



**PROCEEDINGS OF ABSTRACTS
II. INTERNATIONAL
BIOLOGICAL & LIFE SCIENCES
CONGRESS
BIOLIC 2024**

30 OCTOBER - 1 NOVEMBER, 2024

Megasaray Westbeach Hotel, Antalya, Turkey



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**Organized by
Trakya University
International Researchers Association**

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WELCOME NOTES

You are welcome to our II. International Biological and Life Sciences Congress (BIOLIC) which is organized by Trakya University and the International Researchers Association. The congress will be held in Megasaray Westbeach Hotel, Antalya, Turkey, on 30 October – 1 November, 2024 will be normal as well as with online participation.

Our meeting is a premier international science, technology and business forum focusing on Agriculture, Biology and Life Sciences. The program will include oral talks by invited prominent scientists and oral and e poster presentations by participants in selected topics. The Congress is intended that the subjects to be kept broad in order to provide opportunity to the science and research community to present their works as oral or poster presentations in a friendly environment of Antalya, Turkey to share their knowledge and experience and benefit from each other.

The first meeting has been organized in Lviv, Ukraine in 2019 by Trakya University, with part of more than 200 participants from all over the world with 376 scientific papers. The 2nd congress will gather scientists from around the world, and present their recent achievements. The attendees will have ample opportunities for learning, reconnecting, engaging and networking with colleagues from academia and industry as well as meeting with various exhibitors.

As there have been many different scientific meetings around the world, we aimed to bring three different communities together, namely science, research and private investment groups considering practical information sharing that is of value for researchers and scientists from around the world, in a friendly environment of Antalya, Turkey to share their knowledge and experience and benefit from each other as well as prospects to overcome the limitation for sustainable crop production to feed the world.

There are 68 orals and 64 poster presentation in the congress both joining and presenting normal and online with 101 participants from 22 different countries from the world.

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 congress e mail and exhibited in electronical poster boards as well as in online e poster hall in our web page during the congress.

Congress 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 congress and we would like to give also special thanks to our sponsors and collaborators for giving us a big support to organize this event.

Prof Dr Yalcin KAYA
Head of the Organizing Committee

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“Development of therapeutic antibodies and antibody fragments”

Assoc Prof Dr Cengiz IKTEN, Akdeniz University, Turkey
“Bioinformatics for Agriculture”

Prof Dr Can ERTEKIN, Akdeniz University, Turkey
“Greenhouse Gas (GHG) Emissions in Berry, Stone Fruits, Nuts and Citrus Production”

Prof Dr Viliana VASSILEVA, Kneja Maize Institute, Bulgaria
“Response of maize breeding to climate change”

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CONTENTS

WELCOME NOTES.....	3
ORGANIZING COMMITTEE.....	4
SCIENTIFIC COMMITTEE.....	5
CONTENTS.....	5
ENZYMES-ASSISTED GREEN SOLVENTS EXTRACTION OF POLYPHENOLS FROM CHOKEBERRY POMACE	15
COMPARATIVE CHROMOSOMAL ANALYSIS OF TWO SPECIES THREATENED WITH EXTINCTION: THE BARBARY SHEEP AMMOTRAGUS LERVIA AND THE LEPTOCEROS GAZELLE GAZELLA LEPTOCEROS.....	16
ECOLOGICAL ADAPTATION AND PHYSIOLOGICAL RESPONSES OF TWO ECOTYPES OF CAROB (CERATONIA SILIQUA) TO WATER STRESS	17
SUBSEQUENT EFFECT OF ANAEROBIC DIGESTATE ON SOIL PROPERTIES	18
ESTIMATING CARBON SEQUESTRATION POTENTIAL OF TWO AGROFORESTRY PRACTICES IN HUNGARY	19
SPACEBORNE FOREST MONITORING	20
THE ROLE OF PROBIOTICS IN PREVENTION OF FOOD ALLERGY	21
PHOTOSYNTHETIC PIGMENTS IN PRIMULA VERIS LEAVES FROM DIFFERENT REGIONS OF ALBANIA AND KOSOVO	22
STUDY OF AUTOANTIBODIES IN PRIMARY BILIARY CHOLANGITIS (CBP) IN THE ANNABA REGION: CHARACTERISTICS, PREVALENCE AND DIAGNOSTIC ROLE OF AUTOANTIBODIES ASSOCIATED WITH CBP.	23
DIFFERENTIAL DROUGHT TOLERANCE MECHANISMS IN CHICKPEA GENOTYPES: INTEGRATING PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES	24
ANTIFUNGAL PROPERTIES OF ALGERIAN HONEY: A NATURAL SOLUTION TO COMBAT FOODBORNE FUNGI	25
SCREENING OF E. COLI AND B. SUBTILIS CELLS FOR ANTIBIOTIC AND HEAVY METAL RESISTANCES BY PAPER DISC-AGAR DIFFUSION ASSAY	26
STUDY OF THE COMPARATIVE TOXICITY OF SINAPIS ARVENSIS AND EUCALYPTUS GLOBULUS ON AN APHID PEST AND ITS NATURAL ENEMY.....	27
CRUCIAN CARP AND BARBEL CATCH ANALYSIS IN OHRID LAKE	28
BEE VENOM: A DOUBLE EDGE IN THE REGULATION OF INFLAMMATION.....	29
A PRELIMINARY STUDY OF YELLOW PIGMENTS USED IN THE FRESCOES OF ALBANIAN POST-BYZANTINE PAINTERS JANI AND HIS SON VASILI FROM THE XVIII CENTURY; COMPOSITIONAL STUDY WITH X-RAY FLUORESCENCE AND RAMAN SPECTROSCOPY.....	30
EVALUATION OF ORANGE PEEL EXTRACT ON HUMAN NEUTROPHILS PROPERTIES: VIABILITY, ADHESION, AND ROS PRODUCTION	31
THE INFLUENCE OF CHEMICAL MUTAGENS ON THE PHOTOSYNTHETIC PIGMENTS OF THE TULIP PLANT	32
ASSESSMENT OF THE ANTIOXIDANT ACTIVITY OF THE MEDICINAL PLANT ARNICA MONTANA L. AFTER APPLICATION OF THE ELICITOR SALICYLIC ACID.....	33

GROWTH ACCELERATION AND ANTIOXIDANT POTENTIAL OF MICROPROPAGATED ARNICA MONTANA L. PLANTS USING BIOTIC ELICITOR YEAST EXTRACT	34
CONTENT OF ANTIBACTERIALS IN HOME PHARMACIES IN PRIMARY HEALTH CARE IN NIKŠIĆ, MONTENEGRO.....	35
ANTIBACTERIAL PRESCRIBING IN PRIMARY HEALTH CARE IN NIKŠIĆ, MONTENEGRO	36
PRELIMINARY STUDIES ON THE BENEFITS OF THE SEEDS OF SOME SPECIES OF THE GENUS AMARANTHUS L.	37
ANALYSIS OF THE IMPACT OF AGRICULTURAL PRACTICES ON SOIL BIODIVERSITY (EARTHWORM POPULATIONS AND ORGANIC MATTER)	38
SEQUESTRATION OF ORGANIC CARBON IN WETLAND SOILS AND INFLUENCE OF MICROBIAL RESPIRATION, C/N AND C/S RATIO, PH, EC AND BULK DENSITY ON THE WESTERN COASTAL LOWLANDS OF ALBANIA.....	39
HISTOLOGICAL STUDY AND LC-MS/MS ANALYSIS OF A MEDICINAL PLANT (PALLENIS SP.) FROM THE SEMI-ARID REGION OF TEBESSA, ALGERIA	40
PLANT DIVERSITY IN SEMI-ARID STEPPE REGIONS: A CASE STUDY OF THE TEBESSA AREA IN EASTERN ALGERIA.....	41
POSSIBILITIES OF VALORIZING SOME RARE VARIETIES OF DATES FROM SOUTHERN ALGERIA	42
EVALUATING DRINKING WATER QUALITY FOR LIVESTOCK IN AIN NAGA: IMPLICATIONS FOR FARM MANAGEMENT AND ANIMAL HEALTH.....	43
UNSATURATED FATTY ACID COMPOSITION IN THE MEAT OF ABERDEEN ANGUS, HEREFORD, AND LIMOUSIN BULLS.....	44
CHANGES OF ZOOPLANKTON AND ZOOBENTHOS BIOMASS IN PONDS STOCKED WITH GRASS CARP	45
IN SILICO STUDY OF CHEMICAL COMPOUNDS OF PROPOLIS AS INHIBITORS OF ALZHEIMER DISEASE.....	46
CHEMICAL CHARACTERIZATION AND BIOLOGICAL VALORIZATION OF THE EXTRACTS OF NATURAL SUBSTANCE FROM ALGERIA AND APPLICATION IN THE PARAPHARMACEUTICAL FIELD.....	47
CURRENT STATUS OF EDİRNE PASTURE AREAS, IMPROVEMENT WORKS, PROBLEMS AND SOLUTION SUGGESTIONS	48
SPATIAL – TEMPORAL VARIATIONS OF NA, MG, K, CA IN SEDIMENTS OF FELENT STREAM BASIN (KÜTAHYA, TÜRKİYE).....	49
MULTI – STATISTICAL EVALUATION OF MACRO ELEMENTS IN SURFACE SEDIMENTS OF FELENT STREAM (SAKARYA RIVER BASIN)	50
THE ROLE OF INNOVATIVE TECHNOLOGIES IN PREGNANCY MONITORING: EFFECTIVENESS OF ARTIFICIAL INTELLIGENCE AND REMOTE MONITORING SYSTEMS	51
REVOLUTION IN GYNECOLOGICAL CANCERS WITH ARTIFICIAL INTELLIGENCE: FROM DIAGNOSIS TO TREATMENT, FROM MANAGEMENT TO THE FUTURE.....	52
THE SHADOW OF COVID-19 ON URINARY TRACT INFECTIONS IN PREGNANCY: RISKS AND HEALTH IMPLICATIONS AFTER THE PANDEMIC	53

ENSURING DRUG QUALITY: QUALITY CONTROL IN NANODELIVERY SYSTEMS UTILIZING LIPOSOMES, NANOEMULSIONS, AND EXOSOMES.....	55
NANOSTRATEGIES AGAINST ANTIBIOTIC-RESISTANT URINARY TRACT INFECTIONS.....	56
ANALYSIS OF POLYMORPHISM INFORMATION PARAMETERS OF GENETIC DIVERSITY BASED ON ISSR MARKERS	57
VALORIZATION OF DATE PALM (PHOENIX DACTYLIFERA) FRUIT WASTE AND ITS ANTIMICROBIAL APPLICATION	59
ESTIMATION OF ALTERED RED BLOOD CELL AGGREGATION IN PATIENTS WITH CHRONIC LYMPHOCYTIC LEUKEMIA USING IMAGE FLOW ANALYSIS: THE IMPACT OF TARGETED THERAPIES.....	60
VULNERABILITY OF TUNISIAN OASES AGRICULTURE TO CHANGES IN PRODUCTION FACTORS: IMPACT OF CLIMATE CHANGE AND WATER SCARCITY. 61	
THE IMPACT OF DIFFERENT ROASTING PROFILES ON DEHYDRATION BEFORE FIRST CRACK.....	62
COMPARISON OF THE ANTIMICROBIAL EFFECTS OF INFUSION, DECOCTION AND MACERATION OF AQUEOUS EXTRACTS OF DOUM PALM SEEDS (HYPHAENE THEBAICA)	63
CORRELATION BETWEEN BLOOD GLUCOSE AND GLYCATED HEMOGLOBIN LEVELS IN DIABETIC PATIENTS WITH GENETIC HEMOGLOBIN VARIANTS.....	64
EXPLORING THE GENETIC POTENTIAL OF RICE ACCESSIONS FOR SALINITY TOLERANCE AT SEEDLING STAGE USING MORPH-MOLECULAR MARKERS.....	65
BI-ALLELIC VARIANTS IN BRF2 ARE ASSOCIATED WITH PERINATAL DEATH AND CRANIOFACIAL ANOMALIES.....	66
ESTROUS CYCLE LENGTH IN THE ALGERIAN ARBIA GOAT: EXFOLIATIVE VAGINAL CYTOLOGY AND SERUM PROGESTERONE LEVELS.....	67
PREVALENCE, TREATMENT, AND ECONOMIC IMPACT OF COLIBACILLOSIS IN BROILER CHICKENS IN THREE WILAYAS OF CENTRAL ALGERIA	68
SEARCH FOR A POSSIBLE ASSOCIATION BETWEEN THE RS11200638 POLYMORPHISM OF THE HTRA1 GENE AND THE DEVELOPMENT OF AGE-RELATED MACULAR DEGENERATION IN A SAMPLE OF PATIENTS FROM THE WILAYA OF ORAN	69
NATURAL CINNAMIC ALDEHYDE ISOLATION FROM CINNAMONUM ZEYLANICUM: IN SILICO STUDIES (MOLECULAR DOCKING, DFT AND ADME).	70
IN VITRO AND IN SILICO STUDIES OF ANTIFUNGAL ACTIVITY OF SYZYGIUM AROMATICUM ESSENTIAL OIL AND ITS MAIN CONSTITUENT ‘EUGENOL’ AGAINST A CITRUS FUNGAL STRAIN, FUSARIUM PROLIFERATUM.....	71
ESTIMATION OF RED BLOOD CELL AGGREGATION IN PREECLAMPSIA USING MICROFLUIDIC FLOW ANALYSIS.....	72
SYNTHESIS, CHARACTERIZATION AND ANTIOXIDANT ACTIVITY OF HISTAMINE-DERIVED LIGANDS	73
INNOVATIVE SYNTHESIS OF SCHIFF BASE DERIVATIVE FOR EFFECTIVE REMOVAL OF HEAVY METALS FROM INDUSTRIAL WASTEWATER	74

GREEN SYNTHESIS OF ZINC OXIDE NANOPARTICLES: AN ECO-FRIENDLY PATHWAY TO ANTIOXIDANT AND ANTIMICROBIAL SOLUTIONS.....	75
DEVELOPMENT OF DATA BASE FOR CLINICAL AND RHEOLOGICAL INDICES FOR WOMEN WITH PREECLAMPSIA - PILOT STUDY	76
DEVELOPMENT OF IMAGE FLOW ANALYSIS IN THE EVALUATION OF RBC AGGREGATION IN WOMEN WITH PREECLAMPSIA	77
DEVELOPMENT OF A PCR ASSAY FOR RAPID IDENTIFICATION OF CLINICAL ENTEROCOCCUS FAECALIS	78
ANTIOXIDANT ACTIVITY OF EPHEDRA ALATA EXTRACT AND BIOSYNTHESIS OF CEO2 NANOPARTICLES: ASSESSMENT MIC AND MBC AGAINST BACTERIAL SPECIES	79
EXAMINATION OF THE HEALTH SAFETY OF OAK SEEDS ORIGINATING FROM SEED SOURCES IN CENTRAL SERBIA	80
THE ANTIMICROBIAL POWER OF CADMIUM NANOPARTICLES OBTAINED FROM COLPOMENIA PEREGRINA ALGAE EXTRACT.	81
INVESTIGATION OF REPRODUCTION AND PRODUCTION TRAITS IN PURE AND CROSSBRED BALADI RABBITS	82
ENHANCING POTATO RESISTANCE TO LATE-BLIGHT THROUGH SERENDIPITA INDICA COLONIZATION	83
THE PREDICTIVE ROLE OF NEUTROPHIL-TO-LYMPHOCYTE RATIO FOR CARDIOVASCULAR MORTALITY IN HEMODIALYSIS PATIENTS.....	84
PHENOLIC COMPOSITION, ANTIOXIDANT ACTIVITIES AND INHIBITORY EFFECT ON A-AMYLASE OF IMMATURE FABA BEAN (VICIA FABA V. MAJOR) HUSK EXTRACT AND ITS FRACTIONS	85
CHEMICAL CONSTITUENTS OF ESSENTIAL OIL OF ORMENIS AFRICANA AERIAL PARTS FROM ALGERIA	86
TRADITIONAL USES AND PHYTOCHEMICAL COMPOSITION OF ESSENTIAL OIL SISYMBRIUM IRIO FROM ALGERIA.....	87
ANTHROPOMETRIC INDICES, OVERWEIGHT, OBESITY AND THEIR ASSOCIATION WITH LIFESTYLE AND UNHEALTHY BEHAVIOUR AMONG ADOLESCENTS	88
ASSESSMENT OF NUTRITIONAL AND CARDIO-METABOLIC STATUS IN TYPE 2 DIABETIC PATIENTS IN THE TLEMCEN REGION.....	89
NUTRITIONAL PROFILE AND CARDIOMETABOLIC RISK IN HEMODIALYSIS PATIENTS AT TLEMCEN UNIVERSITY HOSPITAL.....	90
EVALUATION OF THE IN VITRO ANTIOXIDANT, ANTIBACTERIAL AND ANTIFUNGAL ACTIVITIES OF SATUREJA BATTANDIERI BRIQ. FROM ALGERIA.....	91
ANTIMICROBIAL AND ANTIOXIDANT PROPERTIES OF ESSENTIAL OIL AND METHANOL EXTRACT FROM TEUCRIUM POLIUM L.	92
CHEMICAL COMPOSITION OF PISTACIA LENTISCUS ESSENTIAL OIL FROM EASTERN ALGERIA	93
OBESITY IN ALGERIAN ADOLESCENTS AS DETERMINED BY BODY MASS INDEX AND BODY FAT MASS RATE	94
IMPACT OF TONIFERTAL 4H SUPPLEMENTATION ON ENHANCING RABBIT FERTILITY	95

SYNERGISTIC EFFECTS OF TWO ESSENTIAL OILS OF ROSMARINUS OFFICINALIS AND CARTHAMUS CAERULEUS AGAINST PATHOGENIC MICROORGANISMS	96
EPIDEMIOLOGICAL AND BIOCHEMICAL PROFILE OF DYSLIPIDEMIA DURING PREGNANCY IN DIABETIC WOMEN FROM WEST ALGERIA.....	97
TRICHODERMA SPP. INDUCE THE SYSTEMIC DEFENSE RESPONSE IN TOMATO AGAINST SCLEROTINIA SCLEROTIORUM.....	98
PRIMA SCALA MEDI 2020 PROJECT: ANALYSIS OF GENETIC AND PHENOTYPIC DIVERSITY IN LOCAL CHICKEN POPULATIONS IN ALGERIA	99
ROLE OF STJC, FIMH AND STHE FIMBRIAL GENES IN BIOFILM FORMATION OF SALMONELLA TYPHIMURIUM ON POLYSTYRENE AND STAINLESS-STEEL SURFACES.....	100
AI-ASSISTED EARLY DETECTION OF PLANT DISEASES AND PESTS AND REDUCTION OF PESTICIDE USE WITH AGRICULTURAL UNMANNED GROUND VEHICLES	101
EVALUATING PLANTAGO LANCEOLATA EXTRACT FOR INHIBITION OF BACILLUS CEREUS BIOFILM.....	102
MYRTUS COMMUNIS FRUIT EXTRACTS ANTIBACTERIAL AND ANTIBIOFILM ACTIVITIES ON STAPHYLOCOCCUS AUREUS	103
EVALUATING BIOFILM FORMATION BY SALMONELLA TYPHIMURIUM AND ITS CSGD, RFAG, RMBA, AND STJC MUTANTS IN SIMULATED GASTROINTESTINAL ENVIRONMENTS.....	104
STRUCTURE AND MATRIX OF BIOFILMS: A COMPREHENSIVE REVIEW	105
FATTY ACID PROFILE OF MEATS AND THEIR IMPACTS ON HUMAN HEALTH	106
COMPARATIVE ANALYSIS OF TRADITIONAL AND GREEN EXTRACTION TECHNOLOGIES FOR PHENOLIC COMPOUNDS FROM OLIVE FLESH AND LEAVES	107
BIOREMEDIATION OF CONTAMINATED SOILS	108
MICROPOLLUTANTS AND THEIR EFFECTS ON ENVIRONMENTS	109
FORAGE YIELDS OF SOME CONFECTIONARY SUNFLOWER VARIETIES GROWN AT DIFFERENT DENSITIES.....	110
KEY BACTERIAL INFECTIONS IMPACTING APRICOTS AND HOW TO MANAGE THEM	111
INVESTIGATION OF THE EFFECT OF D398S MUTATION ON THE KINETIC PARAMETERS AND THERMAL STABILITY OF GLUCOSE ISOMERASE FROM Anoxybacillus gonensis G2T.....	112
IN VITRO ANTIOXIDANT AND SUNSCREEN ACTIVITY OF ACETONE AND METHANOL EXTRACTS OF MAIZE LEAVES AND MAIZE TASSEL.....	113
THE IMPORTANCE OF GENETIC TESTS USED IN COLORECTAL CANCER DIAGNOSIS	114
MECHANISM OF BAX/BCL-2 ASSOCIATED MULTIDRUG RESISTANCE IN CANCER	115
APPLICATIONS OF ELECTRO-PEROXONE PROCESS IN THE REMOVAL OF PHARMACEUTICALS.....	116
EFFECT OF ompC GENE ON BIOFILM FORMATION UNDER SALT STRESS IN SALMONELLA TYPHIMURIUM STRAIN 14028	117

ANTIMICROBIAL POTENTIAL OF BACTERIA FROM THE MICROALGAE PHYCOSPHERE.....	118
STUDIES ON PHOTOCATALYTIC DEGRADATION OF ANIONIC AND CATIONIC DYES VIA ANTIMONY TRIOXIDE.....	119
THE ROLE OF POLYMERIC NANOMATERIALS IN DRUG DESIGN.....	120
MULTI-OMICS DATA MINING IN PLANT SCIENCE: FAR1 GENE FAMILY IN P. VULGARIS.....	121
THE ROLE OF GLUTAMATE RECEPTOR-MEDIATED NITRIC OXIDE PRODUCTION IN MITOCHONDRIAL STRESS RESPONSE IN <i>ARABIDOPSIS THALIANA</i>	122
OMICS-ASSISTED CHARACTERIZATION AND EXPRESSION ANALYSIS OF THE ALFIN-LIKE GENES IN PHASEOLUS VULGARIS L	123
REVEALING THE FUNCTIONALLY IMPORTANT RESIDUES FROM THE THREE DIMENSIONAL STRUCTURE DATA OF PROTEINS	124
THE EFFECT OF E3 LIGASE ATPUB18 IN NO SIGNALIZATION ON ABA-INDUCED STOMATAL CLOSURE.....	125
IN SILICO ANALYSIS OF ABIOTIC STRESS RESILIENCE: UNVEILING KEY PLANT PLATZ GENES IN <i>PHASEOLUS VULGARIS L</i>.....	126
RISK FACTORS FOR THE EFFICIENCY OF ARTIFICIAL INSEMINATION IN DAIRY COWS.....	127
STUDY OF THE RELATIONSHIP BETWEEN THE RESUMPTION OF POSTPARTUM OVARIAN CYCLICITY AND CERTAIN NUTRITIONAL CRITERIA IN DAIRY COWS..	128
IN SILICO INVESTIGATION INVOLVING GOLD AND SILVER NANOPARTICLES WITH B-AESCIN AGAINST COVID-19 VARIANTS	130
EFFECTS OF INFESTATION BY THE PARASITE VARROA DESTRUCTOR ON THE EMERGENCE WEIGHT OF WORKERS, AND LIFESPAN DIFFERENCES BETWEEN SENSITIVE AND RESISTANT HONEY BEE (<i>APIS MELLIFERA</i>) COLONIES	131
OCCUPATIONAL EXPOSURE TO CHEMICAL AND RADIOLOGICAL HAZARDS IN HEALTHCARE WORKERS IN PUBLIC HEALTH FACILITIES, TLEMEN, ALGERIA	132
ASSESSMENT OF THE LEVEL OF CARBON MONOXIDE IN EXHALED AIR AMONG WORKERS AT GASOLINE STATIONS IN ALGERIA.	133
RESVERATROL LOADED MICELLES WITH EFFECT ON EXPLORATORY BEHAVIOR AND BRAIN MONOAMINES IN RATS WITH SCOPOLAMINE INDUCED DEMENTIA..	134
PLURONIC P123 AND PLURONIC F127 COPOLYMER MICELLES LOADED WITH RESVERATROL PROTECT AGAINST APOPTOSIS IN AN IN VIVO EXPERIMENTAL MODEL OF DEMENTIA.	135
CORIANDRUM SATIVUM IN WINE AROMATIZATION IN BULGARIA.....	136
THE EFEKT OF CULTIVATION TECHNOLOGIES ON THE GRAIN YIELD AND QUALITY OF DURUM WINTER WHEAT	137
EVALUATING QUALITY STANDARDS IN DURUM WHEAT AND SEMOLINA PRODUCTION: A CASE STUDY OF ZIBAN MILLS	138
NASAL TREATMENT TARGETING SARS-COV-2 VARIANTS IN THE AGE OF VACCINES	139

APPLICATION OF SACCHAROMYCES CEREVISIAE 31 AND METSCHNIKOWIA PULCHERRIMA 62, ISOLATED FROM ALBANIAN VINEYARDS, AS NEW STARTERS IN THE PRODUCTION OF ALE STYLE BEER.....	140
EXTRACTION AND EVALUATION OF BIOACTIVE COMPOUNDS IN FRESH AND DRIED OLIVE LEAVES	141
BAT DIVERSITY IN THE ALGERIAN BIBANS, A LIMESTONE KARST MASSIF	142
PRODUCTION OF POLYHYDROXYALKANOATES AND EXTRACELLULAR PRODUCTS FROM PSEUDOMONAS PUTIDA	143
MOLECULAR CHARACTERISATION OF SPECIES AND GENOTYPE OF HISTOMONAS MELEAGRIDIS IN CHICKENS FROM TUNISIA.....	144
STUDY OF THE ANTIMICROBIAL ACTIVITY OF HEXANE AND ETHYL ACETATE EXTRACTS OF ANABASIS OROPEDIORUM MAIRE.....	145
THE EFFECT OF PLASMA ACTIVATED WATER ON THE MICROBIAL DECONTAMINATION AND PRESERVATION OF STRAWBERRIES.....	146
ASSESSMENT OF GROUNDWATER QUALITY FOR DRINKING AND IRRIGATION IN THE BOUHAMA AREA, ALGERIA.....	147
SCREENING LANTANA ACIDA, FICUS SYCOMORUS AND BRIDELIA FERUGINEA FOR ACTIVITY AGAINST TYPE-2 DIABETES.....	148
COMPARATIVE EFFECT OF TWO BIOSTIMULANTS ON THE PHYTOCHEMICAL EXPRESSION OF A STRATEGIC CEREAL CROP.....	149
A LONGITUDINAL ANALYSIS OF THE IMPACT OF PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOURS ON GESTATIONAL WEIGHT GAIN: WHAT ARE THE REASONS OF NON-PRACTICE ?.....	150
SCREENING OF PROMISING LINES USING GENERATION MEAN ANALYSIS FOR HIGH GRAIN YIELD AND YIELD RELATED TRAITS.....	151
OVERVIEW OF PLANT BASED NANO MEDICINES	152
GENETIC TRANSFORMATION OF WHEAT FOR ABIOTIC STRESS TOLERANCE	153
ETHNOVETERINARY PRACTICES USED IN THE POTHOHAR PLATEAU (DISTRICT CHAKWAL), PAKISTAN FOR TREATMENT OF ANIMALS	154
AEROPALYNOLOGICAL STUDY AND POLLEN DIVERSITY IN THE ATMOSPHERE OF BATNA (NORTHEAST ALGERIA): ANNUAL ANALYSIS USING A HIRST-TYPE VOLUMETRIC SAMPLER	155
MEDICINAL PLANTS AND ACNE TREATMENT: AN ETHNOBOTANICAL STUDY AMONG YOUNG ADULTS ACROSS SIX ALGERIAN CITIES	156
EXTRACTION OF MASTIC OIL (DROU).....	157
BIOPRESERVATION TRIALS OF THE TRADITIONAL ADGHESH CHEESE USING LACTIC ACID BACTERIA	158
FRESH CHEESES MADE IN THE EASTERN ALGERIAN REGION.....	159
ETHNOBOTANICAL SURVEYS ON INFLUENZA TREATMENT METHODS IN THE COMMUNES OF M'SILA, OULED DERRADJ, BERHOUM AND MAGRA OF THE WILLAYA OF M'SILA (ALGERIA)	160
FLORISTIC DIVERSITY OF M'SILA: INVENTORY, CHOROLOGY, ECOLOGY	161
CURRENT APPROACH TO THE CHILD WITH FEVER.....	162

UNLOCKING THE POTENTIAL OF AVOCADO PEELS: A PATH TO SUSTAINABLE NUTRACEUTICALS	163
THE INHIBITOR EFFECT OF MAGNESIUM SULFATE ON THE ACTIVITY OF GLUCOSE-6-PHOSPHATE DEHYDROGENASE	164
QUALITY CONTROL PREPARATION FOR SPECTROPHOTOMETRIC METHEMOGLOBIN DETERMINATION	165
DETERMINATION OF ALLERGIC TREE POLLEN GRAINS SPREADING IN SELÇUK UNIVERSITY ALAEDDIN KEYKUBAT CAMPUS.....	166
DEVELOPMENT AND VALIDATION OF A NEW HPLC-UV METHOD FOR THE DETERMINATION OF GOSSYPOL IN COMMERCIALY AVAILABLE COTTON OILS	167
FIRST DETECTION OF COLLETOTRICHUM CEREALE CAUSED ANTHRACNOSE IN TURFGRASS AREAS IN TÜRKIYE	168
MICRODOCHIUM SPP. CAUSING DISEASES IN TURFGRASS AREAS AND THEIR DAMAGES	169
THE CHARACTERIZATION OF LEA GENE FAMILY IN P. VULGARIS USING MULTI-OMICS APPROACH.....	170
CURRENT EVIDENCE IN THE MANAGEMENT OF NEONATAL SEPSIS	171
CURRENT APPROACH TO THE CHILD WITH FEVER.....	172
BIOMASS LIPID PROFILES OF SPIRULINA MICROALGAE AS FOOD SUPPLEMENT	173
GAMMA IRRADIATED MICROENCAPSULATED BLACK MULBERRY POWDER CONTAINING APIGENIN AND MORUSIN.....	174
PRODUCTION OF BETA GLUCAN SUPPLEMENTED MICROENCAPSULATED APPLE PHLORIDZIN (PHLDZ) POWDER AND APPLE PHLDZ BASED GEL CANDY	175
FLORISTIC BIODIVERSITY STUDY OF THE NATURAL BIOTOPES OF THE DESERT LOCUST (SCHISTOCERCA GREGARIA FORSSKÅL) IN THE TADEMAÏT PLATEAU (ALGERIAN SAHARA).....	176
STUDY OF WATER TRANSFER IN SOIL. EFFECTS OF TEXTURE AND SALINITY.....	177
PRODUCTION OF POLYHYDROXYALKANOATES AND EXTRACELLULAR PRODUCTS FROM PSEUDOMONAS PUTIDA	178
PAST, PRESENT AND FUTURE OF VEGETABLE PRODUCTION IN TURKEY	179
CONTRIBUTION TO A CHARACTERIZATION OF THE POSTPARTUM PERIOD IN THE CAMEL (CAMELUS DROMEDARIUS).....	180
ULTRASOUND AND HORMONAL MONITORING OF OVARIAN ACTIVITY IN THE CAMEL (CAMELUS DROMEDARIUS) DURING THE POSTPARTUM PERIOD.....	181
EFFECT OF ADDING SOYBEAN OIL TO DIESEL FUEL ON ENGINE CHARACTERISTICS	182
THE ROLE OF CHATBOTS IN SUPPORT REQUEST SYSTEMS AND THE POTENTIAL OF CHATGPT	183
RESPONSE OF MAIZE BREEDING TO CLIMATE CHANGE	184
IMPACT OF TONIFERTAL 4H SUPPLEMENTATION ON ENHANCING RABBIT FERTILITY	185

STUDYING THE EFFECT OF AN AQUEOUS EXTRACT OF TEUCRIUM POLIUM L. ON MERCURY TOXICITY INDUCED ALTERATIONS IN LIPID PROFILES (LIPID FRACTIONS) IN LIVER TISSUE OF RATS.....	186
MERCURY-INDUCED ACUTE NEPHROTOXICITY IN RATS: TREATMENT WITH AQUEOUS EXTRACT OF PISTACIA ATLANTICA (DESF)	187
OXIDATIVE STRESS IN VICIA FABA L. SEEDLINGS UNDER DIFFERENT ABIOTIC STRESSES: SALINITY, WATER DEFICIT, AND HEAVY METAL STRESS	188
DETECTION OF MICROPLASTICS NEAR THE ESTUARY OF KAVAJA RIVER USING RAMAN SPECTROSCOPY	189
SEA URCHIN POPULATION OF TURKEY IN TERMS OF BIOACTIVE POTENTIALS ..	190
BIOLIC 2024 CONGRESS STUDENT ORGANIZING TEAM	191
OUR SPONSORS	192

ENZYMES-ASSISTED GREEN SOLVENTS EXTRACTION OF POLYPHENOLS FROM CHOKEBERRY POMACE

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ABSTRACT

Chokeberry pomace is a rich source of polyphenols that can be utilized in the food industry serving as a food colour enhancer, antimicrobial agent, or antisenescence. However, some polyphenols can be found bound within plant cellular walls, making it hard to recover them from the pomace. Hence this study assessed the effectiveness of enzymes: Pectinex® Ultra colour, (20 µL/10 g DW), Pectinex® BE XXL (20 µL/10 g DW), and Fructozym (15 µL/10 g DW), in extracting a high level of polyphenols from chokeberry pomace. The enzymes were used with distilled water as a solvent and combined with 50% ethanol and 50% glycerol both acidified with citric acid. The extraction effectiveness of polyphenols was assessed by testing for Total phenolic content, total anthocyanins (TA), and antioxidant capacity (FRAP, DPPH, and TEAC). HPLC was also performed to quantify and identify the most abundant anthocyanins in the chokeberry pomace. The highest yields were obtained with Pectinex-ultra-50% ethanol + 1% citric acid(PUEWC) for TPC (1258±2 mg GA/100g DW), Fructozym-50% ethanol +1% citric acid for TA (331±6 mg/100g DW), 50% ethanol + 1% citric acid for FRAP (1644±6 mg AA/100g DW), Pectinex-ultra-50% glycerol + 1 % citric acid for DPPH (1517±209 mg/100g DW), and Fructozym-50% ethanol + 1% citric acid for TEAC (969±3 mg/100 g DW). The study revealed that enzymes can be added to other solvents to improve the level of polyphenols.

Keywords: Green-solvents, enzymes-assisted, extraction, polyphenols, chokeberry, pomace

COMPARATIVE CHROMOSOMAL ANALYSIS OF TWO SPECIES THREATENED WITH EXTINCTION: THE BARBARY SHEEP AMMOTRAGUS LERVIA AND THE LEPTOCEROS GAZELLE GAZELLA LEPTOCEROS

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ABSTRACT

The Barbary sheep *Ammotragus lervia* and the Leptoceros Gazelle *Gazella leptoceros* belong to the Bovidae family. These species are threatened with extinction and listed as vulnerable for the Barbary sheep and endangered for the Leptoceros gazelle. They are included on the red list established in 2023 by the International Union for Conservation of Nature (IUCN). Several reasons are behind this decline, including hunting and poaching, the influence of long periods of drought and the installation of heavy infrastructure. To describe the genome of these species, we cultured lymphocytes from the blood of adult animals. We then established high-resolution GTG banded- karyotypes after blocking the cell cycle with excess thymidine to synchronize divisions and obtain elongated chromosomes in prometaphase. The results obtained enabled us to compare the chromosomes of these two species with those of the domestic goat *Capra hircus*. Similarities and differences have been identified between these three species for certain chromosomes. The similar regions are highlighted and reveal possible chromosomal conservation that may have taken place during evolution. We are currently building a chromosome database for these endangered species.

Keywords: Barbary sheep, *Gazella leptoceros*, endangered species, chromosomes, karyotypes, comparative mapping.

ECOLOGICAL ADAPTATION AND PHYSIOLOGICAL RESPONSES OF TWO ECOTYPES OF CAROB (*CERATONIA SILIQUA*) TO WATER STRESS

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ABSTRACT

The carob tree (*Ceratonia siliqua* L.) is an agro-pastoral species of significant social, economic, and environmental concern. This study uses a method from more than one field to look at the variety of biological, physiological, and agricultural traits that help two ecotypes of *Ceratonia siliqua* from Tissemsilt and Ain Sefra survive. We characterized these ecotypes through investigations into their germination, morphological variability, and physiological response to water stress. The results revealed significant differences between the two ecotypes, indicating specific adaptations to their respective environments. In the study of morphological variability, six leaf-related characteristics were considered. These included the number of leaflets, leaf area, and petiole length. The results showed big differences that suggest adaptive diversity in response to local conditions. In terms of physiological and biochemical mechanisms for water stress tolerance, we examined leaf water status (relative water content RWC and stomatal conductance *gs*), osmoregulation (proline and soluble sugars), and chlorophyll pigments (chlorophyll a, b, total, and carotenoids). The findings demonstrated differentiated responses between ecotypes, highlighting their ability to adjust metabolism and physiology to cope with water stress. Finally, when evaluating the geographical origin factor, the data showed that Ain Sefra exhibited the highest average values for most studied characteristics, underscoring the significance of origin. In conclusion, this study gives a thorough look at how two ecotypes of *Ceratonia siliqua* germinate, change shape, and react physiologically. Their adaptation to their environment and their potential use in farming and environmental situations are the focus.

Keywords: stomatal conductance, Chlorophyll pigments, RWC, proline, Soluble sugars.

SUBSEQUENT EFFECT OF ANAEROBIC DIGESTATE ON SOIL PROPERTIES

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ABSTRACT

Processing plant biomass through composting or methane fermentation is perceived as an element of the circular economy. The products obtained as a result of the processes (compost or digestate) are a valuable alternative to conventional, organic fertilizers. Composting is a simpler and cheaper process, but biogas production has recently become more popular. The production of biogas from biomass by anaerobic digestion results in generation of anaerobic digestate (AD). According to Polish law, digestate is considered as a waste. The digestate is characterized by significant hydration (> 90%), alkaline reaction and, above all, nitrogen content in the ammonium form, easily released into the atmosphere. Such characteristics pose the environmental problems and require digestate conditioning. However, digestate conditioning involves additional technological solutions and related costs. This is the reason why the unaltered digestate is directly applied to the soil. Moreover AD is recognized as a source of N, P and K easily available to plants. Considering such a practice, the subsequent impact of AD on soil properties determining soil fertility and health was assessed. The research was carried out on Luvisol located in the Poznań district (Poland). The AD dose was 15 m³ /ha and was applied during the autumn period before sowing winter wheat. The soil samples for testing were taken in individual terms: I - before AD application; II - 1.5 months after AD application; III - in spring after the start of vegetation; IV - after the harvest of plants. The collected soil material was dried and sieved. In the soil samples prepared in this way, the physicochemical (pH, CEC) and chemical properties (OM, TOC, total amounts and available amount of N,P,S as well as available amount of Cu, Zn, Mn, Ni and Fe) of the soil were assessed using methods commonly used in chemical - agricultural analysis. The increase in pH value often highlighted in the literature, resulting from AD application, was also noted in this study, but it was not a spectacular change. In soil from the IV term of sampling, pH value was found to be 0.5 higher compared to the pH value of the soil before AD application. Nevertheless, this phenomenon was accompanied by an increase in CEC value, which was particularly noticeable for potassium and calcium, where in the soil of IV term of sampling the amount of these elements was found to be 33 and 15% higher, respectively. Also noteworthy is the 35 - 38% increase in the amount of OM, TOC, total N, available P and S that occurred in the soil as the influence of AD applied dose. Also, the available amounts of microelements in the soil increased. As a subsequent effect of the digestate application the content of Zn, Mn and Fe increased by 24, 18 and 12%, respectively, in relation to the amounts found in the soil before AD application. As the research showed, the mineral nitrogen were subject to successive reduction, as a result of which, its amount in the soil from the IV term of sampling was 30% lower compared to the level in the soil from the I term of sampling. The subsequent impact of the digestate was statistically confirmed in relation to the amounts of TOC, OM and available from N, P and S. Therefore, it is difficult to talk about a broad positive effect of this organic additive on all soil properties. At the same time, it should be consider that the impact of digestate is shortterm, and the transformations of the introduced nutrients (especially nitrogen) are quick, so such a application requires supplementation with conventional fertilizers.

Keywords: Soil, microelements, digestate, soil properties

ESTIMATING CARBON SEQUESTRATION POTENTIAL OF TWO AGROFORESTRY PRACTICES IN HUNGARY

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ABSTRACT

In 2022, the report of the Intergovernmental Panel on Climate Change (IPCC) classified agroforestry as one of the three most important mitigation alternatives within the land use sector. Quantifying carbon sequestration in agroforestry systems is crucial for understanding their role in mitigating climate change. In two sample areas (alley cropping and shelterbelt systems) we use the traditional method for measuring biomass is to cut down individual trees and plants, and then measure their carbon content in laboratory. The carbon content of the soil sample is determined according to methodology. We have large- and smaller-scale global models based on extrapolation of field measurements, which are used in forestry for carbon sequestration estimates. In case of shelterbelt systems, we can perform a more accurate carbon stock calculation based on the data of the National Forest Database. Unfortunately, this method cannot be used in all types of systems. Using satellite-based remote sensing we can create maps and graphs displaying biomass, soil carbon content, carbon absorption and greenhouse gas emissions. Their advantage is large spatial coverage, but their disadvantage is medium spatial resolution, so small areas cannot be examined by them. In our research work, we want to assess the mitigation potential of Hungarian agroforestry systems, comparing the accuracy of the mentioned methods. While challenges exist, advancements in technology and modeling, coupled with comprehensive field data, can enhance our understanding and capability to measure carbon sequestration accurately. This, in turn, can drive policy decisions and incentivize sustainable land management practices.

Keywords: agroforestry, carbon sequestration, biomass, climate change

SPACEBORNE FOREST MONITORING

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ABSTRACT

A novel space-based approach was created to utilise high-resolution Sentinel-2 satellite imagery of the European Space Agency and Google Earth Engine platform (GEE). Sentinel-2 imagery was used for studying forest health change, species composition and biomass content. We developed a new method to create vegetation and water index (NDVI, Z NDVI, NDWI) maps and charts from satellite imagery for multiple purposes, including land-cover surveying, tree species classification, and forest disturbance detection in Hungary. The image processing steps such as query, filtering, masking, visualising, and analysing took place in the digital cloud for forest monitoring. Forest disturbances, encompassing biotic, abiotic, and anthropogenic damage types, were regularly surveyed in Hungary using the Google Earth Engine (GEE). In the GEE, Machine learning algorithms including Random Forest, Minimum Distance Estimation, Support Vector Machine, and Gradient Boost Regression were employed to facilitate classification tasks related to land cover, tree species, and forest damage. The objective centred on achieving precise mapping of forests and tree species, thereby enhancing the accuracy of forest monitoring endeavours and enabling analysis of tree species distribution. Our findings for sample areas and the whole country suggest that integrating satellite imagery with ground-based reports yielded a suitable dataset for conducting forest damage monitoring using Google Earth Engine. The method we employed demonstrated success in identifying various types of forest damage on spectral index maps during the surveyed period, achieving a Total Accuracy of 78% and accurately classifying tree species with an accuracy of 82% compared to the validation set, the Hungarian Forestry Database. These results are promising and indicate the usability of the approach.

Keywords: forest monitoring, Sentinel-2, Machine Learning, Google Earth Engine, image classification

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THE ROLE OF PROBIOTICS IN PREVENTION OF FOOD ALLERGY

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ABSTRACT

With the prevalence of food allergy increasing every year, becoming a significant public health concern worldwide. The reasons for this increase are not entirely understood, but factors such as changes in diet, environmental influences, and genetic predispositions are believed to play a role. More and more studies have shown that probiotics can intervene in food allergy based on the intestinal mucosal immune system. This work presents the application and potential immunomodulation mechanisms of probiotics on food allergy. Probiotics indeed play a crucial role in maintaining the balance of intestinal microorganisms, known as the gut microbiota. This balance is vital for various physiological functions, including maintaining the integrity of the mucosal barrier, supporting immune function, and promoting gastrointestinal health. Probiotics can help inhibit the growth and invasion of harmful bacteria in the gut, thus preventing conditions like diarrhea and potentially reducing the risk of food allergies. Despite the lack of conclusive evidence, the overall findings suggest that probiotics may hold promise as a potential adjunct therapy for preventing and managing food allergies. The mechanisms through which probiotics exert their effects on the immune system and gut microbiota are complex and not yet fully understood. Therefore, further research needed to elucidate the specific strains, dosages, and treatment protocols that are most effective for different types of food allergies.

Keywords: Probiotic, microbiota, immune response, food allergy

PHOTOSYNTHETIC PIGMENTS IN PRIMULA VERIS LEAVES FROM DIFFERENT REGIONS OF ALBANIA AND KOSOVO

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ABSTRACT

Albania is rich on natural resources, suitable land and climate conditions to produce wild and cultivated medicinal and aromatic plants. *Primula veris* is one of the most common medicinal plants in Europe and in our country. *Primula veris* is a herbaceous plant, belonging to the Primulaceae family, that grows wild in fields and forests. In our study, we chose five regions with different geographical extents, two areas located in the north of Albania (Peshkopia and Burreli) and three areas in Kosovo (Badovc, Novoberdo-Artana and Brezovica). The purpose of this study was to evaluate the morphology of the leaves and the variability of the amounts of photosynthetic pigments in *Primula veris* L. plants collected in the areas taken in this study. For the analysis of photosynthetic pigments in plant leaves during their flowering phase, we use the CCM-200 chlorophyll meter. Measurements were also made for the leaves of the collected plants from four areas under study. The plants of the Peshkopia area had little development both in the leaf surface and in the level of photosynthetic pigments. The measured photosynthetic pigments are at a higher value in the area of Brezovica, which is considered by various authors as a quite ecologically clean area. The chlorophyll pigments in *Primula veris* in the Novoberdo-Artana and in Badovci area have resulted in approximately the same values due to the geographical position of the two areas and the same climatic conditions. From the assessment of *Primula veris* plants in the area of Brezovica, it is observed that they have a greater development compared to other areas studied at the same stage of their development. The results obtained from this study will help in the evaluation of this medicinal plant and its cultivation in the areas where it is found naturally.

Key words: *Primula veris*, photosynthetic pigments, chlorophyll meter CCM-200

STUDY OF AUTOANTIBODIES IN PRIMARY BILIARY CHOLANGITIS (CBP) IN THE ANNABA REGION: CHARACTERISTICS, PREVALENCE AND DIAGNOSTIC ROLE OF AUTOANTIBODIES ASSOCIATED WITH CBP.

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ABSTRACT

Primary biliary cholangitis is a destructive, non-asuppurated disease of autoimmune origin characterized by destruction of the small bile ducts. This study attempts to determine the prevalence of primary biliary cholangitis in a population in the Eastern Algerian region - Annaba- and to describe the clinical, immunological and biological characteristics of the disease. The Immunodot technique was used for the determination of autoantibodies: anti-mitochondrial (AMA-M2), anti-speckled protein 100 Kd (Sp100), anti-glycoprotein 210 (Gp210) and anti-liver cytosol antibody Type 1 (anti-Lc1) in the serum of patients. Our epidemiological study is retrospective, descriptive and analytical having focused on 394 patients suspected of having a CBP. It was performed at the Immunology department, Clinique Sainte Thérèse, CHU Annaba, Algeria (January-November 2023). Patient records were used to sort the criteria studied: determination of autoantibodies, biological and clinical profile. The results showed the following clinical signs: icterus (30%), followed by asthenia (16.66%), abdominal pain (13.33%), pruritus (10%) and hepatomegaly (6.66%). There are also other signs in 23.33% of cases such as pallor, weight loss, anemia with its various types, arthralgia, fever, headache and inflammatory syndrome. The results concerning the biological profile revealed cholestasis syndrome (36.66%), and cytolysis (46.66%). Autoantibodies (AMA-M2) were positive at (67%). The positivity of autoantibodies was 27% for anti-Gp210, 20% for anti-Sp100 and 20% for anti-Lc1. CBP is associated with other autoimmune diseases of which: (43.33%) are autoimmune hepatitis (HAI) with the presence of anti-Lc1 at 20%, thus define an overlap syndrome and (56.66%) are other diseases (lupus, hepatic encephalopathy, chronic hepatopathy, hepatic exploration, interstitial lung disease, myopathy, hepatitis and Gougerot cirrhosis).

Keywords: *Primary biliary cholangitis, autoimmune disease, Cholestasis, anti-mitochondria antibodies, ursodeoxycholic acid.*

DIFFERENTIAL DROUGHT TOLERANCE MECHANISMS IN CHICKPEA GENOTYPES: INTEGRATING PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES

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ABSTRACT

In this study, in vitro drought conditions induced by polyethylene glycol (PEG6000) were used to investigate the effect of water deficit on seeds and seedlings of two chickpea genotypes (*Cicer arietinum* L.) ILC 482 and Rabat 9. For this purpose, *Cicer* seeds were cultured in MS (Murashige and Skoog) medium containing different levels of PEG 6000 0%, 5%, 10% and 20% w/v for 21 days. Seed germination and morphological observations including shoot and root length; fresh and dry weight and relative water content (RWC) were recorded at the end of the experiment. In addition Biochemical traits including Total proteins , proline, antioxidant parameters of seedlings under drought stress were further observed. Our results showed that the seed germination rate was reduced with elevated PEG-6000 concentrations in both varieties. Besides, water deficiency conditions altered the morphology of seedling leaf and root. Overall, Interesting results were found in the protein profiles of the chickpea genotypes under drought stress conditions. Protein levels increased with increasing water deficit ILC 482 protein levels increased progressively with increasing polyethylene glycol (PEG) concentrations, However, in Rabat 9, protein levels showed an initial increase up to 5% PEG concentration but declined at higher PEG levels. The findings provide insights into the differential drought responses of these chickpea varieties and contribute to the development of drought-tolerant cultivars.

Key words: Chickpea (*Cicer arietinum* L.) - Drought stress - polyethylene glycol (PEG6000) - Protein profile

ANTIFUNGAL PROPERTIES OF ALGERIAN HONEYS: A NATURAL SOLUTION TO COMBAT FOODBORNE FUNGI

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ABSTRACT

Background: Fungal contamination of food is a widespread issue globally, leading to substantial economic losses and health risks. Natural antifungal agents, such as honey, have attracted attention due to their ability to inhibit fungal growth. **Objective:** This study aimed to investigate the antifungal properties of 14 selected Algerian honeys produced by *Apis mellifera* against four fungal strains and two strains of *Candida albicans*. **Methods:** The antifungal activity of the honeys was evaluated using the food poisoning technique against *Alternaria* sp., *Alternaria alternata*, *Aspergillus flavus* MNHN 994294, *Cladosporium herbarium* MNHN 3369, and two *Candida albicans* strains: ATCC10231 and ATCC26790. **Results:** Parsley honey, euphorbia honey, and thistle honey displayed significant inhibition rates of 57.5%, 52.38%, and 49.20%, respectively, against *Alternaria* sp. Parsley honey also showed 41.75% inhibition against *Alternaria alternata*. No antifungal activity was observed against *Aspergillus flavus* and *Cladosporium herbarium*. Only thistle honey demonstrated moderate efficacy against *C. albicans* ATCC26790, with inhibition zones ranging from 11±0.33 mm to 12±0.66 mm at 80% and 50% concentrations. **Conclusion:** The results suggest that certain Algerian honeys, particularly those from parsley, euphorbia, and thistle, possess promising antifungal properties. Further investigation is required to elucidate their mechanisms of action and potential applications in food preservation.

Keywords: Antifungal activity, Algerian honey, *Alternaria* sp., *Candida albicans*, Food preservation

SCREENING OF *E. COLI* AND *B. SUBTILIS* CELLS FOR ANTIBIOTIC AND HEAVY METAL RESISTANCES BY PAPER DISC-AGAR DIFFUSION ASSAY

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ABSTRACT

Different microorganisms can cause harmful problems and damages on the host organisms, by disrupting their life cycle due to their pathogenicity. So, here comes in help antimicrobial agents such as: antibiotics and heavy metals that prevent/inhibit their infection and their growth process in the host organisms. In this experiment two main parts are developed to complete the whole experiment. The first part consist in the observation and determination of the effect of different antimicrobial agents like: antibiotics (kanamycin, ampicillin, chloramphenicol) and heavy metals (aluminium chloride, cobalt chloride, nickel chloride) on the bacteria growth by applying screening process. While, the second part include the impact of antibiotics concentration and minimum inhibitory concentration range on the growing process of bacteria under different dilution factors, where both parts are applied on two different samples cultures such as, *E. Coli* DH5 α strain and *B. Subtilis* PY79 strain. To better understand the procedure and all the steps followed during this experiment, some purposes have been achieved. The main aim is to understand the effect of each of the antimicrobial agents on both cultures growth process by using disc-agar diffusion assay technique. Another purpose to fulfil was testing the mechanism of action of each of the antibiotics and heavy metals used, by understanding their ability to inhibit, kill or even disrupt the metabolic process of microbial cells. So, based on this the determination of samples culture sensitivity or resistance was also important aim to accomplish. Moreover, the method used to incubate both cultures *E. Coli* DH5 α strain and *B. Subtilis* PY79 strain at 37°C for 72 hours was paper disc assay diffusion technique. Also, the plates prepared were incubated at LB agar medium and the result in the end were obtained in the form of inhibition zone around the paper disc. As a result, both cultures have a bigger inhibition zone when kanamycin and chloramphenicol are applied compared with ampicillin that formed a smaller inhibition zone. Meaning that *E. Coli* DH5 α strain and *B. Subtilis* PY79 strain are more sensitive against kanamycin and chloramphenicol and are more resistance against ampicillin. While, for the heavy metals used cobalt appear to have the bigger effect on both cultures compared with the two other elements. Moreover, testing the effect of kanamycine antibiotic, it esulted that for the same amount of antibiotic used, MIC value appeared the same for both cultures, but the diameter of inhibition zone is bigger in the case of *B. Subtilis* PY79 strain by making it more sensitive. All in all, it can be said that *E. Coli* DH5 α strain was more resistance against all the antimicrobial agents used compared with *B. Subtilis* PY79 strain that appear to be more sensitive. Also, in the case on kanamycin used in the same concentration for both cultures, *E. Coli* DH5 α strain resulted to be more resistance against it.

Keywords: E.coli, antibiotics, disc-agar, heavy metal, B.Subtilis.

STUDY OF THE COMPARATIVE TOXICITY OF SINAPIS ARVENSIS AND EUCALYPTUS GLOBULUS ON AN APHID PEST AND ITS NATURAL ENEMY.

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ABSTRACT

Eucalyptus and plants from the Brassicaceae family such as field mustard are highly sought-after plants for their phytosanitary, human health and environmental benefits. This study looked at the insecticidal effect of *Sinapis arvensis* and *Eucalyptus globulus* on populations of a model aphid pest, the green plum aphid *Hyalopterus pruni*, in the laboratory. Insecticide treatments involved the use of formulated extracts of the two plants harvested in autumn and spring respectively in the ChercHELL and Ouled Yaich regions in northern Algeria. The aphids were placed on healthy apricot leaves previously soaked in the treatment solutions at two different doses. Observations were made over an exposure period of 2h, 6h, 10h, 24h and 48h. The bioformulated essential oil of *E. globulus* harvested in autumn showed average toxicity from the 6th hour at the D1 dose of 0.59g/50ml H₂O. The temporal effect and harvesting period showed a highly significant difference. Soxhlet-formulated ethanolic extracts of *S. arvensis* showed a better effect from the 10th hour with high toxicity at 24 hours for dose 1 of 0.6g/50ml H₂O. According to our observations, there was no effect of the different treatments on the aphids parasitized.

Key words: phytoextract, essential oil, aphids, parasitoids, toxicity.

CRUCIAN CARP AND BARBEL CATCH ANALYSIS IN OHRID LAKE

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ABSTRACT

Fish and fishery have always played an important role in Ohrid Lake region, especially for the population of the towns and villages surrounding the Lake. The fishermen that operate in the lake are organized in the Fishery Management Organization. The aim of the study was to evaluate catch structure and CPUE two cypriniform fish species of Ohrid Lake: crucian carp (*Carassius carassius*) and barbel (*Barbus rebeli*). Evaluation of catch, gear used and effort were based on data provided from Fishery Management Organization of Ohrid Lake. There are 220 fishing boats of which 70 boats are equipped with fishing nets and long lines and 150 boats are equipped only with long lines. The total production of the lake for these two species in two years of study was respectively 0.06 and 0.09 ton for the crucian carp and 2.1 and 0.33 ton for the barbel. The catch per unit of effort (CPUE) ranged from 0.02 kg/day/boat for both the years for the crucian carp and from 0.04 kg/day/boat in 2021 to 0.05 kg/day/boat in 2022 for the barbel. The months with the highest production for crucian carp were in july, august, september of 2021 and 2022 with 0.02-0.05 tons, while for barbel, in march 2021 with 2 tons and in march, october of 2022 with respectively 0.1 tons each.

Keywords: crucian carp, barbel, CPUE, Ohrid Lake

BEE VENOM: A DOUBLE EDGE IN THE REGULATION OF INFLAMMATION

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ABSTRACT

Bee venom is a complex mixture of bioactive compounds, such as melittin and phospholipase A2, with a dual inflammatory effect, namely both anti-inflammatory and pro-inflammatory properties depending on the biological contexts, individual sensitivity and the doses applied. This study aims to highlight the notable effects of Algerian *Apis mellifera* venom on human health focusing neutrophils, which are essential cells of the innate immune system and play a key role in the inflammation response. Freshly isolated human neutrophils were used for the experimentation. Neutrophils were subjected to increasing concentrations of bee venom for both degranulation and ROS production, using spectrophotometry methods. The results showed over-activation of neutrophils (200%) at lower doses of bee venom (10 µg/ml) without significant inhibition of ROS production in stimulated neutrophils. Bee venom, help to modulate the functions of neutrophils by playing a dual role: the activation and degranulation leads to the production of free radicals, including reactive oxygen species (ROS), which contribute to the rapid elimination of pathogens. However, this can also induce tissue damage and exacerbate inflammation through excessive production of free radicals and pro-inflammatory mediators. These effects highlight the importance of the dose and biological context in the interaction between bee venom and neutrophils and its consequences in the inflammatory process. A thorough understanding of these mechanisms is essential for the safe and effective use of bee venom in alternative therapy strategies.

Key words: Bee venom, inflammation, Neutrophils, ROS, Degranulation.

A PRELIMINARY STUDY OF YELLOW PIGMENTS USED IN THE FRESCOES OF ALBANIAN POST-BYZANTINE PAINTERS JANI AND HIS SON VASILI FROM THE XVIII CENTURY; COMPOSITIONAL STUDY WITH X-RAY FLUORESCENCE AND RAMAN SPECTROSCOPY

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ABSTRACT

To study the history of the Middle Ages in Albania, it is essential to examine the art of cult objects from that period. As part of the Byzantine Empire, Albania has inherited a wealth of architectural works, adorned with high-quality frescoes and other artistic elements that have survived to the present day. The level of Byzantine and Post-Byzantine Albanian art serves as a clear indicator of the social and economic conditions in the country during that time. This article presents a preliminary study on the chemical characterization of the yellow pigment used in the workshop of Jan and his son Vasili, from Qestorati, in the XVIII century. For this analysis, techniques such as atomic spectroscopy, X-ray fluorescence, and Raman molecular spectroscopy were employed.

Keywords: X-Ray Fluorescence, Raman Spectroscopy, Post-Byzantine, Frescoes, Mural Painting, Yellow Ochre,

EVALUATION OF ORANGE PEEL EXTRACT ON HUMAN NEUTROPHILS PROPERTIES: VIABILITY, ADHESION, AND ROS PRODUCTION

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ABSTRACT

Neutrophils are key players in the innate immune response ; these characteristics were measured using various assays. Our study focused on evaluating the impact of orange peel extract (OPE) at increasing concentrations on isolated human neutrophils, specifically its effects on cell viability, adhesion, and reactive oxygen species (ROS) production. For viability assessment, we used the typan blue exclusion test, revealing that the extract did not induce cytotoxic effects. Neutrophils treated with the OPE exhibited a viability rate of 97%, compared to 100% in the control group, indicating the extract's safety and non-toxic nature to neutrophils. Adhesion assays were conducted to evaluate the neutrophil adhesion. The results indicate no significant effect of OPE; treated neutrophils exhibited an adhesion rate of 92.75%, suggesting that the extract does not alter neutrophils's ability to adhere to endothelial cells under our experimental conditions. Furthermore, ROS production by neutrophils under PMA activation was measured using the cytochrome C reduction assay. The results demonstrated that treatment with OPE did not lead to a significant reduction in ROS levels compared to the control, indicating no significant impact of the extract on neutrophil oxidative burst activity. In conclusion, our findings indicate that OPE, at the tested concentrations, is non-toxic for human neutrophils, not significantly change their adhesion ability and ROS production.

Keywords : Orange peel extract, Neutrophils, Adhesion, Cytochrome C, ROS.

THE INFLUENCE OF CHEMICAL MUTAGENS ON THE PHOTOSYNTHETIC PIGMENTS OF THE TULIP PLANT

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ABSTRACT

Cultivation of decorative plants such as tulips, crocuses, etc., are a tradition in various European countries. They are also widespread in Albania. The blooming period of tulips in natural conditions is short, but they are characterized by beautiful and colorful flowers. Induced mutagenesis is one of the most used techniques to increase variation in plants and ornamentals as well as to create new varieties with desired traits. In our study we used directed mutagenesis to improve traits in flowers, at the time of flowering in the tulip plant (*Tulipa L.*). We used chemical induced mutagenesis to improve tulip flower tail length as well as flower size. In our treatments we used chemical mutagens EMS (etil metan sulfonat) and dES (dietil sulfat) with three doses each. The treatments of the tulip bulbs were done according to the protocols described by the IAEA. Bulbs after treatment with chemical mutagens were planted in the greenhouse in the M1 generation. In the first mutant generation we analyzed the photosynthetic pigments in the leaves of tulip plants. Measurements were performed with a CCM 200 chlorophyll meter. EMS second dose has the greatest influence on increasing photosynthetic activity. The photosynthetic pigments are obviously different from the mutant plants which show an increase in photosynthetic activity of the tulip plant in forming the replacing bulbs. At the end of the vegetation, the number of bulbs, of the mutant plants was increased by 55-65% compared to the control. Treatment with chemical mutagens with EMS third dose and dES second dose there was a difference flower color which was conserved in the M2 generation.

Key words: chemical mutagens, mutations, photosynthetic pigments, tulips

ASSESSMENT OF THE ANTIOXIDANT ACTIVITY OF THE MEDICINAL PLANT ARNICA MONTANA L. AFTER APPLICATION OF THE ELICITOR SALICYLIC ACID

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ABSTRACT

The development of plant biotechnological methods is a significant advance, providing tools for the conservation of plant genetic resources, rapid clonal propagation, enhancement of secondary metabolites, regeneration of genetically manipulated superior clones, and *ex vitro* conservation of plant species with desired traits. *In vitro* techniques are potentially capable of producing a highly viable population of identical plants regardless of climate change, and they are promising technologies for plant improvement and the production of plant-specific valuable metabolites. *Arnica montana* L. (Asteraceae) is an herbaceous plant species that is endemic to Europe. The plant is mainly found in grasslands, shrublands, and alpine mountain habitats. *A. montana* has numerous health benefits due to its anti-inflammatory, immune-modulatory, analgesic, antioxidant, antibacterial, and anticancer properties. The plant is a rich source of secondary metabolites, including sesquiterpene lactones of helenalin and 11 α , 13-dihydrohelenalin type, flavonoids, terpenoids, phenolic acids, and essential oils. The species is applied externally for bruises, sprains, and muscular and rheumatic pain. Elicitation is an effective method for modulating and generating valuable plant compounds using *in vitro* plant cells or tissue culture. As an abiotic elicitor, salicylic acid alters the expression of genes encoding key enzymes of secondary plant metabolism. The aim of this study was to assess the effect of salicylic acid (SA) treatment on the antioxidant activity and growth parameters of *A. montana* shoots grown *in vitro*. The mean number of shoots produced per explant was not statistically different at 50 μ M SA and 100 μ M SA, as well as compared to the control. A decrease in the number of shoots was observed at the highest concentration of SA (200 μ M). Plants grown on nutrient media containing different concentrations of salicylic acid were higher than those cultured on the control medium. Maximum biomass accumulation was achieved after treatment with 100 μ M SA. The plants derived from this treatment have bigger leaves with large leaf petioles and a larger leaf area. Control plants were the shortest in height and accumulated the least amount of biomass. At the highest concentration of SA, leaf curling was observed, and a reduction in the amount of biomass compared to plants treated with lower SA concentrations was reported. The treated plantlets with various concentrations of SA were subjected to spectrophotometric methods that were applied to characterize antioxidant properties. Antioxidant activity of leaves of *A. montana* plantlets significantly decreased by adding the elicitor salicylic acid to the MS medium. SA has been reported to inhibit or stimulate ethylene production dependent on the concentrations of SA used and in the plant material analyzed. In the present study, probably in tubes is accumulated ethylene which imposes oxidative stress and was accompanied with a decrease in the enzymatic and non-enzymatic antioxidant capacity.

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Keywords: mountain arnica, elicitor, micropropagation, enzymatic and non-enzymatic antioxidant capacity

GROWTH ACCELERATION AND ANTIOXIDANT POTENTIAL OF MICROPROPAGATED ARNICA MONTANA L. PLANTS USING BIOTIC ELICITOR YEAST EXTRACT

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ABSTRACT

Arnica montana L. is an alpine herbaceous plant that grows in nutrient-poor grasslands. Mountain arnica, also known as leopard's bane and mountain tobacco, is a medicinal plant species that has been used for many centuries in European medicine. The species belongs to the Asteraceae family and is extremely rich in secondary metabolites. More than 150 biologically active compounds were extracted and identified from *A. montana*, the majority of which were classified as phenolic compounds - phenolic acids, coumarins, flavonoids, and lignans; terpenoids - monoterpenes, essential oils, sesquiterpene lactones, diterpenes, triterpenes, and carotenoids; and pyrrolizidine alkaloids. The plant exhibits antiseptic, anti-inflammatory, antibacterial, antisclerotic, antifungal, and antioxidant activities. *A. montana* is currently listed in the IUCN Red List and in the Red Data Books and Red Data Lists of many European countries and is protected as a species under the EU Habitats Directive and the EU regulation of trade in fauna and flora. The development of biotechnological methods for *in vitro* cultivation of arnica is very important for its sustainable use. Elicitation of plant cells and tissue culture is an excellent strategy for enhanced accumulation of secondary metabolites in a relatively short time. Yeast extract, as a biotic elicitor rich in vitamins of the B-complex, chitin, N-acetylglucosamine oligomers, β -glucan, glycopeptides, and ergosterol, is well known for triggering phenolic acid biosynthesis. The effect of yeast extract in MS nutrient media applied at different concentrations (50, 100, and 200 mg/l) on the growth and metabolites with antioxidant power content of *in vitro* micropropagated *A. montana* plants was tested. The yeast extract included in the nutrient medium had a positive effect on the morphogenetic potential of *A. montana*. An increase in the average number of shoots per explant was observed at all yeast extract concentrations tested. The best results were obtained in plants treated with 100 mg/l yeast extract, where the average number of shoots per explant was the highest and the highest amount of biomass was produced. The study demonstrates the benefits of using yeast extract to accelerate the growth and antioxidant potential of arnica plants *in vitro*. The antioxidant enzyme activity in the *Arnica montana* plantlets was observed in a dose dependent manner upon plants exposure to yeast extract. Moreover, treatment with yeast extract during micropropagation has resulted in raised SOD, CAT, APX and GPX activity with increased concentration of the yeast extract.

This research was funded by National Science Fund—Bulgaria, grant number KII-06-H76/5 (05.12.2023)

Keywords: *Arnica montana*, In vitro propagation, Yest extract, antioxidant activity

CONTENT OF ANTIBACTERIALS IN HOME PHARMACIES IN PRIMARY HEALTH CARE IN NIKŠIĆ, MONTENEGRO

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ABSTRACT

OBJECTIVES: To analyze the presence of antibacterials (AB) in home pharmacies of patients in Primary Health Care Centre Nikšić, Montenegro. **METHODS:** The research was designed as prospective study in the period from March 1st to April 30th, by two medical doctors, during their internship rotation at Nikšić Primary Health Care Centre. The data were collected through structured questionnaires filled in by examiners. Participation in the research which was initially approved by the Ethics committee was voluntary and anonymous. The criteria for inclusion in the study were: the patient's age (18 and older) and one or more AB prescribed by family medicine doctors. Patients were asked if they had any AB in their home pharmacies. AB were classified into the third (subgroups) and the fifth (generic names) level of ATC classification, WHO AWaRe classification and antibacterial spectrum. Statistical analysis was performed using the SPSS program. **RESULTS:** This research included 356 respondents, of whom 170 (47.8%) had antibiotics in their home pharmacies. The most found AB were from the group of penicillins (34,8%) and cephalosporins (47,72). AB from the macrolide group (14,09%) tetracyclines (1,36%) were presented to a lesser extent. Quinolones (0,9%), aminoglycosides (0,9%) and lincosamides (0,45%) were the least frequent. The most broad-spectrum of AB (67,23%) were amoxicillin-clavulanic acid, cefixime and azithromycin. According to the AWaRe classification, there were more AB from Watch group (56,8%) in regard to Access group (43,15%). The most frequently AB stored in patient's home pharmacies were amoxicillin (22,27%) amoxicillin-clavulanic acid (11,36%) and cefixime (32,27%). **CONCLUSION:** The fact that more than half of the respondents have AB in their home pharmacy is a matter of great concern. In addition to the irrational prescribing by doctors, the use of AB on your own certainly contributes to the development of resistance to the antibiotics mentioned above.

Keywords: antibacterials, home pharmacy, patients, primary health care

ANTIBACTERIAL PRESCRIBING IN PRIMARY HEALTH CARE IN NIKŠIĆ, MONTENEGRO

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ABSTRACT

OBJECTIVES: To analyze the most commonly prescribed antibacterials (AB) by family medicine doctors in Primary Health Care Center Nikšić, Montenegro. **METHODS:** A prospective study has been conducted from March 1st to April 30th 2024 by two medical doctors, during their internship rotation at Nikšić Primary Health Center. The data were collected using a questionnaire, designed specifically for this research. The research was anonymous and it was previously approved by the Ethics committee. AB were analyzed according to the third (subgroups) and fifth (generic names) level of ATC classification, WHO AWaRe classification, method of administration and antibacterial spectrum. Statistical analysis was carried out using SPSS statistics program. **RESULTS:** The research was conducted on 365 patients, who were prescribed one or more AB during their visit. The most prescribed group of AB were cephalosporines with 36,5% (cefixime 19.1%, ceftriaxone 14.3%, cephalexine 2.9% and cefpodoxime 0.2%) and penicillins with 25,7% (amoxicillin 9.7%, amoxicillin and clavulanic acid 6.3% and benzylpenicillin-procaine 9.7%), followed by aminoglycosides, which were prescribed in 15% of cases (amikacin 9.2% and gentamicine 5.8%). Quinolones (9.2%) and macrolides (7.8%) were also commonly prescribed. The least prescribed antibiotics were trimethoprim-sulfamethoxazole (1.7%) and metronidazole (1.5%). The percentage of prescribed antibiotics that belong to the „Access“ group was 49,5%. No AB from the „Reserve“ group was prescribed. Wide-spectrum AB (73.8%) were used much more than narrow-spectrum (26.2%). Most of the prescribed AB were for oral use, while parenteral AB were prescribed in 39% of the cases. **CONCLUSION:** High rate of broad-spectrum and AB from “Watch” group that are prescribed should be of a great concern. Decreasing the inappropriate use of AB is crucial not only to slow down the spread and development of AB resistance, but also to deliver high quality health care to the patients.

Key words: antibacterials, prescribing, doctors, primary health care

PRELIMINARY STUDIES ON THE BENEFITS OF THE SEEDS OF SOME SPECIES OF THE GENUS *AMARANTHUS* L.

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ABSTRACT

The global challenge of malnutrition highlights the need to explore nutrient-rich, underutilized species that have the potential to combat food and nutrition insecurity. Plants neglected in the recent past are now considered as alternative food crops. Amaranth (*Amaranthus* L.) is a little-known and underexploited crop that shows promising potential as a global resource, primarily of seeds and leaves. A large part of the representatives of the genus *Amaranthus* L. are considered resistant and adaptable. Their environmental plasticity makes them more durable compared to some conventionally grown crops. The seeds of *Amaranthus* species could remain viable for a long time under extreme conditions and develop under favorable environmental conditions. Today, some authors refer to it as a superfood. An analysis of literature sources over the past 20 years shows that prove that Amaranth seeds do not contain gluten. They are rich in secondary metabolites and have valuable antioxidant properties. Amaranth seeds are considered one of the few sources of phytosqualene (up to 8%). Oil extracted from *Amaranthus* seeds is rich in unsaturated fatty acids, especially linoleic acid (omega-6 fatty acid) and oleic acid (monounsaturated fatty acid). The lack of gluten in the seeds and the content of bioactive compounds determine them as a suitable source for the production of gluten-free foods, part of healthy diets, etc. The review is focused on the composition, antioxidant properties and possible applications of species of the genus *Amaranthus* and to evaluate the potential for it to be used as a functional food.

Keywords: *Amaranthus* L., seed

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ANALYSIS OF THE IMPACT OF AGRICULTURAL PRACTICES ON SOIL BIODIVERSITY (EARTHWORM POPULATIONS AND ORGANIC MATTER)

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ABSTRACT

Soil is a natural ecosystem with a high level of biodiversity. In particular, the underground biodiversity performs very important and irreplaceable ecological functions. Part of the general biodiversity is agrobiodiversity, which is found in agricultural systems, including the biodiversity of the subsoil. It performs important functions in the production of plants and the preservation of soil fertility. Soil biodiversity and its role in agricultural systems depends on the cultivation system, the agricultural practices followed and the plant species found in the system. But the ecological role that subsoil biodiversity has in agricultural systems is threatened by inappropriate agricultural practices, especially in intensive cultivation systems. The high-level use of agrochemicals and the reduction of organic matter in the soil has a decisive impact on the content of soil biodiversity. The improvement of soil biodiversity can be done through ecocompatible farming systems (organic, conservative, biodynamic agriculture, etc.) and agroecological practices that ensure the sustainability of production and agro-environmental quality. The improvement of soil biodiversity can be done through ecocompatible farming systems (organic, conservative, biodynamic agriculture, etc.) that ensure the sustainability of production and environmental quality. Earthworms were carefully extracted by hand sorting in a soil monolith of 25 × 25 × 20 cm and the Soil Organic Matter was determined through the loss-on-ignition procedure. Analysis of the indicators obtained in the study showed a higher presence of earthworms in plots where less intensive agricultural practices are applied than in cultivated plots where conventional practices are applied. It was shown that the type of plant cultivation plays a major role in determining the number of earthworms per square meter and also most of the variability in soil organic matter. The results obtained from this study will serve as an important element in the design of sustainable agroecosystems that preserve the biodiversity of the soil and improve the environment quality.

Keywords: agricultural practices, soil biodiversity, earthworm populations, organic matter, environmental quality

SEQUESTRATION OF ORGANIC CARBON IN WETLAND SOILS AND INFLUENCE OF MICROBIAL RESPIRATION, C/N AND C/S RATIO, PH, EC AND BULK DENSITY ON THE WESTERN COASTAL LOWLANDS OF ALBANIA

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ABSTRACT

Important ecosystems for blue carbon sequestration are coastal wetlands which have an impact on the global carbon cycle. They are important deposits of organic carbon in soil. One of the main factors in the sequestration of organic carbon is the type of vegetation in wetlands, the development of which depends, among other things, on the availability of nutrients such as carbon (C), nitrogen (N), sulfur (S), C/N and C/S ratio, microbial respiration, pH, EC and Bulk Density. The study is extended to the Kune-Vain lagoon which is located in the part of the coastal lowland in the north-west of Albania. For this study, 45 samples were taken and analyzed in the laboratory. The C, N and S were analyzed using dry combustion: CNS technique. The microbial respiration was determined by measuring the CO₂ evolved in a 10-day incubation at 25 °C in the dark. Soils in the lagoon resulted rich in organic carbon (average value 37.47 g C /kg), with average values of Total Nitrogen of 10.29 g N /kg and average Total Sulfur of 2.03 g S /kg, neutral and slightly alkaline soil reaction (6.47 to 8.54), high Electrical Conductivity (average of 4862 μs/cm⁻¹), Bulk Density with a mean value of 1.22 kg dm⁻¹. Also, it was found that the microbial respiration does not prevent the accumulation and storage of organic carbon. The identification of the level of organic carbon in the coastal lagoons of Albania has an important role in the Blue Carbon ecosystems, which constitute one of the main reserves of organic carbon on Earth. In this way, they contribute to the reduction of Greenhouse Gasses and the impacts of climate change.

Keywords: Soil Organic Carbon, wetlands soils, C/N, C/S ratio, microbial respiration, GHG

HISTOLOGICAL STUDY AND LC-MS/MS ANALYSIS OF A MEDICINAL PLANT (*PALLENIS* SP.) FROM THE SEMI-ARID REGION OF TEBESSA, ALGERIA

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ABSTRACT

Summary: *Pallenis* sp. belongs to the Asteraceae family and is widespread in arid to semi-arid climates. It is distinguished by a stem with closely linked crowns, capitula with broad bracts that are very leathery and hard at maturity, and a height that does not exceed 5 cm. It is also known for its medicinal use, such as treating burns. The purpose of this current work is to highlight this medicinal plant. To determine the different tissues, we used samples from populations of *Pallenis* sp. in the Southeast zone of Tébessa in March 2019. Observations under binoculars (preliminary study of morphology) and a histological study of the different parts of *Pallenis* were carried out, to search for chemical components with pharmaceutical characteristics using a phytochemical analysis, which will be a method for potential research of active principles. The richness of this plant in secondary metabolites such as quinic acid, chlorogenic acid, and fumaric acid was revealed by LC-MS/MS; These secondary metabolites are common in the Asteraceae family and the *Pallenis* genus.

Keywords: Asteraceae, *Pallenis* sp., Morphology, Histology, LC-MS/MS.

PLANT DIVERSITY IN SEMI-ARID STEPPE REGIONS: A CASE STUDY OF THE TEBESSA AREA IN EASTERN ALGERIA

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ABSTRACT:

Biodiversity refers to all forms of life on Earth, and the distribution of plants is influenced by various geographical factors such as climate, soil, and elevation. Semi-arid climatic zones are characterized by water scarcity, as seen in steppe regions with hot temperatures. For instance, the Tebessa region in eastern Algeria is a steppe area located within a recent subsidence basin. Given the importance of identifying and understanding the surrounding vegetation, our approach involves studying the plant diversity in the Tebessa region, documenting its distribution, and reviewing previous studies on the region's flora. Such studies are conducted worldwide, especially in remote and unexplored areas. This study aims to provide an overview of the current knowledge on plant diversity in the Tebessa region and pave the way for future ethnobotanical studies.

Keywords: Plant diversity, Tebessa, Semi-arid, Vegetation, Steppe.

POSSIBILITIES OF VALORIZING SOME RARE VARIETIES OF DATES FROM SOUTHERN ALGERIA

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ABSTRACT:

This study was conducted to determine the morphological and physicochemical parameters necessary to characterize the different stages of maturation (Tamer) of seven varieties of dates with varying consistencies: Amrane, Tamdjouhert, Tezerza, Takrbouchet, Tantbouchet, Tenisin, and Tanselit. The research found that soft and semi-soft dates are dark in color, tender in texture, and fragrant in taste. These two classes of dates differ in several physicochemical factors, some of which significantly affect the characterization of the fruit. The study highlighted an interesting variability among the seven varieties of dates: Amrane, Tamdjouhert, Tezerza, Takrbouchet, Tantbouchet, Tenisin, and Tanselit. Our work identified various morphological, physicochemical, and biochemical characteristics of the dates, including weight, dimensions, water content, pH, electrical conductivity, ash content, titratable acidity, reducing sugars, mineral elements, and total sugar levels. The weight of the dates studied ranged from 5.68 to 15.01 grams, while the weight of the pulp varied from 4.79 to 9.25 grams. The length of the dates was between 18.84 and 50.30 mm, and the diameter ranged from 11.72 to 25.32 mm. The water content was between 17.66% and 22.74%, and the pH values, which were slightly acidic, ranged from 5.01 to 6.21. Electrical conductivity ranged from 0.00 to 9.00, titratable acidity was low (0.02%–0.89%), total sugar levels ranged from 29.16% to 57.03%, reducing sugar content varied from 51.86% to 77.62%, and potassium (K⁺) content ranged from 770.97 to 1070.36. Overall, the determination of the nutritional value of the studied date varieties, which have different characteristics, was based on biometric analysis. This analysis showed that the length and weight of the dates and stones varied considerably among the varieties. Similarly, the physicochemical and biochemical analyses confirmed this variability. According to the analyses conducted, the varieties Tanselit, Amrane, and Takrbouchet stand out from the others due to their favorable characteristics across all studied parameters, followed by Tamdjouhert and Tantbouchet in the second position. In contrast, Tezerza and Tenisin exhibited less favorable characteristics in three of the studied parameters. The importance of these analyses lies in their ability to enable quality control of dates based on their degree of maturity, using not only classical morphological criteria but also biochemical criteria. This evaluation provides a comprehensive understanding of the morphological (weight and size), nutritional (sugar content, mineral elements), and functional values of the dates.

Keywords: date palm, rare varieties, arid region, physicochemical characterization, valorization.

EVALUATING DRINKING WATER QUALITY FOR LIVESTOCK IN AIN NAGA: IMPLICATIONS FOR FARM MANAGEMENT AND ANIMAL HEALTH

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ABSTRACT:

This study aimed to evaluate the sanitary quality of drinking water for livestock in the municipality of Ain Naga by identifying biological, chemical, and physical hazards to assess the level of risk. A field survey was conducted across several farms to analyze water sources and watering systems, focusing on the origin of the drinking water, the number and hygiene of drinking troughs, and their usage capacity.

Bacteriological analyses performed on water samples collected from boreholes, water sources, and drinking troughs indicated the complete absence of total coliforms, fecal coliforms, total germs, and fecal streptococci or enterococci. These findings confirm that the drinking water in Ain Naga has good bacteriological quality.

Physicochemical analyses showed that while boreholes and water sources had normal levels of physical parameters and chemical substances, watering troughs contained minerals such as chlorides, sulfates, ammonium, and nitrates at levels exceeding regulatory and international standards. This suggests that the physicochemical quality of drinking water in this municipality is only moderate.

The survey linked these results to several contributing factors, including inadequate hygiene practices, traditional watering system installations, lack of maintenance of water pipelines, and excessive use of pesticides and fertilizers in farming areas. These conditions contribute to the contamination of drinking water, affecting livestock health and production.

Based on these findings, the study recommends improving maintenance of watering installations to ensure the hygiene of materials in direct contact with drinking water and conducting annual water quality analyses. These measures are essential for protecting animal health, ensuring good farming practices, and enhancing livestock production in Ain Naga.

Keywords: drinking water quality, livestock health, bacteriological analysis, physicochemical contaminants, farm management.

UNSATURATED FATTY ACID COMPOSITION IN THE MEAT OF ABERDEEN ANGUS, HEREFORD, AND LIMOUSIN BULLS

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ABSTRACT:

The objective of the study was to determine and compare the composition of unsaturated fatty acids (UFAs) in the meat of Aberdeen Angus (AA), Hereford (HF), and Limousin (LI) bulls, raised under the 'Baltic Grassland Beef' label, a beef production program emphasizing natural grazing and sustainable farming practices in the Baltic region. A total of 27 samples of the *Longissimus dorsi* (LD) muscle, representing 7 AA, 11 HF, and 9 LI bulls, were analyzed. The average UFA content in the samples ranged from 46.67±0.87 to 49.72±1.22 g/100 g of muscle, with monounsaturated fatty acids (MUFAs) comprising 42.43±1.00 to 43.83±1.58 g and polyunsaturated fatty acids (PUFAs) contributing 4.24±0.28 to 6.90±1.21 g. The breed of the bulls significantly influenced the total UFA content and the concentration of specific fatty acids, such as C17:1 (cis-10-heptadecenoic acid) and C18:2n6c (linoleic acid). The total UFA content in the meat of LI bulls was 3.05 g higher ($p<0.05$) than in HF bulls and 0.65 g higher than in AA bulls. The meat of HF bulls exhibited a higher content of C17:1, while the meat of LI bulls had a higher concentration of C18:2n6c. Among the MUFAs, the most abundant was C18:1n9c (oleic acid), with the AA breed exhibiting the highest content, followed by the HF and LI breeds. Among the PUFAs, the predominant fatty acid was linoleic acid (C18:2n6c), with the highest concentration found in LI breed (3.21±0.78 g/100 g of muscle), which was 1.22 g higher than in HF ($p<0.05$) and 0.05 g higher than in AA breed. The omega-6 to omega-3 ratio in the meat of all breeds was within the recommended range, indicating the meat's suitability for inclusion in diets aimed at providing beneficial n-3 and n-6 fatty acids. The lowest n-6 to n-3 ratio was calculated in LI bull meat (2.14±0.22), while the highest ratio was recorded in AA bull meat (2.88±0.15).

Keywords: beef, UFAs, MUFAs, PUFAs

CHANGES OF ZOOPLANKTON AND ZOOBENTHOS BIOMASS IN PONDS STOCKED WITH GRASS CARP

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ABSTRACT:

It was studied the influence of grass carp on living components in ponds with a surface 1000m². During benthos sampling in each pond included in the study, two sampling were done. The frequency of sampling was every month for two years. After stocking the experiment pond with grass carp it was determined a rise of filtratory species of the zooplankton. The biomass of Cladocera crab was grown 1.30 times, when the biomass of the Rotifera group representative was grown 1.74 times. The presence of zoobenthos in the pond decreased 1.2 times in the second year compared with the first year. The decrease of abundance in Oligochaeta was 1.14 times, when in the other groups of macrozoobenthos was 1.23 times. The results of samples of quantitative valuation taken during the first year of the study were compared with those taken during the second year, it was observed that the average biomass of cladocera increased from 6.068g/m³ to 7.93g/m³, the average biomass of copepod decreased from 4.64g/m³ to 3.69g/m³, when the average biomass of rotifers increased from 0.65g/m³ to 1.13g/m³. The results showed that the rhythm of rise for rotifers biomass was higher then the cladoceran, meanwhile the copepod have demonstrated a reduction of their biomass in general.

Key words: grass carp, ponds, biomass, zooplankton, zoobenthos

IN SILICO STUDY OF CHEMICAL COMPOUNDS OF PROPOLIS AS INHIBITORS OF ALZHEIMER DISEASE.

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ABSTRACT:

The in silico study was conducted on compounds identified in propolis extracts by HPLC/ESI-MS. By using molecular docking modelling approaches, we tried to understand the mechanisms involved in the interaction of propolis compounds with the experimentally studied enzyme targets AChE and BChE, the molecular docking modelling approach was used to better understand the mechanisms of interactions involved in the inhibition of enzymes responsible for the onset of Alzheimer's disease by the different compounds present in the propolis extracts studied. we applied the RMSD test on 100 protein-ligand complexes drawn arbitrarily via PDB as a reminder, a prediction is considered reliable if the value of RMSD is less than 2Å Indeed, the molecular docking of the compounds identified by HPLC/MS in the propolis studied highlights Chlorogenic acid and cynarine as best inhibitors of enzymes respectively. Visual analysis shows that these compounds are well positioned in the active sites studied by involving a significant number of interactions such as hydrogen bonds, Pi-Anion, Pi-Pi stacking.

Key words: Propolis, Docking, HPLC/MS, inhibitors.

CHEMICAL CHARACTERIZATION AND BIOLOGICAL VALORIZATION OF THE EXTRACTS OF NATURAL SUBSTANCE FROM ALGERIA AND APPLICATION IN THE PARAPHARMACEUTICAL FIELD.

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ABSTRACT:

Propolis is a sticky, resinous natural substance collected by worker bees, known in folk medicine since ancient, is produced from honeybees using collected extracts from leaves, buds and exudates of various plant flora times. Five samples of propolis were extracted with ethanol, total phenolic compounds were quantified by Folin-Ciocalteu method and flavonoid contents were also quantitatively determined by the AlCl₃ colorimetric method, a qualitative phytochemical study was carried out using chemical tests and analytical thin layer chromatography, their antioxidant activity was determined by DPPH (1,1-diphenyl-2-picrylhydrazyl) and linoleic acid bleaching test, evaluation of their antimicrobial activity was determined by the diffusion method of disk against pathogenic strains and the evaluation of neuroprotective (anti-Alzheimer and anti-Parkinson activity) activity was carried out by the inhibition of AchE and ButchE enzymes. And finally preparation of mouthwashes based on propolis and evaluated of its antimicrobial activity against three pathogenic strains (application in oral medicine).

Keywords: Propolis, biological activities, oral solution.

CURRENT STATUS OF EDIRNE PASTURE AREAS, IMPROVEMENT WORKS, PROBLEMS AND SOLUTION SUGGESTIONS

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ABSTRACT:

This article aims to indicate the current status of pasture areas in Edirne Province, their usage patterns, the improvement works carried out, the problems experienced and the solution suggestions. Pasture areas are areas of absolute importance for animal husbandry. As in other parts of our country, these areas are used for grazing cattle and sheep in Edirne Province. There are a total of 57,419 hectares of pasture in Edirne Province, covering approximately 9% of the province's surface area. In TUIK 2023 statistics, the current number of cattle in Edirne was reported as 142,046 and the number of sheep as 364,855, and only 10-20% of the quality roughage required by this animal population can be met by grazing from the existing pasture areas. In order to develop pasture areas, the Ministry of Agriculture and Forestry began carrying out the Pasture Improvement and Management Projects in 2004. Within the scope of the project, planned grazing, fertilization, etc. applications are being carried out. Projects have been carried out by the Ministry of Agriculture and Forestry in 66 villages on an area of 18,761 hectares so far. In addition to the ministry, resources from local sources such as the Edirne Governorship and District Governorships and the Provincial Special Administration Budget have been used for pasture improvement. In addition, citizens living in the villages contribute to these studies in kind and in cash. However, the efficiency and productivity of using pasture areas are decreasing due to reasons such as the decrease in family businesses engaged in animal husbandry, their replacement by large businesses and the change in animal breeds, both as a natural result of climate change and as a result of the change in the social structure in rural areas. In order to use pasture areas in Edirne province more effectively and efficiently, first of all, improvement activities in pasture areas should be transformed into sustainable forms. In Land Consolidation Projects, pasture areas should be planned in a way that they can be used more efficiently and livestock enterprises should be made easily accessible to pastures. In order to eliminate administrative problems in the villages where pastures are allocated, it would be right to limit pasture allocations to existing livestock enterprises. In pasture areas that cannot be grazed during the grazing season and are suitable for mowing, mowing should be done to prevent fire hazard, to ensure healthy development in the next season and to evaluate the remaining grass in the pasture as roughage without wasting. In addition, in order to combat blackthorn, which is a problem not only in Edirne but also in the region, it would be appropriate to develop projects and support models that can be considered as biological control methods and to increase the goat population that will generate economic income, in addition to mechanical and chemical control.

Key words: Edirne, pasture, improvement, roughage, livestock

SPATIAL – TEMPORAL VARIATIONS OF NA, MG, K, CA IN SEDIMENTS OF FELENT STREAM BASIN (KÜTAHYA, TÜRKİYE)

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ABSTRACT:

Freshwater sediments harbouring a wealth of macro and micro elements play a crucial role in our ecosystems. Macro minerals, also known as macro elements, are needed by all the living things in large quantities. However, they may be toxic if exposed in large quantities for an extended period. Felent Stream is the most important branches of Porsuk Stream and it is being used for various purposes such as industrial water supply, irrigation water and receiving environment for domestic wastes of the Kütahya Province. This study was carried out to determine the spatial-temporal variations of sodium (Na), magnesium (Mg), potassium (K) and calcium (Ca) accumulations in sediments of Felent Stream. Five locations (F1 – F5) were selected on the Felent Stream Basin and sediment samples were collected in the dry (end of summer) and wet (end of winter) seasons of 2022 – 2023. According to the results of this research, the annually average concentrations of investigated macro elements in sediments of Felent Stream were found in the order of Ca (16621 mg/L) > Mg (11931 mg/L) > K (999 mg/L) > Na (345 mg/L) and the average macro elemental contents of the sediments increased about four times during the wet season.

Keywords: Felent Stream Basin, Spatial – Temporal Variations, Macro Elements

MULTI – STATISTICAL EVALUATION OF MACRO ELEMENTS IN SURFACE SEDIMENTS OF FELENT STREAM (SAKARYA RIVER BASIN)

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ABSTRACT:

Multi-statistical techniques are essential tools to evaluate the environmental pollution. In water quality studies, the Person Correlation Index (PCI) helps us to understand the relationships between different variables and Cluster Analysis (CA) helps us to group the sampling points having similar water quality characteristics. Felent Stream is one of the main fluvial watershed elements of the Sakarya River Basin. But like many freshwater ecosystems, this important lotic habitat is being exposed to domestic, industrial and agricultural pollutants. The main objective of this research was to assess the surface sediment quality of the Felent Stream from a statistical perspective. For this purpose, 5 locations (F1 – F5) were selected on the Felent Stream and surface sediment samples were collected in the dry (end of summer) and wet (end of winter) seasons of 2022 – 2023. PCI and CA were applied to data to categorize the investigated locations and define the significant relations among the investigated macro elements (Mg, K, Ca and Na). As a result of applied PCI, statistically significant positive correlations were determined among the investigated parameters and as a result of applied CA, 3 clusters, named as "Relatively low macro elemental content zone (C1)", "Relatively moderate macro elemental content zone (C2)" and "Relatively high macro elemental content zone (C3)", were formed.

Keywords: Felent Stream, Multi – Statistical Evaluation, Sediment Quality

THE ROLE OF INNOVATIVE TECHNOLOGIES IN PREGNANCY MONITORING: EFFECTIVENESS OF ARTIFICIAL INTELLIGENCE AND REMOTE MONITORING SYSTEMS

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ABSTRACT:

Our study is based on literature-based research on the effects of artificial intelligence (AI) and remote monitoring technologies on pregnancy monitoring. In addition to traditional methods used to monitor maternal and fetal health during pregnancy, it is aimed to examine how AI-supported tools and remote monitoring systems make a difference. **Applications of AI in Pregnancy Monitoring:** The ability of AI to analyze ultrasound images, make risk estimates, and interpret patients' health data. **Remote Monitoring Systems:** The role and effectiveness of sensors and mobile applications used at home during pregnancy. **Ethics and Security Issues:** Security standards, data privacy, and ethical issues of these technologies. This topic can provide important information for both clinical practices and health policies by examining the innovative use of technology in the field of health.

Keywords: Artificial Intelligence (AI), Remote Monitoring Systems, Pregnancy Monitoring, Ultrasound Image Analysis, Early Diagnosis, Women's Health

REVOLUTION IN GYNECOLOGICAL CANCERS WITH ARTIFICIAL INTELLIGENCE: FROM DIAGNOSIS TO TREATMENT, FROM MANAGEMENT TO THE FUTURE

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ABSTRACT

Artificial Intelligence (AI) is revolutionizing various fields of medicine, including oncology. This review explores the role of AI in the diagnosis, treatment, and management of gynecological malignancies. By integrating recent advancements in AI technologies with gynecological oncology, this paper aims to highlight the potential benefits, current challenges, and future directions in this evolving field.

Keywords: Artificial Intelligence (AI), Gynecologic Cancers, Risk Assessment, Decision Support Systems, Personalized Medicine, Drug Discovery, Robotic Surgery, Data Security, Algorithm Neutrality, Clinical Integration, Future Directions

THE SHADOW OF COVID-19 ON URINARY TRACT INFECTIONS IN PREGNANCY: RISKS AND HEALTH IMPLICATIONS AFTER THE PANDEMIC

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ABSTRACT

Introduction: The COVID-19 pandemic has deeply affected the global health system, making many health problems more visible. One of these effects is the increase in urinary tract infections (UTIs) during pregnancy. Pregnancy is a sensitive period for urinary tract infections, and understanding how this situation has changed in the post-pandemic period is important in order to evaluate the effects of healthcare services in this area. **Pregnancy and Urinary Tract Infections:** Pregnancy creates a predisposition to urinary tract infections due to hormonal changes and physical pressures. The growth of the uterus and the pressure it exerts on the urinary tract create a suitable environment for bacteria to grow. UTIs can pose serious risks of complications for both the mother and the baby during pregnancy, so timely diagnosis and treatment are of great importance. **Effects of COVID-19 on Pregnancy :** The effects of COVID-19 on pregnancy have a wide range of effects in terms of both changes in the immune system and the impact of pandemic conditions on access to healthcare. Various difficulties experienced during the pandemic may trigger an increase in urinary tract infections during pregnancy. **Among these factors:** **1. Difficulties in Accessing Healthcare:** Access to healthcare services may have become difficult during the pandemic. Pregnant women may have skipped regular check-ups and experienced delays in early diagnosis and treatment of urinary tract infections. **2. Social Isolation and Restrictions:** Social isolation and restrictions may have negatively affected the process of monitoring health problems and receiving treatment for pregnant women. This may cause infections to progress without being diagnosed early. **3. Increased Stress and Psychological Burden:** The stress and anxiety brought on by the pandemic may weaken the immune system, which may increase susceptibility to infections. The psychological state of pregnant women may affect their general health. **Research and Findings** Research conducted in the post-pandemic period shows that urinary tract infections have increased in pregnant women. Various studies have found that difficulties in accessing healthcare services and increased stress levels during pandemic conditions increase UTI rates. In addition, delays in the treatment of urinary tract infections during the period when health services were limited may have encouraged the spread of these infections. **Conclusion and Recommendations** The effects of COVID-19 on urinary tract infections during pregnancy are an important warning that requires the restructuring and improvement of the health system. Increasing access to health services for pregnant women, regular check-ups, and managing stress factors experienced during the pandemic can reduce the risk of UTI. Reviewing health policies and providing better health services will play an important role in preventing and managing such infections during pregnancy. In this context, conducting comprehensive

research to better understand the relationship between pregnancy and urinary tract infections and strengthening health services are critical to protecting both maternal and infant health.

Keywords: COVID-19 and Urinary Tract Infections in Pregnancy, COVID-19 and Pregnancy Complications, Stress and Immune System, Infection Management in Pregnancy, Pandemic and Health Services

ENSURING DRUG QUALITY: QUALITY CONTROL IN NANODELIVERY SYSTEMS UTILIZING LIPOSOMES, NANOEMULSIONS, AND EXOSOMES

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ABSTRACT

Nanodelivery systems, including liposomes, nanoemulsions, and exosomes, represent significant advancements in targeted drug delivery due to their ability to enhance bioavailability and precision. However, maintaining high drug quality within these systems is crucial yet challenging. This presentation discusses the critical methodologies for quality control in nanodelivery systems to ensure drug efficacy, safety, and consistency. Our research focuses on validating key quality control techniques. We employed dynamic light scattering (DLS) for particle size analysis, rheological assays to assess the flow properties and stability of the formulations, and surface tension assays to evaluate the interfacial properties of the nanoemulsions. The study identified particle size distribution, zeta potential, and encapsulation efficiency as critical quality attributes that significantly influence the performance and stability of nanodelivery systems. Results indicate that optimized formulations demonstrate enhanced stability, highlighting the necessity of tailored quality control protocols. Comprehensive quality control frameworks are essential for the successful clinical application of nanotechnology in drug delivery, ensuring that therapeutic benefits are maximized without compromising safety. Our findings provide a foundation for developing standardized quality control protocols in nanodelivery systems, contributing to the broader application of nanotechnology in medicine.

Keywords: Drug Quality, Quality Control, Nanodelivery Systems, Liposomes, Nanoemulsions, Exosomes.

NANOSTRATEGIES AGAINST ANTIBIOTIC-RESISTANT URINARY TRACT INFECTIONS

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ABSTRACT

Antibiotic-resistant urinary tract infections (UTIs) are a growing global health issue, with traditional antibiotics becoming less effective. This challenge necessitates innovative solutions, such as nanotechnology-based strategies, to enhance treatment efficacy. This presentation explores the use of nanodelivery systems, including liposomes, nanoemulsions, and exosomes, to combat antibiotic-resistant UTIs. These systems can encapsulate antibiotics, increase drug concentration at the infection site, and reduce side effects. Key areas covered include: • **Mechanisms of Resistance:** Understanding how bacteria develop resistance to conventional antibiotics. • **Nanodelivery Systems:** Discussing how liposomes, nanoemulsions, and exosomes can encapsulate and deliver antibiotics directly to the site of infection. • **Targeted Therapy:** Exploring the role of surface modifications in directing nanoparticles to specific bacterial strains. • **Synergistic Effects:** Examining how combining nanotechnology with existing antibiotics can restore their efficacy. • **Clinical Implications:** Highlighting the potential for these nanostrategies to be translated into clinical practice, improving treatment outcomes for antibiotic-resistant UTIs. Nanotechnology offers a promising approach to address the limitations of current treatments and enhance the management of UTIs, ultimately improving patient outcomes and addressing a critical public health issue.

Keywords: Nanotechnology, Urinary Tract Infections, Antibiotic Resistance, Nanodelivery Systems, Liposomes, Nanoemulsions, Exosomes

ANALYSIS OF POLYMORPHISM INFORMATION PARAMETERS OF GENETIC DIVERSITY BASED ON ISSR MARKERS

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ABSTRACT:

Biodiversity and climate change are fundamental to the adaptive evolution of species. Genetic diversity, understood as a fluctuation in the frequency of alleles (types of genes) in the gene pool, is constantly altered by a changing environment and is a driving force for the survival of plant populations in dynamic environments. Populations predominantly use pre-existing genetic diversity, but new mutations and recombinations increasingly contribute to the adaptive evolution of later generations. The non-random distribution of genetic diversity (alleles and genotypes) among populations and species results from complex interactions between physiological and biogeographical factors, natural selection, and population history in space and time. Studies of the genetic structure of different populations help to understand historical events, and population dynamics, predict how species will respond to changes in their environment, etc. The present study aimed to analyse the genetic diversity of 128 *Orobanche cumana* accessions belonging to fourteen different populations in Moldova and Serbia, using 13 ISSR markers. The total number of loci and the number of polymorphic loci, the range of detected loci per primer and the range of percentage of polymorphic loci per primer, the mean polymorphism level (%) and the mean number of loci per primer, the range and mean values of the polymorphism information content (PIC), the range and mean values of marker index (MI), the range and mean values of resolving power (Rp), the range and mean values of unbiased measures of Nei's genetic distance were calculated to assess genetic variability in the populations and to establish measures of informative polymorphism. A total of 279 bands were generated for 14 populations of *O. cumana* belonging to races E and H, of which 265 were polymorphic with an average number of loci per primer of 21.46 (range of 12-32). The mean values for the percentage of polymorphism, PIC, Rp, and MI were calculated as 94.56% (range 85-100%), 0.30 (range of 0.20-0.36), 11.62 (range of 3.88-17.69) and 5.91 (range of 1.99-8.09), respectively. The mean values of Nei's unbiased genetic distance were 0.27 (range 0.05-0.51). In 7 Serbian populations of race E, 181 polymorphic ISSR fragments were identified from 188 analysed amplicons with a mean number of loci per primer of 14.46 (range of 5-22). The Moldavian 7 populations of races E and H showed a slightly higher number of analysed (197) and polymorphic (185) fragments with a mean number of loci per primer of 15.15 (range of 9-25). Mean values for polymorphism percentage, PIC, and MI were slightly higher in Serbian populations (95.30%, 0.29, and 3.94, respectively) than in Moldavian populations (94.37%, 0.26, and 3.52, respectively). Lower mean values of Rp in Serbian populations (5.66) than in Moldavian populations (5.97) can be explained by the different numbers of genotypes taken for the study (49 and 79, respectively). Mean values of Nei's unbiased genetic distance were 0.12 (range of 0.06-0.17) in Serbian populations and 0.15 (0.05-0.23) in Moldavian populations.

Data from these studies suggest that high genetic diversity in Serbian populations is associated with intrapopulation polymorphism, whereas diversity in Moldavian populations is based on racial differentiation. These findings of high genetic heterogeneity are also supported by the

results obtained by Serbian colleagues using the RAPD technique in the analysis of genetic diversity in local broomrape populations collected from different agricultural regions belonging to the same population (Ivanovic, 2021). The present study showed differences between *O. cumana* populations collected from different geographical regions with distinct backgrounds, successfully revealed by ISSR molecular markers. This study was part of sub-program 011101 "Genetic and biotechnological approaches to managing agro-ecosystems under climate change", funded by the Ministry of Education and Science".

Keywords: genetic diversity, climate change, populations, *O. cumana*, ISSR markers.

VALORIZATION OF DATE PALM (PHOENIX DACTYLIFERA) FRUIT WASTE AND ITS ANTIMICROBIAL APPLICATION

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ABSTRACT:

The date palm (*Phoenix dactylifera*L) is a plant widely cultivated for its fruit: dates. Its geographical area of cultivation extends from North Africa to southwest Asia. In 2020, worldwide date production represented an area of 1,235,601 hectares, with a total yield of 9,454,213 tonnes. Date palm cultivation is of vital cultural, socio-economic and ecological importance to the habitats of these regions. Based on production in 2019, around 6,194 to 14,621 tonnes of date pits were generated taking into account direct consumption and after processing. Date pits contain substantial secondary metabolites that include polyphenolic compounds such as flavonoids, antioxidants and phenolic acids, which can be used as a good source of functional foods. In this context, this study is part of a strategy aimed at completing efforts to improve and add value to date pits. It focuses on analyzing the antibacterial efficacy of aqueous, acetic and methanolic extracts from date palm seeds, testing them against pathogens such as *Staphylococcus aureus*. The *in vitro* antibacterial activities of crude date seed extracts against pathogens were assessed using the agar diffusion method. The results demonstrated significant antibacterial activity for the extracts examined. The acetone and methanol extracts, as well as the aqueous extract obtained by infusion, showed significant antibacterial activity against *Staphylococcus aureus*, with inhibition diameters of 14.13 ± 0.7 mm, 13.25 ± 0.4 mm and 14.00 ± 0.5 mm respectively. The results obtained provide crucial information indicating that date seed extracts possess important antimicrobial properties, making them potentially valuable as a source of active ingredients in various fields.

Key words: Date palm, *Phoenix dactylifera* L, seeds extracts, Antimicrobial activity, aqueous extract, infusion method, acetone extracts, methanol extracts.

ESTIMATION OF ALTERED RED BLOOD CELL AGGREGATION IN PATIENTS WITH CHRONIC LYMPHOCYTIC LEUKEMIA USING IMAGE FLOW ANALYSIS: THE IMPACT OF TARGETED THERAPIES

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ABSTRACT

Chronic lymphocytic leukemia (CLL) remains still incurable with conventional therapy. Novel targeted therapies have been developed that inhibit the Bruton's tyrosine kinase (BTK) pathway and the anti-apoptotic protein B-cell lymphoma 2 (BCL-2). However, little is known about the effect of different CLL treatments on red blood cell (RBC) rheology. The study aimed to assess the extent of RBC aggregation in patients with CLL compared to that of healthy individuals and to elucidate the hemorheological effects of the applied therapies by means of microfluidic system - BioFlux. Images of RBC aggregates were obtained by examination of the flow of cell suspensions in Dextran 70 in microfluidic channels. The healthy control samples were characterized by a prevalence of rouleaux with areas of $<660 \mu\text{m}^2$ (74%) and relatively small portion of large aggregates ($660\text{--}1300 \mu\text{m}^2$, 26%). In contrast, in untreated patient RBC suspensions, the small rouleaux ($<660 \mu\text{m}^2$, 28%) were significantly reduced at the expense of the large aggregates. ($1300\text{--}2700 \mu\text{m}^2$, 55%). Furthermore, CLL suspensions also contained very large RBC aggregates with a areas of more than $2700 \mu\text{m}^2$ (17%). Our results also shows that treatment with BTK inhibitor (Ibrutinib) significantly reduces the area of the large aggregates and significantly restores the rheological properties of RBSs to those of healthy ones. The administration of Obinutuzumab+Venetoclax had a minor effect on the impaired rheological properties of patients' RBCs compared to Ibrutinib treatment. In addition, our study provides a new methodology for image flow analysis of RBC aggregation by determining the aggregation index for the different size rouleaux formations. In summary, the results demonstrate strong rheological alterations in RBCs from CLL patients and the BTK inhibitor's beneficial impact on these processes. This study provides a basis for further research evaluation of the effects of different medications and the improvement of CLL therapeutic strategies.

Keywords: chronic lymphocytic leukemia, RBC aggregation, targeted therapies, image flow analysis

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VULNERABILITY OF TUNISIAN OASES AGRICULTURE TO CHANGES IN PRODUCTION FACTORS: IMPACT OF CLIMATE CHANGE AND WATER SCARCITY

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ABSTRACT

This study looked at how changes in oases's production factors such as irrigation frequency, fertilizer and phytosanitary treatments, affected the cropping system. Moreover, such a situation is further exacerbated by considerable climate change (increased temperatures and less rainfall). In this work, a survey was performed to describe and compare different oases's characteristics. It covered 11 oases (Gabès), 14 oases (Kébili), and 5 oases (Gafsa) patches with 345, 124, and 86 framers questioned, respectively. In orchards, farmers' resources were investigated (farm size, irrigation water sources, irrigation frequency, fertilization input, phytosanitary treatments, and amendment soil frequency). The distribution of oases revealed that the average patch size of a farm varied by region, with values of 0.19 ha in Gabès, 0.5 ha in Kébili and 1.63 ha in Gafsa, resulting in excessive farm size fragmentation. The long frequency of irrigation showed a scarcity of water resources particularly in the oases of Gafsa and also in some parts of Kébili 's oases. Such findings showed that the oases studied are characterized by a deficit of water irrigation resources. Irrigation water quality is deteriorating and salinity is increasing, owing primarily to overexploitation. The average period between two successive additions of organic amendments in the ancient oases was significantly higher and there was a tendency towards the use of mineral fertilizers. The ancient oases farms received sand input once every five years. The limited use of phytosanitary treatment in these oases might be attributed to the use of varieties that is less susceptible to various pathogens. This study has shown that the change of production factors of oases agriculture threatened the agrobiodiversity of local plant genetic resources (date palms, fruit trees, vegetable species, *etc.*). The intensification of date palm ('Deglet Nour' variety) has led to the marginalization of local varieties, which are noted for their intriguing ability to adapt to the oasis's climate. Finally, Tunisian oases agriculture is seriously challenged by scarce water resources, rising temperatures, drought, salinity, diseases, and pests.

Keywords: Tunisian Oases, Production Factors, Oases Agricultural Production, Climate Change, Vulnerability.

THE IMPACT OF DIFFERENT ROASTING PROFILES ON DEHYDRATION BEFORE FIRST CRACK

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ABSTRACT

This paper investigates the impact of various roasting curves on coffee beans, focusing primarily on changes in moisture content. Water plays a crucial role in the roasting process by carrying away heat, which affects the chemical reactions within the beans. The experiments show that altering the turning point and heat application significantly influences dehydration. Specifically, changes in these parameters directly affect the efficiency of moisture removal. However, the impact of airflow is inconsistent; increased airflow can reduce the thermal energy within the chamber, thereby affecting dehydration efficiency. Additionally, turning points below 90°C do not significantly impact the dehydration process. We also discuss the effects of two roasting curves: Fast Start Slow Finish (FSSF) and Slow Start Fast Finish (SSFF). The experiments reveal that FSSF results in more dehydration after the beans turn yellow, while SSFF leads to more dehydration before the beans turn yellow. This study aims to provide new insights for coffee roasting researchers and industry professionals, helping them better understand and control moisture content changes during the roasting process.

Keywords: Coffee Roasting Profiles, Dehydration, Turning Point, Airflow

**COMPARISON OF THE ANTIMICROBIAL EFFECTS OF INFUSION,
DECOCTION AND MACERATION OF AQUEOUS EXTRACTS OF DOUM PALM
SEEDS (HYPHAENE THEBAICA)**

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ABSTRACT

Plants have long been recognized for their crucial role as sources of nutrition and medicinal substances, making them highly valued natural resources. Therapeutic plants offer humanity a precious gift from nature, producing bioactive compounds long used in traditional practices to improve people's health. The doum palm (*Hyphaene thebaica*), is considered one of the world's most promising plants for its potential benefits. Doum palm contains active compounds that make it effective in treating a wide range of diseases. The increasing resistance of microorganisms to many commercial synthetic products has led to a search for plant materials that can be used in the development of new antimicrobial agents capable of solving this problem. Accordingly, this study determined the antibacterial activities of methanolic and acetic extracts of doum palm (*Hyphaene thebaica*) kernel, against pathogenic bacteria such as *Staphylococcus aureus* and *Staphylococcus epidermidis*. The *in vitro* antibacterial activities of the crude extracts were measured using the agar diffusion method. The findings demonstrated notable antibacterial activity in the tested extracts. Among the aqueous extracts, the maceration, decoction, and infusion methods exhibited antibacterial effects against *Staphylococcus aureus*, with inhibition diameters measuring 10.39 ± 0.35 mm, 13.5 ± 0.5 mm, and 12.00 ± 1.25 mm, respectively. In the case of *Staphylococcus epidermidis*, only the decoction and infusion methods displayed inhibition diameters of 9.5 ± 2.15 mm and 9.47 ± 1.81 mm, while the maceration method showed no antibacterial effect. The results obtained highlight that extracts from doum palm (*Hyphaene thebaica*) seeds have significant antimicrobial properties, suggesting their potential value as sources of active compounds for various applications.

Key words: Antimicrobial activity, Doum palm, *Hyphaene thebaica*, , Seeds extracts, aqueous extracts, decoction methods, infusion methods, maceration methods

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.

EXPLORING THE GENETIC POTENTIAL OF RICE ACCESSIONS FOR SALINITY TOLERANCE AT SEEDLING STAGE USING MORPH-MOLECULAR MARKERS.

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ABSTRACT

Rice (*Oryza sativa* L.) belongs to family Poaceae, is one of the most important crop which is main staple food for about half the population of the world. Generally, rice is salt sensitive crop so salinity plays a crucial role for decreasing the overall rice production. In Pakistan, most of cultivated area under rice is not fit for rice cultivation due to saline or saline sodic soil. Keeping in view the importance of rice crop, present study was planned to evaluate rice advance lines against salinity. Experiment material comprised of 15 rice advance lines having two check varieties were collected from Rice Research Institute (RRI), Kala Shah Kaku, Punjab, Pakistan. Experiments were conducted using two factor factorial complete randomized design. Hydroponic setup was installed for evaluation of physical parameters. In this experiment, 15 advance breeding lines including two check varieties (Super Basmati and KSK282) were planted in two factors factorial under completely randomized design in hydroponic system keeping row × row and plant × plant distances to 3cm. Genotypes were evaluated for both morphological as well as Molecular level using four salinity levels i.e. T₀= control, T₁=4 dsm⁻¹, T₂= 8 dsm⁻¹ and T₃= 12 dsm⁻¹. Rice genotypes were evaluated for various traits at seedling stage such as plant length, fresh shoot weight, fresh root weight, fresh plant weight, dry plant weight, chlorophyll content, number of fresh leaves and number of dead leaves. Analysis of variance (ANOVA) for morphological traits displayed that rice genotypes and salinity treatment levels showed significant (P≤0.05) differences among themselves. This exhibited that enough genetic variation was present among genotypes for salinity tolerance under studied salinity levels in hydroponic condition and it is useful technique for screening of rice genotypes under saline conditions. Rice genotypes were also screened against salinity through microsatellite SSR markers at seedling stage to observe Saltol QTL for salt tolerance in rice. Ten SSR markers named as RM1287, RM10800, RM3412, RM10, RM10793927, RM140, RM7075 and RM7414 were used to locate Saltol QTL (located on chromosome 1). Results showed that Genotype OPS-132 performed really well in both physical assessment (performing moderate tolerant to SES examination of genotypes against salinity) as well as molecular level (8 out of 10 markers showed positive band to OPS-132). OPS-132 also performed better than check varieties in all aspects and suggested that this genotype should be include in rice hybridization program to develop salt tolerance breeding cultivars.

Keywords: Saltol QTL, accessions, SSRs, hydroponic, KSK 282.

BI-ALLELIC VARIANTS IN BRF2 ARE ASSOCIATED WITH PERINATAL DEATH AND CRANIOFACIAL ANOMALIES

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ABSTRACT

Background: Large-scale sequencing among 1.52 million healthy individuals allows exploring genetic of recessive lethality, for example, a significant underrepresentation of double transmission of a protein-altering BRF2 splicing variant, BRF2 encodes a subunit of the RNA-polymerase III complex, whose subunits were associated with autosomal recessive disorders, such as Treacher-Collins syndrome. Methods: We combined NGS with functional analyses to investigate the effects of BRF2 variants. Results: We identified a significant underrepresentation of double transmissions of a BRF2 protein-altering splicing variant in Iceland. In our population set of 170.000 chip-genotyped Icelandic individuals imputed from 73.000 whole-genome sequencing Icelanders, we identified 28 couples where both individuals are heterozygotes for this BRF2 variant. The genotype is available for 29 out of 66 offspring of these couples. 22 out of 29 offspring are heterozygous carriers (76%), 7 are non-carriers (24%), and none are homozygous. Data of early mortality is available for three of these families: five of their seventeen offspring died before 3 months of age, while all surviving siblings are heterozygous. Using data aggregation, we identified seven more individuals worldwide from three unrelated families carrying biallelic variants in BRF2. Affected individuals present a variable phenotype ranging from severe craniofacial anomalies with early death to intellectual disability with motor and speech development, depending on the combination of the variants, i.e. homozygous stop-gain, truncation paired with missense in the DNA-binding domain, homozygous missense in the zinc-finger domain that recruits the polymerase III subunit, respectively. In silico 3D modelling and functional analyses suggested functional impairment of the identified variants. Zebrafish knocked-down for the orthologous *brf2* presented with abnormal escape response reduced swimming velocity and head malformations, which could be complemented by the human wild-type but not mutated BRF2 mRNA further demonstrating their deleteriousness. Conclusion: Our results show that BRF2 biallelic alterations are associated with early death. We provide a new link between brain anomalies and RNA polymerase III subunits and its target

Keywords: Bi-allelic, Autosomal recessive, RNA polymerase III, Brain anomalies, BRF2

ESTROUS CYCLE LENGTH IN THE ALGERIAN ARBIA GOAT: EXFOLIATIVE VAGINAL CYTOLOGY AND SERUM PROGESTERONE LEVELS

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ABSTRACT

Our study aimed to estimate the estrous cycle length of the Algerian Arbia goat in Northern Algeria. Eighteen (18) Arbia goats were used in our work. Blood samples were taken from each goat twice a week (at a 2 or 3-day interval) for 3 months. The serum progesterone concentration was determined by Radio-Immuno-Assay. Smears of the vaginal mucosa were taken at the same time as the blood samples. The predominance of superficial cells on the smear of the vaginal mucosa as well as a serum progesterone level less than 1 ng/mL expressed the return to estrous which was considered the beginning of a new cycle. A negative correlation was observed between the percentage of superficial cells (SC) and serum progesterone (P4) levels in all goats. Our results showed a significant difference ($P < 0.05$) between the means of different cycle lengths obtained among the females. In addition, normal cycles had an average of 20.11 ± 1.85 days (17-25 days) representing 59.6% of cycles. Besides, a large number of short cycles (<17 days) with an average of 14.41 ± 1.51 days were found representing 25.5% of recorded cycles. The number of long cycles (>25 days; with an average of 32.14 ± 5.58 days), represented 14.9% of recorded cycles. Following these results, it can be concluded that the local goat in Northern Algeria had different types of cycles (normal, short, and long) with a large percentage of normal cycles.

Keywords: Cycle length, goat, progesterone, vaginal cytology smears

PREVALENCE, TREATMENT, AND ECONOMIC IMPACT OF COLIBACILLOSIS IN BROILER CHICKENS IN THREE WILAYAS OF CENTRAL ALGERIA

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ABSTRACT

The aim of our study was to evaluate the economic losses and diagnostic methods of avian colibacillosis in broiler chickens. The experimental study was conducted on 15 chicken farms in three wilayas of central Algeria (Blida, Médea, and Bouira). Our results show that this disease (colibacillosis) is the most frequent (28%) compared to other diseases encountered during the experiment ($p < 0.05$). It can cause economic losses of up to 15% in body weight and 3% of mortality, especially as a secondary infection. In terms of diagnosis, respiratory symptoms were found in 60% of cases. Respiratory and septicemic lesions appear from the second week of age, whereas sudden deaths and omphalitis are the most characteristic signs at the start. Laboratory diagnosis shows that all suspicions (100%) based on clinical symptoms and lesions were confirmed positive. The most commonly used antibiotic treatments in the studied farms were Quinolones and Beta-lactams, accounting for 73.33% of the treatments used. Particular attention should be paid to this pathology to control the factors favoring its occurrence and to avoid the economic losses it causes.

Keywords: Diagnosis, E. coli, farming, economic loss.

**SEARCH FOR A POSSIBLE ASSOCIATION BETWEEN THE RS11200638
POLYMORPHISM OF THE HTRA1 GENE AND THE DEVELOPMENT OF AGE-
RELATED MACULAR DEGENERATION IN A SAMPLE OF PATIENTS FROM
THE WILAYA OF ORAN**

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ABSTRACT

AMD, or age-related macular degeneration, is an eye disease characterized by aging and deterioration of the macula, a small area of the retina necessary for clear, precise vision. This can lead to significant alterations in central vision. There are two main types dry and wet AMD. which results from several risk factors that can increase the chances of developing this disease. Studies have shown that individuals carrying the allele are at risk for the rs11200638 polymorphism of the HTRA1 gene which encodes a member of the trypsin family of serine proteases. This protein is an enzyme secreted to regulate the availability of insulin-like growth factors (IGF), and regulate cell growth have a significantly higher risk of developing the disease. This research is carried out in the LGMC-USTO MB laboratory aims to deepen the understanding of the objectives, which are multiple. First of all, it is a question of evaluating the association between the SNP rs11200638 and the risk of developing AMD. Additionally, data analysis will determine whether other genetic factors interact with the rs11200638 SNP to influence AMD risk. This study was carried out on a sample of 60 individuals from western Algeria, of which 30 were AMD patients and 30 were healthy controls. The PCR RFLP technique was used to determine the genotype of the SNP rs11200638 of the HTRA1 gene using the restriction enzyme MSP1. This technique makes it possible to identify specific DNA variations associated with the disease. Statistical analyzes were carried out using SPSS ver.25 software, allowing the evaluation of associations between SNP genotype and disease risk factors. Our study results after statistical analysis confirm an association between the rs11200638 polymorphism in our sample and the occurrence of AMD disease. In conclusion, these results need to be confirmed on a large sample to ensure this association.

Key words: AMD, polymorphism, HTRA1, SNP rs11200638, PCR-RFLP, MSP1, population of west Algeria.

NATURAL CINNAMIC ALDEHYDE ISOLATION FROM CINNAMONUM ZEYLANICUM: IN SILICO STUDIES (MOLECULAR DOCKING, DFT AND ADME).

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ABSTRACT

Spices represent an abundant source of natural compounds possessing chemical properties of significant interest in both industry and pharmacology. In this context, our focus is directed towards an aromatic compound; Cinnamaldehyde. This natural active compound holds paramount significance owing to its wide range of biological effects, including anti-hyperglycemic properties, efficacy against bacteria, viruses, fungi, molds, and its potent anti-inflammatory capabilities. Its isolation is accomplished through the application of various techniques to extracts and essential oils derived from Ceylon cinnamon, scientifically known as *Cinnamomum zeylanicum*. In this work, we have developed a method for isolation the Cinnamaldehyde using a Soxhlet device and an ultrasonic bath. The molecule was identified on the basis of organoleptic parameters, confirmed by structural infrared and LC/MS and RMN spectroscopic analysis. Isolation of cinnamic aldehyde is achieved by silica gel column chromatography of the EO (51%). The addition of sodium bisulphite precipitated the aldehyde, giving a yield of 74%. Theoretical approaches have been used to study the structure-biological activities relationship. DFT was used to predict chemical reactivity by calculating global (I, A, χ , μ , η , ω , S) and local parameters (such as Fukui parameters) of the cinnamaldehyde. The similarity to drugs is estimated by the values of molecules's pharmacokinetic parameters given by the ADME study. In silico molecular docking predict the energy binding of complex formed with 3TZF enzyme to evaluate its stability.

Key words: essential oil, extract, *Cinnamomum Zeylanicum*, Cinnamaldehyde, sodium bisulphite, chromatography, DFT, ADME, Molecular Docking.

IN VITRO AND IN SILICO STUDIES OF ANTIFUNGAL ACTIVITY OF SYZYGIUM AROMATICUM ESSENTIAL OIL AND ITS MAIN CONSTITUENT ‘EUGENOL’ AGAINST A CITRUS FUNGAL STRAIN, FUSARIUM PROLIFERATUM

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ABSTRACT

Our study focused on the investigation of the antifungal efficacy of the essential oil derived from the clove plant and its major constituent, eugenol, against a fungal strain “Fusarium proliferatum”. The essential oil was obtained by hydrodistillation and the main compound eugenol, was isolated. The evaluation of the antifungal potential was carried out by the dilution method, to determine the evolution of the mycelial growth in contact with the essential oil and with the chemical fungicide “Agriconazole” used as a reference control. The essential oil showed significant efficacy at 100 µl ml⁻¹; whereas, eugenol, and the reference control, showed a complete inhibitory effect at 50 µl ml⁻¹. The in silico study including molecular docking, DFT and ADMET analysis was conducted to confirm the in vitro assay. Molecular docking results indicate that eugenol indeed functions as a potent inhibitor of Trichodiene Synthase for Fusarium sp, thus elucidating its fungicidal activity.

Keywords: Clove; molecular docking; density functional theory (DFT); ADMET

ESTIMATION OF RED BLOOD CELL AGGREGATION IN PREECLAMPSIA USING MICROFLUIDIC FLOW ANALYSIS

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ABSTRACT

Preeclampsia (PE) is a complex systemic syndrome that occurs after the 20th week of gestation and is characterized by maternal de-novo hypertension and/or significant proteinuria. Abnormal blood rheology found in PE is related to a reduction in blood flow rate, which is an important factor in determining the amount of oxygen and nutrients carried across the placenta. In this study, microfluidic flow analysis is used to determine *in vitro* the aggregation of the red blood cells (RBCs) in women with PE and healthy pregnant women – pregnant controls (PC). The RBC aggregation at flow conditions is determined with the air pressure-driven microfluidic system BioFlux - at a low shear rate (8.9 s^{-1}), followed by a high shear rate (446 s^{-1}). The RBC aggregation indexes (AI) and number of aggregates at high and low flow conditions are evaluated by the developed image analysis using the software environment Image J and an elaborated program in IntelliJ IDEA. The results demonstrate that RBC aggregation depends on the disease severity, and it is higher in patients with preterm birth and low birth weight. The AI and number of undispersed RBC aggregates at low shear stress are higher for non-severe and severe PE than PC. The RBCs from PE patients also become significantly more adhesive, forming large, branched aggregates at a low shear rate. The significantly more undispersed RBC aggregates at high shear stress indicate the formation of stable RBC clusters, drastically more pronounced in patients with severe PE. Regarding RBC aggregation indices, the severe PE group strongly differs from the PC group both at a low and high shear rate, indicating the formation of stable RBC clusters that are difficult to break down at high flow conditions. The combined study of rheological properties of the blood in flow with the microfluidic device and consequent image analysis demonstrate that altered RBC aggregation contributes to PE severity.

Keywords: Red Blood Cells, RBC Aggregation, Preeclampsia, Microfluidic Flow Analysis

Acknowledgment: *The research/work was performed under the Project BG-RRP-2.011-0025 with the financial support by the European Union NextGenerationEU.*

SYNTHESIS, CHARACTERIZATION AND ANTIOXIDANT ACTIVITY OF HISTAMINE-DERIVED LIGANDS

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ABSTRACT:

In the pursuit of novel bioactive compounds, this study focuses on the synthesis and characterization of ligands derived histamine, a biogenic amine with diverse physiological roles. The synthetic process involves strategic modifications of the structure of histamine to create new ligands, each with unique chemical properties. Comprehensive characterization techniques including spectroscopy and elemental analysis were used to validate successful synthesis and assess ligand purity. In addition, the antioxidant potential of these histamine-derived ligands has been evaluated by rigorous in vitro tests. Antioxidant activity is of paramount importance due to its association with various health benefits, including the potential to counter oxidative stress-related disorders. Preliminary results indicate significant antioxidant activity of our ligands, highlighting their potential as therapeutic agents. This interdisciplinary investigation bridges the fields of organic synthesis, chemical characterization, and bioactivity evaluation. The outcomes offer valuable insights into the design and development of histamine-derived ligands with potential applications in pharmacology and medicine. This research underscores the importance of exploiting natural compounds as a source of inspiration for the development of new bioactive molecules.

Keywords: *Histamine, biological application, ligand synthesis and antioxidant Activity.*

INNOVATIVE SYNTHESIS OF SCHIFF BASE DERIVATIVE FOR EFFECTIVE REMOVAL OF HEAVY METALS FROM INDUSTRIAL WASTEWATER

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ABSTRACT

Heavy metals, also known as metallic trace elements, naturally occur in soil, water, and air in minimal quantities. However, various human activities, such as the combustion of coal, oil, and waste, along with certain industrial processes, release significant amounts of heavy metals into the environment. These metals pose a complex environmental challenge, as they persist in ecosystems, disrupt natural habitats, degrade soil quality, affect surface waters, forests, and crops, and bioaccumulate in the food chain. Additionally, some heavy metals are carcinogenic to humans. In response to this critical issue, numerous remediation methods have been developed. Our research focuses on decontaminating polluted water using a synthetic Schiff Base ligand with potential pharmacological applications. The ligand was characterized using various spectroscopic techniques (IR, ^1H NMR) and single-crystal XRD analysis. We conducted a kinetic study to assess the efficiency of heavy metal removal, considering factors such as contact time effect, temperature, and pH. Furthermore, we will evaluate the ligand's capacity for wastewater decontamination. This research holds promise for addressing the environmental impact of heavy metal pollution. Thermodynamic calculations indicate that the interaction between our ligand and heavy metals is of a chemical nature. Furthermore, the complexation of these metals by our synthesized ligand is an exothermic process. This study addresses a multidisciplinary research challenge, encompassing organic and inorganic chemistry, as well as structural and environmental chemistry. The findings from this work offer intriguing prospects for potential biological applications of this type of ligand.

Keywords: Environmental pollution, Water contamination, synthesis and characterization, Heavy metals and Toxicity

GREEN SYNTHESIS OF ZINC OXIDE NANOPARTICLES: AN ECO-FRIENDLY PATHWAY TO ANTIOXIDANT AND ANTIMICROBIAL SOLUTIONS

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ABSTRACT

In this study, *Mentha pulegium* extract was used in green synthesis of ZnO nanoparticles. The characterization of the nanoparticles was performed by Fourier-transform infrared spectroscopy (FTIR) to identify the functional groups and confirm the presence of biomolecules responsible for the reduction and stabilization of ZnO nanoparticles. X-ray diffraction (XRD) analysis was utilized to determine the crystalline structure of the synthesized nanoparticles. Scanning electron microscopy (SEM) was used to examine the surface morphology and particle size distribution. Furthermore, the antioxidant activity of the ZnO nanoparticles was evaluated using DPPH and ABTS assays. The antibacterial potency of the ZnONPs was evaluated using agar well diffusion against Gram positive and negative bacteria to explore the efficacy of ZnO nanoparticles as antimicrobial agents. The results revealed a significant effects of ZnONPs against *Staphylococcus aureus*, *Escherichia coli*, *salmonella entrica* *klebsiella pneumoniae*, *pseudomonas aeruginosa*..This research highlights the potential of green-synthesized ZnO nanoparticles in biomedical and environmental applications due to their unique properties.

Key words: Zinc oxide nanoparticles, Green synthesis, FTIR, DRX, SEM, Biological activities.

DEVELOPMENT OF DATA BASE FOR CLINICAL AND RHEOLOGICAL INDICES FOR WOMEN WITH PREECLAMPSIA - PILOT STUDY

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ABSTRACT

Preeclampsia (PE) presents with maternal hypertension and significant proteinuria, leading to potential organ damage in previously normotensive women. Identification of early pathological signs and diagnostic markers is needed to prevent this disease and preserve fetus development. This preliminary research aims to develop a Pregnancy Related Integrated Database Analytics (PRIDA) combining the main clinical, genetic, biochemical, hematological, and rheological indices of women diagnosed with PE and healthy pregnant controls. The PRIDA is implemented in a SQL environment, which ensures reliable data management and allows interrelationships between the individual included parameters to be found. The database also includes the rheological parameters for red blood cell (RBC) aggregation evaluated by the microfluidic system BioFlux, which allows these ones to be determined in flow. The accurate evaluation of the indices characterizing RBC aggregation is based on the images obtained from the BioFlux system. They are analyzed with an image processing toolbox from ImageJ and a computer program developed by IntelliJ IDEA (integrated development environment). The results obtained for the RBC aggregation indices show a statistically significant difference between the group with PE and healthy pregnant women. The inclusion of these rheological characteristics in the database will allow the evaluation of possible interrelationships with routinely studied clinical indices and provide a deeper understanding of this pathology. The development of the PRIDA is an important step in the identification of new prognostic markers for risk assessment of adverse pregnancy outcomes for women with PE.

Keywords: data base, clinical indices, rheological parameters, red blood cells (RBCs), preeclampsia,

Acknowledgment: This work is funded by the European Union „NextGenerationEU” instrument, project number BG-RRP-2.011-0025-C01, “Development of a Pathologic Pregnancy Database for Retrieval of New Knowledge for Diagnostic Markers Identification”, part of the “Funding of Research Projects in the Field of Green and Digital Technologies” Operational Program 2021BG-RRP - National Recovery and Sustainability Plan.

DEVELOPMENT OF IMAGE FLOW ANALYSIS IN THE EVALUATION OF RBC AGGREGATION IN WOMEN WITH PREECLAMPSIA

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ABSTRACT:

In recent years, many computerized image analysis techniques have been applied to determine the rheological characteristics of red blood cells (RBCs). This study aims to elaborate on the combined experimental approach and image analysis (based on specialized software environments) of RBC aggregation for women with preeclampsia (PE) and healthy pregnant women (PC). The RBC aggregation is assessed using the microfluidic system BioFlux - a high-quality imaging platform for performing in-flow rheological analyses. Obtained by BioFlux images of the RBC aggregation are imported as input data into the software environment Image J. Then, the results are further processed in an elaborated program in IntelliJ IDEA. The algorithm created for assessing and analyzing the received image data includes several steps, from the image intensity transformation process through the binary image transformation to the region segmentation analysis. This leads to obtaining the number and size of aggregates and, as a last step - calculating the RBC aggregation index (AI). The results obtained for the AI, based on the methodology developed by the authors of the current study, show a statistically significant difference between the two studied groups of pregnant women – PC and PE. Our combined approach shows an abnormal RBC aggregation in women with PE, which can be used as a prognostic biomarker for early diagnosis, stratification, and possible prevention of this disease.

Keywords: Software Application, Image Flow Analysis, RBC Aggregation, Preeclampsia

Acknowledgment: *The research/work was performed under the Project BG-RRP-2.011-0025 with the financial support by the European Union NextGenerationEU.*

DEVELOPMENT OF A PCR ASSAY FOR RAPID IDENTIFICATION OF CLINICAL ENTEROCOCCUS FAECALIS

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ABSTRACT

Some strains of enterococci have opportunistic behavior and are recognized as pathogens in hospitals. They cause nosocomial infections that take the form of endocarditis, bacteremia, sepsis or local infection, as they may have a food-toxicological risk infection (gastroenteritis, diarrhea, nausea). This work is summarized in the determination of species of enterococci from different infections by conventional phenotypic methods followed by a diagnosis based on DNA tests connected by PCR to give a more-limited identification of these isolates. A total of 20 clinical isolates of enterococci were identified in this study. They originate from the urinary and genital infections, stool, sepsis and bacteraemia. These strains were identified in part by morphological, biochemical and physicochemical methods at the hospital and were identified as follows: ten isolates *E. faecalis*, five *E. faecium*, four *Enterococcus* spp. and finally only one *E. durans*. Furthermore, a diagnosis based on DNA testing has been established to confirm the accuracy of the identification of these strains. To this end, three pairs of primers encoding an internal part of superoxide dismutase gene (*sodA*) specific-species were used for *E. faecium* (EFM1 / EFM2) and *E. faecalis* (FL1 / FL2) and (BF1 / BF2) whose sequences have been developed and designed in this study. The results show differences, on the five isolates identified phenotypically as *E. faecium*, four of them responded negatively by the absence of an amplified 190 bp band, a single isolate responded positively, confirming the conventionnel identification. The molecular identification method proposed in this study is more-limited compared to conventional hospital methods, it is reproducible is more discriminating at the species level. It is very advantageous in epidemiological studies or diagnoses enterococcal infection.

Keywords: DNA, sepsis, bacteremia, *sodA*, primers, *E. faecalis*, *E. faecium*

ANTIOXIDANT ACTIVITY OF EPHEDRA ALATA EXTRACT AND BIOSYNTHESIS OF CeO₂ NANOPARTICLES: ASSESSMENT MIC AND MBC AGAINST BACTERIAL SPECIES

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ABSTRACT

The rise of antibiotic-resistant bacteria necessitates the development of novel antimicrobial agents. Cerium oxide nanoparticles (CeO₂-NPs), synthesized via green methods, offer a promising solution due to their unique physicochemical properties and biocompatibility. Additionally, the antioxidant properties of plant extracts can enhance the functional potential of these nanoparticles. This study aims to synthesize CeO₂-NPs using Ephedra alata plant picked from the south of Algeria, evaluate the antioxidant activities of the plant extract, and assess the antimicrobial efficacy of the nanoparticles against various pathogenic bacteria. The successful synthesis was confirmed through Fourier transform infrared spectroscopy (FTIR), X-Ray diffraction (XRD), dynamic light scattering (DLS), scanning electron microscopy (SEM), and UV-Visible spectroscopy. The antioxidant activity of the Ephedra alata extract was determined using DPPH, ABTS, and FRAP assays. The total polyphenol and flavonoid contents were quantified using standard spectrophotometric methods, yielding 167.05 µg GAE/mg and 9.96 µg GAE/mg. The antimicrobial activity of CeO₂-NPs was assessed using broth microdilution assays. CeO₂-NPs exhibited significant antibacterial activity with MIC and MBC values against Staphylococcus aureus (31.25 µg/mL and 125 µg/mL), Pseudomonas aeruginosa (250 µg/mL and 500 µg/mL), Enterobacter cloacae (125 µg/mL and 250 µg/mL), and Salmonella enterica (250 µg/mL and 1000 µg/mL). The Ephedra alata extract itself showed antibacterial activity with MIC and MBC values against Staphylococcus aureus (1000 µg/mL and 2000 µg/mL), Pseudomonas aeruginosa (2000 µg/mL and 4000 µg/mL), Enterobacter cloacae (800 µg/mL and 2000 µg/mL). The antioxidant activity of the Ephedra alata extract and the antimicrobial properties of CeO₂-NPs highlight their potential for diverse biological and environmental applications and underscores the promising use of CeO₂-NPs as potent antimicrobial agents in combating resistant bacterial strains.

Keywords: Antioxidant activity; Ephedra alata; Cerium oxide; Nanoparticles; MIC; MBC

EXAMINATION OF THE HEALTH SAFETY OF OAK SEEDS ORIGINATING FROM SEED SOURCES IN CENTRAL SERBIA

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ABSTRACT

The paper presents an examination of the presence of pathogenic fungi and insects on oak seeds collected from 13 areas in Central Serbia (Kucevo, Krusevac, Kraljevo, Boljevac, Beograd, Kragujevac, Uzice, Despotovac, Ivanjica, Nis, Kursumlija, Djerdap and Sabac). The presence of the following pathogenic fungi was identified in a low range – from 1.0 to 5.0%: *Botrytis cinerea* Pers., *Alternaria tenuis* Nees, *Cladosporium herbarum* (Pers.) Link, *Mucor racemosus* Bull., *Rhizopus nigricans* Ehrenb., *Thamnidium elegans* Link, *Trichothecium roseum* (Pers.) Link, *Fusarium* spp., *Penicillium* spp., *Aspergillus* spp., *Ciboria batschiana* (Zopf) N.F. Buchw, *Pestalotiopsis funerea* (Desm.) Steyaert, *Pestalotia hartigii* Tubeuf, *Cytospora intermedia* Sacc., *Gnomonia quercina* Kreb., *Phomopsis quercina* (Sacc.) Höhn. ex Died., *Gloeosporium quercinum* Westend., *Ophiostoma* spp. and sterile mycelium. Among the harmful insect species, the following were found on the examined seeds: *Curculio glandium* Marsham, 1802, *Curculio elephas* (Gyllenhal 1836), *Cydia simplana* (Hübner, 1799) and *Andricus quercus salicis* (Burgsdorf, 1783) in the range of only 1.0 do 4.0%. The species *Quercus rubra* showed the greatest resistance to the presence of the above-mentioned harmful agents, while the highest number of diseases and pests was found on the seeds of *Quercus petraea*, which may also be a consequence of the large number of samples. The results of these examinations indicate a satisfactory health condition of all the examined tree species, particularly regarding the presence of economically significant pathogenic fungi and harmful insects.

Keywords: Oak seeds, pathogenic fungi, insects, diseases, pests.

THE ANTIMICROBIAL POWER OF CADMIUM NANOPARTICLES OBTAINED FROM COLPOMENIA PEREGRINA ALGAE EXTRACT.

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ABSTRACT

In this prospective study, we focused on the synthesis and characterization of cadmium nanoparticles (CdNPs) using hydroethanolic extract from the brown algae *Colpomenia peregrina*, sourced from the Tipaza Sea. The synthesis of CdNPs was meticulously characterized using advanced techniques such as UV-Visible spectroscopy, Fourier-transform infrared spectroscopy (FTIR), and dynamic light scattering (DLS). In the second part of our study, we investigated the antimicrobial activities, with particular emphasis on the antibacterial and antifungal properties of CdNPs. Antibacterial activity assessments, conducted using the disk diffusion method in triplicate, revealed remarkable efficacy of CdNPs. Specifically, these nanoparticles demonstrated highly effective bactericidal activity against multidrug-resistant bacterial strains including *Serratia marcescens*, *Citrobacter freundii*, and *Chrisomonas luteola*, with inhibition zones measuring 16 mm, 16 mm, and 19 mm, respectively, at a concentration of 5 mg/ml. Furthermore, the CdNPs showed significant inhibitory effects against two *Candida albicans* fungal strains, with inhibition zones of 15 mm and 17 mm at a concentration of 5 mg/ml. In conclusion, the remarkable antimicrobial properties of CdNPs derived from *Colpomenia peregrina* extract pave the way for a multitude of biological applications. These promising results suggest significant potential for future antimicrobial treatments and underscore the importance of marine natural resources in pharmaceutical and medical research.

Keywords : Nanoparticles; Cadmium; *Colpomenia peregrina*; Antimicrobial activity.

INVESTIGATION OF REPRODUCTION AND PRODUCTION TRAITS IN PURE AND CROSSBRED BALADI RABBITS

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ABSTRACT

Rabbit industry is a segment of animal science that is not well developed in Jordan. However, rabbit meat finds some preferences over other kinds of meat in some countries; this could be due to price difference compared to beef or sheep meat, and in some other countries the reason could be due to cultural background. In Jordan, the main reason for raising rabbits is exhibition. In addition to the local rabbit breed (Baladi), several breeds are known but the most important ones are the New Zealand white, Californian, and the Flemish Giant rabbit. The purpose of this project was to study the effect of crossing Baladi rabbit with the Exotic breed of rabbit and investigate both reproductive and productive traits. Reproductive traits included litter size, age at puberty, and litter size at weaning. Moreover, the productive traits focused on the growth characteristics for both pre and post weaning stages, and carcass traits as well. Reciprocal differences, heterosis, and heterosis retention in non-F₁ generations were also evaluated. Results of the study showed no significant effect of genotype on all reproductive traits. However, litter weight at birth and weaning, and average daily gain were highly affected by bunny genotype ($P < 0.05$). In addition, Flemish Giant and F₁ Baladi- Flemish Giant bunnies gained more during post-weaning stage compared to their Baladi counterparts ($P < 0.05$). Dressing percentage, foreleg, loin, and hind leg were also affected by bunny genotype ($P < 0.05$). In conclusion, crossbreeding system may improve some economically important traits of Baladi rabbits.

Keywords: Rabbit, crossbreeding, production

ENHANCING POTATO RESISTANCE TO LATE-BLIGHT THROUGH SERENDIPITA INDICA COLONIZATION

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ABSTRACT

Potato (*Solanum tuberosum*) is one of the most important staple crops. Late-blight, caused by *Phytophthora infestans* (*Pi*), poses a significant threat to potato production, leading to substantial yield losses. In this research the impact of *Serendipita indica* colonization investigated on potato resistance to late-blight. The objective of this study was to investigate the effect of *P. indica* on *Pi*. Potato cultivars “Agria and Jelly” selected for the greenhouse studies. The use of *S. indica* was conducted concurrently with the planting of the tubers in the soil, while zoospore inoculation was performed on the aerial parts. The results showed that *Pi* infection was significantly reduced in both cultivars when potato roots were colonised with *S. indica*. This enhanced resistance is a consequence of the modulation of antioxidant and defense enzymes/genes in the host by *S. indica*. Notably, the activities of enzymes such as Ascorbate-Peroxidase, Peroxidase, PolyPhenol-Oxidase, Phenylalanine-Ammonia-Lyase and H₂O₂ content were markedly elevated in the *Pi* infection in the *S. indica* colonised plants in comparison to controls. Additionally, the inoculation of *S. indica* into the roots of the potato plants resulted in a modification of gene expression associated with defense mechanisms, including PAL, PPO, MAPK and WRKY. This leads to the rapid and efficient activation of potato defense mechanisms, which is comparable to the response observed in potato plants infected with *Phytophthora*. Overall, the findings suggest that the application of *S. indica* during potato cultivation represents a novel and effective strategy to enhance plant resistance and mitigate the impacts of Late-blight disease.

Keywords: Antioxidant enzymes, Gene expression, Potato, *Phytophthora infestans*, *Serendipita indica*, Sustainable agriculture.

THE PREDICTIVE ROLE OF NEUTROPHIL-TO-LYMPHOCYTE RATIO FOR CARDIOVASCULAR MORTALITY IN HEMODIALYSIS PATIENTS

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ABSTRACT

Cardiovascular diseases are the primary causes of mortality among hemodialysis patients. We aimed to investigate the prognostic role and predictive value of neutrophil-to-lymphocyte ratio (NLR) for cardiovascular mortality in patients with end-stage renal disease (ESRD). **Methods.** 137 patients who were on maintenance hemodialysis in our dialysis center were included for 24-months follow-up. The endpoint was cardiovascular mortality. Pearson correlation analysis was conducted to evaluate the factors, associated with NLR. Patients were divided into two groups - survivors and non-survivors during the follow-up period. Kaplan-Meier curves and Cox proportional analysis were used to assess the prognostic value of the investigated hematological index. **Results.** We found the positive correlation of NLR with age, total white blood cell count and neutrophils and negative correlation with lymphocytes, serum creatinine, albumin and iron. The mean NLR was significantly higher in non-surviving group. In Cox regression analyses high NLR was associated with cardiovascular mortality (HR 2.229, 95% CI 1.08-4.59, $p < 0.001$). NLR was an independent predictor for cardiac death when adjusted for other risk factors (HR 1.953, 95% CI 1.04-3.22, $p < 0.005$) **Conclusions.** NLR is reliable marker for cardiovascular mortality. This routinely used hematological parameter should be considered as diagnostic and prognostic marker for cardiovascular mortality in hemodialysis patients.

Keywords: neutrophil-to-lymphocyte ratio, hemodialysis, cardiovascular mortality

PHENOLIC COMPOSITION, ANTIOXIDANT ACTIVITIES AND INHIBITORY EFFECT ON α -AMYLASE OF IMMATURE FABA BEAN (*VICIA FABA* V. MAJOR) HUSK EXTRACT AND ITS FRACTIONS

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ABSTRACT

There is significant interest in utilizing food processing by-products like immature faba bean husk (IFBH), which still contain essential components including vitamins, minerals, dietary fiber, and polyphenols, substances that are often overestimated and usually thrown away or utilized in animal feed. Given the richness of this part in bioactive substances, the present study focuses on evaluating the phenolic compound content, as well as the antioxidant and antidiabetic activities of crude extracts from the IFBH and its six fractions (I–VI), separated by chromatography on a Sephadex LH-20 column with ethanol and 50% acetone as the mobile phases. The antioxidant activity was measured in the crude IFBH extract and its fractions using ferric reducing antioxidant power (FRAP) and radical scavenging capacity against DPPH and ABTS. Our results indicate that total phenolic contents in the fractions ranged from 152 ± 3 (fraction I) to 608 ± 14 mg GAE/g (fraction II), the latter was 2× higher than the one determined in the crude extract. The crude extract from the IFBH and its fractions exhibit effective antioxidant and antiradical activities. HPLC analysis of the fractions revealed the presence of flavones, flavonols, and phenolic acids. The antidiabetic activity was studied through the inhibition of α -amylase, EC 3.2.1.1. The findings indicated that the crude extract of IFBH exhibited $13.92 \pm 1.52\%$ inhibition of α -amylase, while fraction II showed $36.31 \pm 1.82\%$, fraction III $11.72 \pm 2.50\%$, fraction IV $13.04 \pm 2.25\%$, and fraction V $11.36 \pm 2.42\%$ inhibition at a concentration of 0.5 mg/mL. The inhibition observed in this study may have a beneficial effect on hyperglycemia in type II diabetics. Therefore, polyphenols from this by-product could serve as a promising natural source of antioxidants and bioactive compounds for diverse industrial applications, such as dietary supplements for individuals with type II diabetes.

Keywords: Immature faba bean husk, Phenolics, Radical scavenging activity, antidiabetic activity, Column chromatography, HPLC.

CHEMICAL CONSTITUENTS OF ESSENTIAL OIL OF *ORMENIS AFRICANA* AERIAL PARTS FROM ALGERIA

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ABSTRACT:

The chemical composition of essential oil obtained by hydrodistillation of the fresh aerial parts of *Ormenis africana* (Jord. et F.) Lit. et M. (Asteraceae) collected on the Boutaleb Mountains (Setif, Algeria). The essential oils were extracted by a Clevenger approach and has been investigated by gas chromatography and gas chromatography-mass spectrometry. One hundred and twenty four constituents were found to be present in this essential oil, accounting 100 (%) of total essential oil. The main constituents that resulted were α -Bisabolol (18.72%), Santolina alcohol (9.80%) and Eucalyptol (9.65%). The three major constituents have several properties; alpha has a healing, anti-inflammatory, gastroprotective, antimicrobial, antioxidant, insecticide, analgesic therapeutic power. Eucalyptol is used in the treatment of respiratory conditions (bronchitis, colds), asthma attacks or sore throats. Santolina alcohol is particularly interesting in cases of cutaneous verminosis, in cases of stomach cramps or dysmenorrhea. This is the first report on essential oil of *O. africana* volatiles, it is appropriate to study its toxicity and biological activities.

Keywords: *Ormenis africana*, Asteraceae, Essential oil, GC-MS, α -Bisabolol, Santolina alcohol, Eucalyptol, Boutaleb Mountains.

TRADITIONAL USES AND PHYTOCHEMICAL COMPOSITION OF ESSENTIAL OIL *SISYMBRIUM IRIO* FROM ALGERIA

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ABSTRACT:

This study we investigated the traditional use and the chemical composition of *Sisymbrium irio* ("Corcase" in Arabic) essential oil collected from M'sila, Eastern Algeria. *S. irio* is one of about 90 species of the genus belonging to family " Brassicaceae ", indigenous species of southern Europe, North Africa and temperate Asia. Plant used for the treatment of different types of diseases such example a treatment of rheumatoid, irritation, decrease inflammation and injuries. The chemical composition of essential oil obtained by hydrodistillation of the fresh leaves of *S. irio* has been investigated by gas chromatography and gas chromatography-mass spectrometry. The oil contained 12 components, representing 100% of the total oil. The major constituents are isopropyl isothiocyanate (68.19%), butane, 2-isothiocyanato- (14.53%) and phytol (5.07%). In conclusion, this study needs phytochemical and biological research on this plant as a source of the presence of novel bioactive chemical constituents and discovering other therapeutic uses.

Keywords: *Sisymbrium irio*, Brassicaceae, GC-MS, isopropyl isothiocyanate, Diseases, Algeria

ANTHROPOMETRIC INDICES, OVERWEIGHT, OBESITY AND THEIR ASSOCIATION WITH LIFESTYLE AND UNHEALTHY BEHAVIOUR AMONG ADOLESCENTS

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ABSTRACT:

Overweight and obesity among adolescents remains a major public health issue as it is well known to increase the risk of cardiovascular, metabolic and musculoskeletal disorders in later life. Westernization, urbanization, globalization, modernization and digitalization, which are associated with emulating of unhealthy behaviors and sedentary lifestyles among teenagers, are leading factors that have contributed to the epidemic of obesity throughout childhood and adolescence in a global aspect. **Objective:** The purpose of the presented study was to share current information about the role of anthropometric indices utilized to evaluate the impact of processes such as westernization, urbanization, globalization and digitalization on the lifestyle of adolescents and the prevalence of overweight and obesity among them. **Materials and methods:** A systematic review of available scientific resources in online databases Web of Science, Science Direct, Scopus, Research gate and PubMed was carried out on searched topic. Every available original article or official report published in English for the period January 2014- May 2023 and presenting verified information on application of anthropometric indices assessing the influence of westernization, urbanization, globalization and digitalization on the lifestyle of adolescents and the prevalence of overweight and obesity among them was included in the study. The unoriginal and unrepresentative studies, conference abstracts and unavailable full texts were removed. **Results:** Anthropometric indices play crucial role as indirect, predictive indicators of adolescents' health. These metrics are easy applicable and helpful in identifying overweight and obesity related with unhealthy behavior and sedentary lifestyle among teenagers. Body mass index (BMI) is a leader among the anthropometric indices used to assess nutritional status and physical activity in adolescents. In the last decade, it has been observed tendency to apply and combine with BMI, indices such as waist circumference (WC) and waist to height ratio (WHtR) to determine overweight and obesity, as a result of unhealthy behavior. **Conclusion:** In order to prove the negative impact of processes - westernization, urbanization, globalization, digitalization on the lifestyle of adolescents, and from there on the increased spread of overweight and obesity in them, anthropometric indicators are widely applied. The monitoring of anthropometric and weight status of teenagers and their parameters serve as a critical indicators of quality of life and health during adolescence, as well as predictors of obesity and accompanying cardiometabolic alterations.

Key words: anthropometric indices, lifestyle, adolescents, overweight and obesity

ASSESSMENT OF NUTRITIONAL AND CARDIO-METABOLIC STATUS IN TYPE 2 DIABETIC PATIENTS IN THE TLEMCCEN REGION

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ABSTRACT

Diabetes is a serious chronic disease that affects metabolism. It occurs when the pancreas does not produce enough insulin or when the body cannot use insulin properly. Its prevalence has been increasing over the past few decades, posing a threat to public health. The most common types of diabetes are type 1, type 2, and gestational diabetes, with type 2 accounting for about 90% of cases worldwide. The aim of this study is to identify risk factors associated with diabetes complications in type 2 diabetic patients recruited from medical center in Tlemcen, and to calculate the Framingham Risk Score (FRS) (an estimate of the 10-year risk of cardiovascular disease) through a nutritional survey. This survey included a sample of 34 male and female patients. We evaluated the role of various factors such as nutritional status, smoking, the risk of heart disease, and the role of physical activity in the development of diabetes. Our results showed that nutritional status, smoking, and heart disease are risk factors for the development of type 2 diabetes. Our patients showed a moderate FRS for men (11%) and a low FRS for women (9%). However, no significant difference was found for the gender variable in our study. This study highlights the importance of a comprehensive and personalized approach for managing type 2 diabetic patients, including tailored nutritional education, regular cardio-metabolic monitoring, and consistent, appropriate physical activity.

Key words: dietary profile, dietary preferences, diabetic patients, cardiometabolic risk.

NUTRITIONAL PROFILE AND CARDIOMETABOLIC RISK IN HEMODIALYSIS PATIENTS AT TLEMEN UNIVERSITY HOSPITAL

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ABSTRACT

This work presents the results of a dietary survey conducted among hemodialysis patients in Tlemcen, Algeria. The main goal was to determine their nutritional profile, dietary habits, and cardiometabolic risk. The survey found that hemodialysis patients in Tlemcen are aware of their health condition and the need to avoid nutrients like protein, potassium, and phosphorus. They typically follow a diet low in these nutrients, especially in cereals and dairy products. However, their consumption of potassium-rich fruits like dates and bananas was high on dialysis days. Their intake of vegetables and lean protein sources was often insufficient. Patients also preferred processed foods like chocolate and sugary drinks, impacting their cardiometabolic profile negatively. These findings highlight the need to educate hemodialysis patients in Tlemcen about balanced diets tailored to their needs. We recommend nutritional follow-up in hospitals by nutritionists and nephrologists to create personalized dietary plans and advice on good dietary practices. This can improve their condition and reduce cardiometabolic risks, enhancing their quality of life.

Keywords: dietary profile, dietary preferences, hemodialysis patients, cardiometabolic risk.

EVALUATION OF THE IN VITRO ANTIOXIDANT, ANTIBACTERIAL AND ANTIFUNGAL ACTIVITIES OF SATUREJA BATTANDIERI BRIQ. FROM ALGERIA

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ABSTRACT:

Satureja battandieri Briq. is one the Lamiaceae family's valuable herbs. It is widely used in traditional medicine, cuisine, and food preservation. The point of this study was to estimate some biological activities such as antioxidant, antibacterial, and antifungal of this plant's essential oil (EO), methanolic (ME), and aqueous extracts (AE), as well as verify its polyphenolic content. Two samples—BI and Mj—that were taken from two different M'sila state areas were the subject of this investigation. The antioxidant activity was assessed using the DPPH assay and the extracts' IC₅₀ values were determined. The antimicrobial activity was evaluated using different techniques (fumigation, disc diffusion, well diffusion, and poisoned food), and the MICs were estimated using the microdilution method. Total polyphenolic contents were calculated using the Folin-Ciocalteu technique. The respective yields (w/w) were as follows: the aqueous decoction extraction was 2.7 and 2.04%, the methanolic extraction by maceration was 12.5 and 8.08%, and the hydrodistillation extraction of EO was 5.16 and 6.37%. The MICs ranged from 0.62 to 1.25 µL/mL and from 0.62 to 10 µL/mL for Mj and BI EOs, respectively. Both ecotypes' AEs had MBCs of 37.5 to > 300 mg/mL and MICs ranging from 37.5 to > 300 mg/mL, indicating that they were less efficacious or even ineffective. The EO vapor technique significantly prevented mold growth, whereas the other techniques significantly decreased it (36% to >92%). These findings indicated that the Mj ecotype is more powerful than the BI ecotype, that the EO of *Satureja battandieri* has antibacterial qualities, and that the EM and EA extracts had higher antioxidant activity.

Keywords - *Satureja battandieri*, antimicrobial activity, antioxidant activity, essential oil, methanolic extract, aqueous extract.

ANTIMICROBIAL AND ANTIOXIDANT PROPERTIES OF ESSENTIAL OIL AND METHANOL EXTRACT FROM TEUCRIUM POLIUM L.

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ABSTRACT

Teucrium polium is a common labiate species in the Mediterranean basin. Its importance is well known in traditional medicine. The objective of this work was to evaluate the biological activity of this plant's essential oil (EO) and methanolic (ME), including their antibacterial, antifungal, and antioxidant properties, and to search for polyphenolic content. The plant yielded 15.56% (w/w) methanolic extract (ME) by maceration and 0.63% (v/w) essential oil (EO) by hydrodistillation. The antimicrobial activity of the plant extracts was tested against bacterial, yeast, and mold strains through the disk and well diffusion methods. The bacterial inhibition zone diameter ranged from 10 to 32 mm and from 9 to 14 mm for the EO and the EM, respectively. The bacterial minimal inhibition concentration (MIC) ranges from 15.62 to 62.5 mg/mL, and the MBC was 62.5–125 mg/mL for EM. The MIC values for the EO were from 5.72 to 22.9 mg/mL, and the MBCs were from 11.45 to 22.91 mg/mL for the EO. For fungi, EO caused very significant inhibition on all the tested fungi, with a percentage inhibition between 50.29% and 87.11%, and the EM caused a percentage inhibition ranged from 0.00% to 71.92%. In terms of antioxidant activity, the IC₅₀ values of the β-carotene bleaching test were at 2.90 and 1.8 mg/mL for ME and EO, respectively, while the DPPH test ones were estimated at 0.035 and 10.46 mg/mL for ME and EO, respectively. The total phenolic content of the ME was estimated at 143 mg GAE/g. The flavonoid content was 137.5 mg QE/g of extract.

Keywords - *Teucrium polium*, methanolic extract, essential oil, polyphenols, antioxidant activity, antimicrobial activity

CHEMICAL COMPOSITION OF PISTACIA LENTISCUS ESSENTIAL OIL FROM EASTERN ALGERIA

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ABSTRACT

The use of medicinal plants today is the form of the most widespread medicine worldwide. Utilizing aromatic plants as interesting source of phytochemicals constitute one of the largest scientific concerns. *Pistacia lentiscus*, also known as mastic tree, belongs to the family Anacardiaceae which consisting of more than eleven species. It is largely distributed in the Mediterranean region ecosystems where it grows wild in Algeria, Tunisia, Morocco, Turkey, France, Spain, Italy and Greece. Despite its limited distribution in the world, this plant is known internationally for several therapeutic properties. Thus this study was focused to investigate chemical composition of essential oil from *P. lentiscus* leaves (PLEO) collected in the flowering stage from Souk-ahras area, Algeria. PLEO analysis was carried out using GC/MS on an Agilent 6890N GC system coupled with a 5975B network mass selective detector. The column of the system was HP-5MS (30m×0.25mm, film thickness 0.25µm). The oven temperature program was initiated at 45 °C, held for 1 min then raised up to 250 °C at a rate of 5 °C/min for 6 min. Helium was used as the carrier gas at a flow rate 1.0 ml/min with a split ratio equal to 1/50. The detector and injector temperatures were 250 and 280 °C, respectively. The compounds of the oil were identified by comparison of their retention indices (RI), mass spectra fragmentation with those on the stored mass spectra computer library. Phytochemical analysis indicated that leaf of *P. lentiscus* comprising anthocyanins, leucoanthocyanins, flavonoids, tanins and terpenoids. The obtained results showed also that PLEO was characterized by variety of components in less percentage. The main compounds present are 4-terpineol, germacrene D, sabinene, α-Pinene and caryophyllene.

Key words: *Pistacia lentiscus*; essential oil; chemical composition; 4-terpineol.

OBESITY IN ALGERIAN ADOLESCENTS AS DETERMINED BY BODY MASS INDEX AND BODY FAT MASS RATE

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ABSTRACT

The aim of the study was to evaluate the sensitivity and specificity of the International Obesity Task Force (IOTF) and Algerian national data based on BMI to detect excess fat in adolescents. A cross-sectional study of 257 adolescents aged 16-19 years was conducted in Constantine (Algeria). BMI was calculated from weight and height measurements. Body fat percentage (BF%) was estimated by impedance measurement. The IOTF and Algerian national data were evaluated for sensitivity and specificity in detecting excess body fat. The BF% thresholds used to define true positives were 30% for girls and 25% for boys. BMI was significantly associated with BF% in the whole population ($r=0.759$). Obesity is more common in girls regardless of the reference used. The obesity rate estimated by BF% (20.62%) was significantly higher than that estimated by IOTF (5.84%) and Algerian data (5.45%). The sensitivity of the evaluated criteria (IOTF and Algerian data) was high for males (83.3% and 100%, respectively) and low for females (19.2% for both IOTF and Algerian data). The specificity of the two criteria was high for both sexes (100%). Specificity was higher than sensitivity; therefore, the ability of BMI to detect non-obese adolescents was higher than its ability to identify obese adolescents. Body mass index is a very specific but less sensitive method of assessing increased adiposity in adolescents. It fails to detect excessive adiposity in a significant percentage of female adolescents. It seems necessary to measure body fat in addition to BMI in adolescent girls.

Key words : Adolescent, Body Mass Index, Fat mass rate, Impedancemetry, Algeria

IMPACT OF TONIFERTAL 4H SUPPLEMENTATION ON ENHANCING RABBIT FERTILITY

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ABSTRACT:

The aim of our study is to evaluate the effect of Tonifertal 4H supplementation on reproductive parameters and weight in both male and female rabbits. This research was conducted at the Blida 1 University station with 20 rabbits (8 males, average age 5 months, mean weight of 3522g, and 12 females, aged 4 to 8 months, mean weight of 2267g). We monitored various reproductive parameters through weighing and using the CASA system. Our findings indicate that Tonifertal 4H supplementation led to improvements in reproductive parameters and weight gain. A significant difference ($p < 0.05$) was found between treated and not treated animals. Treated females showed a fertility rate of 83%, while treated males exhibited positive outcomes: semen volume 1.05ml, semen pH=7, vitality $72.375 \pm 12\%$, mass motility score 7.54 and individual motility score 3.21. In conclusion, the use of essential oils enhances reproductive parameters in rabbits.

Keywords: Rabbits, essential oil, fertility, reproduction, weight, CASA.

SYNERGISTIC EFFECTS OF TWO ESSENTIAL OILS OF *ROSMARINUS OFFICINALIS* AND *CARTHAMUS CAERULEUS* AGAINST PATHOGENIC MICROORGANISMS

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ABSTRACT

Today, antibiotic resistance is a major threat to global health, food security and development. As the incidence of infections increases, the effectiveness of treatment decreases, making it increasingly difficult, if not impossible, to treat infections due to the declining efficacy of antibiotics. The growing concern about antibiotic resistance has sparked a strong interest in the search for new antimicrobial agents. Essential oils are widely used in the pharmaceutical, food and cosmetic industries, as well as in aromatherapy. These oils exhibit a wide range of biological properties including antibacterial, antifungal, antiviral, insecticidal, cytotoxic and antioxidant activities. While numerous researchers have investigated the antibacterial properties of individual essential oils, few studies have focused on the antibacterial effects of essential oil blends. In the present study, the chemical composition of *Rosmarinus officinalis* and *Carthamus caeruleus* essential oils and their synergistic effects on antibacterial activities were investigated. The chemical composition of the essential oil was analyzed by gas chromatography (GC) and gas chromatography-mass spectroscopy (GC/MS). The antibacterial activity of the essential oils was evaluated using the dilution agar method against six bacterial strains, two gram-negative *Escherichia coli*, *Klebsiella pneumoniae* and four gram-positive: *Staphylococcus aureus*, *Bacillus subtilis*, *Micrococcus luteus* and *Bacillus cereus*. The essential oil of *R. officinalis* was characterized mainly by 1,8-cineol (20.4%) and camphor (16.1%). The identified constituents of the essential oil of *C. caeruleus* were mainly acetylenic compounds represented by carlina oxide (90.4%). *C. caeruleus* essential oil had good antimicrobial activity against four bacterial strains (*Escherichia coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus* and *Bacillus cereus*) with MIC and MBC values between 0.2-0.4 µl/ml and 0.2-6.2 µl/ml, respectively. Whereas, *R. officinalis* essential oil had moderate antibacterial activities against all strains with MIC and MBC values between 1.6-7.1 µl/ml and 6.1-12.3 µl/ml, respectively. The antimicrobial activity results of the essential oil blend showed higher antibacterial activity against all tested bacteria with MIC and MBC values between 0.2-1.6 µl/ml and 0.5-6.1 µl/ml, respectively. The blend of essential oils showed high antibacterial activity compared to virgin oils. This activity may be due to the association of active compounds such as 1,8-cineol and carlina oxide. These findings provide a new source of drugs that may help in therapy, leading to the development of a new treatment based on a combination of these essential oils against gram-negative and gram-positive bacteria, which continue to pose a threat to public health.

Keywords: *C. caeruleus*, *R. officinalis*, essential oils blend, synergistic effects, antibacterial activity.

EPIDEMIOLOGICAL AND BIOCHEMICAL PROFILE OF DYSLIPIDEMIA DURING PREGNANCY IN DIABETIC WOMEN FROM WEST ALGERIA

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ABSTRACT

Introduction. Dyslipidemia, characterized by abnormal blood lipid levels, represents a major health problem worldwide. In pregnant women, particularly those with diabetes, these abnormalities can lead to serious complications for both the mother and the fetus. The aim of this study is to examine the epidemiological and clinical profile of dyslipidemia in diabetic women during pregnancy. **Patients and methods.** This study was conducted over a one-month period, including 40 diabetic pregnant women. The average age of the participants was 33.9 ± 1.003 years. A questionnaire consisting of 16 items was used. The biochemical profile was analyzed by measuring various parameters, including blood glucose, urea, creatinine, total cholesterol, triglycerides, as well as HDL (high-density lipoproteins) and LDL (low-density lipoproteins) levels. **Results.** Our results indicate that diabetic pregnant women were on average 34 years old, with 52.5% aged between 30 and 40 years, and an average BMI of 25.85 kg/m². Most were in their third trimester of pregnancy (77.5%) and multiparous (87.5%). The majority (92.5%) suffered from gestational diabetes, while the others had pre-gestational diabetes. Among them, 62.5% had associated diseases such as hypertension (37.5%) and urinary infections (25%). The blood glucose levels of diabetic pregnant women were higher than those of healthy subjects, but their renal function (urea and creatinine) was similar. Total cholesterol and triglyceride levels, as well as the TyG index, were also higher than those of healthy women. **Conclusion.** Abnormal lipid levels during pregnancy could affect the biochemical profile of diabetic women.

Keywords: Dyslipidemia, Pregnancy, Biochemical Profile, Diabetes, Complications

TRICHODERMA SPP. INDUCE THE SYSTEMIC DEFENSE RESPONSE IN TOMATO AGAINST SCLEROTINIA SCLEROTIUM

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ABSTRACT

The objective of this study is to explore the efficiency of different strains of *Trichoderma* on the biocontrol of stem rot of tomatoes caused by *Scelerotonia sclerotiorum*. A collection of 7 *Trichoderma* strains, recovered from rhizospheric soils around infected lettuce plants grown in *Scelerotonia*-infested fields, was isolated. The strains were identified using molecular tools based on sequencing the ITS region of ribosomal DNA. The results revealed that the strains belong to *T. harzianum*, *T. asperillum*, and *T. hamatum*. To screen for its antagonist potential on *S. sclerotiorum*, both fungi were cultivated on dual culture. The results of the confrontation between *Trichoderma* strains and *S. sclerotiorum* showed that the genus *T. harzianum* was more efficient in reducing the growth rate and the number of sclerotia formed by *S. sclerotiorum* compared to other species, the growth depended significantly upon strains tested. Under controlled conditions, the irrigation of the tomato plants in pots by the beneficial strains was released with a spore suspension at 10⁷ spores/ml for each *Trichoderma* strain. After one week, the seedlings were challenged with *S. sclerotiorum*. This experiment demonstrates that the plants treated by *T. harzianum* decrease the Stem rot severity by 75% to 100% compared to the control non-treated. Thus, *T. harzianum* displays higher efficiency in controlling *S. sclerotiorum*, and it could be suitable as a biostimulant due to its ability to promote growth in tomato plants. Besides, *T. harzianum* induced two-fold the phenolic compounds level compared to the infected control. Further, the peroxidase activity was enhanced by 50% on average in plants treated with *T. hamatum* and *T. asperillum* than the control non-treated. The study signifies how *Trichoderma* spp. reprograms the host's defense network to provide robust protection against *S. sclerotiorum*.

Keywords: *Trichoderma* strains, Tomato, *Scelerotonia sclerotiorum*, biocontrol

PRIMA SCALA MEDI 2020 PROJECT: ANALYSIS OF GENETIC AND PHENOTYPIC DIVERSITY IN LOCAL CHICKEN POPULATIONS IN ALGERIA

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ABSTRACT

The PRIMA SCALA-MEDI project is characterizing the genetic and phenotypic diversity of Mediterranean local breeds of sheep and chicken and study their ability to adapt to harsh environments and management systems. The project is conducted in three North African countries (Tunisia, Algeria and Morocco), and two Southern Europe countries (France and Italy). For the chicken species, in Algeria the project includes two parts, the first consists to characterize the diversity of the local populations and the second consists of set up a cross-breeding programme between two contrasted origins of local chickens. For the first part, and in order to better know the populations of local chickens and to investigate the farming methods, field trips were carried out in more than 100 farms, distributed, in five different agroecological and climatic zones of the country. During the field surveys, the farming method practiced and all morphobiometric characters and the zootechnical performance were recorded. Also, blood samples were taken from each bird sampled, which will be used for the following molecular analysis (genotyping by DNA chip and epigenetic analysis by the LUMA technique). A total of 250 birds were sampled (200 females and 50 males). On top of that, 100 chickens from the breeding technical institute "ITELV" were also added to the project. These chickens, which have been in a closed herd for more than 10 years and have not been crossed with exotic strains. After DNA extraction, samples were genotyped with the IMAGE001v2 DNA array (around 10k SNPs). After quality control, Fst values and Principal Component Analysis (PCA) distinguished animals from the two ITELV centers (Baba-Ali and Tlemcen) from all village chickens sampled in North Algeria, probably because of genetic drift and inbreeding in the ITELV herds that have been closed since 10 years. Results suggested that the farming methods are essentially done by women and the birds showed a various phenotypic characteristic. For genetic results, shown a rather high level of diversity and a low level of genetic differentiation of local chickens among agroecological zones.

Keywords: Scala Medi 2020, Chicken, farmer, ITELV, Algeria, Phenotypic, Genotypic Diversity.

ROLE OF STJC, FIMH AND STHE FIMBRIAL GENES IN BIOFILM FORMATION OF SALMONELLA TYPHIMURIUM ON POLYSTYRENE AND STAINLESS-STEEL SURFACES

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ABSTRACT

Salmonella is one of the most common causes of foodborne outbreaks worldwide and can survive on various surfaces by virtue of its biofilm-producing capacity. Fimbriae play an essential role in attachment to the surface and the construction of cell aggregates; therefore, they are critical for the initialization of biofilm formation. In this study, *Salmonella* Typhimurium ATCC 14028 wild-type strain and its fimbrial mutant strains *ΔsthE*, *ΔfimH*, and *ΔstjC* biofilm-producing capacity on polystyrene and stainless-steel surfaces were compared at 24, 48, and 72 hours. In addition, the biofilm morphotypes and pellicle structures of strains were investigated. The findings revealed that biofilm formation was significantly reduced in the mutant strains compared to the wild strain on both surfaces. The biofilm-producing ability of the *stjC* mutant strain decreased by 75% on the polystyrene, and biofilm formation of the *sthE* mutant strain decreased by 72% on the stainless steel compared to wild-type. Biofilm morphotypes of “rdar” were defined for wild-type, *fimH*, and *sthE* mutant strains, whereas the “pdar” morphotype was determined in the *stjC* mutant strain. Additionally, it was found that the mutant strains produced less cellulose than the wild-type. The pellicle formation observed in the mutant strains remarkably differed from that of the wild-type strain. This differentiation is more apparent in the *stjC* mutant strain, which produces less cellulose and has a tinier pellicle ring. These results highlight the importance of fimbriae in biofilm formation on different surfaces, suggesting that these structures can be notable targets for research aimed at eradicating *Salmonella* biofilms.

Keywords: *Salmonella*, *fimH*, *sthE*, *stjC*, fimbriae, biofilm formation, stainless steel, polystyrene

AI-ASSISTED EARLY DETECTION OF PLANT DISEASES AND PESTS AND REDUCTION OF PESTICIDE USE WITH AGRICULTURAL UNMANNED GROUND VEHICLES

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ABSTRACT

The use of artificial intelligence technologies in controlling plant diseases and pests in the agricultural sector provides early detection and effective intervention, thereby reducing crop losses. In this context, Agricultural Unmanned Ground Vehicles (AUGVs) minimize pesticide usage, supporting environmental sustainability and enhancing agricultural productivity. With advanced sensors and algorithms, AUGVs continuously monitor plant health in the fields, detecting abnormalities and performing targeted pesticide applications only where necessary. Additionally, path planning algorithms such as A*, SLAM, Dijkstra, RRT, and RRT* used in AUGVs ensure the most efficient routes in the field, saving energy and time, thus increasing operational efficiency. These algorithms determine optimal routes by considering factors such as field size, plant layout, and existing obstacles, enhancing the effectiveness of agricultural operations. This study examines the integration, application areas, and benefits of AI-assisted early detection systems and AUGVs in agriculture.

Key words: Precision agriculture, Deep learning, Path planning algorithms, Image processing

EVALUATING PLANTAGO LANCEOLATA EXTRACT FOR INHIBITION OF BACILLUS CEREUS BIOFILM

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ABSTRACT

Bacillus cereus, which stands out as one of the most common causes of food poisoning, is a facultative anaerobic, Gram-positive bacteria capable of spore formation. This pathogen, which is widely isolated from various foods such as dairy products, vegetables, rice and meat, causes colonies to develop resistance to disinfectants and antibiotics thousands of times more than planktonic species with its biofilm forming ability. This increases the risk of infection in food production facilities and compromises food safety. The need to identify natural resources for the elimination of *B. cereus* biofilms, which is a serious concern in the food industry, has emerged. *Plantago lanceolata*, also known as ribwort plantain, has been used in traditional medicine for the treatment of diseases since ancient times. Due to the bioactivities of leaf extracts such as antimicrobial, antioxidant, anti-inflammatory and wound-healing, it is a promising natural source to inhibit *B. cereus* biofilm. In this study, it was aimed to determine the antibiofilm activity of *P. lanceolata* on *B. cereus*. Accordingly, *P. lanceolata* leaf acetone extracts were obtained and *B. cereus* bacteria were treated at final concentrations of 300, 150 and 75 µg/ml, respectively. In the experiments carried out in 96-well microplates, planktonic cells were removed from the medium after controlling the growth and then the biofilm amounts were quantitatively determined by crystal violet staining method. Biofilm inhibition percentages of extracts with 300, 150 and 75 µg/ml concentrations were 62.48 ± 2.24 , 29.23 ± 1.79 and 24.55 ± 2.36 , respectively. The data obtained from the study support that *P. lanceolata* leaves are a promising natural source for inhibiting *B. cereus* biofilm.

Keywords: *Bacillus cereus*, *Plantago lanceolata*, antibiofilm

MYRTUS COMMUNIS FRUIT EXTRACTS ANTIBACTERIAL AND ANTIBIOFILM ACTIVITIES ON STAPHYLOCOCCUS AUREUS

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ABSTRACT

Staphylococcus aureus is a Gram-positive, biofilm-forming bacterium that is a common cause of acne, abscesses, boils and skin infections in humans. *S. aureus* biofilm is a major problem that causes difficulties in numerous sectors. Although several chemical biofilm destruction techniques are available, these methods pose a significant risk to human health. Therefore, the need and seeking for a natural compound is inevitable. *Myrtus communis* has been demonstrated to possess various beneficial properties, including antibacterial, antibiofilm and antioxidant effects. In previous studies, it has been reported that *M. communis* is rich in phenols and flavonoids, which are secondary metabolite contents. This study aims to identify the antimicrobial and antibiofilm activities of *M. communis* extracts on *S. aureus* bacteria. Accordingly, dichloromethane and ethanol extracts of *M. communis* fruits were used and antibacterial and antibiofilm activities were measured spectrophotometrically by serial dilution method in a 96-well microplate. The concentration of biofilm was determined according to the results of antibacterial activity. The experiments were performed in five replicates. As a results of *M. communis* dichloromethane extract, 1200, 600 and 300 µg/ml concentrations were found to have 92.38 ± 0.02 , 89.81 ± 0.01 and $78.25 \pm 0.02\%$ bacterial inhibition, respectively. In addition, biofilm inhibition of 75 and 37.5 µg/ml concentrations was found to be $69.57 \pm 2.76\%$ and $50.86 \pm 1.29\%$, respectively. *M. communis* ethanol extract didn't show antibacterial activity. However 150, 75 and 37.5 µg/ml concentrations were found to have 85.14 ± 1.34 , 58.54 ± 1.88 and $49.04 \pm 0.88\%$ biofilm inhibition, respectively. The results show that *M. communis* fruit extracts have strong antibacterial and antibiofilm properties against *S. aureus* bacteria. The results showed that two different solvents can observe different results from the same material. Therefore, it is suggested that *M. communis* plant may be a natural source for the control of *S. aureus* bacteria.

Keywords: *S. aureus*, *M. communis*, antibacterial, antibiofilm

EVALUATING BIOFILM FORMATION BY SALMONELLA TYPHIMURIUM AND ITS CSGD, RFAG, RMBA, AND STJC MUTANTS IN SIMULATED GASTROINTESTINAL ENVIRONMENTS

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ABSTRACT

Salmonella Typhimurium is a significant pathogen known for its ability to develop resistance to various stresses encountered in the gastrointestinal tract and its capacity to form biofilms. In this study investigated the effects of different concentrations of gastric acid, pepsin, bile salts, pancreatin, and alpha-amylase under gastrointestinal conditions on biofilm formation by *Salmonella* Typhimurium 14028 wild type and its *csgD*, *rfaG*, *rmbA*, and *stjC* mutants at 24, 48, and 72 hours. 0.1 mg/mL, 0.5 mg/mL, 1 mg/mL, 1 mg/mL concentrations of alpha amylase in LB-NaCl medium, an increase of up to 20% was determined in the wild type strain compared to the control (grown only in LB^{-NaCl}) at low concentration, no significant difference was detected at medium concentration, while alpha amylase added at high concentration caused a decrease in biofilm formation by almost 30%. A similar trend was observed in the mutant strains. In media containing different concentrations of pepsin (0.5 mg/mL, 1 mg/mL, 1.5 mg/mL), bile salts (0.3%, 0.4%, 0.5%), and pancreatin (0.5 mg/mL, 1 mg/mL, 1.5 mg/mL), biofilm production decreased as the concentration increased. At pH 2.5, 3 and 3.5, biofilm production capacity of wild type and mutant strains decreased significantly, while biofilm production increased in direct proportion as the pH increased. The ability of *Salmonella* Typhimurium wild-type strain to produce biofilm under all conditions tested indicates that it is a challenging pathogen resistant to gastrointestinal stress, while the increased susceptibility of mutant strains indicates that these genes play an important role in pathogenicity.

Keywords: *Salmonella* Typhimurium, biofilm formation, gastrointestinal, pepsin, bile salts, pancreatin, alpha-amylase, pH levels, *csgD*, *rfaG*, *rmbA*, *stjC* mutants, pathogenicity.

STRUCTURE AND MATRIX OF BIOFILMS: A COMPREHENSIVE REVIEW

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ABSTRACT

This review examines the structure and function of biofilms formed by microorganisms in various environments, as well as the advantages and disadvantages associated with these biofilms. Over an extended period of years, bacteria were considered to be planktonic (i.e., suspended or free-floating cells) and non-social organisms. Contrary to this view, bacteria in natural environments produce an extracellular matrix and form biofilm structures. These biofilms enable bacteria to establish symbiotic relationships within their own species and with other bacterial species, resulting in a resilient life form capable of withstanding environmental stresses, antibiotics, and host immune responses. Biofilms are characterized by structures that exhibit varying phenotypes in relation to growth rates and genetic expression, influenced by adhesion to interfaces, other cells, or substrates, and embedding within the extracellular polymeric matrix. The matrix, composed of various types of biopolymers produced by biofilm cells, serves multiple functions that significantly contribute to the biofilm lifestyle. It forms the structural skeleton of the biofilm, responsible for surface adhesion and cohesion. The extracellular polymeric substance (EPS) plays a critical role in stabilizing the biofilm by enhancing cohesive forces between cells. EPS immobilizes biofilm cells, which remain in close proximity, facilitating cell-cell communication and cooperative interactions. A comprehensive examination of biofilm characteristics will elucidate the complexities of these microorganism communities associated with surfaces. This review offers a thorough summary of the current literature.

Keywords: Biofilm, extracellular polymeric substance (EPS), matrix of biofilm, microorganism.

FATTY ACID PROFILE OF MEATS AND THEIR IMPACTS ON HUMAN HEALTH

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ABSTRACT

Meat, derived from various species of poultry, mammals, and fish, is regarded among the top preferences of consumers and producers. Foods of animal origin (such as beef, veal, lamb, chicken and fish) contain adequate and balanced amounts of macro- and micronutrients essential for growth and vital functions. Meat lipids are composed of triglycerides (which make up intramuscular fat) and phospholipids, which provide the two main precursors and long-chain derivatives, especially those in the n-3 series. The lipid content and fatty acid composition of meat varies according to muscle type, the diet, breed, age, sex, the amount of lipids or oil in the feed, the concentration and type of crude protein in the feed, the energy required for the animal etc. The amount of fat in the human diet, especially saturated fatty acids, is recognized as an important risk factor for coronary heart disease. PUFAs (especially n-6, n-3 and conjugated linoleic acid) present in animal muscle tissue appear to play a positive dietary role in the prevention or reduction of some human diseases. Therefore, PUFA/SFA and n-6/n-3 fatty acids are recognized as important indices for the nutritional assessment of fatty meat. Fatty acids (FA) have three “levels” of saturation; saturated (no double bond), monounsaturated (a single double bond in the FA carbon chain, MUFAs), and polyunsaturated (multiple double bonds in the FA carbon chain, PUFAs/HUFAs). The initial double bond's distance from the terminal methyl groups is used to define polyunsaturated fats (PUFAs). For example, an omega-3 double bond is located on the third carbon, whereas an omega-6 double bond is located six carbons away. Saturated FAs and MUFAs can be synthesized de novo in the central nervous system, whereas PUFAs cannot be synthesized de novo without initial dietary uptake. The three essential, non-endogenous omega-3 fatty acids are eicosapentaenoic acid (EPA, C20:5n3), docosahexaenoic acid (DHA, C22:6n3), and alpha-linolenic acid (ALA, C18:3n3). Flaxseed, chia seeds, linseed, canola, and walnuts are examples of plants that provide ALA. In vivo desaturation and carbon atom addition transform ALA into EPA/DHA. Due to the restricted nature of this conversion, dietary consumption of EPA and DHA is required. Fish is a source of EPA and DHA, depending on the species, age, the site of the capture (wild/farmed), processing techniques etc. This study will give up to date information on fatty acid profiles of meats and their impacts on human health.

Keywords: fatty acids, meat, omega-3, human health

COMPARATIVE ANALYSIS OF TRADITIONAL AND GREEN EXTRACTION TECHNOLOGIES FOR PHENOLIC COMPOUNDS FROM OLIVE FLESH AND LEAVES

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ABSTRACT

Phenolic substances are compounds with one or more hydroxyl groups in the aromatic ring. Fruits, vegetables, leaves, seeds, flowers, stalks, and branches of plants all contain phenolic compounds. Phenolic compounds are anticarcinogenic and antimutagenic due to their antioxidant characteristics. Studies have shown that the Mediterranean diet plays an important role in lower mortality from cardiovascular disease and cancer in Mediterranean countries compared to other countries. The Mediterranean diet, which includes plenty of fruits and vegetables, cereals and olive products, has been found to have a preventive effect against some diseases. One of the main sources of phenolic compounds found in the Mediterranean is olives. Olives are an important source of phenolic compounds, not only oleacein in the oil but also oleuropein in the leaves. Oleuropein, the primary phenolic compound found in olive trees, gives olive fruits their distinctive bitter flavor. Oleuropein, an active component in olive leaves and fruit, is a mixture of hydroxytyrosol and elenolic acid glycosidic esters. The methods of obtaining phenolic compounds are also important. With the developing technology, traditional methods are being replaced by environmentally friendly green methods. In this study, the advantages and disadvantages of traditional and green technologies in the extraction of phenolic compounds from olive flesh and leaves, as well as the factors affecting these methods will be evaluated.

Keywords: olive leaves, Oleuropein, green extraction, phenol

BIOREMEDIATION OF CONTAMINATED SOILS

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ABSTRACT

Bioremediation of polluted soils is carried out by microorganisms present in the soil that can degrade various contaminants. The activity of soil microorganisms is stimulated to enhance biodegradation. This method is a widely utilized, cost-effective, and eco-friendly technique for cleaning contaminated soils. The bioremediation process is related to the microbial metabolism of target pollutants as energy and carbon sources, which is the crucial process in the biological treatment of microorganisms. Soil microorganisms mostly ensure the conversion of organic pollutants into inert or by-products, but also facilitate detoxification. This sometimes produces toxic byproducts during the degradation process, requiring increased oxygen availability and nutrient adjustments. Soil, one of the receiving environments, breaks down pollutants that penetrate it through biological and chemical processes, but most of the time, the pollution load in the environment exceeds the natural degradation capacity of these pollutants. When pollutants accumulate, human intervention is needed in addition to natural bioremediation to eliminate this contamination. Bioremediation is also a natural treatment process that restores environmental conditions by utilizing the biological activity of microorganisms to reduce the toxicity levels of pollutants. Examples include adding nutrients to optimize growth or improving environmental conditions. This study investigates the bioremediation of contaminated soils using current research.

Keywords: Biodegradation, Bioremediation, Microorganism, Pollution load

MICROPOLLUTANTS AND THEIR EFFECTS ON ENVIRONMENTS

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ABSTRACT

Increasing chemical consumption, which started with globalization, leads to widespread environmental degradation due to the micropollutants it contains. As a result of this situation, life in water, soil and air causes serious concerns for human health. This increase in the use of chemical-containing micropollutants has negative effects on human and living health through air, water and soil ecosystems, and has thus led to widespread contamination of the receiving environments and rendering them unusable. There is a growing public concern worldwide about micropollutants polluting natural habitats. Unplanned urbanization resulting from rapid industrialization, combined with the inevitable increasing global population, can cause serious concerns in water, air and soil systems such as drinking water, air quality, groundwater, surface water and agricultural soils. Micropollutants spread over a wide range of receiving environmental systems and their concentrations gradually increase. Some of the micropollutants are found in very low concentrations in the environment and include a diverse group of organic compounds such as cosmetics, pharmaceuticals, corrosion inhibitors, pesticides, polycyclic aromatic hydrocarbons, surfactants and phthalates. Many micropollutants in urban ecosystems mix with the receiving environments. Commercial forms of these substances include detergent water discharge, personal care products excreted in urine, and various household chemicals, including food and plastic additives. The problem of micropollutants relates not only to their direct discharge into the environment, but also to their transfer through sewage sludge. These micropollutants can negatively impact the environment and human life through their toxic effects such as endocrine disruption, mutagenicity, carcinogenicity, and antibiotic resistance. This study aims to show the effects of micropollutants on receiving environments, which are present in various environmental systems such as drinking water, groundwater, surface water, soil and air, and also occur with anthropogenic effects. It also highlights knowledge gaps and areas for future research regarding the effects of micropollutants on the environment and human health.

Keywords: Chemical consumption, ecosystems, micropollutants, receiving environment

FORAGE YIELDS OF SOME CONFECTIONARY SUNFLOWER VARIETIES GROWN AT DIFFERENT DENSITIES

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ABSTRACT

This study was conducted to determine the forage yield of some confectionary sunflower varieties (F-300, F-400, and Palanci 1) grown at different plant densities (7143, 5714, and 4762 plants da⁻¹) under the conditions of Hatay. For this purpose, the confectionary sunflower varieties were planted according to a split-plot design in randomized blocks, with the varieties assigned to the main plots and the planting densities to the subplots. To determine the forage yield of different confectionary sunflower varieties, plant height, stem diameter, green forage yield, dry matter yield, leaf weight, stem weight, and head weight characteristics were examined. Among the varieties, the F-400 variety was superior in terms of plant height, stem diameter, green forage yield, dry matter yield, leaf weight, stem weight, and head weight. In terms of plant density, the density of 4762 plants da⁻¹ yielded better results in these yield-related characteristics. As a result, it was determined that cultivating the F-400 confectionary sunflower variety at a density of 4762 plants da⁻¹ would be more productive.

Keywords: Confectionary Sunflower, Density, Forage Yield, Variety

KEY BACTERIAL INFECTIONS IMPACTING APRICOTS AND HOW TO MANAGE THEM

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ABSTRACT

Diseases of bacterial origin are an important group of diseases that are widely seen in apricot and cause serious losses. Unfortunately, this problem is increasing daily in the world and in Türkiye since necessary precautions have not been taken. The main bacterial pathogens with destructive effects on apricot are *Pseudomonas syringae* pv. *syringae*, *P. syringae* pv. *morsprunorum*, *Agrobacterium tumefaciens* (= *Rhizobium radiobacter*) and *Xanthomonas airboricola* pv. *pruni*. Cancers usually develop on pruning wounds or other points of injury (roots, branches, etc.). Winter cold temperatures and inappropriate selection of susceptible plants have a promoting effect on these disease agents. These disease agents can be latent in asymptomatic plants. Symptoms of the disease generally vary according to the bacterial species and are characterised by gum discharge on the stem and branches, brown watery spots on the fruits, and tumors on the roots or parts of the stem close to the soil. Stunting, small, and chlorotic leaf formation is also observed in diseased plants. Cultural and chemical control is of great importance in disease management. These measures significantly limit both the spread and severity of the disease. In this research, it was tried to emphasise what are the main bacterial diseases that cause significant losses in apricot production in the world and Türkiye, how big a threat they pose to apricot cultivation, and what measures can be taken to combat the disease.

Key Words: Apricot, bacterial diseases, canker, disease management

INVESTIGATION OF THE EFFECT OF D398S MUTATION ON THE KINETIC PARAMETERS AND THERMAL STABILITY OF GLUCOSE ISOMERASE FROM *Anoxybacillus gonensis* G2T

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ABSTRACT

Glucose isomerase (GI) (E.C.5.3.1.5), is an intracellular enzyme found in many microorganisms that catalyzes the isomerization of glucose to fructose or fructose to glucose. It is defined as a type 1 or type 2 GI. It is used in industry, particularly in the production of high fructose corn syrup (HFCS), because it isomerises glucose to fructose. The formation of a fructose-glucose equilibrium in HFCS production is temperature-dependent. Therefore, in GIs obtained from mesophilic organisms, approximately 40–45% fructose is produced. In industrial applications, this ratio is increased to 50%, but the application of these methods requires high costs. For this reason, GI's obtained from thermophilic organisms are used in such applications. As the temperature increases, the fructose-glucose balance shifts towards the fructose side, eliminating the need for expensive methods. Type 2 glucose isomerase(G2T) from *Anoxybacillus gonensis*, a thermophilic organism, was isolated as a recombinant, and the results showed that *Anoxybacillus gonensis* G2T glucose isomerase (AGOGI) has superior properties in terms of kinetic parameters than other GIs used today. In this study, it is aimed at improving the biochemical and kinetic parameters of AgoGI, whose kinetic properties were improved by genetic manipulations. For this purpose, a D398S site-specific mutation was applied to AgoGI. The kinetic data of D3982 were calculated as Km value 122.05 ± 2.84 mM, Vmax value 44.99 ± 0.30 μ mol/min/mg protein, kcat value 37.53 1/sec, and kcat/Km value 0.308. The optimum pH value of the enzyme was determined to be 6.5, and the optimum Tm value was determined to be 85 °C. According to the results obtained, although the D398S mutation caused a charge change in the enzyme, no change was observed in the biochemical and kinetic parameters of the enzyme, so it is considered that it is not necessary to apply this mutation in industrial use.

Keywords: Glucose Isomerase, Enzyme Characterization, Site Directed Mutagenesis

IN VITRO ANTIOXIDANT AND SUNSCREEN ACTIVITY OF ACETONE AND METHANOL EXTRACTS OF MAIZE LEAVES AND MAIZE TASSEL

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ABSTRACT

The cosmetics industry is one of the fastest growing sectors globally, with a volume and revenue of USD 100.49 billion worldwide. At the global level, it is projected to register a CAGR of approximately 5.5% from 2021 to 2028. Especially sunscreen products have a large share in this market volume. Sunscreen products protect the skin from the damages caused by UV rays from the sun by protecting the skin. Although chemicals such as oxybenzone, titanium dioxide, etc. in sunscreen products protect the skin from harmful rays from the sun, long-term use causes some damage to human health. For this reason, the interest in organic and natural sunscreens is increasing every year. In this perspective, the discovery of raw materials with natural ingredients is gaining importance. Especially the discovery of effective products obtained from plant wastes is economically and sustainably important. In this study, *in vitro* total antioxidant activity (DPPH) and sunscreen activities (SPF) of acetone and methanol extracts of maize leaves and maize tassel collected from Bursa were calculated. In this study, 1 mg/ml acetone and methanol extracts of maize leaves had DPPH inhibition activity of $52.85 \pm 1.28\%$ and $64.27 \pm 1.53\%$, while maize tassel had $49.51 \pm 1.02\%$ and $53.14 \pm 1.17\%$ activity, respectively. When *in vitro* sun protection activities were analysed, it was observed that acetone and methanol had 14.10 ± 0.15 and 29.06 ± 0.20 % activity, respectively. Maize tassel acetone extract was found to be 13.06 ± 0.04 and methanol extract was found to be 26.14 ± 0.07 . In conclusion, it is thought that plant parts whose leaves and tassels are not used as food have a potential antioxidant and sunscreen activity and can be used as sunscreen products in the cosmetics sector in terms of being economical and sustainable.

Keywords: Sunscreen, antioxidant, maize leave, maize tassel

THE IMPORTANCE OF GENETIC TESTS USED IN COLORECTAL CANCER DIAGNOSIS

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ABSTRACT

Early diagnosis is critical to improve treatment success. Genetic testing plays an important role in the diagnosis and risk assessment of colorectal cancer. This review examines the genetic basis of colorectal cancer, the use of genetic testing in the diagnostic process and its importance in individualized medicine. This review study was conducted to investigate the role and importance of genetic test in colorectal cancer diagnosis. The research was made by reviewing the existing studies in the literature with determined criteria. Genetic testing identifies familial predispositions, allowing high-risk individuals to be included in early screening programs. In particular, genetic syndromes such as Lynch syndrome and familial adenomatous polyposis (FAP) significantly increase the risk of colorectal cancer. Such tests contribute to optimizing treatment strategies by detecting the disease in its early stages. Furthermore, the results of genetic tests are also used to identify biomarkers that influence patients' response to treatment and prognosis. In this context, the integration of genetic testing allows for significant progress in colorectal cancer management. The obesity prejudice scale score was found to be high in the study group. The obesity prejudice was high among those who had a better body perception, a higher socioeconomic status and had a healthy lifestyle.

Keywords: Colorectal Cancer, Genetic Tests, Review.

MECHANISM OF BAX/BCL-2 ASSOCIATED MULTIDRUG RESISTANCE IN CANCER

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ABSTRACT

Cancer is a complex disease involving genetic and environmental factors and is considered one of the main health problems all over the world. Dysregulation of apoptosis (cell death) in cancer cells is considered one of the mechanisms of multidrug resistance (MDR). Drug resistance is an important and remarkable problem in cancer treatment. With drug resistance, changes, and imbalances between -pro and -anti apoptotic proteins are frequently encountered in many tumors. Intracellular BCL-2/BAX ratio is extremely important in determining whether the cell will go to apoptosis. High BCL-2 expression in various cancer types induces apoptosis in tumor cells and mediates resistance to chemotherapeutic drugs. Therefore, blocking BCL-2 is effective in the apoptotic process in tumor cells. In this review, it is aimed to define the molecular mechanism of multidrug resistance and BCL-2/BAX in cancer and to discuss cell death related studies. In this study, a literature review and research were conducted on the relationship between multidrug resistance and BCL-2/BAX molecular mechanism and apoptosis in cancer. Multidrug resistance, apoptosis and BCL-2/BAX mechanism activities in human cancers have been evaluated in a broad perspective. Anticancer drugs disrupt vital molecular pathways in a cell or kill cancer cells by activating programmed cell death (apoptosis). Apoptosis is the final driver of many anti-cancer drugs. MDR is defined as the phenomenon of tumour cells gaining drug resistance against different chemical structures and different targets. Thus, the multidrug resistance and apoptosis-associated mechanism of BCL-2/BAX appears to be a key to overcoming the failure of chemotherapy. The mechanisms by which tumour cells manage to overcome drug resistance and circumvent chemotherapy-induced cell death require intensive study to develop new strategies in cancer research. This review highlighted the role of many scientific studies on multidrug resistance and apoptosis-associated BCL-2/BAX mechanism.

Keywords: Cancer, multidrug resistance, MDR, BCL-2, BAX

APPLICATIONS OF ELECTRO-PEROXONE PROCESS IN THE REMOVAL OF PHARMACEUTICALS

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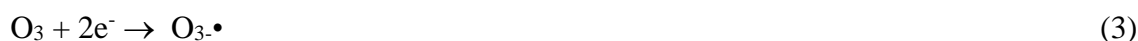
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ABSTRACT

Advanced oxidation technology is considered to be one of the most effective methods for the removal of organic pollutants. Electro-peroxone (E-peroxone) is an emerging advanced oxidation process that makes up for the shortcomings of traditional advanced oxidation technology. E-peroxone process that an electrocatalytic ozonation process is a combination of conventional electrolysis and ozonation. In the E-peroxone process, carbon-based cathodes are used for in situ electro-generated H₂O₂ from the cathodic two-electron reduction of O₂. The in situ generated H₂O₂ then reacts with O₃ to produce OH• radicals via the so-called peroxone reaction. The main reactions in the E-peroxone process are listed in the following Eqs. (1)–(4):



Due to the enhanced O₃ transformation to OH• by electro-generated H₂O₂, the e-peroxone process can considerably accelerate organic pollutant degradation, especially ozone-refractory pollutants. The e-peroxone technology has advantages such as in-situ generation of H₂O₂, no external chemical addition, high degradation efficiency, TOC mineralization, the short reaction time required for water treatment, and low energy consumption. Pharmaceuticals constitute a large group of human and veterinary medicinal compounds designed to prevent, cure, and treat disease and improve health. They have long been used in significant quantities throughout the world. Although concentrations of pharmaceuticals in the aquatic environment are generally low, its continuous input may constitute in the long term a potential risk for aquatic and terrestrial organisms due to high biological activity and high stability. Some of the adverse effects caused by pharmaceutical pollution include aquatic toxicity, resistant development in pathogenic bacteria, genotoxicity, and endocrine disruption. Therefore, over the past few years, they have been considered an emerging environmental problem. The E-peroxone process has been applied for the treatment of various pharmaceuticals such as venlafaxine, amoxicillin, ibuprofen, dexamethasone, tetracycline, diclofenac, gemfibrozil, bezafibrate, clofibrac acid.

Keywords: Electro-peroxone, advanced oxidation processes, pharmaceuticals.

EFFECT OF *ompC* GENE ON BIOFILM FORMATION UNDER SALT STRESS IN *SALMONELLA* TYPHIMURIUM STRAIN 14028

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ABSTRACT

The presence of stress response genes in the *Salmonella* genome protects the bacteria from cell death under various stress conditions. The *ompC* gene plays an active role in intracellular regulation against osmotic stress. In this study, the effect of response regulation to salt stress at different NaCl concentrations (0.1 M, 0.5 M, 1 M, 1.5 M, 2 M, and 3 M) on the biofilm formation characteristics of *Salmonella* Typhimurium wild-type and its *ompC* gene mutant strain was investigated. Our findings indicate that the mutant strain exhibited significantly reduced biofilm production compared to the wild-type strain in salt-free LB medium ($p < 0.05$). The most intriguing observation was the rapid increase in biofilm production by both strains at 24 hours under 0.5 M NaCl, followed by a logarithmic decrease in subsequent hours. As salt concentration increased in the medium, biofilm formation gradually declined, ceasing completely by 72 hours. Examination of biofilm morphotypes of wild-type and $\Delta ompC$ strains under these NaCl concentrations revealed that both strains exhibited the RDAR morphotype in the salt-free LB control experiment. Under 0.1 M NaCl, both strains displayed the PDAR morphotype. At 0.5 M NaCl, the wild-type strain displayed the PDAR-SAW intermediate morphotype, while the $\Delta ompC$ strain exhibited the SAW morphotype. Both strains showed the SAW morphotype under 1 M NaCl. This study shows that salt concentration is an important factor for *Salmonella* biofilm formation and salt stress may be a potential method for biofilm eradication studies.

Keywords: Biofilm, *ompC*, Outer Membrane Protein, *Salmonella*, Salt Stress.

ANTIMICROBIAL POTENTIAL OF BACTERIA FROM THE MICROALGAE PHYCOSPHERE

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ABSTRACT

Microalgae are autotrophic microorganisms that can live in marine, soil, and freshwater ecosystems and can produce organic matter from inorganic matter through photosynthesis. Compared to other microorganisms, algae can be seen as potential candidates in many fields because they are easy to produce in large quantities and have a relatively short life cycle. Algae are used in the food, cosmetics, and pharmaceutical industries and are considered an important biofuel source. In addition, algae can be used in wastewater treatment, phosphate, nitrogen, carbon removal, and removal of heavy metals. Today, carotenoids, phycobilins, fatty acids, sterols, polyhydroxyalkonates, polysaccharides, and many other valuable products are obtained from microalgae. Some bacterial species live attached to the surface of microalgae. This microenvironment around algal cells is called the phycosphere, and this population plays an essential role in algal growth. The phycosphere can influence many biological processes of algae, such as nutrition, growth, metabolism, and disease resistance. Therefore, a healthy and balanced functioning of the phycosphere is important for algal cultivation and biological processes. In addition, the algal microhabitat is also very important for the discovery of many new bioactive compounds. One of the most critical groups among these compounds is antimicrobial substances. The phycosphere flora may harbor potential candidates for discovering new bioactive substances against antimicrobial resistance, one of today's biggest problems and becoming increasingly dangerous. Further studies are needed to understand the phycosphere of microalgae better. It should also be noted that growing microalgae in the laboratory is extremely difficult without preserving their phycosphere flora. Therefore, it is essential to increase the number of studies that explore the phycosphere dynamics to obtain bioactive compounds from microalgae or use these organisms for different purposes. Our study, which is planned to draw attention to this issue, is based on a comprehensive literature review and aims to reveal the potential of these organisms to solve the antimicrobial resistance problem by emphasizing the antimicrobial compounds of microalgae phycosphere flora discovered so far.

Keywords: Antimicrobial activity, microalgae, phycosphere flora

STUDIES ON PHOTOCATALYTIC DEGRADATION OF ANIONIC AND CATIONIC DYES VIA ANTIMONY TRIOXIDE

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ABSTRACT

Today, water pollution is one of the primary ecological threats for many countries across the globe as a result of population growth and continuous industrialization expansion. A strong emphasis is placed on developing sustainable, eco-friendly technologies to comply with strict environmental regulations. Application of existing conventional methods has limited success in treating the recalcitrant nature of industrial wastewater from dye-based effluents. Semiconductor photocatalysis is an advanced oxidation process that addresses water pollution challenges as a potential treatment method. Antimony trioxide (Sb_2O_3) is an attractive semiconductor photocatalyst with high chemical stability, non-toxic and low-cost properties. The morphological and structural properties of Sb_2O_3 were characterized by SEM, FTIR, and Raman spectroscopy. SEM images indicated various polyhedral-like structures with spherical shapes. Methylene blue (MB) is a conjugated aromatic-based cationic dye while Reactive Red 194 (RR-194) is an anionic dye with an azo group. RR-194 and MB were selected as model pollutants to evaluate the photocatalytic efficiency of Sb_2O_3 under UV light and solar-simulated light irradiation. It was observed that the performance of the photocatalytic system under solar-simulated light irradiation was better than that under UV light irradiation.

Keywords: Antimony trioxide, azo dye, decolorization, methylene blue, photocatalysis, Reactive Red-194.

THE ROLE OF POLYMERIC NANOMATERIALS IN DRUG DESIGN

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ABSTRACT

Polymer technology is increasing in importance today. Studies show that polymer materials will make human life easier in the future. Studies are also being carried out in this direction in the biomedical field. There are developments in the use of such materials, especially in methods developed for the diagnosis and treatment of cancer. It is possible to make the smart drug method used in cancer treatment more functional thanks to nanomaterials.

Biocompatible and stable polymeric nanomaterials have become a unique tool for clinical and biomedical purposes. They are called smart polymers. The fact that their surfaces can be chemically and physically functionalized makes them excellent for drug targeting studies. In addition, their biocompatibility and biodegradability make them more advantageous than other metallic nanoparticles in terms of toxicity in clinical studies. In this review, the functions of polymeric nanoparticles in specially designed cancer drugs will be discussed. Information on the redox-responsive, enzyme-responsive, thermo-responsive, light-responsive, and pH-responsive properties of such polymers in drug delivery and targeting systems in smart drug production will be given and current studies in the literature will be briefly mentioned. In addition, a summary of the natural or synthetic polymers will be presented. For example, the pharmaceutical industry uses natural polymers such as collagen, heparin, chitosan, and dextrose. However, for smart drug design purposes, synthetic polymers such as poly(vinylimidazole), polyethylene glycol, poly(caprolactone) and poly(ethylloxazoline), are more favorable because of their functionalizability and modifiability properties.

Keywords: Drug design, polymeric nanomaterials, cancer treatment, smart polymers.

MULTI-OMICS DATA MINING IN PLANT SCIENCE: FAR1 GENE FAMILY IN *P. VULGARIS*

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ABSTRACT

Far-red impaired response 1 (*FAR1*) gene family play a crucial role in controlling growth and developmental stages of the plants. Using bioinformatics tools, *FAR1* gene family has been studied in many plant species except for *P. vulgaris* (common bean) so far. In this study, genome-wide identification and characterization of *FAR1* gene family have been performed in common bean. In silico analyzes of gene structures, chromosomal positions, protein properties, phylogenetic relationships, cis-elements and many other characteristics of *FAR1* members have been performed. Followingly, 26 *FAR1* genes have been identified and they were found to be categorized into three groups according to the phylogenetic analysis. The data of synonymous (Ks) and non-synonymous (Ka) substitution rates, phylogenetic relationships, and synteny analysis of the *FAR1* gene family has provided important insights into the polyploidization, evolution, and domestication of *FAR1* genes between *P. vulgaris* and some other plant species including *A. thaliana*, and *G. max*. Transcriptome analysis revealed tissue-specific expression pattern of *FAR1* genes in *P. vulgaris*. Also, some of the *FAR1* genes were found to either up- or down-regulated in response to salt and drought stress conditions in the leaves of *P. vulgaris* suggesting the potential role of this family in plant defence responses. To sum up, the results obtained from this study might be useful for other researchers to understand molecular mechanisms underlying evolution and role of *FAR1* genes in *P. vulgaris*.

Keywords: *Phaseolus vulgaris*, FAR1, RNAseq, Abiotic Stress, Multi-Omics Data Mining, Bioinformatics

**THE ROLE OF GLUTAMATE RECEPTOR-MEDIATED NITRIC OXIDE
PRODUCTION IN MITOCHONDRIAL STRESS RESPONSE IN *ARABIDOPSIS
THALIANA***

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ABSTRACT

Glutamate receptors (GLRs), similar to ionotropic glutamate receptors (iGluRs) in mammals, play key roles in cognitive processes such as memory and learning, as well as in the pathology of depression and psychosis, and the development of neurodegenerative diseases like Alzheimer's (AD) and Parkinson's (PD). Recent studies in humans have shown that glutamate receptors (NMDAR) in the brain cell membrane facilitate increased Ca²⁺ influx, leading to the accumulation of nitric oxide (NO). Elevated NO levels in cells have been linked to neurodegenerative diseases. Interestingly, plants also possess GLRs similar to animal iGluRs, with significant sequence homology observed between Arabidopsis GLRs and their animal counterparts. However, it remains unclear whether this pathway, which is present in mammals, also exists in plants. In this study, rotenone, a complex I inhibitor, was applied to *A. thaliana* wild type Col. and GLR3.4 mutants (*atglr3.4.1* and *atglr3.4.2*) to induce mitochondrial stress. Changes in NO levels, NOS (nitric oxide synthase) activity, and the expression of several mitochondria-related genes (UPOX: upregulated by oxidative stress; UCP: uncoupling protein; AOX: alternative oxidase; CI76: 76 kDa subunit of complex I; SHD2-1: succinate dehydrogenase 2-1 in complex II; COX5b: 5b subunit of cytochrome c oxidase (complex IV); COX6b: 6b subunit of complex IV) were analyzed. The results demonstrated that a decrease in intracellular Ca²⁺ levels reduced NOS activity, leading to lower NO production. Furthermore, the observed increase in NO levels and the expression of mitochondrial stress genes suggest that the AtGLR3.4 receptor plays a significant role in mitochondrial stress responses.

Keywords: Arabidopsis thaliana, Glutamate Receptors, Nitric Oxide, Neurodegenerative Diseases, Mitochondria

OMICS-ASSISTED CHARACTERIZATION AND EXPRESSION ANALYSIS OF THE ALFIN-LIKE GENES IN PHASEOLUS VULGARIS L

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ABSTRACT

Members of the Alfin-like (AL) transcription factor family are crucial in plant responses to abiotic stress, influencing various metabolic and physiological processes. These transcription factors feature a highly conserved DUF3594 domain and a PHD finger motif. In this study, bioinformatics tools were used to identify 10 Alfin proteins, and their biochemical and physicochemical properties were analyzed. PvAL proteins were found to be between 240 and 258 amino acids in length, with molecular weights ranging from 24.71 to 29.30 kDa. The instability index values of all PvAL members were determined to be above 40. Phylogenetic analysis revealed that PvAL genes are divided into three main phylogenetic groups. Duplication analysis identified a total of six segmental duplication events and one tandem duplication event. Conserved motif, gene structure, and phylogeny analyses yielded consistent results. For instance, genes sharing the same motif type and number exhibited similar gene structures and they were also grouped under the same branch in the phylogenetic tree. Additionally, PvAL genes showed varying expression levels across different plant tissues, and miRNA analysis revealed that some stress-related miRNAs target PvAL genes. Cis-element analysis indicated that PvAL genes are involved in a wide range of functions, including tissue-specific, stress-responsive, and hormone-responsive expression. Furthermore, RNAseq data was utilized to conduct a comparative expression analysis of Alfin genes. Various expression levels of PvAL genes were detected under salt and drought stress. While Alfin proteins have been identified and characterized in many plant species so far, this study is the first to conduct a genome-wide identification and characterization of Alfin proteins in the *Phaseolus vulgaris* genome. Consequently, the results obtained can serve as a foundation for future research studies.

Keywords: AL transcription factor; common bean; evolutionary analyses; expression patterns; genome-wide characterization

REVEALING THE FUNCTIONALLY IMPORTANT RESIDUES FROM THE THREE DIMENSIONAL STRUCTURE DATA OF PROTEINS

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ABSTRACT

The fatty-acid-binding proteins (FABPs) transport fatty acids and other lipophilic substances. Brain fatty acid-binding protein (B-FABP, also FABP7) is expressed in levels in correlation to neuronal differentiation during brain development. In this study, the aim is to reveal the topologically important residues in the B-FABP using only the alpha Carbon coordinates in its PDB structure data (accession numbers of 1fe3 and 1fdq and compare their identities with functionally important residues found in UNIPROT and literature. The new topological method employed by constructing adjacent tetrahedra from the alpha Carbon nodes using Delaunay triangulation and filtering the residues that protrude on the surface on the structure, called herein the sharp residues. When the sharp residues were checked for being functionally important residues or not, specificity was found to be high: 0.90. Out of the 42 residues that were not predicted to have variants implied in a disease (UNIPROT accession code: O15540) 38 were not found to be sharp residues. Computational methods aim to reduce the number of experiments that require many resources. The high specificity found with the new method proposed points that the method may be useful in serving this purpose.

Keywords: Delaunay triangulation, sharp residues, UNIPROT variants

THE EFFECT OF E3 LIGASE ATPUB18 IN NO SIGNALIZATION ON ABA-INDUCED STOMATAL CLOSURE

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ABSTRACT

The Ubiquitin/26S proteasome system (UPS) is a critical protein modification system involved in various cellular pathways such as biotic/abiotic stress responses, cell cycle progression, hormone signaling, aging, and the circadian clock in plants. It recognizes, degrades, and eliminates misfolded or damaged proteins resulting from stress. Therefore, this system plays a crucial role in plant defense and adaptation to environmental stresses. E3 ligases are one of the enzymes involved in the UPS pathway. Plant E3 ligases are categorized into four families, one of which, the PUB family, functions as an E3 ligase and has been identified in various plant species, with studies investigating its role in stress responses. Moreover, E3 ligase AtPUB18 has been found to function as a negative regulator in abscisic acid (ABA)-induced stomatal closure, a key response to drought stress. As is well known, ABA application stimulates NADPH oxidase (NOX), leading to the production of reactive oxygen species (ROS), such as H₂O₂, followed by nitric oxide (NO) production. In this process, NO acts as a negative regulator of ABA signaling. However, it remains unclear whether AtPUB18 plays a role in NO-mediated signaling triggered by ABA. To address this, ABA and sodium nitroprusside (SNP), a NO donor, were applied to *Arabidopsis thaliana* wild-type Columbia and the AtPUB18 mutant to determine the effects of the AtPUB18 E3 ligase on ABA-induced stomatal closure and NO signaling in this process. To assess the role of AtPUB18 in this signaling pathway, several physiological [changes in relative water content (RWC), leaf water loss as an indicator of stomatal conductance] and biochemical parameters [NOX activity, levels of ROS (H₂O₂ and O₂ .), NO content, and GSNOR activity] were measured. The results indicated that AtPUB18 plays a significant role in ABA-induced stomatal closure and NO signaling.

Keywords: *Arabidopsis thaliana*, ABA, AtPUB18, NO, U-BOX E3 Ubiquitin Ligases

IN SILICO ANALYSIS OF ABIOTIC STRESS RESILIENCE: UNVEILING KEY PLANT PLATZ GENES IN *PHASEOLUS VULGARIS* L.

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ABSTRACT

Plant AT-rich sequence and zinc-binding (PLATZ) proteins belong to a novel class of plant-specific zinc-finger-dependent DNA-binding proteins that play essential roles in plant growth and development and abiotic stress responses. While the *PLATZ* (*PvPLATZ*) gene family has been identified in various species, a comprehensive identification and characterization of this gene family in *Phaseolus vulgaris* L., a nutritionally significant edible crop, has not yet been performed. In this study, using a range of bioinformatics and in-silico analyses, 15 *PvPLATZ* genes were identified in the *P. vulgaris* genome. In silico analyses of gene structures, protein properties, phylogenetic relationships, and various other characteristics of *PvPLATZ* members were conducted. The molecular weights of putative *PvPLATZ* proteins ranged from 21.99 to 28.46 kDa and the intron numbers of *PvPLATZ* genes ranged from 2 to 3. The physical locations of *PvPLATZ* genes were further examined to reveal their distribution across different chromosomes. In addition to structural characterization, we conducted promoter region analysis to predict potential cis-regulatory elements involved in stress response and gene expression regulation. Phylogenetic analysis revealed the evolutionary relationships between *P. vulgaris* *PvPLATZ* genes and those in other plant species, highlighting conserved and unique features. Furthermore, miRNA target analysis identified potential miRNAs that may regulate *PvPLATZ* gene expression, suggesting a post-transcriptional regulatory layer. Gene ontology (GO) analysis provided a comprehensive overview of the predicted biological processes, molecular functions, and cellular components associated with the identified *PvPLATZ* genes. In addition, RNA-seq data was utilized to carry out a comparative expression analysis of *PvPLATZ* genes. According to RNA-seq analysis, all genes were up- or down-regulated except for *PvPLATZ-8* and *PvPLATZ-13* after salt and drought stress treatment of *P. vulgaris*. Overall, the results indicated that certain *PvPLATZ* genes may play significant roles in abiotic stress responses in *P. vulgaris*. This study lays the foundation for future research aimed at elucidating the molecular mechanisms underlying *PvPLATZ*-mediated stress responses and developing stress-resilient crop varieties.

Key Words: *Phaseolus vulgaris* L., salt stress, drought stress, bioinformatics, RNA-seq, plant yield

RISK FACTORS FOR THE EFFICIENCY OF ARTIFICIAL INSEMINATION IN DAIRY COWS

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ABSTRACT

The main objective of this study is to investigate some factors responsible for the failures of AI. The study, was conducted in the region of Tizi-Ouzou from September 2023 to June 2024 and is divided into two parts. The first part focused on a retrospective study by analyzing artificial insemination results to assess reproductive outcomes and draw conclusions about fertility in the study region. In total, 188 cows were included in this study. Regarding fertility parameters, the success rate in first insemination was 31.9%, with 51% of cows requiring more than three inseminations, and a fertility index of 2.7. As for fecundity, the interval between two calvings (IV-V) was 423 days, the interval between calving and first insemination (IV-IA1) was 102 days, the reproduction period (IA1-IAF) was 42 days, resulting in an interval between calving and successful insemination (IV-IAF) of 144 days. These results confirm that reproductive parameters are divergent from recommended norms. The second part focused on studying specific risk factors responsible for artificial insemination failures through the measurement of certain biochemical markers. Blood samples were taken just before artificial insemination to measure progesterone and various metabolites: glucose, cholesterol, beta-hydroxybutyrate (BHB), total proteins, triglycerides, cortisol, and C-reactive protein (CRP). Descriptive analysis of the data revealed the following: 20% of cows were inseminated during the luteal phase, 20% had a negative energy balance, with 20% of those experiencing subclinical ketosis, 20% had hypercortisolism, 40% had hypertriglyceridemia indicative of lipomobilization, and 15% had elevated CRP levels. Based on these results, we can confirm that improper timing of insemination relative to heat cycles, negative energy balance, stress, and certain inflammatory processes partly contribute to insemination failures, despite the multiple risk factors involved.

Keywords: Artificial insemination, fertility, fecundity, progesterone, heat cycles, failures, risk factors, metabolites.

STUDY OF THE RELATIONSHIP BETWEEN THE RESUMPTION OF POSTPARTUM OVARIAN CYCLICITY AND CERTAIN NUTRITIONAL CRITERIA IN DAIRY COWS

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ABSTRACT

In dairy cows, calving is a crucial and delicate period to manage in breeding. It is recognized that cows undergo parturition stress, thus amplifying the negative energy balance (NEB). Metabolic stress in early lactation is known to cause ovarian dysfunction and would therefore have a negative effect on reproduction. These negative effects could possibly be due to all the energy that is directed towards milk production. The concept of prioritization of energy and other nutrients, also known as homeorhesis (or teleoforesis), has been described and has laid the foundations for the study of NEB using different methods, namely body condition score (BCS), plasma metabolites, enzymes or hormones. Recently, there have been reports on the relationships between the resumption of postpartum ovarian cyclicity and nutritional criteria, such as BCS and several plasma metabolites. The objective of the study is to explore the relationships between body condition (NEC), concentrations of certain plasma metabolites, and reproductive performance of Montbéliarde cows in Algeria. The study was conducted in two private dairy farms located in the wilaya of Tizi-Ouzou. Blood samples were collected from 50 Montbéliarde dairy cows at 2, 4, 6 and 8 weeks postpartum to measure non-esterified fatty acids (NEFA), β -hydroxybutyrate (BHBA), glucose, total cholesterol, urea, total protein, aspartate aminotransferase (AST), alanine aminotransferase (ALT), γ -glutamyltransferase (γ GT), calcium, magnesium (Mg), potassium (K), phosphorus (P), sodium (Na) and progesterone (P4). Body condition score (BCS) was estimated at calving and at the time of blood sampling. Postpartum cyclicity recovery was assessed by measuring progesterone levels (≥ 1 ng/ml) at weeks 4, 6, and 8 postpartum. Statistical analyses were performed by SAS (version 9.1.3, SAS Institute Inc., Cary, NC). A descriptive analysis of biochemical and reproductive data was the first statistical approach to the results by calculating frequencies, means, standard deviations (SDs), and threshold errors of the mean (SEMs) for each farm. Differences in mean metabolite values between experimental groups (farm A vs. farm B) were performed using the t-test (SAS t-test), with a significant difference considered at the threshold of $P < 0.05$. Statistical analysis of the data was performed using one-way ANOVA. Correlations between variables (all blood parameters involved as well as BCS) were analyzed using Pearson correlation coefficients with the SAS "proc Corr" procedure. The effect of plasma metabolites at each week on the probability of pregnancy at first insemination (P/IA) and the return to postpartum activity (RAO) was evaluated using a multivariable mixed model (PROC GENMOD). Increased BHBA, NEFA and glucose levels were associated with lower probability of resumption of ovarian activity (ROA) and pregnancy at first insemination (P/1-AI). However, plasma cholesterol, AST, ALT, TG and total protein concentrations were positively associated with ROA. In addition, increased BHBA and sodium were associated with increased time to conception, whereas decreased Mg concentrations were associated with increased calving-first insemination interval. No significant effect was observed between NEC at calving or NEC loss and P/1-AI.

Our study suggests the possibility of routinely using biochemical energy profiles for health monitoring of dairy herds. Biochemical assessments should be systematic, especially before AI. Blood glucose is of highly contested utility in assessing energy status. In contrast, ketone bodies and NEFA are good indicators. NEFA reflect instantaneous energy balance, while ketone bodies refer to cumulative energy balance. These results indicate that a balanced diet and good reproductive management can improve reproductive performance.

Keywords: dairy cow, postpartum, ovarian cyclicity, energy balance, nutritional criteria, reproductive performance

IN SILICO INVESTIGATION INVOLVING GOLD AND SILVER NANOPARTICLES WITH B-AESKIN AGAINST COVID-19 VARIANTS

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ABSTRACT

The ongoing evolution of SARS-CoV-2 variants poses a formidable challenge to global health, necessitating innovative and multifaceted therapeutic approaches. This study adopts a synergistic strategy by combining the antiviral properties of B-aescin, a natural biomolecule, with the unique capabilities of gold and silver nanoparticles. B-aescin, derived from horse chestnut seeds, has demonstrated promising antiviral activity against related coronaviruses, while nanoparticles offer targeted delivery and enhanced stability of therapeutic agents. Through integrated computational analyses, employing techniques such as molecular docking, molecular dynamics simulations, and quantum mechanical calculations, we investigate the efficacy of this dual approach against COVID-19 variants, including Alpha, Beta, Gamma, Delta, and Omicron. Our analysis focuses on elucidating the synergistic interactions between B-aescin and nanoparticles, as well as their collective effects on variant-specific viral targets. Our results demonstrate enhanced antiviral activity and target specificity when B-aescin is combined with gold and silver nanoparticles, compared to individual treatments. Furthermore, we explore the influence of nanoparticle properties, such as size, shape, and surface functionalization, on the synergistic effects observed. These findings provide valuable insights into the development of synergistic antiviral strategies for combating the diverse spectrum of SARS-CoV-2 variants and highlight the potential of combining natural compounds with nanotechnology for therapeutic intervention.

Keywords: SARS-CoV-2, COVID-19, Variants, Antiviral, Biomolecules, Molecular dynamics.

EFFECTS OF INFESTATION BY THE PARASITE VARROA DESTRUCTOR ON THE EMERGENCE WEIGHT OF WORKERS, AND LIFESPAN DIFFERENCES BETWEEN SENSITIVE AND RESISTANT HONEY BEE (APIS MELLIFERA) COLONIES

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ABSTRACT

The ectoparasite varroa destructor is the main threat responsible for the collapse of bee colonies. Thus, several methods of combating this mite exist, but they are not sustainable. Hence the importance of naturally resistant colonies. Several resistance mechanisms have been developed by the bee. In Algeria, strains of Tellian bees (*Apis mellifera intermissa*) are naturally resistant to varroa by exhibiting more pronounced delousing behavior than in susceptible bees.

The objective of this study is to highlight possible physiological mechanisms involved in this resistance. We therefore chose parameters that were significantly impacted by varroa infestation in susceptible colonies. We measured the weight of the bees at emergence as well as their lifespan. To do this, our sample is divided into two groups: non-infested workers (control) and workers infested by varroa during their embryonic development. Bees come from sensitive colonies and resistant colonies. Concerning the weight of the workers at emergence, we noted a significant difference ($p < 0.05$) between the two groups: $102,451 \pm 0.57$ mg for the non-infested bees and $91,987 \pm 0.55$ mg for the infested bees from the resistant colonies. Likewise, $110,539 \pm 0.65$ mg for non-infested bees and $95,968 \pm 0.76$ mg for infested bees from susceptible colonies. We also see a significant difference between uninfested workers from susceptible colonies and uninfested workers from resistant colonies. This leads us to the hypothesis that varroa is attracted much more by heavier individuals and therefore richer in fatty substances. We found a very highly significant difference ($p < 0.001$) in lifespan between susceptible and resistant workers. The average survival is $31,094 \pm 0.60$ days for resistant colonies and $23,470 \pm 0.50$ days for sensitive colonies. According to the results obtained so far, the infestation of bees by varroa presents a negative effect on their weight development during their embryonic life, not only in susceptible colonies, but also in those that are resistant. Interestingly, resistant workers live significantly longer than susceptible bees.

Further research is underway to understand the physiological mechanisms linked to resistance to the ectoparasite varroa destructor.

Keywords: *Apis mellifera intermissa*, Varroa destructor, resistance, emergence weight, lifespan.

OCCUPATIONAL EXPOSURE TO CHEMICAL AND RADIOLOGICAL HAZARDS IN HEALTHCARE WORKERS IN PUBLIC HEALTH FACILITIES, TLEMCCEN, ALGERIA

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ABSTRACT

Healthcare workers are exposed on a regular basis to a multitude of dangerous agents. The objective of our cross-sectional descriptive study undertaken from December 2023 to March 2024 was to determine the chemical and radiological risks to which healthcare workers in public health facilities in the city of Tlemcen are exposed and to describe the effects of this exposure. Results: of the 144 participants, 79.2% were women with an F/M sex ratio of 3.8. The average age was 33.06 ± 7.089 years. Approximately 30% of the staff were medical, 65.2% paramedical and 5% were maintenance and cleaning workers. 14.6% of them were exposed to cytotoxics, 32.64% to anesthetic gases, 25.17% to solvents and 29.86% to ionizing radiation. The most reported symptoms were hair loss (69.2%), fatigue (74.4%), dermatological signs 19.3% and endocrine disorders 37.2% for these different exposures respectively. The use of suitable individual and collective protective equipments was not always respected due to their unavailability and a lack of knowledge. Only 38.35% worked under the hood. None of the participants reported having received training on chemical and radiological risks specifically in a hospital setting; their information is often provided by self-study. Conclusion: These data highlight the importance of implementing strong medical-analytical collaboration and effective measures to protect healthcare workers.

Keywords: Chemical risk, radiological risk, occupational exposure, healthcare workers, public health facilities, means of protection.

ASSESSMENT OF THE LEVEL OF CARBON MONOXIDE IN EXHALED AIR AMONG WORKERS AT GASOLINE STATIONS IN ALGERIA.

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ABSTRACT

The risk of occupational exposure to chemical agents such as hydrocarbons and gases in employees of gasoline stations may endanger their health and/or their safety. The objective of our cross-sectional descriptive study, which was undertaken from September 2023 to July 2024, was to determine the concentrations of carbon monoxide (CO) in exhaled air by a COoximeter that also gives the values of carboxyhemoglobin (COHb) and to describe the effects of chemical exposure in employees of gasoline stations in the city of Tlemcen, Algeria. Results: All 49 participants in our study were male. The mean age was 43.02 ± 9.146 years. About 88% of them were gas pump operators, 10% were team leaders and 2% were accountants. 22.4% thought they were exposed to hydrocarbons, 12.2% to gases and 63.3% to both. 57% were smokers. 88% reported clinical symptoms of which 28% were skin disorders, 37% neurological symptoms and fatigue was reported by 28.5%. The mean CO in expired air was 10.20 ± 8.27 ppm and the mean COHb (%) was 2.26 ± 1.32 . These values were higher in smokers but with no significant difference. Only 46% of employees wore protective clothing and 22% were trained on the risks of chemical exposure. Conclusion : These data underscore the importance of biomonitoring, air metrology oin gasoline stations and training on protection.

Keywords: Carbon monoxide, gasoline station, carboxyhemoglobin, Co-oximeter, Occupational exposure.

RESVERATROL LOADED MICELLES WITH EFFECT ON EXPLORATORY BEHAVIOR AND BRAIN MONOAMINES IN RATS WITH SCOPOLAMINE INDUCED DEMENTIA

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ABSTRACT

The aim of this study was to evaluate the potential of resveratrol loaded in nanosized micelles (mRVT) as a platform for neuronal delivery. To achieve this, the effects of micellar and pure resveratrol (RVT) were evaluated and compared in terms of spatial working memory, anxiety-like behavior, and monoaminergic brain systems in rats with scopolamine (Sco) induced dementia. The micelles were based on biocompatible copolymers Pluronic P123 and Pluronic F127. The size of the micelles was approximately 33 nm indicating opportunity for their blood-brain barrier penetration. Male Wistar rats (200-250g) were randomly divided into Control (0,9% NaCl) group; Sco (2 mg/kg) group and four groups with simultaneous administration of Sco and RVT or mRVT in two different doses (5 and 10 mg/kg). All treatments were via intraperitoneal injections. Resveratrol (pure and in micelle) were injected one hour before Sco for 11 consecutive days. On the 12th day of treatment the animals were subject of T maze and Hole board behavioral tests. For biochemical analysis, the rats were euthanized, their brains removed, and cortex and hippocampus dissected. Our result revealed better protective effect of resveratrol loaded in micelles against Sco-induced impairment of spatial working memory in rats compared to the pure drug. The hole board test and biochemical assays stand out the micellar RVT at a dose of 10 mg/kg with a better anxiety reduction ability of the animals and significantly preserving effect on noradrenaline and serotonin brain content. In conclusion, the more significant effect of mRVT indicates improved biological activity and highlights the potential of the micellar system as a brain delivery platform.

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PLURONIC P123 AND PLURONIC F127 COPOLYMER MICELLES LOADED WITH RESVERATROL PROTECT AGAINST APOPTOSIS IN AN IN VIVO EXPERIMENTAL MODEL OF DEMENTIA.

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ABSTRACT

A growing number of studies identify the usefulness of resveratrol (RVT) in Alzheimer's disease treatment, but its low bioavailability remains a significant limitation. Our previous data showed that in a model of experimental dementia in rats, RVT encapsulated in Pluronic micelles (mRVT) exerted better memory protective effect compared to the pure drug. This study aimed to explore the underlying mechanisms of the memory protective effect of Pluronic micelles loaded with resveratrol in a rats with scopolamine (Sco) induced memory impairment. The micelles were based on the biocompatible copolymers Pluronic P123 and F127. In vivo experimental model of dementia was produced via intraperitoneal injection of Sco (2 mg/kg) for 11 consecutive days. Male Wistar rats were randomly divided into six groups: I Control, II Sco, III Sco+RVT 5 mg/kg, IV Sco+RVT 10 mg/kg, V Sco+mRVT 5 mg/kg and group VI Sco+mRVT 10 mg/kg. RVT and mRVT were administrated 1 hour before the Sco. In the end of the treatment the animals were euthanized and their brains were removed. The levels of phosphor-cAMP-response-element-binding protein (pCREB), B-cell lymphoma 2 (Bcl2) and Bcl-2-associated X protein (BAX) in the cortex and hippocampus were measurement via ELISA methods. Our results demonstrated that both RVT and mRVT treatments possess anti-apoptotic effects and possibility to restore the Sco-suppressed phosphorylation levels of CREB. Notably, the mRVT at a dose of 10 mg/kg demonstrated the strongest pCREB stimulation effect and anti-apoptotic activity. Furthermore, the Bcl-2/BAX ratio in this group was increased more than 5 times in cortex and more than 6 times in hippocampus compared to Sco treated animals. In conclusion, our results demonstrated better anti-apoptotic effect of mRVT treatment, compared to the pure drug, and provided evidence for the pCREB involvement in this process. Funding: This research was funded by NATIONAL SCIENCE FUND - BULGARIA, Grant number KP-06-N 73/10

Keywords: resveratrol, micelles, scopolamine, rats

CORIANDRUM SATIVUM IN WINE AROMATIZATION IN BULGARIA

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ABSTRACT

Coriander (*Coriandrum sativum* L.) is an annual plant in the family Apiaceae. The valuable spice is widely used in different cuisines and traditional medicine. Due to its chemical composition, coriander is under the scientific scope, for its benefits for the human metabolic health such as: diuretic effect, antioxidant activity, antidiabetic properties and protective effects on different systems in the human body (central nervous, gastrointestinal and cardiovascular). Coriander is not widely used in Bulgarian traditional medicine, but one traditional usage of *Coriandrum sativum* seeds, traditional for Bulgaria and other European countries, is for aromatization of Artemisia- based wines. Coriander has been a part from the ancient Egyptian pharmacopeia, used in medicinal wines as well, together with a wide range of other medicinal and aromatic plants. Obtained results from the literature review for Bulgarian aromatized wines are compared to data on similar beverages from Europe; Coriander is typical for Bulgarian and Italian aromatized beverages, where it is the main spice used, whereas in Serbia, seeds from *Pimpinella aromatica* are preferred. A regional traditional usage of *Coriandrum sativum* is presented, where the seeds are widely used by the local artisans of aromatized wine, in large quantities. Coriander is essential part of the preparation of the beverage in Bulgaria and is the main spice ingredient in the recipes, recognized by the producers for its aroma.

THE EFEKT OF CULTIVATION TECHNOLOGIES ON THE GRAIN YIELD AND QUALITY OF DURUM WINTER WHEAT

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ABSTRACT

Durum wheat *Triticum turgidum* L. subsp. durum (Desf.) van Slageren is an economically important cereal crop and the second most produced *Triticum* of the World. In Latvia durum wheat does not belong to the traditionally cultivated plant species, but with the influence of climate change and augmented demand for food supply, there is a need to increase durum wheat production in Baltic region. The yield of the durum winter wheat grains is determined the genetic potential of the variety, by annual meteorological conditions, and also the selected cultivation technologies. Durum wheat is more demanding of favourable growing conditions than bread wheat (*Triticum aestivum* L.). The impact of cultivation technologies on winter durum wheat variety 'Winter Gold' (seeding rate 500, 600, 700 seed m⁻² and N150 and N170 top-dressing) was studied at the Institute of Agricultural Resources and Economics, Stende's Research Centre during 2022 - 2024. The obtained results confirmed that the durum winter wheat variety 'Winter Gold' winter hardiness was rated with 5-7 points (1 - low). In 2023 the average grain yield of the variety 'Winter Gold' was obtained 5.56 t ha⁻¹. The significant higher yield ($p > 0.05$) 6.08 t ha⁻¹ and the highest volume weight 80.11 kg L⁻¹ showed the variant with the sowing rate 600 seeds m⁻² and nitrogen fertilizer N170. The protein content in grains varied from 128.0 g kg⁻¹ to 132.9 g kg⁻¹, on average 130.0 g kg⁻¹. In 2024 average grain yield of the variety 'Winter Gold' was obtained 8.58 t ha⁻¹. The significant highest yield ($p > 0.05$) showed variant 700 seeds m⁻² and nitrogen fertilizer N150 (8.97 tha⁻¹). The protein content in grains varied from 117.7 g kg⁻¹ to 136.3 g kg⁻¹, on average 124.6 g kg⁻¹. Grain quality of winter durum variety 'Winter Gold' in both years was corresponding to the food grain standards.

Keywords: Winter durum wheat, seeding rate, N top-dressing

EVALUATING QUALITY STANDARDS IN DURUM WHEAT AND SEMOLINA PRODUCTION: A CASE STUDY OF ZIBAN MILLS

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ABSTRACT

The goal of national cereal production is self-sufficiency, but the quality of the products should not be overlooked or ignored by producers. It is essential to present a product on the market that meets satisfactory nutritional, organoleptic, and hygienic standards. To achieve this, several studied and agreed-upon criteria must be followed. Like all food products, durum wheat and semolina have specific international and national standards that must be met. The objective of this study is to evaluate the quality of wheat and semolina at the ZIBAN Mills, from the moment the durum wheat is received until the products reach the seller, ensuring at each stage that the appropriate standards are applied in every aspect of production. Observation of the wheat transformation process revealed that the company has successfully obtained ISO certifications and continues to pursue additional certifications. The company is consistently striving to meet hygiene, safety, and quality standards. Physico-chemical analyses of the durum wheat and semolina received showed significantly distinct and acceptable results in terms of moisture content and specific weight (PS). The moisture content of the grains before the first milling stage (B1) indicated that the conditioning of the grains was carried out correctly, while the moisture content of the semolina was found to be significantly distinct, unstable, and, in some cases, below the mill's standard. The ash content in the grains and semolina was low, indicating the purity of the derived products. The particle size distribution of the semolina was found to be acceptable, although the gluten content was slightly below the standard

Keywords: Durum wheat, Semolina production, Quality standards, ISO certification, Moisture content, Ash content, Gluten content.

NASAL TREATMENT TARGETING SARS-COV-2 VARIANTS IN THE AGE OF VACCINES

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ABSTRACT

The emergence of SARS-CoV-2 variants continues to challenge global healthcare systems, urging the exploration of innovative therapeutic modalities. This study proposes a novel nasal treatment approach leveraging the antiviral properties of B-escin, a natural compound, in conjunction with gold and silver nanoparticles. B-escin, extracted from horse chestnut seeds, exhibits notable efficacy against coronaviruses, while nanoparticles offer advantageous features for targeted delivery and stability enhancement. Through integrated computational analyses encompassing molecular docking, molecular dynamics simulations, and quantum mechanical calculations, we assess the potential of this combined strategy against prevalent COVID-19 variants, including Alpha, Beta, Gamma, Delta, and Omicron. Specifically tailored for nasal administration, our investigation emphasizes the synergistic interactions between B-escin and nanoparticles, elucidating their collective impact on variant-specific viral targets within the nasal mucosa. Computational results indicate augmented antiviral activity and target specificity when combining B-escin with gold and silver nanoparticles, surpassing individual treatment efficacy. Moreover, we investigate the influence of nanoparticle characteristics, such as size, morphology, and surface functionalization, on the observed synergistic effects. These findings underscore the promise of developing a nasal treatment utilizing natural compounds and nanotechnology, offering a potential frontline defense against the diverse spectrum of SARS-CoV-2 variants.

Keywords: SARS-CoV-2, COVID-19, Nasal Treatment, B-escin, Nanoparticles, Antiviral, Computational Analysis, Variant-Specific Targets.

APPLICATION OF SACCHAROMYCES CEREVISIAE 31 AND METSCHNIKOWIA PULCHERRIMA 62, ISOLATED FROM ALBANIAN VINEYARDS, AS NEW STARTERS IN THE PRODUCTION OF ALE STYLE BEER

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ABSTRACT

In recent years, several studies have shown the suitability of new wild *Saccharomyces* and non-*Saccharomyces* yeasts isolated from vineyards, to be used as starters in the brewing industry to enhance the flavor profile of beers. For this purpose, *Saccharomyces cerevisiae* 31 and *Metschnikowia pulcherrima* 62, isolated respectively from the Shesh i Zi and Kallmet vines, have been used as a single starter or in co-culture (sequential inoculum) for the production of English Ale and American Wheat style beer. *S. cerevisiae* S-04 was used as reference starter. Some fermentation kinetics were monitored and the main compositional characteristics of the beers were evaluated. The beers obtained with the sequential inoculation technique with *S. cerevisiae* 31 and *M. pulcherrima* 62 showed better compositional characteristics especially with regard to the higher content of glycerol and maltose fermentation compared to the beers obtained using *S. cerevisiae* 31 and similar data with *S. cerevisiae* S04 as single starters. These data, although preliminary, support a valid candidacy of *S. cerevisiae* 31 and *M. pulcherrima* 62 as new starters in the brewing industry.

Keywords: *Saccharomyces cerevisiae*, *Metschnikowia pulcherrima*, fermentation characteristics, sequential inoculation, beer.

EXTRACTION AND EVALUATION OF BIOACTIVE COMPOUNDS IN FRESH AND DRIED OLIVE LEAVES

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ABSTRACT

For centuries, olive leaves have been widely used as a folk remedy in traditional medicine, with their extracts being associated with food, cosmetic, and health preservation benefits. They have also been incorporated into the human diet as herbal tea extracts or powdered supplements (Romani et al., 2017). Olive leaves are considered a byproduct of olive oil and table olive cultivation. In this study, we assessed the bioactive compounds in the olive leaves of four important cultivars cultivated in the country. The aim was to maximize the concentration of bioactive compounds in fresh and dried olive leaves intended for infusion purposes. The selected cultivars were 'Kalinjot,' 'Ulliri i Bardhë i Tiranës,' 'Ulliri i Kuq,' and 'I Holli i Himarës.' The leaves were divided into two experimental groups. In the first group, compounds were extracted using the ultrasound method with 80% ethanol as the solvent. In the second group, the leaves were dried using a thermostat set to 35°C for 48 hours, and then the bioactive compounds were extracted following the same process as with the fresh leaves. The analyses performed included the determination of total polyphenols, total flavonoids, pigments (chlorophyll and carotenoids), and antioxidant activity using DPPH and ABTS radicals. From the results, it was observed that the dried leaves contained higher amounts of bioactive components compared to the fresh leaves. Among the cultivars, the leaves of 'Ulliri i Bardhë i Tiranës' showed the highest levels of these compounds. Additionally, the antioxidant activity assessment revealed that olive leaves exhibited high antioxidant activity for both tested radicals.

Keywords: Olive leave, Olive cultivars, Bioactive compounds, total Polyphenols, Antioxidant activity

BAT DIVERSITY IN THE ALGERIAN BIBANS, A LIMESTONE KARST MASSIF

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ABSTRACT

We have no knowledge of the bat species present in the Bibans mountain range in Algeria. In order to contribute to the protection of this chiropteran fauna, we studied its diversity in the Bibans mountain range, with the appearance of a karstic relief, located partly in the south of the wilaya of Bejaia (the other part being located in the neighbouring wilaya of Bordj Bou Arreridj). The bats were caught in chiropterological nets at the entrance to a winter roost Ifri (Tala el vir) from November 2019 until February 2020. Detector listening was carried out at 5 different habitats, from November 2020 to February 2021. Between capture and automatic detection, 13 species of bats were detected: *Pipistrellus kuhlii*, *Tadarida teniotis*, *Eptesicus isabellinus*, *Hypsugo savii*, *Miniopterus schreibersii*, *Rhinolophus ferrumequinum*, *Myotis capaccinii*, *Myotis punicus*, *Pipistrellus pipistrellus*, *Rhinolophus hipposideros*, *Rhinolophus blasii*, *Myotis nattereri* and *Plecotus gaisleri*. The bat fauna of this area is totally unknown and the results presented constitute an important contribution to our knowledge of the vertebrate fauna of the region and thus of the country as a whole.

Keywords: biodiversity, chiropterans, Bibans massif, limestone karst, Algeria.

PRODUCTION OF POLYHYDROXYALKANOATES AND EXTRACELLULAR PRODUCTS FROM PSEUDOMONAS PUTIDA

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ABSTRACT

With an annual production of more than 368 million tons of plastic, the management of their accumulation is constantly being raised. Indeed, conventional petrochemical plastics are either destroyed after their use, producing toxic and polluting fumes, or accumulated in the environment, particularly in the oceans. Thus, the interest in the manufacture of biodegradable plastics is growing. Polyhydroxyalkanoates (PHAs) are a type of biosourced and biodegradable polymers that are particularly interesting due to their structural variety and their resemblance to conventional plastics. However, their biological manufacture is currently based on fermentation using pure microbial cultures, natural or recombinant. *Pseudomonas* species have been chosen as producers of PHAs in many recent studies. Being metabolically versatile and possessing a remarkable tolerance to a wide range of carbon sources, these bacteria have become a cell factory for the production of PHAs. In the present study, strains of the genus *Pseudomonas* characterized by their ability to synthesize intracellular lipids were isolated from wastewater samples. Out of all eighteen (18) isolates, 12 were screened with a specific Sudan Black B stain, 08 strains have a high potential for the production of PHAs. As part of the production and extraction of PHAs, a batch fermentation was launched with colony 12 for 18 hours and the biomass recovered by centrifugation. An extraction of polymers with chloroform is carried out, then the screened strains are lyophilized. For sustainable production, it is essential to reduce the costs of carbon sources and improve process efficiency, including using waste as a fermentation substrate.

Keywords: Bioplastic, Polyhydroxyalkanoates (PHAs), Batch, *Pseudomonas putida*, Biodegradable

MOLECULAR CHARACTERISATION OF SPECIES AND GENOTYPE OF HISTOMONAS MELEAGRIDIS IN CHICKENS FROM TUNISIA

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ABSTRACT

Histomonas meleagridis, a protozoan parasite, is responsible for histomonosis, which can lead to substantial losses in the poultry industry due to high mortality and morbidity. In Tunisia, the domestic chicken *Gallus gallus domesticus* represents one of the most valuable sources of protein. Despite the economic significance, there have been no efforts made to identify risk factors contributing to the occurrence of this disease in free-range chicken flocks in the region. Furthermore, studies on protozoan infections affecting Tunisian poultry are currently limited to parasitological surveys. In this study, we used partial sequences of the α -actinin 1 gene and 18S rRNA as nuclear markers for the molecular characterization of *H. meleagridis* isolated from *G. gallus domesticus* across various geographical regions of Tunisia. Regardless of the sampling source, all individuals exhibited the same α -actinin haplotype. Phylogenetic trees constructed using Maximum Likelihood (ML) and Neighbor-Joining (NJ) methods demonstrated similar topologies, revealing two distinct clusters. Within cluster 1, α -actinin 1 sequences formed a strongly supported monophyletic group with *H. meleagridis* sequences from Austria and France. In contrast, cluster 2 encompassed published sequences originating from France and China. Phylogenetic analyses based on 18S rRNA sequences grouped all Tunisian isolates into a separate monophyletic clade, along with *H. meleagridis* sequences from France designed, previously, as Genotype II. This study presents the first molecular characterization and phylogenetic analysis of *H. meleagridis* in Tunisia. The findings did not reveal a clear genetic structure, which may be attributed to significant gene flow between populations of the protozoan parasite across countries, facilitated by the poultry trade.

Keywords: *Histomonas meleagridis*, *Gallus gallus domesticus*, molecular characterization, Phylogenetic analyses, gene flow.

STUDY OF THE ANTIMICROBIAL ACTIVITY OF HEXANE AND ETHYL ACETATE EXTRACTS OF ANABASIS OROPEDIORUM MAIRE.

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ABSTRACT

Algeria, with its rich and diverse flora that forms a genuine phylogenetic reservoir, is one of the countries in Africa where the majority of rural and urban populations rely heavily on medicinal plants. This work focuses on one of the plants from arid regions: *Anabasis oropediorum* Maire known as Ajram. It is traditionally used to treat skin diseases, especially eczema. The aim of this work was to evaluate the antimicrobial activity of the ethyl acetate and hexane extracts of Ajram collected from Laghouat province. The extracts are prepared using the Soxhlet and ultrasonic maceration technique and then a liquid-liquid extraction process is used. The highest productivity is recorded for the aqueous extract at 9.79%, followed by the hexane extract of the stem at a rate of 2.42%, then the hexane extract of the flowers at a rate of 1.82%, and the lowest productivity recorded for the ethyl acetate extract at a rate of 0.87%. Antimicrobial activity is determined on four microbial strains: *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa* and *Candida albicans*. The disk diffusion method (measuring the diameter of inhibition) is used, and the results obtained showed interesting inhibition zones. *Pseudomonas aeruginosa* (diameter of inhibition = 10 mm) and *Staphylococcus aureus* (9 mm) showed sensitivity to the hexane extract of stems, while *Pseudomonas aeruginosa* (7 mm), *Staphylococcus aureus* (9 mm) and *Candida albicans* (8 mm) strains showed sensitivity to the extract ethyl acetate for flower. While *Escherichia coli* showed resistance to both extracts. The results obtained represent an interesting tool for increasing the shelf life of food products (disinfectants), or for use against some diseases. Perspectives have been identified following this study, including: Complementing this work with other tests such as antioxidant, anti-inflammatory, and anti-cancer activities. Testing other extraction methods and studying their biological capacity. Application of this study in vivo.

Keywords: *Anabasis oropediorum* Maire, hexane extract, ethyl acetate extract, antimicrobial activity.

THE EFFECT OF PLASMA ACTIVATED WATER ON THE MICROBIAL DECONTAMINATION AND PRESERVATION OF STRAWBERRIES

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ABSTRACT

The study investigates the efficacy of Plasma Activated Water (PAW) in enhancing the shelf life and microbial safety of strawberries through surface decontamination. PAW, generated by exposing water to plasma, contains reactive oxygen and nitrogen species that are effective in microbial inactivation. The primary objective is to evaluate PAW's potential as an alternative to conventional decontamination methods. In this study, PAW was produced by subjecting water to plasma for varying durations until the target pH values of 2.50, 2.75, and 3.00 were achieved. The antimicrobial effectiveness of PAW was tested against planktonic cells of *E. coli* and *B. cinerea* spores, with results showing significant reductions in microbial load, especially at lower pH levels. The microbial load on strawberries showed significant reductions, with *E. coli* counts decreasing by 0.73, 3.13, and 3.60 log CFU/mL, and *B. cinerea* by 0.49, 1.99, and 2.56 log CFU/mL at 5, 15, and 30 minutes of exposure, respectively. Despite the pronounced antibacterial effect, statistical analysis revealed no significant difference in antimicrobial efficacy between 15 and 30 minutes ($P>0.05$), leading to the selection of 15 minutes as the optimal exposure duration. The strawberries inoculated with the spoilage-causing fungi *Botrytis cinerea* and the pathogenic bacterium *Escherichia coli* were immersed in PAW (pH 2.5) for 15 minutes and stored at 4°C for up to three weeks. The microbial load was monitored throughout the storage period to assess PAW's antimicrobial efficacy. Throughout a 1-week storage period at 4°C, PAW-treated strawberries exhibited significantly lower mesophilic aerobic bacterial and mold-yeast counts compared to control samples, with the initial bacterial load of 2.43 log CFU/g increasing by 0.8 log over one week. The study also measured the changes in physical and chemical quality parameters of the strawberries, including weight loss, color, pH, β -carotene, ascorbic acid, total antioxidant content, and total anthocyanin levels. The color analysis revealed that PAW-treated samples maintained their appearance better than untreated controls, indicating potential preservation of visual quality. Vitamin C content was slightly reduced in PAW-treated strawberries suggesting that PAW treatment has a minimal impact on vitamin retention. Antioxidant activity measurements indicated that PAW treatment did not significantly alter the antioxidant properties of either fruit during the storage period. The results demonstrated that PAW treatment significantly reduced microbial populations, thereby extending the shelf life of strawberries. Additionally, the quality attributes of PAW-treated strawberries were better preserved compared to untreated controls. This research highlights the potential of PAW as an innovative and effective solution for enhancing the safety and longevity of strawberries, offering a promising alternative to traditional chemical disinfectants.

Keywords: Plasma, decontamination, Antimicrobial Efficacy, *Botrytis cinerea*, Non-thermal Processing

ASSESSMENT OF GROUNDWATER QUALITY FOR DRINKING AND IRRIGATION IN THE BOUHMAMA AREA, ALGERIA.

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ABSTRACT

The Bouhmama region's water needs are met by groundwater from the plio-quadernary aquifer. Water from this aquifer is accessible via boreholes. This aquifer has been excessively exploited in recent years to support the development of irrigated agriculture and the needs of the region's population. This has led to the depletion of reserves in the same way as traditional wells. This increase has led to pressure on groundwater resources, also linked to the climate, as the recharge of groundwater by surface water causes a change in the original chemical composition. This condition, combined with drought, has caused many springs to dry up and led to a deterioration in chemical quality, illustrated by the increased salinity of the water. The use of groundwater in the Bouhmama region for drinking and irrigation purposes has gradually increased over the last decade. The quality and quantity of groundwater has become more important, as good quality water can be used for a variety of purposes, including drinking water supply, agriculture, industry and recreation. Water quality in the aquifer has been significantly altered by anthropogenic activity, such as the extensive use of chemical fertilizers. This research aims to improve our understanding of the hydrogeochemical functioning of the Mellagou aquifer in the Bouhmama region of northeastern Algeria. It contributes to the identification of phenomena affecting the mineralization and salinization mechanisms of groundwater. A total of 15 groundwater samples were taken during the 2022 rainy season, distributed throughout the study area. In order to obtain the results obtained, this study used hydrochemical diagrams (Piper, Schoeller, Stiff, Stabler and Wilcox diagrams), thermodynamic models (saturation indices) and, depending on the calcite SI and dolomite SI values, the majority of the bridges sampled are supersaturated, and therefore precipitate. Water infiltrating the Cretaceous limestones of the deep aquifer is enriched in calcium and bicarbonates; along its underground path and in the presence of dolomite, gypsum and halite, it ends up enriched mainly in sulfates, sodium and chloride. This clearly indicates a dominant geological factor in the enrichment of these elements. Groundwater contains dissolved salts, which are mainly governed by the water supply, lithology and residence time of the water in the aquifer. An excess of dissolved ions in water can affect water quality. Hydrogeochemical studies are particularly useful for assessing, protecting and managing water resources in terms of identifying and evaluating water quality. The analysis was carried out using a chemical-statistical analysis (C.S.A.) method. Three chemical facies with a predominance of calcium bicarbonate facies reflect the influence of intercalations within bicarbonate sedimentary formations. Several processes are expected to control the geochemistry of this aquifer. These include dissolution, mineral salt precipitation, cation exchange, seawater formation and freshwater formation. Groundwater mineralization is mainly governed by the dissolution and precipitation of minerals (gypsum and halite, calcite and dolomite), base exchange and anthropogenic activities. PCA results show that the variables controlling water mineralization are Cl⁻, Na⁺ and K⁺.

Keywords: Groundwater Hydrogeochemistry Mineralization Salinization Anthropogenic Activities PCA (Principal Component Analysis)

SCREENING LANNAE ACIDA, FICUS SYCOMORUS AND BRIDELIA FERUGINEA FOR ACTIVITY AGAINST TYPE-2 DIABETES

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ABSTRACT

The global rise in the incidence of diabetes has prompted a search for alternative, natural anti-diabetic therapies with fewer side effects than currently available synthetic drugs. The present study evaluated the effect of selected medicinal plants (*Lanna acida*, *Ficus sycomorus* and *Bridelia ferruginae*) locally used for treating Type-2 diabetes in Katsina State, Nigeria, on blood glucose, lipid and protein profile of alloxan-induced diabetic rats. Adult albino rats were divided into six groups as follows; group I (Normal control), group II (diabetic control), group III (positive control, diabetic rats treated with standard anti-diabetic drug; Glibenclamide), groups IV, V and VI were diabetic rats treated with 500 mg/kg dose of *L. acida*, *F. sycomorus* and *B. ferruginae* stem bark extracts daily respectively, for 21 days. Glucose levels of rats were monitored weekly. At the end of the experiment, rats were sacrificed and blood samples were collected for lipid and protein analyses. Results obtained revealed that administration of *L. acida*, *F. sycomorus* and *B. ferruginae* stem bark extract significantly ($P < 0.05$) decreased blood glucose levels in the diabetic rats when compared with the diabetic untreated group. Likewise, significant decrease in lipid profile (serum total cholesterol, LDL-cholesterol and triglycerides) with increase in levels of HDL-cholesterol and protein profile was noted in all the extract-treated diabetic groups. In conclusion, *L. acida*, *F. sycomorus* and *B. ferruginae* stem bark extracts demonstrated potential anti-diabetic activity by causing significant glucose-lowering and hypolipidemic effects in alloxan-induced diabetic rats. However, *Lanna acida* extract produced the highest antidiabetic activity among the plant species studied. These findings may pave way for further investigation especially on the plant species with the best antidiabetic activity, in a bid to develop indigenous, cost-effective anti-diabetic drug for effective management of Type-2 diabetes.

Keywords: Medicinal plants, antidiabetic, screening,

COMPARATIVE EFFECT OF TWO BIOSTIMULANTS ON THE PHYTOCHEMICAL EXPRESSION OF A STRATEGIC CEREAL CROP

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ABSTRACT

Numerous studies today focus on biofertilizers, which are crucial for the quality of our food and environment, as well as for optimizing yield. To address the new challenges of biofertilization, we have experimented with new bioproducts to estimate their benefits on plant growth, morphology, phytochemistry, and some physical soil parameters. This is the context in which our experimentation was conducted. We conducted our experimentation at the Department of Biotechnology, Faculty of Natural and Life Sciences, University of Blida1. We tested the effect of two bioproducts: the first based on methanolic extract of *Azolla filiculoides* (EM) and the second based on a mixture of vermicompost juice and methanolic extract of *Azolla filiculoides* (EM+VLC) on the morphology, physiology, and phytochemistry of a strategic crop, "*Pennisetum glaucum* L.," compared to a control. The results of this study showed that the EM treatment had a better effect on total root length and total fresh weight, as well as on phytochemical parameters such as chlorophyll and proteins. On the other hand, the EM+VLC treatment revealed a better effect on leaf length and total dry weight. For phytochemical parameters including phenolic compounds, flavonoids, and antioxidants. Finally, the physico-chemical parameters of the soil, pH, and electrical conductivity (EC) showed a positive effect from both treatments.

Keywords: Bioproducts, *Pennisetum glaucum* L, vermicompost, *Azolla filiculoides*, phytochemistry, soil.

A LONGITUDINAL ANALYSIS OF THE IMPACT OF PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOURS ON GESTATIONAL WEIGHT GAIN: WHAT ARE THE REASONS OF NON-PRACTICE ?

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ABSTRACT

Objectives. – To study physical activity and sedentary behaviours during pregnancy and their effects on gestational weight gain. Also, to study the reasons of non-practice of physical activity by pregnant women.
Materials and methods. – A longitudinal prospective cohort study of 300 pregnant women was conducted in Algeria, from December 2013 to July 2016. Age, parity, socio-economic level and pre-pregnancy body mass index were collected. Gestational weight gain was calculated and classified according to the recommendations. Physical activity and sitting exposures during pregnancy were determined and assessed using an interviewer-administered validated questionnaire. Statistics were performed using Statview™ and SPSS software.
Results. – Only 11 to 15% of women declared practicing physical activity during pregnancy. The main reasons for non-practice were: « did not do before », « lack of time », « Lack of accompaniment », « absence of sports structures », « medical opinion », « husband refusal », « presence of children » and « fatigue ».The percentage of non-practice of physical activity was higher in women with excessive weight gain in the 2nd and 3rd trimester ($P < 0.05$). The average durations of sleep ($P < 0.0001$) and nap ($P < 0.0001$) decreased with the advancement of pregnancy. Average sleep time was lower in women with insufficient weight gain ($P < 0.05$).
Conclusion. – This study showed that absence of physical activity during pregnancy is a risk factor for excessive weight gain. These findings suggested that being physically active and less sedentary may contribute to an appropriate GWG.

Keywords: Pregnant women, Gestational weight gain, Physical activity, Sedentary

SCREENING OF PROMISING LINES USING GENERATION MEAN ANALYSIS FOR HIGH GRAIN YIELD AND YIELD RELATED TRAITS

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ABSTRACT

Aim of this research is to discover best parents and crossbreeds on the basis of their best plant traits for best performance in areas where shortage of water occurs. Wheat plays an imperative role in human and animal sustenance because it is a major source of carbohydrates. Wheat is facing different problems like climate change, biotic and abiotic stress. So, there is a need to explore such wheat germ plasm having ability to grow well under stress environments as well as maintain high yield potential. An experiment was carried out at Department of Plant Breeding & Genetics, Ghazi University, D. G. Khan to determine inherent effects for various plants traits by utilizing six generations e.g., parents, first and second filial generations and backcrosses of two wheat crosses like i.e. Seher-2006 × Faisalabad-2008, Anaj-2017 × Akbar-2019 as cross-II. Through scaling tests, analysis on generation means was performed and involvement of epistasis was found for many plant traits in both cross combinations. Results, of ANOVA showed highly,significant differences between,treatments and within,six:generations:for most,of the:studied:traits:under:both crosses except for:days:to,heading (cross I & II), number,of productive,tillers and number of,grains per spike under both regimes. Scaling:test:was,showed that most:of:the,studied characters exhibited,non-allelic interactions,in both cross (I & II). Genetic,effects were determined,after:the:presence:of:non-allelic interactions. The means of,all studied traits,were highly,significant in both crosses. The additive: (d) and dominance (h) genetic,effects were showed,highly significant:for:most:of the studied:characters:in cross I,and II. Dominance × dominance,genetic interaction was,showed significant,and positive results for,most of the traits in,both crosses (I & II). So, late generation, selection:for:these characters:might be:effective:for:wheat breeding,program.

Keywords: F1 hybrids, genetic analysis, wheat genotypes, spike length, grain yield

OVERVIEW OF PLANT BASED NANO MEDICINES

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ABSTRACT

Demand for nanoparticles is increasing day by day due to their broad range applications in various commercial areas including nano-pharma industries to treat various diseases. Chemically prepared nanoparticles involve generation of toxic products which limit their biological applications. Therefore, phyto synthesis of metal oxide nanoparticles (MNPs) using plant broth and biomolecules has gained significant attention. Green synthesis of nanoparticles is ecofriendly, cost-effective and is a promising alternative to physical and chemical route. Green synthesis of nanoparticles using medicinal plants has become a promising substitute to traditional physical and chemical approaches. The conventional methods of developing nanomaterials are costly and produce toxic products, which limit their uses in different biological applications. So, it is the need of today to minimize the toxic effects of these noxious chemicals on environment, plant and animal life. Hence, an alternative approach is intended to develop which is eco-friendly and cost-effective for the synthesis of small size stable nanoparticles using selected medicinal plants. Here in the current study the overview of nanomedicine based on plant based nano particle/ nano materials have been discussed in detail by focusing different types of nanoparticles.

Keywords: Biomedicines, Nano Particles, Phytomedicines

GENETIC TRANSFORMATION OF WHEAT FOR ABIOTIC STRESS *TOLERANCE*

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ABSTRACT

Rapid global environmental conditions will increase the severity of salinity and drought. Despite wheat (*Triticum aestivum* L.) being a major staple crop, it has also affected by these two major abiotic stresses. Drought affects the grain filling and kernel weight. Saline soil hinders the plant growth and development along and changes the Physiochemical properties of soil. Use of breeding and transgenic techniques facilitated the production of tolerant varieties to cope up the growing wheat demands. This research work investigated the role of *Solanum lycopersicum* PI-II (SIPI-II) gene for mounting tolerance under salinity and drought stress in transgenic wheat. Significant expression of 6.41(TL1) was observed in transgenic plants for 1 day post 100m NaCl treatment. A gradual upregulation was also observed at 200mM NaCl. The 300mM treatment was recorded with 3.78 (TL5) expression level. The maximum fold change was measured for 6 days post treatment in 100mM and 200Mm as 5.01 and 3.99 (TL1). The extended saline treatment (14 days post treatment) in transgenic lines resulted the higher PI-II induction than control wheat plants which showed the efficacy of tomato PI-II gene in salinity tolerance. PI-II expression in 15% PEG treated plants showed PI-II gene transcript up to 7.31 for 1 day post treatment while 25% PEG revealed differential expression ranging from 3.45 to 2.27. Role of PI-II gene in drought tolerance was due to sustained transcript increment during PEG treatment for 1- and 6-days post stress treatment.

Keywords: Wheat, Transformation, Abiotic Stress

ETHNOVETERINARY PRACTICES USED IN THE POTHOHAR PLATEAU (DISTRICT CHAKWAL), PAKISTAN FOR TREATMENT OF ANIMALS

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ABSTRACT

Livestock farming is the major source of income for resource-poor people of the subcontinent region. To obtain maximum output from animals, the health and well-being of animals is important. However, due to the high cost associated with allopathic medicine, the indigenous people use their traditional knowledge of medicine for the treatment of various ailments of domestic animals. Such remedial practices are known as ethnoveterinary medicine. The farmers use different herbal plants against various diseases of livestock such as tick infestation, fever, diarrhea, or allergy. Only a few studies in Pakistan have documented the use of medicinal plants for the treatment of ailments in animals. Therefore, keeping in view the importance of ethnoveterinary medicine, this study was planned to document the traditional practices of farmers in the district of Chakwal, Pakistan. An open-ended questionnaire was designed to conduct in-person interviews with local healers, veterinarians, and some old folk. The data from 68 respondents were recorded in a Microsoft Excel 365 spreadsheet. The results indicated that 31 plants known for their therapeutic potential belonging to 28 different families were used for the treatment of 21 most common diseases of animals. The 9 plants were solely used for the control of tick infestation in livestock. The most frequently used plant for tick control was *Nicotiana tabacum* (80.88%). *Syzygium cumini* was most frequently used for the treatment of diarrhea in ruminants (94.11%). Furthermore, farmers used different preparations of plant parts depending on the desired effect against the disease in different vehicles such as leaves, and seeds in water or oil. The most common route of administration was oral. In conclusion, this study highlights major findings of ethnoveterinary practices which could serve as a hallmark in treating different ailments of animals. Moreover, to achieve maximum therapeutic effects of these medicinal plants, their efficacy, dosage, and toxicological effects in animals still need to be investigated.

Keywords: Ethnoveterinary medicine, medicinal plants, survey, traditional healers

**AEROPALYNOLOGICAL STUDY AND POLLEN DIVERSITY IN THE
ATMOSPHERE OF BATNA (NORTHEAST ALGERIA): ANNUAL ANALYSIS
USING A HIRST-TYPE VOLUMETRIC SAMPLER**

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ABSTRACT

The pollen grains have accompanied humanity throughout the centuries and play a crucial role in the sexual reproduction of higher plants. However, due to their size and chemical composition, airborne pollen can trigger allergic reactions, commonly known as pollinosis, in sensitive individuals. This study aims to analyze the composition and diversity of pollen present in the atmosphere of Batna, located in Northeast Algeria, by establishing an aeropalynological survey for the period from November 1, 2022, to October 31, 2023, using a volumetric sampler of the Hirst type manufactured by Lanzoni®. In this study area, 34 types of pollen were identified, totaling an annual pollen index of 31 853 grains per cubic meter of air, distributed among 28 botanical families. Woody plants dominate significantly, representing 85.40% of the total collected pollen, followed by herbaceous plants (12.70%) and Poaceae (1.60%). The four predominant taxa, accounting for 83.23% of the annual pollen load, include Cupressaceae, Quercus sp., Chenopodiaceae-Amaranthaceae, and Olea europaea L. The findings of this study could have significant implications for improving air quality and managing pollen-related allergies in this region.

Keywords: pollen grains, aeropalynology, Batna, allergens, air quality

MEDICINAL PLANTS AND ACNE TREATMENT: AN ETHNOBOTANICAL STUDY AMONG YOUNG ADULTS ACROSS SIX ALGERIAN CITIES

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ABSTRACT

The study of medicinal plant use in treating dermatological conditions is a rapidly expanding field of research. In this study, an ethnobotanical survey was conducted across six Algerian cities (Batna, Khenchela, Biskra, Algiers, Béjaïa, and Constantine) during March, April, and May 2024, using a randomly distributed questionnaire over a three-month period. The primary objective was to catalog locally used plants for acne treatment. The study involved 82 young adults, predominantly women, who are frequent users of phytotherapy. It identified 17 plant species belonging to 14 botanical families, with Lauraceae, Liliaceae, Asteraceae, and Pinaceae being the most predominant, including cinnamon (22.9%), Aloe vera (16.7%), chamomile (8.3%), and cedar (8.3%) as the most utilized. Leaves were the most commonly utilized parts, predominantly through infusion or topical application, with the latter method being predominant. While some individuals reported minor adverse effects such as skin irritation, a marked improvement in acne symptoms was observed. The anti-acne activity of all plants, except cedar, has been supported by previous studies, highlighting their antibacterial properties. This ethnobotanical study enhances the understanding of local medicinal flora and contributes to the preservation of traditional knowledge. These findings provide valuable insights into the effectiveness of medicinal plants in acne treatment, supporting their therapeutic potential in this field.

Keywords: Medicinal plants, Ethnobotanical survey, Acne treatment, Antibacterial properties, Traditional knowledge

EXTRACTION OF MASTIC OIL (DROU)

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ABSTRACT

A vegetable oil is a fatty substance extracted from an oilseed plant whose seeds, nuts or fruits contain lipids. Among the various vegetable oils available, mastic oil is extracted from the ripe fruits of the mastic pistachio tree, the species of which is *Pistacia lentiscus* L. belonging to the Anacardiaceae family. It is characterized by its dark green leaves and its fruits, which are initially red then turn black when ripe. In Algeria, obtaining this oil is practiced mainly in the Eastern region, and remains artisanal, seasonal and not very profitable. It is carried out particularly in coastal areas. However, questions persist regarding the extraction methods as well as the benefits of this oil. In this context, the objective of our study consists of taking a close interest in this oil in order to know the extraction systems in the area of Skikda and Jijel where mastic is present in abundance in its forests and the extraction of the oil is well known. Additionally, explore its use in different fields. According to the information collected, mastic fruit oil of the species *Pistacia lentiscus* L is obtained using two (2) distinct processes: traditional and industrial depending on the region. The traditional method is an activity practiced by women in the forest area and is carried out in three different ways. The industrial method goes through the same preliminary stages as the traditional one. However, it is based on the use of a horizontal screw press. Mastic oil is used in various fields: therapeutic, veterinary, cosmetic and industrial.

Keywords: Mastic oil, *pistacia lentiscus* L., extraction methods

BIOPRESERVATION TRIALS OF THE TRADITIONAL ADGHESS CHEESE USING LACTIC ACID BACTERIA

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ABSTRACT

Lactic acid bacteria are commonly used in the fermentation of various foods. Their ability to produce organic acids and lower the pH is the main factor that allows them to inhibit the growth of competing microorganisms. Improper handling during the preparation of traditional cheeses leads to very high contamination levels. These contaminations are often the cause of their rapid spoilage, thus limiting their shelf life and potentially causing food poisoning. The objective of the present study is to conduct preservation tests on a traditional cheese, Adghess, by incorporating lactic acid bacteria such as *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. The prepared product is stored in the cold for 17 days, during which its microbiological characterization is ensured by determining the total aerobic mesophilic flora (TAMF), total and fecal coliforms, fecal streptococci, lactic acid bacteria, and pathogenic flora (*Salmonella*, sulfite-reducing *Clostridium*, *Staphylococcus aureus*), along with monitoring the evolution and titratable acidity. The results show that the average pH values decrease over time. The initial average value (pH=4.89) decreases to (pH=4.53) by the 6th day and stabilizes at 4.41 during the final days. Similarly, acidity increases as the pH decreases. A noticeable drop in moisture content is recorded from 47% on the first day (J0) to 28% on the 12th day. Our cheese analyses during the storage period (15 days) show a pH range between 4.89 and 4.41 and an acidity range from 70.26 to 77.45. This fluctuation is linked to the microbial activity in the environment. We recorded the absence of all targeted pathogenic germs (fecal coliforms, *Staphylococcus aureus*, *Salmonella*, molds, fecal streptococci), with the presence of total flora at identical levels of 2.9×10^5 CFU/g on the last day of storage, which remains within standard limits. Microbial dominance is marked by lactic flora. Total coliforms were observed with a relatively significant proliferation ($51-2.01 \times 10^2$ CFU) during the period (J9-J12), with a second disappearance noted on the 13th day, followed by a reappearance in the subsequent days (J14 to J17), where their number increased to (2.96×10^3 CFU). Overall, Adghess cheese exhibits satisfactory microbiological quality, which can be attributed to good hygienic practices during production and the inoculation of milk with lactic acid bacteria, contributing to the improved hygienic quality of the product throughout the 17-day storage period.

Keywords: Adghess, lactic acid bacteria, biopreservation, traditional cheese

FRESH CHEESES MADE IN THE EASTERN ALGERIAN REGION

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ABSTRACT

Milk and dairy products, mainly cheeses, hold an important place in the daily diet of Algerians. They are the main source of calcium and animal protein. However, traditional varieties of Algerian cheeses have not been exhaustively studied and are characterized by traditional production on a family scale, mainly fresh cheeses. The objective of the present study is to identify the main fresh cheeses traditionally made in eastern Algeria. To this end, a survey was conducted in two wilayas : Tébessa and Oum El Bouaghi, to identify them and outline their production process. The sample size is set at 300 households. Sampling was based on the cluster sampling method. The survey allowed us to establish a list of fresh cheeses, namely : klila, michouna, wichouna, jben, adghess, and lba (prepared from cow colostrum). The production of fresh cheese depends on the availability of the raw material, it is abundant during lactation. These cheeses can be made from cow's milk, sheep's milk, or goat's milk with acidic or enzymatic coagulation. The producers state that the coagulant can be of plant origin by using various plants (cardoon flower and artichoke flower) or of animal origin, which is the most frequently used in the region (douth, 89.9% of housewives use it). All the housewives prepare and follow the same steps in making these cheeses, and their storage does not exceed a maximum of 6 days in the cold. In order to preserve our heritage and cultural legacy, it is necessary to prevent the disappearance of these traditional products by developing the market for these products through the improvement of their preservation methods and storage durations.

Keywords: adghess, douth, survey, fresh cheese, jben, klila, michouna.

ETHNOBOTANICAL SURVEYS ON INFLUENZA TREATMENT METHODS IN THE COMMUNES OF M'SILA, OULED DERRADJ, BERHOUM AND MAGRA OF THE WILLAYA OF M'SILA (ALGERIA)

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ABSTRACT

In order to know and identify the traditional uses of medicinal plants among the inhabitants, ethnobotanical surveys are carried out almost every year and since 2005 in the wilaya of M'sila. This work was carried out randomly among 100 people from different social categories during the year 2023, in order to collect as much information on traditional methods of treating influenza. The analyzes of the information collected included 14 medicinal plants belonging to 14 genera and 8 botanical families. The study showed that leaves (38%), fruits (25%) and flowers (19%) are the most widely used parts in the form of infusion (22%), oil (19%) or in juice (14%). The main causes of the flu 160ort he respondents in the communes surveyed in M'sila were the climate (cold) and infections. In addition, 160ort he question on the treatment of covid-19, residents confirmed that they used the same treatments as those 160ort he flu.

Keywords: traditional uses, plants, ethnobotany, flu (+ covid-19), M'sila (Algeria)

FLORISTIC DIVERSITY OF M'SILA: INVENTORY, CHOROLOGY, ECOLOGY

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ABSTRACT

The analysis of the research work (research project, doctoral thesis, engineering and master's theses) carried out in the M'sila region on the flora and vegetation since 2005 has allowed us to collect important ecological information and make a floristic inventory of the region. The results obtained resulted in 548 species belonging to 65 families and 317 genera including 28 endemic plants, 77 rare plants, 12 plants protected by Algerian law, 3 species are classified in the ICUN red list and including 175 species specific to the steppe. The systematic composition of these species shows that 7 botanical families are dominant: Asteraceae with 73 species, Fabaceae with 56 species, Poaceae with 50 species, Brassicaceae with 47 species, Lamiaceae with 28 species, Liliaceae with 21 species and the Caryophyllaceae with 20 species. The chorological and biological spectra show that the species of Mediterranean strains and therophytes are the most representative. The study located several sites of remarkable ecological and economic importance, which deserve to be protected and even classified as protected areas (park, reserve and corridor, etc.) within the framework of sustainable development. It is noted that this biodiversity is coveted and not protected against the uses and activities of the inhabitants (logging, grazing, harvesting of medicinal and useful plants, etc.).

Keywords: inventory and floristic diversity, rare species, protected, chorology, M'Sila (Algeria),

CURRENT APPROACH TO THE CHILD WITH FEVER

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ABSTRACT

Fever is one of the most common complaints in children when they apply to the hospital. Fever is an important symptom of the underlying disease. The first step in evaluating fever is to find the cause. Fever is not a disease, but a physiological response. There is no evidence that fever makes the disease worse. In the evaluation of a child with fever, physical examination, history and laboratory tests should be evaluated together. Experiences combined in the light of current literature are very valuable in determining the source of fever or in cases of fever with no known cause. Detailed History and Physical Examination Age, degree of fever, history of contact, travel history, presence of underlying disease, additional complaints, and medication use should be questioned in detail. Vital signs, toxic appearance, and impaired consciousness are carefully evaluated. Misperceptions of fever and management errors are among the current problems.

To overcome the difficulty of diagnosing fever of unknown origin, many countries have developed guidelines to guide physicians in the management and assessment of fever of unknown origin. These aim to identify children at risk of serious infection requiring urgent treatment while avoiding unnecessary investigations and overuse of therapies. Although guidelines exist for children who are assumed to be at low or high risk of serious infection depending on the clinical situation, variability in the definition and management of fever of unknown origin is significant. Hospitalization and cerebrospinal fluid (CSF) analysis rates vary between hospitals for 40% to 90% of children presenting with fever of unknown origin. This difference in practice can be explained by several factors, such as inconsistency in diagnostic and treatment recommendations across guidelines or low compliance with these guidelines.

Conclusion The aim of our study was to compare the definitions and diagnostic and treatment recommendations published in national and regional fever of unknown origin guidelines in our country. Identifying differences between national and international guidelines with similar healthcare settings may improve the consistency of practice recommendations and inform future guideline development. With this approach, we aim to support increasing consensus on the definition and management of fever of unknown origin in our country.

Keywords: Fever of unknown origin, Approach to a child with fever, Fever, Infection

UNLOCKING THE POTENTIAL OF AVOCADO PEELS: A PATH TO SUSTAINABLE NUTRACEUTICALS

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ABSTRACT

The use of avocado has increased considerably worldwide, integrating various sectors such as the catering, food, cosmetic and medical industries. However, avocado waste extracts, particularly peels, remain largely underutilized. Representing around 11 to 17% of the total weight of the fruit, these peels are often disposed of as waste despite their richness in bioactive compounds, since analyses have clearly demonstrated their antioxidant and antimicrobial properties, offering significant potential for the manufacture of high value-added products in the pharmaceutical and food industries. To explore this potential, we conducted a survey of 2,000 Algerians to determine the rate of avocado consumption, identify the main constraints to this consumption, and assess the reuse of peels. The results show that 64% of participants do not consume avocados because of their high price, and 84% throw away the peels, indicating a lack of information about the potential uses of avocado by-products and their innumerable benefits.

Keywords: Avocado peels; Nutraceuticals; Consumer survey; Waste valorization

THE INHIBITOR EFFECT OF MAGNESIUM SULFATE ON THE ACTIVITY OF GLUCOSE-6-PHOSPHATE DEHYDROGENASE

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ABSTRACT

The G6PDH deficiency evaluation could be performed using qualitative methods such as the methemoglobin reduction test (MRT), and quantitative methods such as UV spectrophotometry (reference method). Sourcing quality controls for this method is challenging. This led us to conduct trials to prepare an internal quality control by adding MgSO₄. The primary aim of this work is to evaluate the inhibitory effect of MgSO₄ on G6PDH activity and, secondarily, to compare MRT with the reference method. Material and methods :Before the addition of MgSO₄, we analyzed 37 samples using the reference method and 32 using MRT. After the addition of MgSO₄, 37 samples were analyzed using both methods. Results and discussion The results show that pretreatment with MgSO₄ resulted in an increase in deficiency rates from 28% to 81% for MRT and from 44% to 73% for spectrophotometry, with an inhibition rate of 19% and a fluctuation range of 5.18 to 11.73 IU/g Hb. MRT's performance reveals good practicability, with sensitivity, specificity, accuracy, positive predictive value (PPV), and negative predictive value (NPV) of 29%, 75%, 41%, 78%, and 26% respectively. The inhibition rate obtained is comparable to that found in some studies. The literature reports better results than ours, probably due to the larger sample sizes in those studies. Conclusion MgSO₄ demonstrated a significant inhibitory effect on G6PDH enzymatic activity. On the other hand, the performance of MRT, a low-cost method, is acceptable.

Keywords: G6PDH, MgSO₄, inhibitory effect, MRT, UV-spectrophotometry.

QUALITY CONTROL PREPARATION FOR SPECTROPHOTOMETRIC METHEMOGLOBIN DETERMINATION

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ABSTRACT

Background / aims: Methemoglobin dosage is necessary to manage poisoning and therapeutic monitoring. Spectrophotometric methemoglobin (MetHb) assay is still used in laboratories. However, unlike automated methods, the unavailability of quality controls presents a reliability problem. Therefore, a quality control preparation procedure was validated. Methods: Blood samples were analyzed after methemoglobinization by adding sodium nitrite (NaNO₂) in a measured amount. The level of MetHb was determined before (MetHb₁) and after the addition of NaNO₂ (MetHb₂) using Evelyn Malloy's method. The range of methemoglobinemia formed (MetHb₂) was determined by calculating the statistical fluctuation interval. Moreover, 33 blood samples treated with NaNO₂ were analyzed using both Evelyn Malloy and COX methods. The data was compared using a student t-test. Results: The initial methemoglobinemia levels were within the normal range with an average of 0.74 ± 0.04 . After adding NaNO₂, the average values increased to $3.21\% \pm 0.059$ ($p < 10^{-3}$). The range of MetHb fluctuation after adding NaNO₂ was from 2.12% to 4.28%. There was no significant difference found between the results given by EM and those given by COX ($p = 0.916$). Conclusions: A practical procedure was developed for the preparation of quality control for spectrophotometric methemoglobinemia determination, allowing for reliable manual method results.

Keywords: Methemoglobin, laboratories, reliability, Quality control, Sodium nitrite

DETERMINATION OF ALLERGIC TREE POLLEN GRAINS SPREADING IN SELÇUK UNIVERSITY ALAEDDIN KEYKUBAT CAMPUS

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ABSTRACT

The transfer of pollen grains from male flowers to female flowers is very important for pollination in the plant kingdom. This transfer is accomplished by abiotic agents such as wind and water, or by animal pollinators who seek reproductive opportunities through imitation of potential mates, such as pollination, nutrients such as pollen and nectar, temperature, floral perfumes, oils or resins, or even ornamental flowers. Wind-pollinated plants produce large numbers of pollen grains to ensure pollination. Excessive amounts of pollen stored in the atmosphere cause allergic reactions in sensitive people. In this study, it is planned to detect the pollen of trees with allergenic effects spread in Selçuk University Alaeddin Keykubat Campus. The pollen of the trees will be collected from the area where the plants spread during their flowering periods and their preparations will be made using palynological methods. Both light and electron microscopes will be used when preparing pollen preparations. Descriptions, measurements and definitions of pollen will be made. As a result, allergenic tree pollens spread in the campus area will be identified and listed, and palynological results of the species will be presented, allowing for the preparation of future regional skin prick tests.

Keywords: Allergenicity, aeropalynology, electron microscopy, Konya, Wodehouse

DEVELOPMENT AND VALIDATION OF A NEW HPLC-UV METHOD FOR THE DETERMINATION OF GOSSYPOL IN COMMERCIALY AVAILABLE COTTON OILS

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ABSTRACT

Cottonseed is the second source of protein in the World after soybeans and the fifth in oil production. The most important use of cottonseed is in human and animal nutrition (food). Apart from this, the Shell of cottonseed can be used in the cellulose industry and its inner part can be used as a medical drug due to its gossypol content. Gossypol is a phenolic compound that is a triterpenoid aldehyde or polyphenolic binaphtyl aldehyde. The name gossypol is derived from the combination of the root of the genus name “gossyp” of cotton and the suffix “ol” of the word phenol. Gossypol is reported to have anti-oxidant, anti-microbial, anti-carcinogenic, anti-fungal and anti-bacterial properties. Gossypol has toxic and anti-fertility effects. For this reason, the gossypol substance contained in its seeds classifies its use in human and animal nutrition as a source of both protein and fat. In this study, a new HPLC-UV method was developed and validated for the determination of gossypol in commercially available cottonseed oils. In the method, C18 column (5 μm \times 4.6 mm \times 150 mm) was used as the stationary phase at 30 °C and methanol:water (90:10, v/v) mixture was used as the mobile phase at a flow rate of 1.1 mL/min. Isocratic elution was applied. The injection volume was 20 μL . Measurements were performed with ultraviolet detection 620 nm. The method was validated according to the International Harmonization Society criteria. This new method, which is quite fast, simple and economical, can be used in the determination of gossypol in cottonseed oils.

Keywords: Gossypol, HPLC-UV, Cotton Seed, Validation

FIRST DETECTION OF COLLETOTRICHUM CEREALE CAUSED ANTHRACNOSE IN TURFGRASS AREAS IN TÜRKİYE

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ABSTRACT

This study was conducted to investigate the cause of yellowing and drying observed in a park in Eskişehir province in 2023. The fungus species obtained as a result of isolations from diseased turfgrass samples taken from 5 different regions where drying was observed in the park was identified by rDNA-ITS sequence analysis. The rDNA Internal transcribed spacer (ITS) regions of the fungus were amplified by polymerase chain ratios (PCR) using the universal fungal rDNA primer pair ITS1/ITS4. The ITS1-5.8S-ITS2 region of the isolates was sequenced and BLAST analyzes were performed. As a result of the analysis, the isolated fungus was determined to be *Colletotrichum cereale*. The spore suspension used in pathogenicity tests was obtained by adding sterile water containing 1% Tween 20 to *C. cereale* isolates grown on PDA and then scraping the surface with a spatula. The spore suspension containing 1x10⁵ spores/ml was sprayed on 15-day-old plants, each containing 35 plants, using a hand sprayer until the plants were completely wet. As a result of pathogenicity test performed on the pots, the disease rate value of the isolate was found to be 92.25%. This is the first report of *Colletotrichum cereale* fungus causing leaf yellowing and drying in turfgrass in Türkiye.

Keywords: *Colletotrichum graminicola*, turfgrass, yellowing, drying

MICRODOCHIUM SPP. CAUSING DISEASES IN TURFGRASS AREAS AND THEIR DAMAGES

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ABSTRACT

Many species of *Microdochium* have been reported to cause disease in turfgrass worldwide. The *Microdochium* species that cause disease in turfgrass are *Microdochium nivale*, *M. bolleyi*, *M. majus*, *M. paspali* and *M. sorghi*. *M. nivale* causes symptoms in the form of round patches in turfgrass areas and is therefore called *Microdochium Patch*, *Fusarium Patch* or *Pink Snow Mold*. *M. nivale* is a species that can cause disease, especially in cool and damp conditions, even in snow-covered areas. *M. nivale* forms patches in turfgrass areas that are initially yellow but eventually have a cream center with a red-purple halo and range in diameter from 5 to 60 cm. Studies conducted in various regions of the world have shown that *M. bolleyi* causes crown and root rots in turfgrasses. It has been observed that the spots caused by the fungus at the base of the plant initially have a wet appearance and that these infected tissues spread in a short time, turning part or all of the plant yellow, and as a result, yellow rings that follow each other regularly or irregularly in round succession form on grass fields. These rings initially appear as small round patches of yellow color, but over time they grow and turn into rings with green centers and yellow edges. *M. sorghi* causes zonate leaf spot disease and rot in *Sorghum* species and other members of the family *Poaceae*. *M. majus* caused brown foot rot on turfgrass, while *M. paspali* causes seaside *Paspalum* disease on *Paspalum vaginatum*.

Keywords: *Fusarium nivale*, *Microdochium bolleyi*, *Microdochium patch*, turfgrass

THE CHARACTERIZATION OF LEA GENE FAMILY IN *P. VULGARIS* USING MULTI-OMICS APPROACH

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ABSTRACT

The Late Embryogenesis Abundant (*LEA*) gene family is vital for many developmental and growth processes in plants. Its members play important roles in responses to abiotic stressors including freezing and desiccation. Due to their notable hydrophilicity and thermal stability characteristics, *LEA* proteins are essential for preserving cell membrane integrity, forming molecular barriers, aiding in ionic binding, and mitigating oxidative damage during extended periods of exposure to abiotic stress conditions. Although *LEA* proteins have been extensively studied in numerous plant species so far, this study represents the first comprehensive exploration and characterization of *LEA* proteins in *Phaseolus vulgaris* genome. In this context, the biochemical/physicochemical properties of the *LEA* gene family at both the gene and protein level have been deeply characterized and defined using various bioinformatics tools. Through comprehensive bioinformatics analyses, we identified 80 *LEA* genes and phylogenetically categorized their proteins into eight major groups specific to the common bean. Our phylogenetic analysis highlighted *LEA_2* as the subfamily with the highest member count. Investigating gene duplications, we uncovered 28 events, including 24 segmental and 4 tandem duplications, significantly influencing the evolutionary trajectory of this gene family. In silico micro-RNA (miRNA) target analyses revealed that 21 *PvLEA* genes were targeted by various miRNAs, with miRN2588 and mir164 being the most prevalent. *PvLEA-63* emerged as the most highly expressed gene across tissues, followed by *PvLEA-27*, *PvLEA-35*, *PvLEA-41*, *PvLEA-49*, and *PvLEA-52*, demonstrating their ubiquitous expression patterns. Moreover, using publicly available RNAseq data, a comparative expression study of *PvLEA* genes was carried out, and expression alterations in *PvLEA-02*, *-08*, *-20*, *-21*, *-40*, *-42*, *-50*, and *-51* genes were detected under both salt and drought stress conditions. Furthermore, qRT-PCR analysis of *PvLEA* genes was conducted in *P. vulgaris* subjected to salt stress in order to confirm the data derived from RNAseq analysis. To sum up, it was seen that some of the *PvLEA* genes might play important roles for abiotic stress defence in *P. vulgaris*. The results obtained from this study might constitute a substantial resource for future researchers interested in unraveling the functional intricacies of *PvLEA* genes.

Keywords: *Phaseolus vulgaris*, *LEA*, RNAseq, Abiotic Stress, Multi-Omics, Bioinformatics

CURRENT EVIDENCE IN THE MANAGEMENT OF NEONATAL SEPSIS

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ABSTRACT

Neonatal sepsis is a bacterial bloodstream infection that causes severe clinical manifestations that are often associated with death or irreversible long-term deficiencies. Death may occur in 3–4% of newborns born in industrialized countries and up to 24% in developing countries. Among survivors, adverse neurodevelopmental outcomes at follow-up, such as cerebral palsy, reduced intellectual and psychomotor development, and visual impairment, are among the most serious long-term outcomes. Most agents that play a role in early-onset sepsis, such as GBS and *E. coli*, are treated with a combination of ampicillin and gentamicin. Routine IVIG use is not recommended to reduce mortality in suspected or proven neonatal infections. Pentoxifylline, Reduced mortality, Shortened hospital stay, but low level of evidence. IgM-rich IgG, Small studies in neonates and adults. Insufficient evidence of benefit. G-CSF or GM-CSF therapy has been evaluated for prophylaxis or treatment. No clear benefit. Insufficient evidence for routine use. Granulocyte transfusion, Marginal reduction in mortality, Attention to pulmonary complications, More studies are needed. Lactoferrin, It has a direct antimicrobial effect on bacteria, fungi, viruses, parasites. Immunomodulatory effect, Activation of antigen-presenting cells, Increases IFN- γ & IL12 release. However, there are not enough studies, routine use is not recommended. There is not enough evidence to recommend routine use in patients with severe sepsis or septic shock, will create a financial burden. Activated Protein C, There is no study that can be analyzed. Effectiveness not shown, Increase in bleeding frequency rhAPC in newborns; It has no place in treatment, It is not appropriate to conduct research. In conclusion, despite intensive research, the diagnosis of neonatal sepsis and the implementation of antibiotic treatment cannot currently be based on a single biomarker. Given the importance of the problem and the need to reduce antibiotic abuse, further studies are urgently needed. However, instead of searching for new biomarkers, it seems more effective to test combinations of two or more of the currently available biomarkers. However, while awaiting the results of new studies, it is advisable to use clinical scores prepared by scientific institutions. Based on maternal risk factors and infant clinical indicators, the risk of sepsis can be calculated and a significant reduction in antibiotic consumption can be achieved.

Keywords: Neonatal Sepsis, Early Onset Sepsis, Neonatal Infections, Late Onset Sepsis

CURRENT APPROACH TO THE CHILD WITH FEVER

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ABSTRACT

Fever is one of the most common complaints in children when they apply to the hospital. Fever is an important symptom of the underlying disease. The first step in evaluating fever is to find the cause. Fever is not a disease, but a physiological response. There is no evidence that fever makes the disease worse. In the evaluation of a child with fever, physical examination, history and laboratory tests should be evaluated together. Experiences combined in the light of current literature are very valuable in determining the source of fever or in cases of fever with no known cause.

Detailed History and Physical Examination

Age, degree of fever, history of contact, travel history, presence of underlying disease, additional complaints, and medication use should be questioned in detail. Vital signs, toxic appearance, and impaired consciousness are carefully evaluated. Misperceptions of fever and management errors are among the current problems.

To overcome the difficulty of diagnosing fever of unknown origin, many countries have developed guidelines to guide physicians in the management and assessment of fever of unknown origin. These aim to identify children at risk of serious infection requiring urgent treatment while avoiding unnecessary investigations and overuse of therapies. Although guidelines exist for children who are assumed to be at low or high risk of serious infection depending on the clinical situation, variability in the definition and management of fever of unknown origin is significant. Hospitalization and cerebrospinal fluid (CSF) analysis rates vary between hospitals for 40% to 90% of children presenting with fever of unknown origin. This difference in practice can be explained by several factors, such as inconsistency in diagnostic and treatment recommendations across guidelines or low compliance with these guidelines.

Conclusion

The aim of our study was to compare the definitions and diagnostic and treatment recommendations published in national and regional fever of unknown origin guidelines in our country. Identifying differences between national and international guidelines with similar healthcare settings may improve the consistency of practice recommendations and inform future guideline development. With this approach, we aim to support increasing consensus on the definition and management of fever of unknown origin in our country.

Keywords: Fever of unknown origin, Approach to a child with fever, Fever, Infection

BIOMASS LIPID PROFILES OF SPIRULINA MICROALGAE AS FOOD SUPPLEMENT

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ABSTRACT

Nutritional composition was determined for special cultivated *Spirulina platensis* and mentioned Thirteen strains of these microalgae were obtained as a percentage of total fat. Total PUFA, SFA contents, n3/n-6 ratios, and eicosapentaenoic acid (EPA)/docosahexaenoic acid (DHA) ratios were obtained. *Spirulina* samples contained 7.53% of average total lipid ($p < 0.01$). Special *Spirulina* was detected as a rich source of alpha linoleic acid (C18:2n-6) (ALA) and gamma-linolenic acid (C18:3n-6) (GLA) and were 15.03% 0.74%, respectively. Besides, the level of arachidonic acid (C20:4n-6) of *Spirulina* was 0.45% of the fatty acids whereas docosapentaenoic acid (DHA) (C22:5n-3) level was high and was in the range of 3.56%. This special cultivated microalgae could be an important food additive. It can be used in salads, soups, and dip foods in food sector and has been utilized in infant formulas, popcorn, spice mixtures, fruit juice mix, potato chips, smoothies made with apples and blueberries, dilled beans, macaroni, and avocado dressing.

Keywords: Microalgae, *Spirulina*, proximate composition, fatty acids, GC, Gas Chromatography

GAMMA IRRADIATED MICROENCAPSULATED BLACK MULBERRY POWDER CONTAINING APIGENIN AND MORUSIN

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ABSTRACT

Currently, the phytochemical composition of black mulberry (*Morus* spp.) and their positive impacts on human health, such as their antioxidant, anticancer, anti-diabetic, and immune-modulating properties, have given an unique importance to these ancient fruits. Fruits, leaves, twigs, and roots of *Morus* spp. are believed to be rich sources of secondary metabolites, including flavonoids (mostly cyanidin-3-O-glucoside), anthocyanins, and such alkaloids. The roots, barks and twigs of black mulberry contain prenylated flavonoids, primarily apigenin and morusin. Owing to the seasonal and sensitive fruit, for the bioavailability of apigenin and morusin of mulberry, the fruit matrix and gum-arabic (as a carrier) was spray-dried by Buchi laboratory type pilot drying unit. The influences of drying parameters and optimum drying conditions were determined by using response surface methodology (RSM). While the inlet air temperature (55-60°C), outlet temperature (36-37°C) and the amount of gum Arabic (35-40%) were independent variables, the phenolic recovery and drying yield were dependent variables, and particles sizes were in the range of 5-10 µm. The solubility, density, hygroscopicity, porosity, cohesiveness, flowability, glass transition temperature, total phenolic content, total anthocyanin content, antioxidant capacity, and color of final mulberry powder and gamma irradiated powder (as 1.5 kGy) were utilized as quality parameters.

KeyWords: Black mulberry powder, Spray-drying, Intermediate product, Food supplement

PRODUCTION OF BETA GLUCAN SUPPLEMENTED MICROENCAPSULATED APPLE PHLORIDZIN (PHLDZ) POWDER AND APPLE PHLDZ BASED GEL CANDY

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ABSTRACT

Apple fruit polyphenolics can be classified into five major subclasses where procyanidins represent the most abundant proportion (between 40% and 89%), followed by hydroxycinnamic acids, flavonols, dihydrochalcones, anthocyanins, and flavan-3-ols. In these profile, phloridzin (Phldz) belongs to the chemical class of dihydrochalcones, phenylpropanoids with structures closely related to those of the immediate flavonoid precursors called as chalcones. Multiple studies have showed that phlorizin can inhibit the sodium–glucose transporter system (SGLT1) on the small intestinal epithelial mucosa and block intestinal glucose absorption by improving insulin sensitivity and glucose uptake. Phlorizin's principal pharmacological action is to produce renal glycosuria and block intestinal glucose absorption through inhibition of the sodium-glucose symporters located in the proximal renal tubule and mucosa of the small intestine. Due to it could increase glucose in the urine, lower blood glucose levels, and prevent reabsorption of glucose, it is used to make medicine. People also consume phlorizin by mouth for fever, malaria, diabetes, and as an antioxidant. In this technopark research manufacturing, the apple floridzin matrix and gum-arabic (as a carrier) was spray-dried by Buchi laboratory type pilot drying unit. The effects of drying parameters and optimum drying conditions were performed by using response surface methodology (RSM). For drying inlet temperature (50-60°C), outlet temperature (35-36°C) and the amount of gum Arabic (25-35%) were independent variables, the phenolic recovery and drying yield were dependent variables, and particles sizes were in the range of 5-15 µm. The physicochemical parameters including solubility, density, hygroscopicity, porosity, cohesiveness, flowability, glass transition temperature, and biochemical parameters containing total phenolics level, antioxidant activity, total anthocyanin level and Hunter Lab color profile of final apple phloridzin powder, selected concentrated beta-glucan fortified apple phloridzin powder were utilized as quality parameters and then arrested the gel candy form.

KeyWords: Black mulberry powder, Spray-drying, Intermediate product, Food supplement

**FLORISTIC BIODIVERSITY STUDY OF THE NATURAL BIOTOPES OF THE
DESERT LOCUST (SCHISTOCERCA GREGARIA FORSSKÅL) IN THE
TADEMAÏT PLATEAU (ALGERIAN SAHARA)**

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ABSTRACT

The Algerian Sahara Desert occupies more than 80% of the country's territory, with edapho-climatic characteristics that are highly restrictive for the spontaneous survival of living organisms. Plants in the Saharan environment play an important role in the life of the desert locust (*Schistocerca gregaria* Forskål), which is a fearsome species due to its massive and destructive invasions. We therefore carried out field surveys and 60 floristic surveys on the Tademaït plateau in order to determine the richness of the flora, biogeographical types and biological types of plant species present in desert Locust biotope. The results obtained enabled us to identify 19 plant species belonging to 14 botanical families. These species belong to a wide range of biogeographical and biological types. These plants are of great interest to the Desert Locust in the biotopes studied

Keywords: Desert locust, floristic biodiversity, natural biotopes, biological types, Tademaït plateau, Sahara, Algeria

STUDY OF WATER TRANSFER IN SOIL. EFFECTS OF TEXTURE AND SALINITY

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ABSTRACT

Salinity in soil and water presents a significant economic barrier to sustainable development on a global scale. This issue is particularly pressing in arid and semi-arid regions, where low precipitation levels fail to remove salts from the root zone, exacerbating the problem. Over 75 countries are currently grappling with salinity challenges, which contribute to a worldwide annual economic loss estimated at \$12 billion due to the salinization of irrigated lands. The economic impact is especially severe in nations where saline land degradation and water resources are prevalent. The most pronounced effects are seen in impoverished farming communities, where salinity exacerbates existing economic hardships. In severe cases, this can lead to the displacement of these communities, with individuals leaving agriculture in search of other sources of income. In various regions, especially arid and semi-arid areas covering about 41% of the Earth's surface (UNDP 1997), saline water is frequently used for irrigation despite often being of suboptimal quality and quantity. Limited annual precipitation (≤ 400 mm) in these areas is insufficient to flush salts from the root zone, leading to their accumulation in the soil due to irrigation practices. This salt buildup affects the soil's physical and chemical characteristics, which in turn influences its effectiveness as a growth medium for plants. Increased salinity and/or sodicity can disrupt soil structure, significantly impacting key hydraulic properties such as water retention and hydraulic conductivity. Examining how different levels of salinity and sodicity impact soil hydraulic properties is essential, as these properties are fundamental to agricultural productivity, ecological and environmental protection, as well as engineering and construction applications. Understanding hydraulic conductivity and its relationship with soil-water interactions is critical for gaining insights into these effects and improving management practices. The experiment involved soil samples placed in columns and irrigated under controlled conditions, with varying gradients of salinity and sodicity applied to different soil textures. The study reveals that varying levels of saline and sodic solutions significantly affect the saturated hydraulic conductivity of several well-characterized soils. It was found that saturated hydraulic conductivity is a critical factor influencing a soil's ability to transmit water, thereby impacting the interactions between soil, plants, and water. The results demonstrate that this property is predominantly controlled by the soil's structure and texture. Additionally, the study shows that changes in the concentration and composition of salts in the soil solution can alter hydraulic conductivity, which in turn affects the soil's hydrodynamic behavior.

Keywords: water transfer, Salinity, Sodicity, Soil Texture, Irrigation, Soil Column.

PRODUCTION OF POLYHYDROXYALKANOATES AND EXTRACELLULAR PRODUCTS FROM PSEUDOMONAS PUTIDA

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ABSTRACT

With an annual production of more than 368 million tons of plastic, the management of their accumulation is constantly being raised. Indeed, conventional petrochemical plastics are either destroyed after their use, producing toxic and polluting fumes, or accumulated in the environment, particularly in the oceans. Thus, the interest in the manufacture of biodegradable plastics is growing. Polyhydroxyalkanoates (PHAs) are a type of biosourced and biodegradable polymers that are particularly interesting due to their structural variety and their resemblance to conventional plastics. However, their biological manufacture is currently based on fermentation using pure microbial cultures, natural or recombinant. Pseudomonas species have been chosen as producers of PHAs in many recent studies. Being metabolically versatile and possessing a remarkable tolerance to a wide range of carbon sources, these bacteria have become a cell factory for the production of PHAs. In the present study, strains of the genus Pseudomonas characterized by their ability to synthesize intracellular lipids were isolated from wastewater samples. Out of all eighteen (18) isolates, 12 were screened with a specific Sudan Black B stain, 08 strains have a high potential for the production of PHAs. As part of the production and extraction of PHAs, a batch fermentation was launched with colony 12 for 18 hours and the biomass recovered by centrifugation. An extraction of polymers with chloroform is carried out, then the screened strains are lyophilized. For sustainable production, it is essential to reduce the costs of carbon sources and improve process efficiency, including using waste as a fermentation substrate.

Keywords: Bioplastic, Polyhydroxyalkanoates (PHAs), Batch, Pseudomonas putida, Biodegradable

PAST, PRESENT AND FUTURE OF VEGETABLE PRODUCTION IN TURKEY

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ABSTRACT

Turkey has a wide range of vegetable production due to its geographical location and climatic diversity. Vegetable production is an important part of the country's economy and has a high value in terms of both domestic consumption and exports. This review analyses the history, current status and future projections of vegetable production in Turkey. The review examines the place and importance of vegetable production in Turkey's agricultural sector and a wide range of production techniques, from traditional farming methods to modern farming practices and organic-sustainable farming methods. In addition, technological developments and sustainability issues are discussed in the context of future projections in vegetable production. In recent years, digitalisation, smart farming and environmental sustainability in agriculture and innovative practices to make vegetable production more efficient and sustainable have become more prominent. This general perspective is crucial to determine the future potential and direction of vegetable production in Turkey. Turkey's vegetable production has undergone a continuous transformation from the past to the present, and this transformation is expected to continue in the future. Technology and sustainability oriented approaches will be the key elements of this process. Turkey's vegetable production has evolved from traditional methods to modern technologies from the past to the present and is expected to continue to evolve with sustainability and innovation oriented approaches in the future. This process also provides a perspective on the development trends and application expectations in vegetable production.

Keywords: Sustainability, technology and innovation, vegetable production

CONTRIBUTION TO A CHARACTERIZATION OF THE POSTPARTUM PERIOD IN THE CAMEL (CAMELUS DROMEDARIUS)

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ABSTRACT

In the arid and semi-arid areas of Algeria, camels represent an inestimable wealth for the indigenous population. These animals provide meat, milk, wool and work. In the natural breeding environment, the camel herd is always faced with the constraints of a hostile environment characterized by low productivity ranges, droughts and diseases, as it has not benefited from modern technical progress such as modern genetic selection, reproductive performance techniques and modern biotechnology, which has repercussions on productions that remain low. Among the key moments of reproduction is the postpartum period. This phase determines the future of the female's reproductive career. The bibliography announces different information concerning the duration of this period, some authors announce that it is reduced and the resumption of ovarian activity is early, comparable to that of the mare 15 to 20 days (Derar et al 2014, Slama et al; 1999) on the other hand other authors announce a long duration comparable to that of the cow of 35 to 45 days (Ilias; 1990, Musa et al; 1987). The main objective of this work was to describe the postpartum period in the camel and to verify the hypothesis of reduced uterine involution and the resumption of early ovarian activity. For this, ten camels were used to verify this hypothesis. The ten camels were followed in the postpartum period (D1 D3, D7, D10, D15, D18, D21, D24, D27, D30, D33, D37, D40) on the gynecological level, ultrasound of the ovaries, histology of the endometrium and on the hormonal level (17 β estradiol and progesterone) The results following direct clinical observations and vaginoscopy showed that the lochia or secretions are hemorrhagic and blackish, the mucous membranes are red edematous during the first week to become clear and the color of the mucous membranes is light pink thereafter. Ultrasound images of the ovaries show ovarian structures (follicles) in different phases of development and are positively correlated with estrogen levels ($P \leq 0.01$) to become negatively correlated in the follicular atresia phase, the progesterone level is always less than 0.5 ng with a slight increase (0.8 ng) in the follicular atresia phase. Histologically, the study of the uterine endometrial biopsy showed that the complete recovery of the endometrial epithelium was in 21 days postpartum. Our study on the postpartum period in the camel showed that the resumption of ovarian activity is precise and the uterine involution is short and complete in three weeks.

Key words: female camel, postpartum period, gynecology, ovarian activity, endometrial histology and hormones.

ULTRASOUND AND HORMONAL MONITORING OF OVARIAN ACTIVITY IN THE CAMEL (CAMELUS DROMEDARIUS) DURING THE POSTPARTUM PERIOD

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ABSTRACT

Ten Sahrawi female dromedary, aged 10 to 12 years, were used to determine the relationship between follicle size and plasma levels of 17 β estradiol and progesterone. Whole blood was collected in dry tubes and the ovarian structures were followed by ultrasound for 40 days after parturition, at an interval of 3 days, after parturition. Ultrasound coupled with the dosage of 17 β estradiol and progesterone allowed us to identify 4 phases of follicular development. The plasma kinetics of the 2 hormones is inversely proportional during the 4 phases. The level of 17 β estradiol increased linearly during the phases of follicular development, the recruitment phase (follicle size ≤ 3 mm) and growth (3 mm < follicles ≤ 9 mm) with a content 24.1 ± 0.54 pg/ml and 38 ± 6.13 pg/ml respectively and reached a peak of 51.82 ± 12.22 pg/ml during maturation (9mm < follicles ≤ 21 mm). Then this content decreased to 31.17 ± 11.17 pg/ml in the atresia phase (follicles > 21 mm). During the recruitment phase, the plasma progesterone content was 0.42 ± 0.28 ng/ml. Then, we recorded a continuous decrease in this content from the maturation phase, 0.21 ± 0.17 ng/ml, until the growth phase, 0.19 ± 0.006 ng/ml, the latter was followed a slight increase in the level of this hormone during the atresia phase 0.56 ± 0.13 ng/ml. Six camels showed follicles, ≥ 5 mm in diameter, on the 10th day postpartum. On the 21st day, the 10 camels showed follicles ≥ 10 mm in size. Statistical analysis showed a significant correlation between follicle size and 17 β estradiol concentrations (P<0.001). This study confirms the precocity of ovarian activity in female dromedary after parturition.

Key words: female dromedary, Postpartum period , ovarian follicle , 17 β estradiol, progesterone.

EFFECT OF ADDING SOYBEAN OIL TO DIESEL FUEL ON ENGINE CHARACTERISTICS

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ABSTRACT

Biodiesel fuels are seen as an important resource due to the environmental damage caused by exhaust emissions from the use of fossil fuels, the increase in global warming and the rise in oil prices. As an alternative, the use of biodiesel by blending certain percentages of biodiesel into diesel fuel is preferred due to both sustainability and some advantages. In this study, 10% soybean oil was added to the fuel used in a single-cylinder diesel engine and the changes in engine power, fuel consumption and exhaust emissions were experimentally investigated. According to the results of the study, it was observed that the engine power was almost the same with the addition of soybean oil to the diesel fuel, but there was an increase in exhaust emissions with some increase in fuel consumption. For this reason, it is clear that further experimental studies should be carried out by adding soybean oil with different characteristics and proportions to be used in diesel engines.

Key words: Energy, diesel engine, emission, biodiesel, sustainability

THE ROLE OF CHATBOTS IN SUPPORT REQUEST SYSTEMS AND THE POTENTIAL OF CHATGPT

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ABSTRACT

This study examines the integration of Artificial Intelligence (AI)-based chatbots into support request systems within technical departments, focusing on the potential provided by advanced language models such as ChatGPT. In the field of corporate technical support, the use of chatbots for customer service is increasing, offering time-saving solutions that enhance human-machine interaction. Chatbots reduce the workload of technical departments by providing quick and practical answers to certain issues, while also playing a vital role in offering initial guidance and basic support for more complex problems.

In this context, the study discusses the advantages of chatbot usage in Information Technology (IT) departments, current application examples of these technologies, and particularly the level of interaction provided by advanced language models like ChatGPT. Presenting suggestions for future development areas, this study also focuses on the technical requirements and processes that institutions need to consider when integrating AI-based support systems into their IT infrastructure. Accordingly, it provides insights on how language models like ChatGPT can be further developed and integrated to offer more comprehensive, flexible, and effective solutions in support request systems.

Keywords: Artificial Intelligence, ChatGPT, Transformer, NLP, Chatbots, Support Request Systems

RESPONSE OF MAIZE BREEDING TO CLIMATE CHANGE

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ABSTRACT

The global challenge of agriculture in the 21st century is to meet the increasing food demand of the growing world population under increasing threats from the climate change. Maize is the species with highest world production and the most widely planted agricultural crop. The grain has high nutritional value and this crop plays an irreplaceable role in ensuring food security. Breeders and the agricultural community around the world will have to expand the capacity of current breeding programs to increase yield potentials in the conditions of climate changes. In the paper the effect of key factors such warmer temperatures, changes in rainfall and higher concentrations of CO₂ on the productivity of maize were reviewed based on the literature. The most sensitive stages to drought were shown. Breeding tools to mitigate unfavorable effect of climate changes on grain yield of maize were reviewed. Breeding program achievements of the Maize Research Institute – Knezha, Bulgaria was shown. New hybrids Kneja 461 and Kneja 561 due to their drought tolerance were found as more productive comparing to the standards Kneja 435 and Kneja 509 in new conditions. Future prospects of the breeding of maize were shown as development of maize varieties resistant to high temperatures; selection and improvement of maize varieties capable of maintaining growth and productivity under changed environment, ect.

Key words: maize, climate change, drought

IMPACT OF TONIFERTAL 4H SUPPLEMENTATION ON ENHANCING RABBIT FERTILITY

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ABSTRACT

The aim of our study is to evaluate the effect of Tonifertal 4H supplementation on reproductive parameters and weight in both male and female rabbits. This research was conducted at the Blida 1 University station with 20 rabbits (8 males, average age 5 months, mean weight of 3522g, and 12 females, aged 4 to 8 months, mean weight of 2267g). We monitored various reproductive parameters through weighing and using the CASA system. Our findings indicate that Tonifertal 4H supplementation led to improvements in reproductive parameters and weight gain. A significant difference ($p < 0.05$) was found between treated and not treated animals. Treated females showed a fertility rate of 83%, while treated males exhibited positive outcomes: semen volume 1.05ml, semen pH=7, vitality $72.375 \pm 12\%$, mass motility score 7.54 and individual motility score 3.21. In conclusion, the use of essential oils enhances reproductive parameters in rabbits.

Keywords: Rabbits, essential oil, fertility, reproduction, weight, CASA.

STUDYING THE EFFECT OF AN AQUEOUS EXTRACT OF TEUCRIUM POLIUM L. ON MERCURY TOXICITY INDUCED ALTERATIONS IN LIPID PROFILES (LIPID FRACTIONS) IN LIVER TISSUE OF RATS

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ABSTRACT

Mercury is a highly toxic metal that can cause profound deterioration of vital metabolic processes. Although there are several reports delineating the biochemical toxicity of mercury which induced oxidative stress by generation of reactive oxygen species initiates various pathological conditions in humans. In the last few years, Some studies have focused their efforts on the use of plant-derived compounds as natural antioxidants which has been found to be beneficial in metal toxicity. The present study, we selected a plant *Teucrium polium* L. The present work aims to investigate the role of an Aqueous Extract of *Teucrium polium* L in reversing the deleterious effects of HgCl₂ exposure on the different lipid fractions (phospholipids liver). To achieve the study, rats were assigned to four groups : Group control received intraperitoneal solutions of 0.9% saline solution (NaCl) ; Group HgCl₂ received i.p. injection of HgCl₂ at a dose of 2 mg/kg once a week ; Group intoxicated treated were injected with HgCl₂ as for group 2 and received aqueous extract of *T. polium* (125mg/kg) by gavage for 45 consecutive days ; Group treated received (125mg/kg bw /day)aqueous extract of *T. polium* by gavage. At the endpoint of the experiment (45 days), the separation of lipid fractions (phospholipids) was carried out by the thin layer chromatography method after extraction the total lipids of the liver each group. Phospholipids in chromatographic fractions are estimated by phosphorus determination. Study results revealed a significant (P <0.05 ; P <0.01 ; P <0.001) elevation in lipid fractions Lysophospholipid, Sphingomyelin, Phosphatidylcholine , Phosphatidylinositol , Phosphatidylserine ,Phosphatidylethanolamine, phosphatidic acids and Cardiolipin in HgCl₂ group comparison with control group .However, aqueous extract of *T. polium* treatment has led to a significant (P <0.05 ; P <0.01 ; P <0.001) decrease in liver levels of different class of phospholipids in intoxicated treated group in comparison with the HgCl₂ group. Altogether, It is concluded that aqueous extract of *T. polium* administration has the ability to increase the resistance of liver against the HgCl₂-induced changes in lipid synthesis.

Keywords: HgCl₂-toxicity, oxidative stress, *Teucrium polium* L, lipid fractions

MERCURY-INDUCED ACUTE NEPHROTOXICITY IN RATS: TREATMENT WITH AQUEOUS EXTRACT OF PISTACIA ATLANTICA (DESF)

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ABSTRACT

Mercury is known to accumulate in living organisms, causing serious damage. An important characteristic of mercury toxicity is the generation of free radicals. The purpose of this study is to evaluate the protective effect of the aqueous extract of *Pistacia atlantica* against mercury-induced oxidative stress in rats. Mercury chloride (HgCl₂) was administered intraperitoneally (at 2.5 mg/kg once per week), and *P. atlantica* was given orally by gavage at a daily dose of 150 mg/kg body weight to rats for 32 days. These results show that HgCl₂ caused a significant depletion of the glutathione level and the enzymatic activity of the antioxidant system catalase (CAT), Glutathion peroxidase (GPx), Glutathion S transferase (GST) at the renal level. These changes were associated with increased lipid peroxidation expressed by a high level of renal Malondialdehyde (MDA) and hydroperoxides (LOOH). However, supplementation with the aqueous extract of *Pistacia atlantica* modified the toxic effects of mercury by reducing lipid peroxidation. These findings may indicate an antioxidant and protective effect of this plant's extract against mercury's harmful effect

Keywords: Mercury, Liver, Kidney, Redox status, *Pistacia atlantica*, Rat

OXIDATIVE STRESS IN VICIA FABA L. SEEDLINGS UNDER DIFFERENT ABIOTIC STRESSES: SALINITY, WATER DEFICIT, AND HEAVY METAL STRESS

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ABSTRACT

We first studied the consequences of abiotic stresses (salinity, water deficit, and heavy metal stress) on the activity of polyphenols and flavonoids. The results showed a significant accumulation of polyphenols and flavonoids in various organs of *Vicia faba* seedlings. These findings highlight the crucial role of secondary metabolites in defending against oxidative stress caused by different abiotic stresses, in detoxifying reactive oxygen species (ROS) under stress conditions. In the second part of our study, we focused on the extract of *Pistacia atlantica*, which demonstrated a strong antioxidant capacity compared to other extracts. This extract was introduced to seedlings stressed by mercuric chloride at a concentration of 15 mg/L for 48 hours. We found that mercuric chloride rapidly penetrated the root system and induced significant oxidative stress within just 24 hours by causing genotoxic effects in root cells. The results showed that DNA repair occurred in the presence of the aqueous extract of *Pistacia atlantica*, along with an increase in polyphenol and flavonoid levels.

Keywords: Oxidative Stress, *Vicia faba*, Abiotic Stresses

DETECTION OF MICROPLASTICS NEAR THE ESTUARY OF KAVAJA RIVER USING RAMAN SPECTROSCOPY

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ABSTRACT

The Department of Instrumental Analytical Methods has conducted a study on the contamination levels of aquatic ecosystems with microplastics using molecular Raman spectroscopy. The widespread use of plastic materials has led to an alarming increase in microplastic pollution across various environments, including rivers, lakes, and marine areas. This study aims to establish a comprehensive methodology for collecting, preparing, and identifying microplastic samples. As discussed in this article, Raman spectroscopy offers both advantages and limitations for this purpose, with special attention required for the chemical treatment of samples. The study presents the sample collection methodology, the chemical preparation process, and the results obtained at this stage of the research.

Keywords: Raman Spectroscopy, Microplastics, Beach Sediments, Environment, Ecosystems,

SEA URCHIN POPULATION OF TURKEY IN TERMS OF BIOACTIVE POTENTIALS

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ABSTRACT

Sea urchin is a free-living, brightly colored benthic vertebrate in deep water, in the phylum *Echinodermata* and class *Echinoidea*. Spherical, covered with spines and a shell of about 3 to 10 cm, it is found in oceans worldwide. The shell and spines of the sea urchin, which has approximately 950 species, are composed of magnesium calcium carbonate compounds. Some species live between high and low tide lines close to the coast, while most live at a depth of 5000 meters. Morphologically, it consists of a mouth, anus, spines, and tube feet called podium. It moves through the water thanks to its sticky tube feet and spines. This creature, which is distributed in all oceans in the world, is found in the waters of our country with 20 species. The species found in our country are mostly black. *Echinocyamus pusillus* in the Black Sea, *Arbacia lixula*, *Cidaris cidaris*, *Echinus melo* in the Marmara Sea, *Sphaerechinus granularis*, *Pssammechinus microtubercularus* *Paracentrotus lividus* in the Aegean Sea and finally *Diadema setosum* in the Mediterranean Sea. In Turkey, *Paracentrotus lividus* is the only commercially important echinoid species processed and consumed as food. In addition to being a delicious food, sea urchin has many bioactive substances such as basic polysaccharides, fatty acids, lipids, actin, and myosin proteins. Among the bioactive compounds in its structure, the antimicrobial effect of polyunsaturated fatty acids and β -carotene, the anti-inflammatory effect of the glycopeptide fraction obtained from internal organs, and the potential anticancer activity of steroid compounds against human leukemia cell line has been reported in many studies. This study aims to give information about the sea urchin population in Turkey and explain the antimicrobial, antioxidant, and anticancer effects of the bioactive potential of this organism.

Keywords: Sea urchin, Diversity in Turkish seas, Bioactivity, Antimicrobial, Antioxidant, Anticancer.

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