revealed a potential role of livestock ($p = 0.00731$) in its natural cycle. This fact emphasize how important is to elucidate the exact contribution of livestock to the epidemiology of sandfly-borne phleboviruses, and their impact on public health.

Keywords: Serology, Microneutralization test, TOSV, Phenuiviridae, Meningoencephalitis, Arbovirus, Phlebotomine, Domestic animal, North Africa

PREVALENCE OF EIMERIA SPECIES IN FUTURE LAYING HENS AND BREEDING HENS, DETECTED BY ITS1-PCR IMMOBILIZED ON FTA CARDS, IN SIX PROVINCES IN NORTHEASTERN ALGERIA

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ABSTRACT

Avian coccidiosis is a globally distributed parasitic disease that significantly impacts poultry production and associated economies. In Algeria, limited epidemiological and ecological data constrain the development of effective control measures. A recent investigation reported a high prevalence and notable diversity of Eimeria species in broiler chickens. However, little is known regarding the presence and distribution of Eimeria spp. in older, floor-raised poultry such as pullets and breeding hens. To address this gap, samples were collected from 32 poultry farms located across six northeastern provinces of Algeria (Algiers, Batna, Bejaia, Bordj Bou Arréridj, Jijel, and Mila). The sampling included 22 pre-laying pullet farms (hens aged 11–17 weeks) and 10 breeding hen farms (hens >20 weeks). Genomic DNA was preserved using FTA cards, and species identification was performed using Internal Transcribed Spacer 1 PCR (ITS1-PCR). Six Eimeria species were identified with varying prevalence: E. necatrix (63%) was the most frequently detected, followed by E. maxima (53%), E. tenella (31%), E. brunetti (19%), E. acervulina and E. mitis (0.3% each). E. praecox was not detected in any samples. All farms were found to be infected, with mixed-species infections (63%) being more prevalent than mono-specific infections (38%). Furthermore, oocyst counts per milliliter of enriched suspension were higher in breeding hen farms compared to pullet farms. These findings, in conjunction with prior studies in broiler production systems, underscore the widespread occurrence of Eimeria infections in Algerian poultry and highlight the need for comprehensive, targeted coccidiosis control strategies.

Keywords: Algeria, poultry farms, Prevalence, Eimeria, ITS1-PCR, FTA cards

REPRODUCTIVE PARAMETERS EVALUATION OF FLECKVIEH COWS IN ALGERIAN FARM

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ABSTRACT

The objective of our study, carried out at the level of the dairy cattle structure located in the wilaya of Tipaza (Algeria), was to assess the reproduction performance of Fleckvieh breed dairy cow. The analysis of the data recorded on the various reproductive events over three years showed an average age of heifers at first calving of 35 ± 2.55 months. The interval of calving to conception and the calving interval were 139 ± 67.5 and 428 ± 68.4 days respectively. The success rate at the first insemination was 55.6% with a fertility index of 1.6 ± 0.8. The fertility parameters evaluated were satisfactory and demonstrate good control of the factors related to the time of insemination. The fecundity parameters evaluated were insufficient and remain below the desired objectives. In conclusion, the identification and correction of the factors responsible for the lengthening of the various fecundity parameters can improve the breeding performance.

Keywords: Dairy cows, fertility, fecundity, Fleckvieh breed

DETERMINATION OF ELEMENTS IN HONEY, HONEYBEE, SUNFLOWER AND BEE DRINKING WATER SAMPLES COLLECTED FROM THE ENEZ DISTRICT, EDIRNE (TURKEY)

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ABSTRACT

Honey is a natural carbohydrate produced by honeybees. Honeybees are foragers that produce honey from pollen and nectar. Like all living organisms, honeybees require nutrients, including minerals and water, in order to reproduce, grow and develop. The aim of this study was to determine the elemental content of honeybee, honey, sunflower and bee drinking water samples, and to identify any potential correlations between element concentrations in the samples. This study was conducted in Enez, Edirne, Turkey. Samples of bee drinking water (n = 10), sunflower (n = 10), honey (n = 10) and dead honeybee (n = 10) were collected from apiaries in the beekeeping area in 2023. In this study, the highest element in honey samples was determined as potassium and the lowest element was determined as cobalt. In the study, the highest element in honeybee samples was determined as potassium, and the lowest element was determined as selenium. In the study, the highest element in sunflower samples was determined as potassium, and the lowest element was determined as molybdenum. In the study, the highest element in bee drinking water samples was sodium, while cobalt content was not detected. In this study, a significant positive correlation was determined between water and honey for molybdenum ($p<0.01$), and a significant negative correlation between water and honeybees for zinc ($p<0.01$), as well as a significant positive correlation for molybdenum ($p<0.01$). No significant correlation was identified between sunflower-honeybee and sunflower-honey. This study demonstrated the elemental content of honeybees, honey, sunflower and bee drinking water, as well as the correlations between the samples in terms of elemental content.

Keywords: Honeybee, Honey, Trace elements, Minerals, Bee drinking water.

EVALUATION OF THE IMPACT OF THE PROBIOTIC PEDIOCOCCUS ACIDILACTICI ON GROWTH PERFORMANCE AND THE CONTROL OF COCCIDIOSIS IN BROILERS.

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ABSTRACT

Coccidiosis of broilers are parasitic diseases caused by protozoa belonging to the genus Eimeria. These parasitizes are characterized by a reduction in intake, an increase in the consumption index, a destruction of the intestinal epithelium, and often downgrading of carcasses at the slaughterhouse level. They represent, without a doubt, one of the most important economic risks in poultry farming. The fight against this pathology represents a problem faced on the one hand with the ban on anticoccidials in food, and on the other hand with the demands of consumers with regard to food safety, the well-being of the animal and the quality of the environment. Several alternative avenues of research have been explored, in this case probiotics. The objective of this study is to evaluate the impact of dietary supplementation pediococcus acidilactici on growth performance, ocsystle excretion, and average lesion scores of the digestive tracts of broilers. A total of 1080 one-day-old chicks are divided into 2 experimental batches (9 repetitions of 60 chicks per treatment) and are fed, for 49 days, with a basic feed supplemented or not with 109 CFU of Pediococcus acidilactici/kg of feed. In our experimental conditions, the addition of the probiotic made it possible to reduce the mortality rate by 19% but did not significantly modify the average live weight of the chickens at 49 days of age (2466.46g ± 24g compared to 2494 ± 32g for the controls; $P = 0.50$). On the other hand, this treatment significantly reduced food consumption (-3%, $P<0.05$) and consequently the consumption index (-2%, $P<0.05$). These results reflect better assimilation of nutrients induced by probiotic supplementation with better integrity of the digestive tract. Before the chicks were hatched, the search for oocysts was unsuccessful on the ground, litter, beds and chicks' down. We recorded a high oocystal excretion in the control batch compared to the probiotic batch ($p<0.05$). The average lesion scores recorded on d10, d14, d21, d35 are relatively between 0-1 in the two batches, on the other hand we observe on day 42 average lesion scores significantly reduced in favor of the probiotic lot ($p<0.05$), in the same way we see on d49 a significant difference ($p<0.05$) in the average lesion score. Our results reveal a certain impact of the probiotic Pediococcus acidilactici on the digestive and metabolic use of the food with better integrity of the epithelium of the digestive tract of these chickens.

Keywords: Probiotic, Pediococcus acidilactici, occystal count, Broiler chicken, Growth performance, average lesion score

STUDY OF THE EFFECT OF A BIMOLECULAR OF THE POMEGRANATE PUNICA GRANATUM L ON ENTEROCOCCUS ISOLATED FROM THE DIGESTIVE TUBE OF POULTRY

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ABSTRACT

Since ancient times, plants used for body care and disease prevention due to their healing properties. Nowadays, plants have become a real source of medicines, food supplements, and cosmetic products. They uses are constantly being developed, and their scope of application is being expanded. In this study, we were particularly interested in pomegranate (PUNICA GRANATUM L), with the aim of determining the effect of its compounds and evaluating their antibacterial activities against multiresistant strains of Enterococcus (Enterococcus faecium and Enterococcus faecalis) isolated from the digestive system of poultry. We tested two strains and studied their sensitivity to pomegranate peel extract using the agar diffusion method. Our results showed that the intestinal strain E. faecium was sensitive to the ethanolic extract and to the methanolic extract, with respective inhibition diameters of 13.5 mm and 13 mm. Moreover, the E. faecalis strain was very sensitive to both extracts, with inhibition diameters of 21.5 mm and 21 mm.

Keywords: Pomegranate, Antibacterial, Multiresistant, Enterococcus faecium, Enterococcus faecalis

SEROPREVALENCE OF EQUINE INFECTIOUS ANAEMIA VIRUS (EIAV), USUTU VIRUS (USUV) AND WEST NILE VIRUS (WNV) IN HORSES IN ALGERIAN EASTERN DRYLANDS

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ABSTRACT

West Nile virus (WNV) and Usutu virus (USUV) are mosquito-borne viruses, that affect humans and equids. Equine infectious anemia (EIA), a blood-borne disease that can be transmitted mechanically by hematophagous insects. The aim of this study was to investigate, the prevalence of equine infectious anemia virus (EIAV), USUV and WNV in eastern Algerian drylands, 139 sera from distinct horses aged between 4 months and 21 years have been collected in 2017. Serological analysis for the presence of antibodies against EIAV and flaviviruses was performed using commercially available ELISAs. Sera detected positive, doubtful, or negative close to the doubtful threshold in flavivirus ELISA were tested by the virus neutralization test (VNT), as described by the World Organisation for Animal Health (WOAH), using WNV and USUV strains. The prevalence of WNV antibodies with ELISA was 25.18% (35/139) against 30.22% (42/139) by WNV VNT. EIAV and USUV antibodies were not detected in any samples. WNV seroprevalence varies with species, breed and location of horses. This is the first screening on horse sera of EIAV and USUV in Algeria. This study indicate that WNV and USUV have circulated/are circulating in the Algerian horse population, unlike EIAV does not seem to be present.

Keywords: WNV, USUV, EIAV, Horse, Seroprevalence

STUDY OF REPRODUCTIVE PERFORMANCE IN DAIRY COWS

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ABSTRACT

A monitoring of the breeding management of dairy cows was carried out at the Boubirek farm located in the commune of Bni Maouche, wilaya of Béjaïa, on 107 cows in order to evaluate the fertility and fecundity of the dairy cattle herd. The data reveal the reproductive parameters such as calving-calving intervals, calving-fertilizing insemination interval, fertility rate, pregnancy rate, first insemination success rate and abortion rate. The analysis of the results obtained indicates poor fertility of this herd with an average calving-calving interval (IVV) increasing to 456d±256.96d and an average fertilizing insemination interval (IVIF) 217.89d±157d higher than the accepted standards and unacceptable fertility with a pregnancy rate of 39%. In conclusion, the reproductive performance of the dairy cattle herd on this farm is below accepted standards, resulting in considerable economic losses.

Keywords: Dairy cows, Reproductive performance, Fertility rate, Pregnancy rate, Artificial insemination.

BACTERIOLOGICAL DIAGNOSIS OF CLINICAL MASTITIS IN DAIRY CATTLE (ALGERIA)

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ABSTRACT

Milk quality is closely linked to udder health. The present study focused on characterising the bacteria responsible for clinical mastitis in dairy cattle farms from the wilaya of Blida (Algeria). Seventy-eight (78) milk samples from cows with clinical mastitis were analysed using the classic bacteriological method. The sensitivity of the strains to antibiotics was determined using the agar diffusion method. The results revealedafter biochemical identification, 81 strains responsible for intramammary infections: S. aureus (17.28%), E. coli (12.34%), Str. Uberis (06.17%), Str. dysgalactiae (3.70%) and other germs (60.51%). The antibiogram results of the most commonly used antibiotics revealed a variable antibiotic resistance of the strains tested to β-lactams (penicillins and cephalosporins) and tetracyclines. S. aureus strains showed a resistance rate of 44.4%, 33.3% and 11.1% to penicillins, cephalosporins and tetracyclines, respectively. Str. dysgalactiae strains showed a resistance rate of 66.6% to penicillins, 33.3% to cephalosporins and 66.6% to tetracyclines. In contrast, Str. uberis strains showed 25% resistance to tetracyclines, and E. coli strains showed 42.8% and 14.2% resistance to penicillins and tetracyclines, respectively. In conclusion, the health status of the udder revealed a predominance of clinical mastitis of environmental origin. Antibiotic resistance could be responsible for the creation of reservoirs of resistant bacteria transmissible to humans.

Keywords: Dairy cattle, clinical mastitis, bacteria, antibiotic resistance

MORPHOLOGICAL AND PRODUCTIVE ASSESSMENT OF TELLI DROMEDARIES' MAMMARY GLANDS WITH IDENTIFICATION OF A RARE TEAT ORIFICE IN ARID DJELFA ,ALGERIA

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ABSTRACT

This study provides a morphological and productive assessment of mammary glands and teats in 66 lactating Telli dromedaries from the semi-arid Djelfa region in Algeria, with focus on the identification of a rare teat orifice. Macroscopic analysis revealed that the predominant udder shapes were cylindrical (45.45%) and funnel-shaped (39.39%), while teats were mainly cylindrical (45.45%) and cylindro-conical (36.36%). Concerning teat orifices, 84.85% presented two orifices and 15.15% had a single orifice, including a rare anatomical variant with unique characteristics. Implementation of a semi-intensive farming system combined with a complementary diet based on wheat bran and barley markedly increased milk yield, reaching an average of 5.23 liters per day per camel, more than double the regional average. These findings highlight the pronounced morphological variability within this population and its potential impact on breeding strategies and optimization of milk production under semi-arid environmental conditions.

Keywords: Telli dromedary, mammary gland morphology, teat orifice, udder morphology, milk production, semi-intensive farming, Djelfa, semi-arid environment.

ANALYSIS OF GASTROINTESTINAL PARASITES OF ANIMALS KEEPT IN CAPTIVITY FROM ZOOLOGICAL PARKS IN ALGERIA

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ABSTRACT

he objective of our study is to identify gastrointestinal parasites and to evaluate the prevalence of parasitic infections in Barbary macaques (Macaca sylvanus), wild boars (Sus scrofa), red deer (Cervus elaphus), Cuvier's gazelle (Gazella cuvieri), and horses (Equus caballus) in three different zooligical parks in Algeria. Our study was conducted over a period of 45 days with one fecal sample collected each week using flotation enrichment and concentration techniques followed by modified Ziehl-Neelson staining. The results obtained for the different species showed an overall parasite prevalence of 71.7%, with Cryptosporidium spp. dominating compared to strongyles and coccidia (Eimeria spp.). The species most affected were Cuvier's gazelle (62.5% Cryptosporidium spp. and 25.0% strongyles), Barbary macaque (76.9% Cryptosporidium spp.), and horse (42.1% Cryptosporidium spp. and 31.6% strongyles). In conclusion, the unsatisfactory health status of certain species raised in captivity may be a zoonotic risk, particularly for cryptosporidiosis and strongyloidiasis.

Keywords: Coprology, gastrointestinal parasites, zoological park, zoonosis, Algeria

IDENTIFICATION OF SOME DIGESTIVE PARASITES IN HORSES AT EQUESTRIAN CENTERS IN ALGERIA

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ABSTRACT

The objective of our study is to identify digestive parasites present in horses in Algeria. This study involved 56 horses (29 stallions and 27 mares), aged 7 to 20 years, from various equestrian centers in several wilayas of Algeria. Fecal samples were collected and analyzed using flotation enrichment and concentration techniques, followed by modified Ziehl-Neelson staining. The results obtained showed an overall infestation rate of 87.5% with a prevalence of 66.1% for strongyles, 10.7% for Parascaris equorum, and 3.6% for Eimeria spp. The Cryptosporidium spp. (16.0%) was observed only for horses that cohabited with cows. Furthermore, infestation rates varied according to breed, with a rate of 44.6% for Selle Français, 26.8% for Arab-Barb, and 16.1% for Arab horse. The study revealed that 82.1% of breeders regularly treat their horses for parasites, while 17.9% of breeders treat them irregularly, which could contribute to parasite infestations. In conclusion, a regular treatment can be effective in limiting parasite infestation.

Keywords: Digestive parasites, coprology, horses, Algeria

MAMMARY MORPHOLOGICAL VARIABILITY AND MILK PERFORMANCE IN TELLI SHE-CAMELS IN THE ALGERIAN SEMI-ARID ZONE

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ABSTRACT

The morphological diversity of mammary glands and teats, as well as milk performance parameters, remains insufficiently understood in Telli she-camels in Algerian semi-arid ecosystems. This study aimed (i) to characterize the morphological variability of udders and teats in Telli she-camels, and (ii) to evaluate the milk performance of this population in the Djelfa region. The study focused on 66 lactating Telli she-camels from the Djelfa region. A systematic macroscopic analysis was used to describe the morphotypes of the udders, the typology of the teats, as well as the configuration and number of teat orifices. In addition, milk performance was quantified in animals raised under a semi-intensive system, benefitting from dietary supplementation based on wheat bran and barley. The morphological examination revealed a predominance of cylindrical udder shapes (45.45%) and funnel-shaped udders (39.39%). The teats were mainly cylindrical (45.45%) or cylindro-conical (36.36%) in shape. Regarding the orifices, 84.85% of the teats had double orifices, whereas 15.15% had a single orifice, including an anatomical variant rarely reported in the literature. The introduction of a semi-intensive rearing system combined with nutritional supplementation significantly improved average milk production, reaching 5.23 L/day/camel, which is more than double the regional average value. In summary, this study highlights a remarkable morphological variability of the mammary system in Telli she-camels and confirms the relevance of adapted zootechnical management strategies to optimize milk production in semi-arid areas.

Keywords: Telli she-camel, anatomical variability, mammary morphology, teat, teat orifice, milk performance, semi-arid zone

RAOULTELLA ORNITHINOLYTICA ISOLATED FROM POULTRY FARMS INTENDED FOR HUMAN CONSUMPTION: PRELIMINARY STUDY OF IT'S RESISTANCE TO 07 ANTIBIOTIC MOLECULES BELONGING TO THE CEPHALOSPORIN FAMILY

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ABSTRACT

The worrying development of antibiotic resistance, caused primarily by the careless use of antibiotics, is becoming a growing global concern. In humans, it has been established that most antimicrobial resistant bacteria originate primarily from animals raised for human consumption. It was also recognized that these bacteria could easily contaminate products derived from these animals. It is therefore with the aim of having a precise idea of the state of the evolution of resistance to antimicrobials belonging to the cephalosporin family, in the poultry industry of the north-eastern of Algeria, which this study was carried out. This is why, antibiograms were carried out, on 205 isolates of avian Raoultella ornithinolytica from farms located in the North-East of Algeria, with regard to 07 antibiotic molecules. The results obtained were then processed statistically and they mainly expressed a general profile of antibiotic resistance characterized by moderate rates of resistance to molecules belonging to the cephalotin family (34.22%). The highest rate of resistance was recorded against ceftazidime, where high resistance to antibiotics (59.02%), a 3rd generation cephalosporin, was revealed. The state of resistance to these antibiotics revealed during our study is worrying, especially when we know that white meat is the most consumed in Algeria. These results would therefore constitute a real danger for the health of the Algerian consumer; this is why drastic measures must be applied to remedy this public health problem.

Keywords: Antibiotic resistance, Raoultella ornithinolytica, cephalosprins, poultry farms.

STUDY OF THE HORMONAL AND BIOCHEMICAL COMPOSITION OF PRE-OVULATORY FOLLICULAR FLUID AND BLOOD SERUM IN THE SHE-CAMEL (CAMELUS DROMEDARIUS)

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ABSTRACT

Background and Objective: In dromedary camels, anovulation is a major cause of infertility, often associated with hormonal and metabolic imbalances. The aim of this study was to analyze and compare the hormonal and biochemical profiles of follicular fluid from an ovulatory ovary and blood serum in adult female camels, in order to better understand the pathophysiological mechanisms underlying this reproductive disorder. **Results:** Testosterone and estradiol (17β) concentrations were markedly higher in follicular fluid compared to serum, consistent with their local role in follicular growth and oocyte maturation. Cholesterol and triglyceride levels were lower in the follicular fluid, likely due to their metabolic use in steroidogenesis. Total proteins, albumin, sodium, calcium, and potassium showed minimal to moderate differences, suggesting a regulated permeability between the serum and follicular compartments. Phosphorus and IGF-1 levels were slightly higher in follicular fluid, possibly reflecting localized metabolic activity. **Conclusion:** This study highlights significant differences between ovulatory follicular fluid and blood serum, particularly in hormonal (estradiol, testosterone, IGF-1) and lipid (cholesterol, triglycerides) parameters. These findings confirm that follicular fluid represents a specialized microenvironment, distinct from the bloodstream, and essential for oocyte development. A better understanding of these variations may contribute to improving reproductive management strategies in camels.

Keywords: She-camel, Ovulation, Follicular fluid, Biochemistry, Hormone, Serum

STUDY OF OVARIAN ABNORMALITIES IN THE SHE-CAMEL (CAMELUS DROMEDARIUS)

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ABSTRACT

Ovarian abnormalities are a common cause of infertility in she-camels, especially in the arid regions of southern Algeria, where environmental conditions strongly influence reproduction. This study was conducted on 25 adult, non-pregnant she-camels slaughtered as part of a health monitoring program. Morphological and pathological examinations of the ovaries revealed several types of abnormalities: A total of 8 she-camels (32%) showed at least one ovarian abnormality. Follicular cysts were the most frequently observed, characterized by large, thin-walled, unovulated follicles. Luteal cysts had thickened, often yellow walls, indicating secretory activity. Polycystic ovaries were identified by multiple small follicles at various stages of degeneration. Ovarian abscesses indicated a purulent inflammatory process, while hydrobursitis (fluid accumulation in the ovarian bursa) reflected a rare perifollicular condition. **Conclusion**: This study confirms the diversity of ovarian abnormalities in she-camels in desert environments. These often silent lesions can significantly impact fertility. Their detection and classification are essential for improving reproductive management of camelids in arid regions

Keywords: Ovary, She-camel, Abnormality, Camelus dromedarius

166 / 5.000 EFFECT OF AN EARLY ADMINISTERED IMMUNE COMPLEX VACCINE AGAINST INFECTIOUS BURSAL DISEASE ON THE ZOOTECHNICAL AND SEROLOGICAL PERFORMANCE OF BROILER CHICKENS IN ALGERIA

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ABSTRACT

Infectious bursal disease is a poultry disease causing immunosuppression and economic losses. Vaccine protection depends on the level of maternal antibodies, making the immune status of chicks at day 0 essential. The objective was to compare two vaccination methods against infectious bursal disease in broiler chickens by analyzing zootechnical and serological performances. A total of 1800 day-old ISA HUBBARD chicks were divided into two groups: one vaccinated with an immune complex vaccine at the hatchery and the other with an intermediate vaccine at the farm. Both groups were homogeneous in terms of hatch weight. Blood samples were collected at day 0, day 14, day 28, and day 35 for serological analysis. Hatchery vaccination reduced mortality rate by 4% and significantly affected the average live weight of chickens at 49 days of age. Similarly, the hatchery-vaccinated group significantly reduced feed consumption (-4%, P

Keywords: Gumboro, vaccination, immune complex, broiler chicken

EFFECT OF MANNAN-OLIGOSACCHARIDE SUPPLEMENTATION ON BROILER GROWTH PERFORMANCE

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ABSTRACT

This trial evaluated the impact of mannan-oligosaccharides (MOS) on broiler performance over a 49-day rearing period. A total of 1,080 ISA 15 one-day-old chicks were randomly assigned to two groups (control and MOS-supplemented), each consisting of 9 replicates of 60 birds. Both groups received the same basal diet, with the treatment group receiving a continuous supplementation of yeast cell wall-derived prebiotics at 2 g/kg. Prebiotic supplementation significantly improved body weight gain during the grower and finisher phases (P

Keywords: broiler, prebiotic, mannan-oligosaccharide, performance.

SURVEY ON BOVINE THEILERIOSIS AMONG VETERINARIANS IN THE SÉTIF REGION

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ABSTRACT

Tropical theileriosis is an enzootic disease in humid, subhumid, and semi-arid areas of the country, where climatic conditions favor the development of vector ticks. The present study is based on information collected from 50 veterinarians regarding tropical theileriosis in cattle in the Sétif region. Its aim is to obtain updated information on the factors influencing the spread of this tick-borne parasitic disease, transmitted mainly by Hyalomma ticks, particularly Hyalomma scupense. The survey revealed that the hot season is particularly favorable for increased infection rates with Theileria annulata, reaching a peak of 98% of animals infected, compared to only 4% in the cold season. Cattle age was a determining factor, with animals aged 1–2 years being the most affected, while calves under one year showed a lower prevalence. A significant difference was also observed between sexes, with females more frequently infected than males. Cattle breed also influenced susceptibility to the disease: exotic breeds exhibited higher prevalence than local breeds, although this difference was not statistically significant. Finally, hygiene conditions in livestock buildings played a crucial role: farms with plastered, crack-free walls showed markedly lower prevalence, highlighting the importance of structural maintenance in limiting the survival of vector ticks. These findings emphasize the need to integrate environmental management measures, particularly improving housing conditions and controlling vector ticks, to reduce the spread of tropical theileriosis in Algeria.

Keywords: tropical theileriosis, cattle, Hyalomma scupense ticks, risk factors, Sétif.

TOXICOLOGICAL AND BIOLOGICAL ACTIVITY OF DAUCUS CAROTA ESSENTIAL OIL AND POWDER AGAINST PLODIA INTERPUNCTELLA (LEPIDOPTERA: PYRALIDAE)

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ABSTRACT

The objective of our study was to identify natural products for the control of a major stored-product pest, Plodia interpunctella. Our experiments were conducted to evaluate the bio-insecticidal effects of essential oils and leaf powder from the aromatic plant Daucus carota, native to Eastern Algeria, under laboratory conditions, on the development and reproduction of P. interpunctella. Essential oils extracted by hydrodistillation were applied topically at various doses (4, 6, 10, and 12 µl/ml of acetone) to newly emerged pupae. The treatments affected the duration of pupal development and inhibited adult emergence, with a lethal concentration (LC_{50}) of 7 µl and LC_{90} of 30 µl/insect. In a follow-up experiment, the efficacy of the essential oils was tested on the reproductive potential of adult females aged 0 to 24 hours, treated with LC_{50} and LC_{90}. The results revealed that treatment with Daucus carota essential oil extended the pre-oviposition period and shortened the egg-laying period, leading to a reduction in reproductive performance, which in turn resulted in lower fecundity and decreased egg viability. Toxicological tests revealed that the plant powder possessed remarkable insecticidal properties. Mortality rates increased significantly at 72 and 96 h, reaching 100% at a dose of 3 g. In addition, the absence of mortality in the control groups confirms that Daucus carota powder has a dose- and time-dependent insecticidal effect against adult Plodia interpunctella

Keywords: Plodia interpunctella, Daucus carota, reproductive potential, toxicology, plant powder, essential oils

REMOVAL OF PROTOZOA AND HELMINTHS IN WWTP

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ABSTRACT

Wastewater Treatment Plant was studied in order to evaluate their efficiency in the removal of protozoan cysts and parasitic eggs. Parasitological removal ranged from 93.29% for helminths eggs to over 97% for protozoan cysts, depending on the treatment system. However, the greatest removal of protozoan pathogens was found in WWTP. According to WHO, the presence of intestinal nematodes, mainly Ascaris sp., Trichuris and Entamoeba histolytica in wastewater is considered as a major risk for the reuse of water in agriculture.

Keywords: Activated sludge, WWTP, Removal, Protozoan cyst, Helminth eggs.

BALANCE, BACTERIA, AND THE BLACK BELT: IMPACT OF PROBIOTICS ON GASTROINTESTINAL SYMPTOMS DURING JUDO TRAINING AND JUDO COMPETITIONS

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ABSTRACT

The gastrointestinal (GI) system plays a critical role in maintaining overall health, energy metabolism, and immune function, all of which are essential for optimal athletic performance. In combat sports such as judo, athletes often experience high levels of physical and psychological stress, especially during intense training cycles and competition periods. These stressors are frequently associated with gastrointestinal symptoms including bloating, abdominal discomfort, diarrhea, and constipation, which can impair performance and recovery. Recent evidence highlights the gut microbiota as a dynamic and modifiable factor influencing not only digestion but also systemic responses such as inflammation, mental resilience, and muscle recovery. Probiotic supplementation, defined as the ingestion of live microorganisms that confer health benefits to the host, has emerged as a potential strategy to restore and maintain gut microbial balance in athletes. This study aims to evaluate the impact of probiotic supplementation on gastrointestinal symptoms in judokas during both training periods and competition phases. A group of elite and sub-elite judo athletes were monitored over a 12-week period. Participants were randomly assigned to receive a daily multi-strain probiotic or a placebo. Gastrointestinal symptom severity, stool consistency, and training adherence were assessed using validated questionnaires and performance logs. Results showed a statistically significant reduction in GI discomfort among probiotic users, particularly during high-stress competition weeks. Additionally, athletes reported improved digestion, fewer missed training sessions, and higher perceived recovery scores. The findings suggest that probiotic supplementation can play a supportive role in maintaining gut homeostasis and reducing exercise-related gastrointestinal disturbances in judo athletes. These results may have practical applications for sports nutrition protocols aimed at enhancing athlete well-being and performance readiness. Further research is warranted to explore strain-specific effects and the long-term benefits of gut microbiota modulation in combat sports.

Keywords: probiotic, performance, judo, stressors, benefit

SCREENING FOR A TARGET REGION IN SIMIAN VIRUS 40 GENOME AND REPURPOSING PHEOPHORBIDE A AS AN ANTIVIRAL MOLECULE

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ABSTRACT

Introduction and Aims: The polyomavirus Simian Virus 40 (SV40) is a well-characterized oncogenic DNA virus known to induce primary brain and bone tumors, malignant mesothelioma, and lymphomas in laboratory animals. Increasingly persuasive evidence suggests that SV40 currently infects humans and may represent an emerging human pathogen. Molecular docking has become an established and predictive approach for the identification of potential antiviral compounds against diverse pathogens. In the present study, 36 high-quality whole-genome sequences of SV40, obtained from various geographical regions, were analyzed to identify conserved genomic regions. A protein encoded by the conserved region was selected as the target for protein–ligand interaction analysis. The interaction between this target protein and a selected antiviral compound was subsequently examined to assess its potential as a therapeutic drug candidate. **Material and Methods:** A conserved and stable genomic region present in all 36 sequences was identified using Geneious Prime (version 2025.1.3) and the Progressive MAUVE algorithm. This region encodes the SV40 small tumor (t) antigen (PDB ID: 2PF4), a protein expressed early in the viral infectious cycle that enhances replication efficiency. Potential ligand molecules capable of interacting with this protein were initially screened through the Swiss-Model database; however, no suitable candidates were identified. Consequently, pheophorbide a—a compound previously recognized in our studies for its antiviral and anticancer activities—was selected for further analysis. Its potential interaction with the target protein was evaluated using cavity-detection-guided blind docking methodology. **Results and Conclusion:** Pheophorbide a ($C_{35}H_{36}N_4O_5$), a chlorophyll derivative recognized for its antiproliferative and photosensitizing properties in photodynamic cancer therapy, exhibited a strong binding affinity (−10.3 kcal/mol) to the SV40 small-t antigen. Given the crucial role of this protein in the early stages of the infectious cycle and in facilitating viral replication, pheophorbide a may possess antiviral activity against other members of the polyomavirus family. Although these predictive bioinformatic results are encouraging, they require further validation through in vitro experiments and clinical investigations. The findings of this study may support the development of more effective and durable therapeutic strategies targeting SV40-associated viral infections.

Keywords: Anticancer, Antiviral, SV40, Simian virus 40, Polyomaviruses, Pheophorbide a

POSSIBLE MORPHOLOGICAL EVIDENCES FOR A NEW SPECIES OF *EUPALOPSELLUS* (ACARIFORMES: EUPALOPSELLIDAE): INSIGHTS FROM A FEMALE SPECIMEN COLLECTED FROM TÜRKİYE

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ABSTRACT

In this study, a single female mite specimen belonging to the genus *Eupalopsellus*, collected from Türkiye, was examined morphologically in detail. The specimen displays key morphological affinities with *Eupalopsellus kermaniensis* Mahdavi & Farzan, particularly in dorsal shield ornamentation and leg chaetotaxy. However, it also possesses several distinguishing features, such as markedly shorter dorsal body setae and notably longer setae *ag2* and *ag3*. A pair of wing-like sclerotized structures adjacent to the anogenital shields, also present in *E. kermaniensis*, was observed in the examined specimen. Similar wing-like structures have been found in *E. oresbiosis* Smith Meyer & Ueckermann and *E. sellnicki* Smith Meyer & Ueckermann, indicating a degree of morphological resemblance to these species as well. Nevertheless, the absence of solenidion w on tarsus IV of the specimen differentiates it from these taxa. The combination of these morphological characters, while closely resembling *Eupalopsellus* aff. *kermaniensis*, suggests that it may represent an as yet undescribed species of *Eupalopsellus*; however, further material is required to confirm this.

Keywords: Mite, taxonomy, diagnostic morphology, new species candidate

Acknowledgement

This study was supported by the Scientific and Technological Research Council of Turkey (TÜBİTAK), project no. 121Z986. The authors gratefully acknowledge TÜBİTAK for its financial support.

DETERMINATION OF ANTIMICROBIAL AND ANTIBIOFILM EFFECTS OF POSTBIOTIC OF LATILACTOBACILLUS SAKEI FROM FERMENTED FOOD ON CLINICALLY SOURCED ANTIBIOTIC-RESISTANT PSEUDOMONAS AERUGINOSA

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ABSTRACT

Pseudomonas aeruginosa is a clinically dangerous pathogen, and its key virulence factors include biofilm production and antibiotic resistance. Lactic acid bacteria (LAB) are commonly used in producing postbiotics, which are biologically active metabolites released during the life cycle of probiotics or after bacterial lysis. These include various concepts like metabionics and cell-free supernatants. This study evaluated the biofilm-forming capacity of 48 antibiotic-resistant Pseudomonas aeruginosa strains isolated from various clinical samples (urine, wounds, blood cultures, etc.) using the crystal violet staining method in 96-well microplates. Biofilm formation was quantified using an ELISA reader. The results indicated that 30 isolates (62.5%) were strong biofilm producers, 14 (29.2%) were moderate, and 4 (8.3%) were weak biofilm producers. The antimicrobial activity of a postbiotic derived from a Latilactobacillus sakei isolate, obtained from traditional fermented meat (Turkish sausage) samples, was tested against the strong biofilm-forming strains using the minimum inhibitory concentration (MIC) method. According to the findings, 26 strains (87%) had a MIC value of 6.25 mg/ml, 3 strains (10%) 12.5 mg/ml, and 1 strain (3.3%) 3.12 mg/ml. When the postbiotic was applied at a concentration of MIC/2 to 30 isolates that produced strong biofilms, it was found to have an anti-biofilm effect of 80–100% on 12 of the isolates (40%). Pseudomonas aeruginosa is a clinically dangerous pathogen, and its key virulence factors include biofilm production and antibiotic resistance. Lactic acid bacteria (LAB) are commonly used in producing postbiotics, which are biologically active metabolites released during the life cycle of probiotics or after bacterial lysis. These include various concepts like metabionics and cell-free supernatants. This study evaluated the biofilm-forming capacity of 48 antibiotic-resistant Pseudomonas aeruginosa strains isolated from various clinical samples (urine, wounds, blood cultures, etc.) using the crystal violet staining method in 96-well microplates. Biofilm formation was quantified using an ELISA reader. The results indicated that 30 isolates (62.5%) were strong biofilm producers, 14 (29.2%) were moderate, and 4 (8.3%) were weak biofilm producers. The antimicrobial activity of a postbiotic derived from a Latilactobacillus sakei isolate, obtained from traditional fermented meat (Turkish sausage) samples, was tested against the strong biofilm-forming strains using the minimum inhibitory concentration (MIC) method. According to the findings, 26 strains (87%) had a MIC value of 6.25 mg/ml, 3 strains (10%) 12.5 mg/ml, and 1 strain (3.3%) 3.12 mg/ml. When the postbiotic was applied at a concentration of MIC/2 to 30 isolates that produced strong biofilms, it was found to have an anti-biofilm effect of 80–100% on 12 of the isolates (40%).

Keywords: Pseudomonas aeruginosa, Latilactobacillus sakei, postbiotics, biofilm, quorum sensing

BIOCOMPUTATIONAL ANALYSIS OF TURKISH AND GERMAN HELICOBACTER PYLORI WHOLE GENOME SEQUENCES FOR A NOVEL THERAPEUTIC APPROACH

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ABSTRACT

Introduction and Aims: Helicobacter pylori (Hp) infects approximately 50% of the global population and, in certain cases, the infection progresses to peptic ulcer formation, which may subsequently lead to the development of gastric cancer. There are recent studies that indicate new strains with antibiotics resistance have been emerged. This study aims to compare Hp whole-genome sequences from Turkey and Germany in terms of prophage content and antibiotic resistance regions, and to assess the antibacterial potential of sulforaphane. This molecule was selected for molecular docking analysis with three essential Hp proteins, based on findings from previous pharmaceutical studies. **Material and Methods:** A total of 34 Hp whole genome sequences (WGS) were downloaded from NCBI database. The sequences were screened for prophage regions by PHASTEST web server and for antibiotic resistance by ResFinder (4.7.2). 3 bacterial proteins responsible for pathogenesis of Hp were selected for molecular docking analysis; urease (PDB: 4HI0), vacuolating cytotoxin A (VacA) (PDB: 2QV3) and the cytotoxin associated gene A (CagA) (PDB: 4DVZ). The potential interactions between these target proteins and sulforaphane ($C_6H_{11}NOS_2$) as a ligand were evaluated individually using a cavity-detection-guided blind docking methodology. **Results and Conclusion:** A total of 5 prophages was found in 17 German Hp strains. Genetic completeness of these prophages was 4 intact and 1 incomplete. Whereas Turkish strains were determined as 2 questionable prophages. All the phages were identified as Helicobacter phages belonging to Schmidviruses and were temperate prophages. These prophages could affect the severity and incidence of Hp infections and further studies on bacteria-phage interactions are needed. None of the screened strains had antibiotic resistance genes. Although the collection dates of Turkish Hp sequences have been recorded, isolation date of German Hp sequences are unknown. They possess a risk of being the lack of updated knowledge. The current antibiotic resistant Hp strains' distribution should be screened fostering with a comprehensive Hp WGS database establishment for each country. Sulforaphane, an isothiocyanate derived from its precursor glucosinolate, glucoraphanin—commonly found in broccoli and other edible cruciferous vegetables—demonstrated binding interactions with the selected key virulence factors; urease (−4.9 kcal/mol), VacA (−4.2 kcal/mol), and CagA (−4.4 kcal/mol). These findings suggest that sulforaphane may possess antibacterial potential against Hp. Further validation through in vitro experiments and clinical investigations are necessary for confirmation of the results. The findings of this study may support the development of more effective and durable therapeutic strategies for Hp-associated infections and cancers.

Keywords: Anticancer, Antibacterial, Helicobacter pylori, Sulphoraphane, Molecular docking

GENETIC DIVERSITY OF BOMBINA BOMBINA FROM TURKIYE USING COI GENE

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ABSTRACT

The Bombina genus involves seven species, and its phylogeny is recognised based on morphological and genetic variation. Two Bombina species existed in Türkiye; Bombina bombina and Bombina variegata. B. bombina is widely distributed throughout Eastern and Central Europe. It is also found in northwest Anatolia. This species ranges from Turkish Thrace and northwestern Anatolia in Türkiye. There are two subspecies existed in B. bombina from Türkiye: B. b. bombina and B. b. arifiyensis. Population trend is decreasing in IUCN Red List for B. bombina. Its population threatened by urban and agricultural development in Türkiye. DNA barcoding is rapid and mostly accurate approach to reveal genetic biodiversity. COI is the general barcode marker for animal barcoding. Barcode sequences are generally deposit to BOLD. The Barcode of Life Data System (BOLD) was launched in 2005 and now provides a data storage and analysis platform. In this study, we aim to reveal genetic diversity between two subspecies of B. bombina from Türkiye. We compared genetic structure of B. bombina species from Türkiye according to COI gene from Edirne and Sakarya. We extracted DNA from 25 specimens preserved in 96% ethanol. For the COI gene region, we used primers as CO1490, 5' - GGT CAA CAA ATC ATA AAG ATA TTG G - 3', and HCO2198, 5'-TAA ACT TCA GGG TGA CCA AAA AAT CA-3'. We calculated the number of unique haplotypes, haplotype and nucleotide diversity using DnaSP version 5.10.3. Trees were inferred with maximum parsimony (MP) and Bayesian inference (BI). Phylogenies were inferred with the ML method using the IQtree2 software. Phylogenetic relationships were also estimated using the Bayesian Inference (BI) method with the software MrBayes 3.2.6. We deposited our sequences to BOLD system and some of our sequences were first record in BOLD. The B. b. bombina and B. b. arifiyensis are grouped in one BIN number. RESL analysis gave one species for B. bombina from Türkiye. We found genetic diversity as 0.003 from B. b. bomina and B. b. arifiyensis. We found six haplotypes for two subspecies. Two subspecies were not grouped together in haplotype network. We found nucleotide diversity and haplotype diversity as (Pi) 0.00173 and (Hd) 0.653, respectively. Low bootstrap values supported the separation from two subspecies in phylogenetic trees. In conclusion, we present low genetic variability between Thracian and Anatolian B. bombina.

Keywords: amphibian, DNA barcoding, BOLD

GENETIC STRUCTURE OF PELODYTES CAUCASICUS FROM RIZE USING MICROSATELLITE MARKER

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ABSTRACT

Pelodytes caucasicus is a Caucasian endemic species and is distributed only in some provinces in the Eastern Black Sea Region in Türkiye. The fragmented population and decreasing population structure have made it essential to reveal the genetic structure and relationship of the populations for the P. caucasicus species. Microsatellites are highly polymorphic markers consisting of short repeats. Genetic diversity is an important factor in ensuring the long-term persistence of a species and/or population despite changing environmental changes, because loss of genetic diversity and inbreeding reduce reproduction and survival in the short term and reduce the evolving capacity of populations in the long term. Microsatellites have rapid mutation rates and can be used to infer current population structure, demography and gene flow. We analyzed total of 22 (21[X], 1[X]) specimens from Çat plateu from Rize, Türkiye. We isolated DNA the manufacturer's instructions. We amplified the eight different microsatellite loci (Ppu1, Ppu3, Ppu4, Ppu6, Ppu8, Ppu11, PPU5 ve PPU10) previosuly previously developed. All forward primers (5′ end) were fluorescently labeled with a FAM or Yakima Yellow tag (Macrogen). We scored the alleles using GeneMarker program. We determined observed (HO) and expected (HE) heterozygosity, the number of effective alleles (Ne), and the number of private alleles for each microsatellite marker. Inbreeding coefficients (F IS), number of alleles (A) per locus, and allelic richness (Ar) were calculated with Fstat. The number of observed heterozygosity were found as 0.53 and expected heterozygosity as 0.58. We found F IS as 0.12. The population size (Ne) was determined as 1.7 in Çat (Rize) population. Summary, lower observed heterozygosity than expected heterozygosity and FIS which is bigger than zero is sign for homozygosity in Pelodytes caucasicus from Rize. This species need further attention and biomonitoring is recommended for this population. This work was supported by the Scientific and Technological Research Council of Turkey (Grant ID: 121Z897).

Keywords: conservation genetic, Caucasion frog, population genetic

PREDICTING FOOD SUPPLY CHAIN LOSSES IN DEVELOPING COUNTRIES WITH MACHINE LEARNING

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ABSTRACT

Losses in the food supply chain represent a critical issue that directly affects food security, economic efficiency, and sustainability, particularly in developing countries. From this perspective, the present study concentrates on food losses with the aim of designing a model that addresses questions related to losses in supply chain stages. To this end, the Food Loss and Waste Database is employed to construct a predictive framework for food losses across supply chain processes. However, the dataset exhibits considerable variability and contains a high proportion of outliers due to differences in countries, time periods, and data collection methods. Considering these challenges, this study introduces a modeling framework that aims to predict food loss percentages in developing countries using various machine learning models. It incorporates machine learning models that minimize data discrepancies and outlier effects, along with associated cross-validation and explainability components. Although the framework covers the entire supply chain, it emphasizes focusing on selected product groups and stages that provide consistently measured and statistically reliable samples. This dual focus both enables assessing forecasting performance on a generalizable basis and demonstrating the contexts in which such forecasting is methodologically valid. The proposed framework aims to provide decision-makers with a practical roadmap for determining which product/stage segments can be used more effectively and to identify priority areas for data producers to improve measurement quality. In conclusion, the study provides a robust, reproducible, and interpretable machine learning approach for food loss prediction, creates a foundation for broader applications based on evidence from specific supply chain components.

Keywords: Food Loss, Supply Chain, Machine Learning, Developing Countries, Explainable Artificial Intelligence

MORPHOLOGICAL AND MOLECULAR PHYLOGENETIC ANALYSIS OF LITHOSPERMEAE (BORAGINACEAE) TRIBE GROWING IN EUROPEAN TURKEY

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ABSTRACT

The Boraginaceae family is represented by 44 genera and 343 species in our country, the Lithospermeae tribus is represented by approximately 14 genera and 168 species, 13 subspecies and 12 varieties. The aim of this study is to determine the phylogenetic relationships of 21 taxa (7 genera, 19 species, 6 subspecies and 1 variety) belonging to the Lithospermeae tribus distributed in European Turkey and to determine the contribution of DNA barcoding method to the taxonomic problems of the tribus by using matK and ITS barcode regions along with morphological characters. In this direction, phylogenetic trees were created using UPGMA (unweighted pair group method with arithmetic mean) using the sequence data of matK and ITS barcode regions. In addition, a morphological tree was created by using the taxon character matrix of 23 characters that were determined to be different from each other. The phylogenetic trees obtained as a result of the study were evaluated with the support of previous morphological and molecular analyses. It has been observed that the matK barcode region clearly analyses the relationship between genus, species and subspecies taxa in the Lithospermeae tribus, and the ITS barcode region clearly analyses the relationship between section and genera. As a result, it was found that the morphological characters used in the classification of taxa for the systematically problematic Lithospermeae Tribus and the molecular data were found to be compatible and supported each other both in the analysis of phylogenetic relationships and in species identification.

Keywords: Lithospermeae, ITS, *mat*K, Phylogenetics, Systematics, Morphology.

Acknowledgement: This research was supported by Trakya University Scientific Research Projects Unit with project number TUBAP- 2023/87.

DETERMINATION OF MORPHOLOGICAL AND MOLECULAR PHYLOGENETIC PROPERTIES OF SOME TRIFOLIUM L. SECT. CHRONOSEMIUM (FABACEAE) TAXA GROWING EUROPEAN TURKEY USING THE TECHNIQUE OF DNA SEQUENCING

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ABSTRACT

The genus *Trifolium* is an important member of the Fabaceae family and has ecological and economic value as a pasture plant. In this study, the morphological characters and molecular phylogenetic features based on the ITS and matK DNA regions of *Trifolium* sect. *Chronosemium* species distributed in the Thrace Region were investigated. Morphological characteristics of samples collected during field studies were measured and compared in detail. DNA was isolated from leaf tissues of live samples collected from the field, the ITS and matK gene regions were amplified with appropriate primers, and sequence analyses were performed. The obtained sequence data were analysed using MEGA X software, and phylogenetic trees were constructed using Neighbor-Joining (NJ), Maximum Likelihood (ML), and UPGMA methods. Morphological studies revealed distinguishing features among the species and supported classical taxonomic identifications. Molecular phylogenetic analyses revealed that *T. campestre*, *T. diffusum*, *T. retusum*, and *T. scabrum* are closely related to each other. Results from the ITS and matK regions were largely consistent with the morphological data. By presenting the combined morphological and molecular characterization of *Trifolium* sect. *Chronosemium* species distributed in the Thrace Region, the study contributes to a more accurate systematic assessment of these species. The findings are also important for understanding and protecting the region's biological diversity.

Keywords: *Trifolium*, *Chronosemium*, morphology, ITS, matK, phylogenetics.

Acknowledgement: This research was supported by Trakya University Scientific Research Projects Unit with project number TÜBAP- 2023/68.

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