TUNISIAN ASSOCIATION OF BIOLOGICAL SCIENCES
ASSOCIATION TUNISIENNE DES SCIENCES BIOLOGIQUES
الجمعية التونسية للعلوم البيولوجية

34TH INTERNATIONAL CONGRESS OF BIOLOGICAL SCIENCES AND BIOTECHNOLOGY

Book of Abstracts

JUNE, 25 – 28, 2025
Sousse - TUNISIA

Themes

- Biochemistry & Molecular Biology
- Animal Biology, Physiology & Ecology
- Plant Biology, Physiology & Ecology
- Biotechnology
- Environment
- Genetics & Immunology
- Microbiology & Virology
- Pharmacology & Toxicology

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Chers collègues, chers participants,

Nous sommes honorés d'organiser le 34ème congrès international des Sciences Biologiques et de Biotechnologie, et nous souhaitons la bienvenue à tous les chercheurs et doctorants tunisiens, maghrébins et européens qui ont manifesté leur intérêt pour participer à cet évènement.

Le comité d'organisation a reçu, comme d'habitude, des centaines de demandes de présentations orales et par affiche, reflétant la bonne réputation de l'ATSB, un haut niveau scientifique et des connaissances d'actualité couvrant plusieurs domaines.

Lors des sessions plénières, des conférences de haut niveau dans des thématiques pertinentes et innovantes de la recherche seront présentées par d'éminents chercheurs Des mini-conférences plénières ont été aussi programmées pour encourager les jeunes chercheurs.

Après avoir renoué contact avec la Fédération Européenne de Sociétés de Biochimie (FEBS), le bureau exécutif de l'ATSB n'a cessé de diversifier les activités avec ce partenaire, afin de faire profiter nos adhérents, de toutes les opportunités proposées par le FEBS tel que, l'organisation d'ateliers internationaux, la recommandation d'adhérents pour l'octroi de bourses et de représentants ATSB pour être des conférenciers dans les événements FEBS à venir.

Nous invitons tous les adhérents à participer activement aux différentes activités durant le congrès afin que notre association puisse jouer son rôle dans la promotion de la recherche scientifique et continuer à rayonner à l'échelle nationale et internationale.

Nous tenons à remercier les responsables de l'Hôtel ELMOURADI Palce, Kantaoui Sousse et le personnel pour leur accueil et leur professionnalisme et pour avoir bien voulu nous accorder toutes les commodités afin que cette manifestation se déroule dans les meilleures conditions.

Le Bureau souhaite beaucoup de réussite et succès et un séjour agréable à tous les participants.

Le comité d'organisation

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Programme

Wednesday, 25 June 2025

13h00 -16h30	***Registration***	
16h30 -17h00	***Opening Ceremony*** ATSB Activities, Tribute to Former Members **Pr. Issam Smaali, ATSB President** Few Words to Introduce FEBS /Education **Pr. Hatem Fakhfakh, ATSB Vice-President** *No registrations, they will resume after*	
17h00-18h00	***Plenary Conference 1***	
	Moderators	Pr. Chokri Messaoud & Pr. Nejib Mazouki
	Presented by	**Pr. Haythem Mhadhbi**, Centre de Biotechnologie de Borj Cedria
	Title	Plant Biostimulation: A Practical Solution for Supporting Sustainable Agriculture and Environnement Safty?
18h00 -20h00	***Plenary Mini-Conferences***	
	Moderators	Pr. Faiza Fakhfakh, Pr. Abdelilah Chaoui & Pr. Hafedh Belguith
	18h00	**Mini-Conference 1:** **Presented by** Dr. Aymen Ezzine, Institut National des Sciences Appliquées et de Technologie **Title:** Enzymes in Post-Harvest Fruit Treatment as Green Solutions for Sustainable Food Production: Challenges and opportunities.
	18h30	**Mini-Conference 2:** **Presented by** Dr. Nejia Farhat, Centre de Biotechnologie de Borj Cedria **Title:** Using Proteomic Approach to Deeper Understand Halophyte Abiotic Stress Responses: What About *Cakile maritima*?
	19h00	**Mini-Conference 3:** **Presented by** Dr. Lamia Sakouhi, Institut SylvoPastoral-Tabarka & Faculté des Sciences de Bizerte **Title:** Correction of Heavy Metal Phytotoxicity by Environmentally Friendly Bio-Inpouts: Case of 5-Aminolevulinic Acid and Melatonin.
	19h30	**Mini-Conference 4:** **Presented by** Dr. Walid Ben Selma, Institut Supérieur des Sciences Appliquées et de Technologie de Mahdia Title: The Synergistic Effect of *Thymus vulgaris* Essential Oil and Carvacrol with Imipenem Against Carbapenem-Resistant *Acinetobacter baumannii*: in vitro, Molecular Docking, and Molecular Dynamics Studies.
20h00	***Dinner***	

Thursday, 26 June 2025

8h30 -10h30	***3 Sessions of Oral Communications***		
	Room 1:	**Room 2:**	**Room 3:**
	Biotechnology 1	**Plant Physiology & Biology 1**	**Environment 1**
	Moderators: Pr. Hanem Makni Pr. Bassam Jaouadi Pr. Med Ali Borgi	**Moderators:** Pr. Mohamed Kharrat Pr. Zouhaier Abbes Pr. Haythem Mhadhbi	**Moderators:** Pr. Raouf Ben Salah Pr. Hassib Bouallagui Pr. Anis Ben Hsouna
	Comm N° 56-60, 62, 63	**Comm N° 36-43**	**Comm N° 55, 86-89, 91-93**
10h30-10h45	***Coffee Break*** *Free service at the bar (all-in)*		
10h45-11h45	***Plenary Conference 2***		
	Moderators	Pr. Wahbi Djebali & Pr. Zouhaier Abbes	
	Presented by	**Pr. Moez Amri**, UM6P - Université Mohammed VI Polytechnique, Maroc	
	Title	Breeding for Resistance to Broomrapes: The Cornerstone of an Integrated and Successful Control Strategy.	
	3 Sessions of Oral Communications		
	Room 1:	**Room 2:**	**Room 3:**
	Biochemistry & MB 1	**Pharmaco-Toxicology 1**	**Animal Physiology & Biology 1**
	Moderators: Pr. Hasna Mohammadi Pr. Abderraouf Kenani Pr. Abidi Ferid	**Moderators:** Pr. Hichem Sebai Pr. Karima Belguith Pr. Raouf Kenani	**Moderators:** Pr. Olfa Tebourbi Pr. Mohamed Amine Zaouali Pr. Khémais Ben Rhouma
	Comm N° 1, 3-7	**Comm N° 17, 111, 115, 118, 119, 122**	**Comm N° 22-27**
13h15 - 14h30	***Lunch***		
14h30 - 16h30	***Poster Session A:***	**15-20, 35-39, 41-49, 51-65, 89-94**	
	Moderators: Pr. Riadh Ben Salah, Pr. Monia Elbour, Pr. Hafedh Belguith, Dr. Aymen Ezzine, Dr. Emna Harigua, Dr. Nawrez Ktari, Dr. Nizar Chaira, Dr. Soumaya Bourgou,		
16h30 –16h45	***Coffee Break*** *Free service at the bar (all-in)*		
16h45-17h45	***Plenary Conference 3***		
	Moderators	Pr. Hatem Fakhfakh & Pr. Mohamed Makni	
	Presented by	**Pr. Erij Messadi**, Institut Pasteur de Tunis	
	Title	Linking Basic Cardiovascular Research to the Design and Development of Clinical Drugs: the Therapeutic Potential of Venom Peptides.	
17h45 - 19h30	***3 Sessions of Oral Communications***		
	Room 1:	**Room 2:**	**Room 3:**
	Biotechnology 2	**Biochemistry & MB 2**	**Pharmaco-Toxicology 2**
	Moderators: Pr. Bassem Jaouadi Pr. Issam Smaali	**Moderators:** Pr. Ines Elbini Pr. Abdelrazak Maaroufi	**Moderators:** Pr. Erij Messadi Pr. Slah Ouerhani
	Comm N° 65-69, 71, 72	**Comm N° 9, 10, 12-15**	**Comm N° 112-114, 116, 117, 120, 121, 123**
19h30	***Dinner***		

Friday, 27 June 2025

8h30 -10h30	***3 Sessions of Oral Communications***		
	Room 1:	**Room 2:**	**Room 3:**
	Biotechnology 3	**Plant Physiology & Biology 2**	**Animal Physiology & Biology 2**
	Moderators: Pr. Amel Bouanane Pr. Karima Belguith	**Moderators:** Pr. Abdelilah Chaoui Pr. Riadh Ksouri	**Moderators:** Pr. Nabil Attia Pr. Nabil Hamdi
	Comm N° 73, 74, 76, 78-80, 83, 84	**Comm N° 44-49, 51, 52**	**Comm N° 11, 28-35**
10h30-10h45	***Coffee Break*** *Free service at the bar (all-in)*		
10h45-11h45	***Plenary Conference 4***		
	Moderators	Pr. Issam Smaali & Pr. Mokhtar Hamdi	
	Presented by	**Pr. Mohamed Chemkha**, Centre de Biotechnologie de Sfax	
	Title	Treatment and Recovery of Waste and By-Products in a Circular Economy	
11h45-13h15	***3 Sessions of Oral Communications (+ One day)***		
	Room 1:	**Room 2:**	**Room 3:**
	Biochem/Biotech/Plant	**Microbio/Environment**	**Genetics/ Immunology**
	Moderators: Pr. Manel Ben Mhadheb Pr. Neila Trifi Pr. Moez Rhimi	**Moderators:** Pr. Faten Gorsane Pr. Salwa Zehdi Pr. Monia Elbour	**Moderators:** Pr. Faiza Fakhfakh Pr. Slah Ouerhani Pr. Mohamed Makni
	Comm N° 2, 8, 50, 72, 80, 107	**Comm N°85, 90, 96, 108, 109, 110**	**Comm N° 102-106**
13h15 - 14h30	***Lunch***		
14h30 - 16h30	***Poster Session B:***	**2-8, 12, 13, 21-27, 29-33, 66-71, 73-76, 79, 80, 82-88** ***One day:*** **1, 9,10, 11, 14, 28, 34, 40, 51, 72, 77, 78, 81,95**	
	Moderators: Pr. Abdelilah Chaoui Pr. Wahbi Djebali, Dr. Faouzi Horchani, Dr. Hasna Mohammadi, Dr. Hafedh Hajlaoui, Dr. Fatma Hmaied, Dr. Anouar Feriani, Dr. Arafet Manaa		
16h30 –16h45	***Coffee Break*** *Free service at the bar (all-in)*		
16h45-17h45	***Plenary Conference 5***		
	Moderators	Pr. Slah Ouerhani & Pr. Abdelilah Chaoui	
	Presented by	**Pr. Chiraz Abbes Dhouib**, Faculté des Sciences de Bizerte	
	Title	Bacterial Bioremediation and Static Magnetic Fields:	
17h45 - 19h30	***3 Sessions of Oral Communications***		
	Room 1:	**Room 2:**	**Room 3:**
	Biochemistry & MB 3	**Plant Physiology & Biology 3**	**Environment 2**
	Moderators: Pr. Haythem Mhadhbi Pr. Mourad Jridi	**Moderators:** Pr. Chokri Messoud Pr. Krouma Abdelmajid	**Moderators:** Pr. Mohamed Chamkha Pr. Wahbi Djebali
	Comm N° 16, 18-21, 53, 54	**Comm N° 61, 64, 70, 75, 77, 81, 82**	**Comm N° 94, 95, 97-101**
19h30	***Dinner***		
21H: *ELECTIVE GENERAL ASSEMBLY*			

5

Saturday, 28 June 2024

09h00 -10h00	***Plenary Conference 6***	
	Moderators	Pr. Manel Ben Mhadheb & Pr. Riadh Ben Salah
	Presented by	**Pr. Monia El Bour**, Institut National des Sciences et Technologies de la Mer
	Title	Marine Epibiont Bacteria: Biodiversity and Antibacterial Agents to Overcome Antibiotic Resistance.
10h00-10h15	***Coffee Break*** *Free service at the bar (all-in)*	
10h15-11h45	***Plenary Mini-Conferences*** Pr. Riadh Ksouri, Pr. Khémais Ben Rhouma, Pr. Nabil Attia	
10h15-10h45	**Mini-Conference 5:** **Presented by** Dr. Thouraya Majoul, Institut Supérieur des Sciences et Technologie de l'Environnement **Title:** Grape Seed Extract: A Multifaceted Approach to Health and Sustainability.	
10h45-11h15	**Mini-Conference 6:** **Presented by** Dr. Mariem Ben Jemaa, Centre de Biotechnologie de Borj Cedria **Title:** The Functional Enrichment of Foods with Essential Oils: Between Bioactive Potential and Technological Constraints.	
11h15-11h45	**Mini-Conference 7:** **Presented by** Dr. Bouchra Ben Mansour, Faculté des Sciences de Bizerte **Title:** Diversity of Ectoparasites of *Teleost* and *Chondrichtyan* Fishes from Tunisian Coasts.	
11h45 - 12h00	***Closing Ceremony***	
12h00	***Lunch & Departure***	

CONFERENCES

CONFÉRENCE N°: 1.

PLANT BIO STIMULATION: A PRACTICAL SOLUTION FOR SUPPORTING SUSTAINABLE AGRICULTURE AND ENVIRONMENT SAFETY?

ISSAM NOUAIRI, MARWA BATNINI, NADIA KALALA, MANEL CHAOUACHI, AMAL BOUALLEGUE, EYA AZIZI, AMENI BEJAOUI, RANIA NASRA, MONCEF MRABET, HAYTHEM MHADHBI

Laboratory of Legumes and sustainable Agrosystems, Center of Biotechnology of Borj Cedria (L_2AD, CBBC)

The Duality between food production enhancing to satisfy world demographic augmentation and care of health and environmental safety is a complex subject attracting the concern of the overall society.

Plant intensive production is essential for human and animal feeding, and it is largely based on chemical inputs (Fertilizers and pesticides) that had many health and environment harmful effects.

Maintaining sufficient production with less risks depends on alternative solutions known as green or ecofriendly processes. In the last decade, **plant bio-stimulation** is presented as one of the most useful process. It is based on simple and "cheap" biotechnology using molecules, microbes, nanoparticles…. to enhance plant nutritional status, stress resilience and pathogen protective reaction. Many research results showed spectacular effects of this biotechnological process, leading to a similar yield with conventional agriculture production with an important waving of chemical inputs use. The number of green process products is more and more important in the agriculture market. However, a significant number of scientist and mainly producers are not completely convinced by this solution and highlight the limits and shortcoming of this technology.

In this presentation we will discuss scientific and practical advances in the field of plant biostimulation, based on the research activities carried out in our laboratory (L_2AD, CBBC), focusing on success examples, but also on the problems and limitations that confront application of this technology at field scale worldwide and mainly in Tunisian agrosystems conditions.

Keywords: Bio-stimulation, green biotechnology, environment safety, plant production, sustainable agriculture

CONFÉRENCE N°: 2.

BREEDING FOR RESISTANCE TO BROOMRAPES: THE CORNERSTONE OF AN INTEGRATED AND SUCCESSFUL CONTROL STRATEGY

AMRI MOEZ[1*], YOUNESS EN-NAHLI[1], ARIJ BOUAZZI[2], SANAA OULKHIR[1], SALMA ROUICHI[1], KAMAL HEJJAOUI[1], SIWAR THABTI[2], IMEN TRABELSI[3], FADOUA ABDALLAH[4], KHALIL KHAMMASSI[2], ZOUHAIER ABBES[2] MOHAMED KHARRAT[2]

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[2] Field Crop Laboratory, Institut National de la Recherche Agronomique de Tunisie (INRAT), University of Carthage, Tunisia
[3] Agronomy Lab., Institut National de la Recherche Agronomique de Tunisie (INRAT), University of Carthage, Tunisia
[4] The International Center for Agriculture Research in the Dry Areas (ICARDA), Rabat – Morocco
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Broomrapes (*Orobanche* spp. and *Phelipanche* spp.) are holoparasitic plants that represent one of the most devastating biotic constraints to legume crops. In heavily infested fields, broomrape infestation leads to significant yield losses in key legume crops, particularly faba bean (*Vicia faba* L.), lentil (*Lens culinaris* Medik.), Pea (*Pisum sativum* L.), grass pea (*Lathyrus sativus*), and chickpea (*Cicer arietinum* L.). Integrated control management based on genetic resistance remains the most effective strategy to control broomrapes. Breeding for broomrape resistance in food legumes remains a major challenge due to the complex and specific interactions between host plants and the parasitic weed. Such interaction involves multiple mechanisms operating at different pre-attachment and post-attachment stages of the parasite's infection process. The development of resistant germplasm requires a deep understanding of these mechanisms and their genetic control. Since the 1980s, significant research efforts have been made in several countries, including Egypt, Tunisia, Spain, Morocco, and Ethiopia, resulting in the selection, development and release of several broomrape-resistant faba bean varieties such as Najeh, Chourouk, Chams and Zaher in Tunisia, Baraca in Spain and Giza 4, Giza 842, Sakha, Misr1, Misr3 in Egypt. These varieties have been largely adopted by farmers and have played a critical role and significantly contributed to the development and re-introduction of faba bean in infested areas. Recent research advances have also identified promising resistance sources to *Orobanche crenata* in both wild and cultivated species of lentil (*Lens* spp.) and grass pea (*Lathyrus* spp.), offering valuable genetic resources for future breeding programs.

Keywords : Food legumes, broomrapes, resistance, genetic gain

CONFÉRENCE N°: 3.

LINKING BASIC CARDIOVASCULAR RESEARCH TO THE DESIGN AND DEVELOPMENT OF CLINICAL DRUGS: THE THERAPEUTIC POTENTIAL OF VENOM PEPTIDES.

ERIJ MESSADI

Plateforme de Physiologie et Physiopathologie Cardiovasculaires (P2C), Laboratoire des Biomolécules, Venins et Applications Théranostiques (LBVAT, LR20IPT01), Institut Pasteur de Tunis, Université Tunis El Manar, 1068 Tunis, Tunisia.

Studies in animal models can provide important information on the potential cardiovascular activity and cardiotoxicity of new therapeutic agents. Although mouse models are not always representative of human physiology, they provide important clues that clinicians can use to rationally design clinical trials and safe programs to evaluate new pharmacological agents. These studies can therefore play a role in "translating" new discoveries into therapeutic initiatives. There are successful examples of cardiovascular laboratory research programs that have led to the development of cardiovascular drugs from animal venoms, such as captopril, the first oral angiotensin-converting enzyme (ACE) inhibitor found for the treatment of hypertension, batroxobin, an anticoagulant, and the antiplatelet agents tirofiban and eptifibatide for the treatment of myocardial infarction (MI). In line with this approach, we implemented a multidisciplinary research (*i.e.* involving toxinology, pharmacology, biochemistry, molecular biology and bioinformatics) and developed murine models to advance cardiovascular drug research and to better understand the pathophysiology of cardiovascular diseases (CVD) such as MI, including their interaction with other pathologies. Ultimately, this translational medicine approach could bridge the gap between observations made in basic research laboratories and those made at the patient's bedside, and contribute to the development of innovative cardiovascular drugs.

CONFÉRENCE N°: 4.

TREATMENT AND RECOVERY OF WASTES AND BY-PRODUCTS IN A CIRCULAR ECONOMY CONCEPT

MOHAMED CHAMKHA

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The main objective of the Environmental Bioprocesses Laboratory (LBPE-LR15CBS01) research program is to implement biological systems (bacteria, fungi, microalgae, enzymes) with high biotechnological potential for the treatment and recovery of wastes and residues. Our work focuses on exploiting microbial activity for the biodegradation or biotransformation of several urban and industrial wastes, as well as for the rehabilitation of polluted sites through bioremediation. The team is always seeking to combine high-value-added activities with pollution remediation processes.

Examples of the treatment and recovery of olive by-products, such as OMW and leaves, the biodegradation of hydrocarbons, and the production of biosurfactants will be presented.

CONFÉRENCE N°: 5.

STATIC MAGNETIC FIELDS AND BIOREMEDIATION: A PROMISING SYNERGY FOR POLLUTION MITIGATION

ABBES CHIRAZ[1], RIDENE SYRINE[1], WERFELLI NAIMA[2], BOUSSELMI HADIR[1], AHMED LANDOULSI[1]

[1] *University of Carthage, Biochemistry and Molecular Biology Laboratory of Faculty of Sciences of Bizerte, Risks Related to Environmental Stress, Struggle and Prevention (UR17ES20), Bizerte, Zarzouna, Tunisia,*
[2] *International Center For Environmental Technologies, Boulevard Leader Yasser Arafat, Tunis, Tunisia*

Abstract :
This presentation highlights the role of Static Magnetic Field (SMF) in enhancing microbial bioremediation of hydrocarbons, pesticides, and heavy metals. Studies demonstrate that SMF exposure significantly improves degradation rates. For hydrocarbons, SMF (200 mT) doubled the biodegradation of Benzo(a)Pyrene by *Microbacterium maritypicum* CB7, achieving 69% degradation. Similarly, a consortium of *Pseudomonas stutzeri*, *Cupriavidus metallidurans*, and *Rhodococcus equi* exposed to SMF (200 mT) degraded 98% of DDT and 90% of BaP in 30 days, with a 20% increase in bacterial growth. For pesticides, *Advenella kashmirensis* MB-PR degraded 81% of DDT, with bioaugmentation in soil achieving 98% removal. In heavy metal remediation, a mixture of *P. stutzeri* and *C. metallidurans* reduced lead (Pb) by 71.02% in non-sterile soil. SMF emerges as a promising tool to optimize bioremediation efficiency, offering eco-friendly solutions for polluted environments.

KEYWORDS: *Static Magnetic Field (SMF), Microbial Bioremediation, Eco-friendly Technology*

CONFÉRENCE N°: 6.

MARINE EPIBIONT BACTERIA: BIODIVERSITY AND ANTIBACTERIAL AGENTS TO OVERCOME ANTIBIOTIC RESISTANCE

MONIA EL BOUR

INSTM, LRINSTM16/05, Rue du 2 mars 1934, 2025 – Salammbô, Tunisia
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Abstract:

The biodiversity of marine microorganisms and their potential for antibiotic biosynthesis remain relevant for marine biotechnology. In marine ecosystems, major animal and vegetal organisms without their chemical defence are considered to rely on the secondary metabolites produced by their associated microbiota. Thus, most marine bacteria still living associated with marine hosts should produce molecules that prevent their attachment, growth, and/or survival of competing organisms.

Therefore, increasing evidence is accumulating that marine bacteria synthesize new compounds valuable for the discovery of pharmaceutical drugs and bioactive products.

Otherwise, multi-drug resistance is still increasing with high antibiotic use and is well recognized as a global health problem. In marine ecosystems, the microbial communities represent an important source of antibacterial natural products and new drugs mainly produced by marine bacteria to protect themselves from predators. Among the producers of commercially important metabolites, communities of bacteria have been isolated from various sources of marine environments and their bioactivities explored for potential novel microbial products exhibiting antibacterial, antiviral, and other properties. Both invertebrate and seaweed epibiont bacteria (living mainly close to marine organisms) represent the most diversified communities with relevant antimicrobial compounds varieties of economically and biotechnologically priceless secondary metabolites.

Within several studies, we revealed high diversity of bacterial communities associated with different species of marine organisms in basis on their bioactivities. The majority of the bacterial epibionts identified produce active compounds that should be very useful to explore both for human, animal health and biosecurity.

Here we summarize available data about the relevant antibacterial agents produced by marine bacterial epibionts to investigate eventual use to battle against pathogens and spoilage microorganisms.

MINI CONFERENCES

MINI CONFERENCE N° 1:

ENZYMES IN POST-HARVEST FRUIT TREATMENT AS GREEN SOLUTIONS FOR SUSTAINABLE FOOD PRODUCTION: CHALLENGES AND OPPORTUNITIES

AYMEN EZZINE[1,3], SAFA BEN HADJ MOHAMED[1], YOSRA AOUDI[1], SYRINE ABDELWAHED[1], LAURA BACIOU[2], SOFIANE BEZZINE[1], MED NAJIB MARZOUKI[1], ISSAM SMAALI [1]

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[4] *Institut de Chimie Physique UMR 8000, CNRS, Université Paris-Saclay, 91405 Orsay, France.*
[5] *Institut supérieur des études préparatoires en biologie géologie de Soukra (ISEP-BG)*

Abstract: Phytopathogenic fungi pose a considerable threat to the agricultural industry by causing substantial economic losses through severe plant diseases. The excessive use of synthetic fungicides to combat phytopathogens has raised environmental and human health concerns. Consequently, there is an increasing demand for safe and environmentally friendly biopesticides to align with consumer preferences for uncontaminated food. A particularly promising alternative to synthetic fungicides involves the utilization of pivotal hydrolytic enzymes like glucanases, chitinases, and proteases. These enzymes effectively manage fungal phytopathogens while concurrently fostering sustainable plant protection. They function by disrupting the cell wall, proteins, and DNA of phytopathogens, thereby establishing a reliable method of biocontrol. The primary functions, contributions to plant and fruit protection, and mechanisms of action of a case studied enzymes will be explored.

KEYWORDS: *Biological control, Glucanase, Chitinase, Phytopathogenic fungi*

MINI CONFERENCE N° 2 :

USING PROTEOMIC APPROACH TO DEEPER UNDERSTAND HALOPHYTE ABIOTIC STRESS RESPONSES: WHAT ABOUT *CAKILE MARITIMA*?

NEJIA FARHAT 1[1], HANS-PETER BRAUN 2[2], AHMED DEBEZ 3[3]

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Abstract: In their native biotopes, halophytes are naturally adapted to survive and even to thrive under extreme environments. These species have evolved adaptive strategies enabling them to deal with adverse conditions co-occurring with salinity such as drought, extreme temperatures, flooding and nutrient deficiencies. The halophyte's ability to face salinity is strongly related to the efficient coordination of multiple physiological process, metabolic pathways, and protein networks that can elucidate plant response to salinity. Different approaches (OMICS, genomics, and proteomics) have been considered to better understand complex mechanisms underlying plant stress tolerance. Currently, proteomics is used as a powerful tool to uncover stress-responsive proteins and their potential role in enhancing abiotic stress tolerance of plants. A set of key regulatory proteins involved in photosynthesis, ion/osmotic homeostasis, carbohydrate and energy metabolism, antioxidant defense, and signal transduction were identified in halophytes. During the last years, research studies have focused on exploring the proteome profiling of the halophyte *Cakile maritima* (Brassicaceae) subjected to abiotic stresses (salinity, drought) which may provide valuable insights into the mechanisms of stress tolerance and halophyte resilience.

KEYWORDS: *Proteomic approach, Halophyte, Cakile maritima, Stress tolerance*

MINI CONFERENCE N°3 :

CORRECTION OF HEAVY METAL TOXICITY BY ENVIRONMENTALLY FRIENDLY BIO-INPOUTS: CASE OF 5-AMINOLEVULINIC ACID AND MELATONIN

LAMIA SAKOUHI[1,2], ABDELILAH CHAOUI[1]

1: Plant Toxicology and Environmental Microbiology LR18ES38, Faculty of Science of Bizerte, University of Carthage, 7021-Zarzouna, Tunisia
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Abstract: Cadmium (Cd) is a highly toxic heavy metal that severely threatens plant growth, agricultural productivity, and food security. Developing eco-friendly strategies to alleviate Cd-induced phytotoxicity has become a pressing research priority. This presentation aims to elucidate the protective mechanisms activated by melatonin and 5-aminolevulinic acid against Cd toxicity. It will explore their metabolic, cellular, and molecular roles and uncover the signaling pathways they orchestrate to enhance plant stress resilience.

Both compounds, applied as seed priming agents, significantly enhanced chickpea seedling growth, reduced Cd accumulation, and preserved cell membrane integrity under Cd stress. 5-aminolevulinic acid alleviated oxidative damage by improving antioxidant defenses, restoring enzymatic such as superoxide dismutase (SOD), catalase (CAT), ascorbate peroxidase (APX), glutathione reductase (GR), and glutathione peroxidase (GPX), and non-enzymatic (ascorbate, glutathione) antioxidant levels, while modulating Ca^{2+} signaling pathways through the up-regulation of key genes such as calmodulin (CaM), mitogen activated protein kinase (MAPK2), and calcium dependent protein kinase (CDPK21). Additionally, 5-aminolevulinic acid seed priming activated nitric oxide (NO) and hydrogen sulfide (H_2S) signaling pathways.

Meanwhile, priming seeds with melatonin conferred Cd tolerance by reducing pro-oxidant NADPH- and NADH-oxidase activities, limiting hydrogen peroxide overproduction, and enhancing the redox state through increased NAD(P)H availability. This effect was linked to the stimulation of glucose-6-phosphate dehydrogenase (G6PDH) activity and gene expression, suppression of RBOHF gene expression, and activation of the Asada-Halliwell cycle enzymes, restoring redox balance in ascorbate and glutathione pools.

Together, these findings demonstrate that 5-aminolevulinic acid and melatonin act *via* distinct but complementary physiological and molecular mechanisms to enhance Cd stress resilience in plants, providing promising, eco-friendly crop-protective strategies against heavy metal contamination.

KEYWORDS: *Cell membrane integrity, Metal detoxification, Redox state, Signal transduction*

MINI CONFÉRENCE N° 4:

THE SYNERGISTIC EFFECT OF *THYMUS VULGARIS* ESSENTIAL OIL AND CARVACROL WITH IMIPENEM AGAINST CARBAPENEM-RESISTANT *ACINETOBACTER BAUMANNII*: *IN VITRO*, MOLECULAR DOCKING, AND MOLECULAR DYNAMICS STUDIES.

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Abstract:
Background: Carbapenem-resistant *Acinetobacter baumannii* (CRAB) is one of the most predominant causative agents of nosocomial infections, especially in the intensive care unit patients.
Objective: The current study investigates the antibacterial activities of Tunisian *Thymus vulgaris* essential oil (Thyme-EO) alone and in combination with imipenem against CRAB.
Methods: Thyme-EO antimicrobial activities were evaluated by disc diffusion and microdilution assays. Synergism between imipenem and Thyme-EO was determined by combined disc diffusion and checkerboard technique. The synergistic effect of the combined use of carvacrol and imipenem was evaluated by checkerboard assay. Interaction between the major compound identified by Gas Chromatography-Mass Spectrometry (GC/MS) of Thyme-EO and eight bacterial vital enzymes was analyzed by molecular docking and checked by molecular simulation for their stability.
Results: According to GC/MS analysis, carvacrol (78.83%) was the major component. The inhibition zones' diameter by Thyme-EO varied from 18 to 36 mm. Importantly, the values of minimum inhibitory concentration (MIC) and minimal bactericidal concentration (MBC) were of low level and ranged between 0.312 and 1.25 mg/mL. Interestingly, the MBC/MIC was equal to 1 for most tested bacterial strains, confirming a bactericidal effect of Thyme-EO. Combining imipenem and Thyme-EO diminished importantly the MIC of imipenem by 8- to 16-fold in the CRAB [fractional inhibitory concentration indexes (FICI) < 0.5, synergy)].
Carvacrol showed antibacterial activities at low MIC levels of 64 and 128 µg/mL and advanced bactericidal effect justified by the MBC/MIC ratio, which was equal to 1 for most tested CRAB. Moreover, carvacrol interacts synergistically with imipenem against all bacterial isolates (FICI < 0.5).
The docking study demonstrated that carvacrol seemed to have high binding free energies (-8.1 kcal/mol) against D-alanine: D-alanine ligase (2ZDQ), which is implicated in the pathway of peptidoglycan' biosynthesis. A 100-ns dynamic simulation investigation confirmed binding interactions and stability between carvacrol and the active residues of 2ZDQ.
Conclusions: The current results demonstrated that carvacrol alone or combined with imipenem may constitute a promising opportunity as a novel strategy to treat infections caused by CRAB.

KEYWORDS: *Thymus vulgaris essential oil, carvacrol, GC/MS, synergism, carbapenem-resistant Acinetobacter baumannii, molecular docking, dynamic simulation.*

MINI CONFÉRENCE N° 5:

GRAPE SEED EXTRACT: A MULTIFACETED APPROACH TO HEALTH AND SUSTAINABILITY

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Abstract: Winemaking generates substantial by-products, including grape seeds, which are rich in bioactive phytochemicals, particularly polyphenols. This research synthesizes findings from three independent studies exploring the diverse biological activities of grape seed extracts (GSE) from Tunisian grape cultivars and their protective effects against metabolic dysfunction.

Firstly, four Tunisian grape cultivars (Syrat, Merlot, Cabernet Sauvignon, Carignan) were analyzed for total phenolic content (TPC) and biological activities. Significant variations in TPC and antioxidant activity were observed across the Tunisian grape cultivars, with "carignan" exhibiting notable antibacterial and antioxidant activities. GC-MS revealed a predominance of flavonoids, with cultivar-specific differences.

In a second study, we assessed the impact of GSE on HFD-induced alterations in cardiac free fatty acid profiles and the activity of key metabolic enzymes (lipase, glucose 6-phosphate dehydrogenase, pyruvate dehydrogenase, lactate dehydrogenase). GSE administration in HFD-fed rats mitigated detrimental changes in cardiac free fatty acid profiles and restored the activity of metabolic enzymes disrupted by the HFD, indicating an anti-lipotoxic effect.

Finally, proteomic analysis revealed that GSE modulated the cardiac proteome in obese rats, counteracting HFD-induced disruptions in energy metabolism by enhancing the activity of mitochondrial complexes I and III. Furthermore, GSE improved contractile function through the upregulation of key structural proteins such as myosins and actinin.

These findings collectively underscore the multifaceted potential of GSE. Moreover, the consistent cardioprotective effects observed in the context of obesity, demonstrated through both metabolic enzyme activity and proteomic alterations, highlight GSE as a promising therapeutic agent for obesity-related cardiac dysfunction. The utilization of winemaking by-products for these applications also promotes environmental sustainability and valorizes agricultural waste.

KEYWORDS: *Grape Seed Extract, Cardioprotection, Lipotoxicity, Obesity, Proteomics, Sustainability*

MINI CONFERENCE N° 6:

THE FUNCTIONAL ENRICHMENT OF FOODS WITH ESSENTIAL OILS: BETWEEN BIOACTIVE POTENTIAL AND TECHNOLOGICAL CONSTRAINTS

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Abstract: Essential oils are renowned for their potent biological activities, including antimicrobial and antioxidant properties, making them valuable across various industries. However, their practical application is often hindered by inherent challenges such as high volatility, poor water solubility, and susceptibility to degradation. Encapsulation emerges as a promising strategy to overcome these limitations by entrapping essential oils within protective matrices, thereby enhancing their stability, bioavailability, and controlled release profiles. This presentation delves into innovative encapsulation techniques encompassing physical methods, chemical approaches, and physico-chemical strategies. Emphasis is placed on how the selection of encapsulating materials, process optimization, and structural design critically influence the performance and efficacy of the encapsulated essential oils. Key characterization parameters are examined to ensure product quality and functionality. The practical applications of encapsulated essential oils span diverse sectors: in the food industry for flavor masking and shelf-life extension; in cosmetics for improved skin penetration; in pharmaceuticals for targeted drug delivery; and in agriculture for controlled pesticide release. Case studies highlight the successful integration of nano- and micro-encapsulation techniques to surmount essential oil limitations, facilitating their incorporation into various matrices. Furthermore, the session addresses stability assessments under environmental stressors and discusses economic considerations pertinent to scalable production. By bridging the gap between laboratory research and industrial implementation, encapsulation unlocks the full potential of essential oils as sustainable, high-value ingredients.

KEYWORDS: Essential oils, encapsulation, controlled release, nanotechnology, industrial applications

MINI CONFERENCE N° 7:

DIVERSITY OF ECTOPARASITES OF TELEOSTEAN AND CHONDRICHTYAN FISHES FROM TUNISIAN COASTS

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ABSTRACT:
In this study, more than 4 800 Teleostean and Chondrichtyan fishes were sampled off Tunisan coasts. Parasites from various groups were collected (Copepods, Isopods, Monogeneans and Leeches). Various approaches (morphological, ultrastructural and molecular) have been used to identify the different parasites. The copepods are undoubtedly the most dominant in the group. In fact, copepods presented the biggest diversity with 39 species belonging to 11 families: Caligidae, Hatschekiidae, Lernanthropidae, Lernaeopodidae, Bomolochidae, Pennellidae, Eudactylinidae, Kroyeriidae, Pandaridae, Trebiidae and Taeniacanthidae .
We report for the first time in the world, a new species belonging to the Caligidae : *C. tunisiensis* infecting *Serranus scriba* and we report for the first time in Mediterranean area the presence of *C. amblygenitalis* and *P. fistula fistula* in Tunisia. We also reveal the presence for the first time in the Tunisian coasts of *Prohatshekia mediterranea* on *Scorpaena scrofa, Clavellotis sargi* on *Diplodus puntazzo, Bomolochus solea* on *Solea senegalensis, Solea lascaris* and *Parabrachiella* sp on *Pagrus pagrus*.
This work has contributed to the enrichment of the mediterranean copepodofauna of 3 new parasites : *Neobrachiella bispinosa* on *Trigloporus lastoviza, Alella macrotrachelus* and *Clavellotis strumosa* on *Diplodus puntazzo.* The Lernaeopodidae was the more representative family (14 species).
Moreover, 8 species of Isopoda were collected : *Gnathia* sp., *Ceratothoa* sp., *Ceratothoa oestroides, Ceratothoa parallela, Nerocila orbignyi, Mothocya nana, Emetha audouini* and *Anilocra physodes*. *Ceratothoa* sp. found in *Caranx crysos* are recorded for the first time worldwide. We report also for the first time in the world the presence of *Mothocya nana* and *Ceratothoa oestroides* on *Spicara smaris.*
15 species of Monogenea are recorded in this work. A new species of *Microcotyle* (Polyopisthocotyla, Platyhelminthes) are found on the gills of *Dentex gibbosus* : *Ktarius patrickbrueli* n.gen.n.sp.
Two species of Hirudinae are collected in this work : *Pontobdella muricata* and *Branchellion tunisiensis.* This last species is new for Science.
This study has contributed to the enrichment of the knowledge of the Mediterranen and Tunisian parasitic diversity.

KEYWORDS: *Diversity, ectoparasites, fishes, new species*

List of oral communications classified by theme and alphabetical order

ORAL COMMUNICATIONS				
N Comm	**Surname**	**Name**	**Communication Tile**	**Page**
BIOCHEMISTRY AND MOLECULAR BIOLOGY				
1	Abdelkrim	Yosser Zina	FROM ASSAY TO ACTION QUANTITATIVE SCREENING OF LEISHMANIA MTAP AND REPURPOSING OF APPROVED DRUGS FOR LEISHMANIASES THERAPY	40
2	Abid	Ghassen	DECIPHERING THE MOLECULAR BASIS OF DROUGHT TOLERANCE IN FABA BEAN VICIA FABA L THROUGH LEAF TRANSCRIPTOME SEQUENCING AND DE NOVO ASSEMBLY	40
3	Alimi	SOUMAYA	CHEMICAL COMPOSITION BIOLOGICAL ACTIVITIES AND FUNCTIONAL PROPERTIES OF POLYSACCHARIDES FROM PINUS HALEPENSIS CONES	41
4	Aroui	Sonia	PRELIMINARY EVALUATION OF NEWLY SYNTHESIZED ACRIDINE DERIVATIVES WITH ANTIPROLIFERATIVE ACTIVITY AGAINST HUMAN CANCER CELL LINES	41
5	Belhadjsghaier	Kaouther	IMPACT OF MICROPLASTICS ON THE LIPID PROFILE OF RATS	42
6	Bousselmi	Hadir	MAGNETIC FIELD EFFECTS ON MICROBIAL BIOREMEDIATION OF HEAVY METALS LEAD AND MERCURY	42
7	Brahmi	Jihen	NATURAL ADSORBENTS FOR IMPROVING THE QUALITY OF DESALINATED WATER THROUGH BORON REMOVAL AND NUTRIENT ENRICHMENT FOR AGRICULTURAL REUSE	43
8	Darghouthi	Malek	ASSOCIATION OF PTEN AND TSC GENE VARIANTS WITH AUTISM SPECTRUM DISORDER PHENOTYPES	43
9	Elabed	Selma	IMPACT OF MISSENSE MUTATIONS ON THE STRUCTURE-FUNCTION RELATIONSHIP OF HUMAN SUCCINYL-COA SYNTHETASE USING HOMOLOGY MODELING AND MOLECULAR DOCKING	44
10	Emna	Sellami	EXOPOLYSACCHARIDE–SELENIUM COMPOSITE NANOPARTICLES: SYNTHESIS, CHARACTERIZATION, BIOLOGICAL ACTIVITIES AND POTENTIAL USE AS A POSTHARVEST STRAWBERRY COATING	44
11	Ghrab	Jamila	CONTRIBUTION OF MOLECULAR TOOLS IN THE STUDY OF LEISHMANIA SPP TRANSMISSION IN TUNISIA	45
12	Harbeoui	Hela	IMPACT OF FLAVONOID RICH SYRAH GRAPE SEED EXTRACT ON GLUCOSE HOMEOSTASIS AND PROINFLAMMATORY CYTOKINES IN STZ INDUCED DIABETIC MICE	45

13	Heni	Siwar	PROTEOLYTIC HOMEOSTASIS AS A NEW ACTOR IN INFLAMMATORY BOWEL DISEASES	46
14	Herchi	Wahid	ESSENTIAL OILS COMPOSITION, TOTAL PHENOLIC AND ANTIOXIDANT PROPERTIES OF ASTRAGALUS ARMATUS STEMS AND ROOTS EXTRACTS	46
15	Jaouadi	Bassem	BIOPROSPECTING OF NOVEL MICROBIAL EXTREMOZYMES FROM TUNISIAN EXTREME BIOTOPES USING GENOMIC AND METAGENOMIC NGS APPROACHES	47
16	Mariem	Midani	SONOCATALYTIC REMOVAL OF METHYLENE BLUE USING ZNO NANOPARTICLES	47
17	Marzouki	Leila	NEUROPROTECTIVE EFFECT OF CHITOSAN AGAINST ALPHA SYNUCLEIN AGGREGATION IN PARKINSON?S DISEASE	48
18	Mohammadi	Hasna	FROM LAB TO FIELD PORTABLE DNA DETECTION OF ESCHERICHIA COLI AND THE CHALLENGES OF MINIATURIZED ELECTROCHEMICAL BIOSENSORS IN MEDICAL AND ENVIRONMENTAL DIAGNOSTICS	48
19	Ranim	Kroumi	FISH BONE AS A SUSTAINABLE SOURCE OF GLYCOSAMINOGLYCANS: EXTRACTION PROCESSES, FINE CHARACTERIZATION AND MEDICAL APPLICATION	49
20	Rym	El Fessi	CROSS PHARMACOLOGICAL BIOCHEMICAL AND COMPUTATIONAL STUDIES OF THE NOVEL TOXIN MTX PURIFIED FROM SCORPION MAURUS PALMATUS VENOM	49
21	Smirani	Nadia	PRETREATMENT DRYING AND EXTRACTION EFFECTS ON BETALAIN COMPOUNDS RETENTION FROM OPUNTIA SPP PARTS	50
ANIMAL PHYSIOLOGY BIOLOGY AND ECOLOGY				
22	Afoua	mufti	MELILOTUS OFFICINALIS LEAF EXTRACT AS A NATURAL THERAPEUTIC AGENT AGAINST CARDIOMETABOLIC DISORDERS AND MYOCARDIAL INJURY	52
23	Ammar	Rahma	COPPER OXIDE NANOPARTICULES ENHANCE FEAR EXTINCTION MEMORY	52
24	Anouar	Feriani	CAPE ASH LEAF EXTRACT MITIGATES HEPATOTOXICITY AND NEPHROTOXICITY INDUCED BY CCL? VIA ANTIOXIDANT AND ANTI-INFLAMMATORY MECHANISMS	53
25	Arrari	Fatma	SPIRULINA MITIGATES LIPID MICELLE ANDOR LPSINDUCED INFLAMMATORY AND OXIDATIVE DAMAGE IN CACO CELLS	53
26	Baccari	Hanen	PROTECTIVE EFFECT OF CUSCUTA AUSTRALIS EXTRACT AGAINST ETHYLENE GLYCOL INDUCED NEPHROTOXICITY IN RATS	54
27	Boudiaf	Fella	EXPLORATION BIOCHIMIQUE DE LA FONCTION PANCREATIQUE ET DU BILAN LIPIDIQUE AVANT ET APRES LA PERIODE DE JEUNE DU RAMADHAN	54

28	Bouzenna	Nozza	PREVENTIF POTENTIAL OF C CASSIA EXTRACT ON THE OXYDATIF DAMAGE INDUCED BY METHOMYL EXPLORATION BASED ON DOCKING STUDY	55
29	Cherif	Asma	IDENTIFICATION OF SEX VOLATILE COMPOUNDS IN LADY BEETLES	55
30	Chouba	Ibtissem	THE TOXIC EFFECTS OF ?VERTIN ABAMECTIN? ON BEHAVIOR AND HEPATIC TRANSMINASES IN WISTAR RATS	56
31	Ferjani	Wafa	MODULATION OF HUMAN NEUTROPHIL FUNCTIONS BY HYDROETHANOLIC CLADODE EXTRACT OF OPUNTIA FICUS - INDICA	56
32	Grami	Dhekra	PROTECTIVE ROLE OF ZIZIPHUS LOTUS AGAINST BPA-INDUCED OXIDATIVE STRESS IN LIVER AND KIDNEY	57
33	Hajri	Sarra	INTRASPECIFIC MORPHOMETRICAL VARIATION IN BUTHUS TUNETANUS SCORPIONES BUTHIDAE FROM TUNISIA	57
34	Rtibi	Kais	ATTÉNUATION DE LA DYSBIOSE ET DES DYSFONCTIONS DE LA REPRODUCTION INDUITES PAR LES ANTIBIOTIQUES PAR LA TRANSPLANTATION DE MICROBIOTE FÉCAL CHEZ LES RATS MÂLES	58
35	Sahbani	Nehed	OPUNTIA FICUSINDICA L MILL ATTENUATED ETHYLENE GLYCOL AND AMMONIUM CHLORIDE INDUCED UROLITHIASIS IN RATS	58
PLANT PHYSIOLOGY BIOLOGY AND ECOLOGY				
36	Abdelkrim	Souhir	ENHANCING GRASS PEA TOLERANCE AND SOIL HEALTH UNDER SALINITY STRESS USING HALOTOLERANT PLANT GROWTH-PROMOTING RHIZOBACTERIA	60
37	Arraouadi	Soumaya	ANALYSIS OF GENETIC VARIABILITY IN QUINOA GENOTYPES (CHENOPODIUM QUINOA WILLD.) DURING GERMINATION AND VEGETATIVE GROWTH	60
38	Ben Slima	Wided	THE ROLE OF THE PHOTORESPIRATORY ENZYME, GLYCOLATE OXIDASE 1, IN REGULATING POTASSIUM AND SODIUM HOMEOSTASIS IN ARABIDOPSIS THALIANA UNDER SALT STRESS	61
39	Bouatrous	Asma	INCIDENCE OF FOOT ROT DISEASE IN COMMERCIAL DURUM WHEAT GENOTYPES UNDER CONTINUOUS WHEAT CROPPING IN NORTHWEST TUNISIA.	61
40	Chaabani	Emna	DATABASE FOR TUNISIAN MEDICINAL PLANTS WITH ANTIINFLAMMATORY POTENTIAL	62
41	Chouikhi	Marwa	CHANGES IN PHYSICOCHEMICAL AND FUNCTIONAL QUALITY OF TWO HOT PEPPER (CAPSICUM ANNUUM L.) GENOTYPES UNDER COLD STORAGE	62
42	Dalhoumi	Wejden	EFFECT OF EXOGENOUS APPLICATION OF SALICYLIC ACID ON DATE PALM (PHOENIX DACTYLIFERA) DEFENSE REACTION AGAINST FUSARIUM INFECTION	63
43	Ennajah	Amel	CORK OAK FOREST TYPOLOGY AT BELLIF AND ADAPTIVE MANAGEMENT METHODS IN A CONTEXT OF CLIMATE CHANGE	63

44	Hajlaoui	Hafedh	PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES OF CARTHAMUS TINCTORIUS L. TO WATER STRESS UNDER FIELD CONDITIONS	64
45	Hamdi	Moktar	IMPROVEMENT OF THE YIELD AND QUALITY OF DATES BY SELECTION AND VALORIZATION OF GENETIC RESOURCES OF DATE PALM POLLINATORS PHOENIX DACTYLIFERA L ADAPTED TO CLIMATE CHANGE	64
46	Hosni	Taoufik	ANALYSIS OF VARIABILITY IN SUNFLOWER (HELIANTHUS ANNUUS L.) GENOTYPES USING SEED MORPHOMETRIC TRAITS	65
47	Issam	Nouairi	POTENTIAL APPLICATIONS OF BIOGENIC NANOPARTICLES IN IMPROVING PLANT DEVELOPMENT AND CROP PROTECTION	65
48	Karim	KADRI	EFFECT OF DIFFERENT POLLEN SOURCES ON THE MATURATION KINETICS OF 'DEGLET NOUR' DATES	66
49	Khaireddine	Leila	THE PROTECTIVE EFFECTS OF EXOGENOUS MOLYBDENUM AGAINST CADMIUMINDUCED DAMAGE IN WHEAT TRITICUM TURGIDUM L	66
50	Mahmoudi	Hela	ZINC TOXICITY-INDUCED CHANGES IN GERMINATION, GROWTH DYNAMICS, AND OXIDATIVE STRESS MARKERS IN SWEET BASIL (OCIMUM BASILICUM L.)	67
51	Mansouri	Sonia	ENHANCEMENT OF BARLEY HORDEUM VULGARE L GROWTH AND PRODUCTIVITY THROUGH SEED INOCULATION WITH PLANT GROWTHPROMOTING RHIZOBACTERIA	67
52	Medimagh	Sana	HARNESSING BIOSTIMULANTS FOR SUSTAINABLE OILSEED RAPE CULTIVATION EFFECTS OF SEED AND FOLIAR TREATMENTS	68
53	Mhamdi	Baya	VALORISATION DE L?HUILE EXTRAITE DES RESIDUS DE LIN	68
54	Nawres	Aloui	SYNERGISTIC EFFECT OF EXOGENOUS MELATONIN AND CALCIUM ON ALLEVIATING CADMIUM-INDUCED STRESS BY ENHANCING ANTIOXIDANT DEFENSES AND CHLOROPHYLL STABILITY IN WHEAT SEEDLINGS	69
55	Sai Kachout	Salma	INFLUENCE OF CUTTING FREQUENCY ON NUTRITIONAL AND FORAGE QUALITY OF VETIVER	69
BIOTECHNOLOGY				
56	Hassen	Amrou	VALORISATION OF WILD SORGHUM IN BIOFORTIFICATION: PHYTOCHEMICAL COMPOUNDS AND ANTIOXIDANT CAPACITY OF WILD SORGHUM GRAINS	71
57	Abdelhai	Moufida	MORPHOLOGICAL AND PHYSICOCHEMICAL CHARACTERIZATION OF STARCH FROM ALGERIAN CHAYOTE (SECHIUM EDULE) FRUIT	71
58	Belhaj	Ines	SURFACTANT EFFECT ANTIBACTERIAL EFFICIENCY AND BIOFILM DISRUPTION OF GALACTOLIPIDS FROM CHLOROPLASTRICH FRACTION CRF OF ULVA LACTUA FOR OIL?BASED CHEMISTRY	72

59	Ben Hlel	Takoua	DEVELOPMENT OF AMMI VISNAGA ESSENTIAL OIL-INFUSED HAND SANITIZERS: CHEMICAL CHARACTERIZATION AND DRUG-LIKENESS ASSESSMENT	72
60	Ben Hmad	Ines	COMBINED EFFECTS OF ?AMYLASE XYLANASE AND CELLULASE COPRODUCED BY STACHYBOTRYS MICROSPORA ON DOUGH PROPERTIES AND BREAD QUALITY AS A BREAD IMPROVER	73
61	Ben Jouira	Hatem	ENHANCING SALT TOLERANCE IN QUINOA THE ROLE OF ZINC OXIDE NANOPARTICLES	73
62	Ben Mansour	Rim	ROSMARINUS OFFICINALIS IN TUNISIA: PHYTOCHEMISTRY, ANTIOXIDANT, AND ANTI-INFLAMMATORY PROPERTIES	74
63	Ben Yahmed	Nesrine	AN INTEGRATED APPROACH BASED ON SEQUENTIAL FRACTIONATION AND SPECIFIC ENZYMATIC SACCHARIFICATION OF GREEN ALGAE ULVA SP. BIOMASS	74
64	Ben Youssef	Rim	EXOGENOUS APPLICATION OF SALICYLIC ACID AND CALCIUM IMPROVES PHOTOSYNTHETIC PERFORMANCE OF QUINOA PLANT CULTIVATED UNDER SALT STRESS	75
65	Boutara	Meryem	IMPACT OF ULTRASONICATION ON PHYSICOCHEMICAL TECHNOFUNCTIONAL AND BIOLOGICAL PROPERTIES OF PROTEIN EXTRACTS FROM DEGLET NOUR DATE SEEDS	75
66	Dahmen	Ines	FROM CYANOBACTERIA TO COSMETICS PHYCOCYANIN OF PHORMIDIUM VERSICOLOR AS A BIOACTIVE INGREDIENT	76
67	El Haj Mabrouk	Faten	HEPATOPROTECTIVE ACTIVITY OF OROBANCHE CRENATA EXTRACT AGAINST CARBON TETRACHLORIDE (CCL?)-INDUCED LIVER DAMAGE	76
68	Essid	Rym	ACTIVITE ANTILEISHMANIENNE PROMETTEUSE DE L'HUILE ESSENTIELLE DE MICROMERIA NERVOSA : ÉTUDES IN VITRO ET IN SILICO	77
69	Feki	Firas	BIOTECHNOLOGICAL VALORIZATION OF JOJOBA SEED CAKE VIA ENZYMATIC BIOTRANSFORMATION A SUSTAINABLE STRATEGY FOR DETOXIFICATION AND HEPATOPROTECTIVE BIOACTIVE EXTRACT DEVELOPMENT	77
70	Goussi	Rahma	EFFECT OF COOKING PROCESSES ON THE NUTRITIONAL AND ANTINUTRITIONAL PROPERTIES OF QUINOA SEEDS	78
71	Hamada	Walid	THE VALORISATION OF ESSENTIAL OILS AS BIOSTIMULANTS ON PLANTS APPLIED BY SEED COATING ON WHEAT AND ROOTFEEDING ON TOMATO	78
72	Harbaoui	Amel	DEVELOPMENT AND VALIDATION OF A SIZE EXCLUSION CHROMATOGRAPHY METHOD FOR MOLECULAR WEIGHT DETERMINATION OF EXOPOLYSACCHARIDES A CASE STUDY OF ARTHROSPIRA MAXIMA	79

73	Hmissi	Soumaya	EXPLORATION OF THE EFFECTS OF JASMONIC ACID ON MORPHOGENESIS AND SECONDARY METABOLITE PRODUCTION IN LAVANDULA STOECHAS AN IN VITRO PERSPECTIVE	79
74	Ines	Makhlouf	POLYSACCHARIDES EXTRACTED FROM DEVERRA TORTUOSA WASTES: STRUCTURAL, FUNCTIONAL, ANTIOXIDANT, ANTIHYPERTENSIVE AND CYTOTOXIC PROPERTIES	80
75	Jelali	Nahida	OUTCOMES OF SALINITY AND IRON DEFICIENCY EITHER APPLIED ALONE OR IN COMBINATION ON THE PHYSIOLOGICAL TRAITS OF QUINOA	80
76	Mahmoudi	Hela	SEED PRIMING IMPROVES SALT TOLERANCE IN BASIL THROUGH PHYSIOLOGICAL AND BIOCHEMICAL ADJUSTMENTS	81
77	Manaa	Arafet	QUINOA FOR SALT AFFECTED SOILS CHALLENGES AND PERSPECTIVES FOR INTEGRATING QUINOA INTO A SUSTAINABLE AGRICULTURAL SYSTEM IN TUNISIA	81
78	Saadi	Yusr	DIAGNOSIS OF CUTANEOUS LEISHMANIASIS FROM GENE MARKER TO POINT OF CARE MOLECULAR TEST	82
79	Sellami	Douja	OPTIMIZING LEMON PEEL DRYING: A COMPARATIVE ANALYSIS OF THERMAL TECHNIQUES AND THEIR IMPACT ON QUALITY PARAMETERS	82
80	Sila	Assaad	NUTRACEUTICAL POTENTIAL ACEINHIBITORY PEPTIDES DERIVED FROM MARINE BYPRODUCTS HYDROLYSATE	83
81	Slama	Ines	ASSESSMENT OF QUINOA RESPONSE TO WATER DEFICIT AND EVALUATION OF ITS RECOVERY CAPACITY	83
82	Talbi	Ons	MONOPOTASSIUM PHOSPHATE SEED PRIMING IMPROVES PHOSPHORUS DEFICIENCY TOLERANCE IN CHENOPODIUM QUINO	84
83	Torchi	Ayda	DEVELOPMENT OF BIO-BASED EGGSHELL WASTE CARRIER FOR R. ORYZAE LIPASE IMMOBILIZATION	84
84	Zarai	Nadia	IDENTIFICATION PURIFICATION AND FUNCTIONAL CHARACTERIZATION OF TWO NOVEL THIOL PEROXIDASES TPP AND TPM DISCOVERED THROUGH METAGENOMIC LIBRARY SCREENING	85
85	Zarroug	Youkabed	EXTRACTION AND CHARACTERIZATION OF CHICKPEA AQUAFABA FOR THE FORMULATION OF VEGAN PASTRY PRODUCTS	85
ENVIRONMENT				
86	Ben Younes	Sonia	LYSINIBACILLUS FUSIFORMIS STRAIN ZC A BIOLOGIC POWERFUL TOOL FOR BIOTREATMENT AND BIOLEACHING ASSAYS OF THE TUNISIAN PHOSPHATE LAUNDRIES WASTEWATER AND ROCK FROM METLAOUIGAFSA BASIN	87

87	Bouallagui	Zouhaier	PROMOTING THE INTEGRATION OF OLIVE LEAVES IN FOOD FORMULATIONS A STEP FORWARD TO INCREASE THE ADDED VALUE OF THE OLIVE FARMING	87
88	Bouassida	Mouna	ISOLATION AND CHARACTERIZATION OF HYDROCARBON DEGRADING MICROORGANISMS FOR ENVIRONMENTAL BIOREMEDIATION	88
89	Daoud	Lobna	EFFECT OF FRUIT AND VEGETABLES WASTE DIGESTATE ON PEPPER GROWTH AND NITROGEN MINERALIZATION IN SOIL	88
90	Elouni	Sana	PERFORMANCE COMPARISON OF CHEMICALBASED VS NATURALBASED COAGULANT IN VEGETABLE OIL REFINERY WASTEWATER TREATMENT FOR A SAFE AND SUSTAINABLE REUSE	89
91	Mhiri	Takwa	OPTIMIZING HYDROPRIMING DURATION TO ENHANCE WHEAT GROWTH IN CONVENTIONAL AND SOILLESS AGRICULTURAL SYSTEMS	89
92	Feki	Emna	PERFORMANCE OF UASB REACTOR TREATING WASTE ACTIVATED SLUDGE: EFFECT OF ELECTRO-CHEMICAL DISINTEGRATION ON THE ANAEROBIC MICROBIAL POPULATION STRUCTURE AND ABUNDANCE	90
93	Gamraoui	Afef	TREATMENT OF TUNA WASTEWATER USING YARROWIA LIPOLYTICA, TIO_2 NANOPARTICLES AND ACOUSTIC WAVES	90
94	Hiba	Selmi	UTILIZATION OF AGROFOOD RESIDUES FOR LACTIC ACID BACTERIA GROWTH SAFETY ASSESSMENT AND BIOPROCESSING INSIGHTS	90
95	Ibtissem	Ben Hassine	EVALUATION OF THE CONTENTS AND CHARACTERIZATION OF MICROPLASTICS IN TWO SPECIES OF EDIBLE FISH COLLECTED FROM THE SOUTHERN COAST OF TUNISIA	91
96	Kasmi	Mariam	ASSESSMENT OF THE BIOLOGICAL TREATABILITY IN DAIRY AND BEVERAGE WASTE MIXTURES USING NATURAL COAGULATION PRIOR FERMENTATION	91
97	Khouni	Imen	TOWARDS SUSTAINABLE REUSE OF TREATED VEGETABLE OIL REFINERY WASTEWATER: A COMPARATIVE STUDY OF MEMBRANE FILTRATION AND COAGULATION/FLOCCULATION	92
98	Mechergui	Rania	MONITORING AND EVALUATION OF PLANT BIODIVERSITY IN A SYLVOPASTORAL ECOSYSTEM IN THE NORTHWEST REGION OF TUNISIA	92
99	Mejri	Nourane	BIOCHEMICAL AND MOLECULAR EVALUATION OF AMMONIUM TRANSFORMATION POTENTIAL BY SOIL BACTERIAL STRAINS	93
100	Sai	Afef	SMART REMEDIATION OF PHOSPHATE WASTEWATER A STUDY ON TOXICITY CHARACTERIZATION AND AIGUIDED TREATMENT	93
101	Zenati	Billal	TREATMENT EFFICIENCY OF MICROALGAE?BACTERIA CONSORTIA FOR AQUACULTURE WASTEWATER	94

GENETICS AND IMMUNOLOGY				
102	Fehri	Emna	STRUCTURAL DESTABILIZATION AND FUNCTIONAL DISRUPTION OF TGF? BY PATHOGENIC VARIANTS MECHANISTIC AND THERAPEUTIC IMPLICATIONS IN IDIOPATHIC PULMONARY FIBROSIS	96
103	Bahia	Wael	EXPLORATION OF THE GENETIC DIVERSITY STRUCTURE IN ROSA L SPECIES IN TUNISIA	96
104	Chtourou	Khouloud	TLR A NOVEL IMMUNE SIGNATURE ASSOCIATED WITH TUMORIGENESIS PREDICTION AND PROGNOSIS OF CERVICAL CANCER COLORECTAL CANCER AND MELANOMA	97
105	Mhiri	Dalel	GENETIC AND COMPUTATIONAL INVESTIGATION OF A RARE HOMOZYGOUS SNIP VARIANT IN TWO SIBLINGS WITH A NEURODEVELOPMENTAL DISORDER	97
106	Oualha	Rafeh	ANTILEISHMANIAL EFFECTS AND IMMUNE RESPONSE OF REPURPOSED LOCAL ANESTHETICS IN VITRO AND IN VIVO EVALUATION OF PRILOCAINE AND DIBUCAINE AGAINST CUTANEOUS LEISHMANIASIS	98
MICROBIOLOGY AND VIROLOGY				
107	Ben Mhadheb	Manel	DOWNREGULATION TOLL-LIKE RECEPTOR GENE EXPRESSION AMONG HEPATITIS B VIRUS-POSITIVE HUMAN PATIENTS	100
108	Benyagoub	Elhassan	PROFIL D?ANTIBIORSISTANCE DES CONTAMINANTS BACTRIENS ET PATHOGNES ISOLS DES EAUX USES DE BASSINS PISCICOLES DANS LA WILAYA DE BCHAR SUDOUEST DE L?ALGRIE	100
109	Ellafi	Ali	IN SILICO TARGETING OF VIRF BY GAMMAIRRADIATIONMODIFIED FATTY ACIDS A MOLECULAR INSIGHT INTO ATTENUATED VIRULENCE IN SHIGELLA SONNEI	101
110	Marwa	Taboui	ENHANCED ANTIMICROBIAL POTENTIAL OF ARTEMISIA VULGARIS OVER LAURUS NOBILIS AGAINST GASTROINTESTINAL PATHOGENS A COMPARATIVE STUDY	102
PHARMACOLOGY AND TOXICOLOGY				
111	Bekara	Amina	CROSS-SECTIONAL STUDY OF ADDICTION TO PSYCHOACTIVE SUBSTANCES AT THE CHLEF DRUG ADDICTION CENTER (ALGERIA)	103
112	Ben Dhif	Yosr	STUDY OF THE THERAPEUTIC CAPACITY OF GREEN MANGANESE FERRITE NANOPARTICLES DOPED WITH COBALT ON REPRODUCTIVE FUNCTION IN MALE WISTAR RATS	103
113	Ben Hsouna	Anis	ASSESSMENT OF THE PHYTOCHEMICAL COMPOSITION, ANTIMICROBIAL ACTIVITY EFFECTS OF TUNISIAN HALOPHYTE EXTRACTS AND THEIR CAPACITY TO EXTEND THE SHELF LIFE OF RAW MINCED BEEF	104

114	Bouanane Darenfed	Amel	TOXIC AND MICROBIOLOGICAL RISKS OF PSYCHOTROPIC SUBSTANCES OF PLANT ORIGIN	104
115	Elbini	Ines	UNLOCKING BIOMOLECULES FROM ANIMAL VENOM FOR TREATING PARKINSON?S DISEASE	105
116	Ghorbel	Imen	EXTRA VIRGIN OLIVE OIL MITIGATES HEMATOTOXICITY OXIDATIVE STRESS AND LIVER DNA DAMAGE INDUCED BY GLYCIDAMIDE IN ADULT RATS	105
117	Hallegue	Dorsaf	NEUROPROTECTIVE POTENTIAL OF QUERCETIN AGAINST STYRENE OXIDE-INDUCED CYTOTOXICITY VIA MODULATION OF OXIDATIVE STRESS AND APOPTOSIS	106
118	Hjaij	Sarra	MECHANISMS AND THERAPEUTIC POTENTIAL OF SEA ANEMONEDERIVED BIOMOLECULES TARGETING POTASSIUM CHANNELS IN PARKINSON?S DISEASE	106
119	Jlassi	AROUA	NEUROPROTECTIVE EFFECTS OF CURCUMINOIDS ON AGERELATED BRAIN DECLINE INSIGHTS FOR PARKINSON?S DISEASE PREVENTION	107
120	Limam	Hajer	PHARMACOLOGICAL POTENTIAL OF TUNISIAN EUCALYPTUS ESSENTIAL OILS E MAIDENII AND E CAMALDULENSIS CHEMICAL PROFILE AND MULTIFACETED BIOLOGICAL ACTIVITIES STUDY	107
121	Naili	Rahma	EXPLORATION OF THE PREVENTIVE POTENTIAL OF GREEN COPPER FERRITE NANOPARTICLES AGAINST ETHANOL INDUCED HEPATORENAL DAMAGE	108
122	Neili	Nourelhouda	FROM CELL LINES TO IDAS KV INHIBITION REDUCES ?SYNUCLEIN AGGREGATES IN PD	108
123	Zerrouki	Khayra	FROM TOXICITY TO THERAPY HOW PUMPKIN JUICE FIGHTS MERCURYINDUCED BRAIN DAMAGE	109

List of Poster classified by theme and alphabetical order

POSTER				
N Comm	**Surname**	**Name**	**Communication Tile**	**Page**
BIOCHEMISTRY AND MOLECULAR BIOLOGY				
1	Belkahla	Sana	ENHANCED CHEMOSENSITIVITY IN BREAST CANCER CELLS THE ROLE OF DCA IN MODULATING ABCG AND NKGDL EXPRESSION VIA A PERK P	112
2	Ben Salah	Riadh	STRUCTURE AND BIOLOGICAL ACTIVITIES OF POLYSACCHARIDE PURIFIED FROM SENEGRAIN SEED	112
3	Chafaa	Fouad	INTERPRETING THE FORMATION MECHANISM OF A BIOACTIVE HETEROCYCLE USING ELECTRON INTERACTION THEORY	113
4	Gatri	Emna	EFFECTS OF PASTEURIZATION AND THERMOSONICATION ON THE PHYSICOCHEMICAL AND ANTIOXIDANT PROPERTIES OF ORANGE JUICE	113
5	Habbachi	Essia	ASSESSMENT OF LUNG BIOPSIES FOR MOLECULAR EGFR TESTING INSIGHTS FROM THE INSTITUT PASTEUR DE TUNIS	114
6	Krouma	Abdelmajid	PHYSIOBIOCHEMICAL RESPONSES TO EXOGENOUS SELENIUM APPLICATION OF TOMATOES SOLANUM LYCOPERSICUM L CULTIVATED IN THE FIEL UNDER SALINE IRRIGATION	114
7	Larbi	Essia	OXIDATIVE AND INFLAMMATORY STATUS IN CHRONIC RENAL FAILURE AND TYPE 2 DIABETES MELLITUS	115
8	Mokni	Abir	CYNARA CARDUNCULUS AS A POTENTIAL SOURCE OF MILK COAGULATING PROTEASE	115
9	Nouha	ALIMI	BIOCHEMICAL AND MOLECULAR DIAGNOSIS OF GAUCHER DISEASE IN A TUNISIAN FAMILY GENOTYPE?PHENOTYPE CORRELATIONS	116
10	Oumayma	Tej	IDENTIFICATION AND FUNCTIONAL ANALYSIS OF DELETERIOUS NONSYNONYMOUS SNPS IN THE HUMAN SLCA GENE ASSOCIATED WITH IMATINIB RESPONSE IN CHRONIC MYELOID LEUKEMIA	116
11	Saada	Rihab	ROLE OF THE PRNCR1 SNP RS13252298 IN COLORECTAL CANCER SUSCEPTIBILITY IN A TUNISIAN POPULATION	117
12	Sakka	Hela	ENHANCING TOMATO RESILIENCE: COMPARATIVE EFFICACY OF MICROALGAE APPLICATION METHODS ON GROWTH AND STRESS TOLERANCE	117

13	Sana	DALLALI	COMPARATIVE PHENOLIC PROFILING OF LEAVES FROM FOUR MEDITERRANEAN PLANTS IN RELATION TO THEIR ENVIRONMENTAL ORIGIN	118
14	Takrouni	Oumayma	ASSOCIATION OF NF?B GENE POLYMORPHISMS WITH THE RISK OF RECURRENT PREGNANCY LOSS IN A TUNISIAN POPULATION	118
ANIMAL PHYSIOLOGY BIOLOGY AND ECOLOGY				
15	Arrari	Fatma	IN VITRO ANTIOXIDANT EFFICACY OF SPIRULINA AQUEOUX EXTRACT AND IN SILICO MOLECULAR DOCKING OF ITS MAJOR BIOACTIVE COMPOUNDS	120
16	Boukhari Benahmed Daidj	Nabila	NUTRITIONAL ANALYSIS AND EVALUATION OF THE ANTIOXIDANT POTENTIAL OF THE FLESH AND BY-PRODUCTS OF UNUSABLE FARMED MUSSELS (MYTILUS GALLOPROVINCIALIS) WITH A VIEW TO THEIR USE IN HUMAN NUTRITION.	120
17	Chabane	Fatima Zohra	THE HYPOGLYCEMIC AND ANTI-INFLAMMATORY EFFECT OF MAGNESIUM ON RATS WITH TYPE 2 DIABETES	121
18	Jabri	Mohamed Amine	ATRIPLEX HALIMUS AQUEOUS EXTRACT MITIGATES HIGH-CALORIE DIET-INDUCED RENAL TOXICITY IN RAT	121
19	Saddikioui	Leila	MORPHOMETRIC STUDY OF A MARINE CONGER EEL POPULATION FROM BNISAF BAY WESTERN ALGERIAN COASTS	122
20	Zgaren	Nawres	EFFECTS OF AQUEOUS EXTRACT OF JUJUBE FRUIT ZIZIPHUS JUJUBA ON MPO ACTIVITY AND ROS PRODUCTION BY HUMAN NEUTROPHILS IN VITRO	122
PLANT PHYSIOLOGY BIOLOGY AND ECOLOGY				
21	Asmi	Sahar	EXOGENOUS MOLYBDENUM MITIGATES CHROMIUM TOXICITY IN BEAN PHASEOLUS VULGARIS L BY ENHANSING PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES	124
22	Ben Saad	Rania	FUNCTIONAL VALIDATION OF LOBULARIA MARITIMA THIOREDOXIN-H2 PROTEIN FOR ITS ABILITY TO COMBAT BACTERIAL AND FUNGAL INFECTIONS	124
23	Bouazzi	Arij	THE COMBINED EFFECTS OF DROUGHT AND OROBANCHE CRENATA PARASITISM ON FABA BEAN VICIA FABA L GENOTYPES	125
24	Hafsi	Chokri	BENEFICIAL EFFECTS OF HYDROGEN SULFIDE ON GROWTH AND PHOTOSYNTHETIC PEROFORMANCE IN BRASSICA NAPUS (L.) PLANTS UNDER POTASSIUM DEFICIENCY	125
25	Hmissi	Manel	ENDOGENOUS PHYTOHORMONES IMPROVE SALT TOLERANCE IN DURUM WHEAT TRITICUM DURUM DESF BY MODULATING IONIC COMPARTMENTATION AND GAS EXCHANGE	126

26	Horchani	Faouzi	ARE THE EFFECTS OF JASMONIC ACID ON THE GROWTH AND AMMONIUM METABOLIZING ENZYME ACTIVITIES OF WHEAT SEEDLINGS DEPENDENT ON THE PHASE OF SALT STRESS	126
27	Imen	Tlili	EXTENDED COLD STORAGES IMPACT ON DIFFERENT POTATO GENOTYPES FUNCTIONAL QUALITY ATTRIBUTES	127
28	Marzouk Ep Refifa	Belsem	PRIMED BY THE DESERT: A PRELIMINARY INVESTIGATION ON THE EFFECTIVENESS OF CITRULLUS COLOCYNTHIS L. SCHRAD. IMMATURE SEED FIXED OILS AS ENHANCERS OF PLANT VIGOR PERFORMANCE.	127
29	Marzouki	Hanen	PHYTOCHEMICAL DIVERSITY AND ALLELOPATHIC ACTIVITY OF ARTEMISIA HERBA-ALBA: TOWARDS A SUSTAINABLE BIOHERBICIDE	128
30	Riadh	Ilahy	TRUE POTATO SEED TECHNOLOGY IS IT A SUITABLE SOLUTION FOR SMALLHOLDERS UNDER ONGOING CLIMATE CHANGE AND GLOBAL WARMING CONTEXT	128
31	Rzigui	Touhami	PHYSIOLOGICAL PLASTICITY IN CORK OAK QUERCUS SUBER L A COMPARATIVE STUDY OF PROVENANCE RESPONSES TO MODERATE DROUGHT STRESS	129
32	Saidi	Issam	ROLE OF SELENIUM IN PREVENTING COPPER TOXICITY IN BEAN (PHASEOLUS VULGARUS) SEEDLING	129
33	Siwar	Thebti	INTEGRATED BROOMRAPE MANAGEMENT IBM TO CONTROL OROBANCHE FOETIDA	130
BIOTECHNOLOGY				
34	Abdelwahed	Syrine	MOLECULAR CHARACTERIZATION OF HYDROPHOBIC COATING PROTEINS IN SCLEROTINIA SCLEROTIORUM	132
35	Allala	Fawzi	MICROBIALLY INDUCED CALCITE PRECIPITATION: IDENTIFICATION OF NOVEL STRAINS FROM EXTREME ECOSYSTEMS	132
36	Amri	Raja	QUANTIFICATION OF MITOCHONDRIAL DNA COPY NUMBER IN PATIENTS WITH SUSPECTED MITOCHONDRIAL DISEASES USING QUANTITATIVE PCR	133
37	Ayadi	Dorra	UPCYCLING SPENT COFFEE GROUNDS TO ENHANCE QUALITY AND PROLONG SHELF LIFE OF REFRIGERATED BEEF	133
38	Azizi	Eya	BIODIVERSITY OF FABA BEAN VICIA FABA M IN RESPONSE TO THE PHYTOPATHOGENIC FUNGUS ASCOCHYTA FABAE AND THE ROLE OF SYMBIOTICPGPR BACTERIA IN PLANT TOLERANCE	134
39	Bejaoui	Amani	PHYSIOLOGICAL, BIOCHEMICAL AND METABOLIC RESPONSES OF TWO MEDICAGO SATIVA VARIETIES TO PESTICIDE STRESS	134

40	Ben BRAEIK	Olfa	SALVIA OFFICINALIS L ESSENTIAL OIL CHARACTERIZATION AND APPLICATION FOR THE BIOPRESERVATION OF RAW WHITE CHICKEN MEATLA	135
41	Ben Farhat	Leila	BIOSURFACTANT PRODUCTION BY LACTOBACILLUS STRAINS ISOLATED FROM TUNISIAN TRADITIONAL FERMENTED FOOD PRODUCTS	135
42	Ben Mohamed	Hatem	CHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY OF OIL FROM THE SEEDS OF THREE TUNISIAN DATE (PHOENIX DACTYLIFERA L.) CULTIVARS	136
43	Ben Saad	Rania	FUNCTIONAL VALIDATION OF LOBULARIA MARITIMA THIOREDOXIN-H2 PROTEIN FOR ITS ABILITY TO COMBAT BACTERIAL AND FUNGAL INFECTIONS	136
44	Ben Salah	Riadh	ULTRASONIC EXTRACTION PROCESS OPTIMIZATION OF POLYSACCHARIDES FROM LEPIDIUM SATIVUM BY BOXBEHNKEN DESIGN	137
45	Ben Slima	Sirine	ULTRASONIC EXTRACTION PROCESS OPTIMIZATION OF POLYSACCHARIDES FROM LEPIDIUM SATIVUM BY BOXBEHNKEN DESIGN	137
46	Chaira	Nizar	YEAST PRODUCTION FROM DATE PALM	138
47	Chourou	Mohamed Nour	PLANT GROWTH PROMOTING RHIZOBACTERIA (PGPR) ENHANCES TOMATO GROWTH UNDER SALINE CONDITION	138
48	Chtourou Ghorbel	Nidhal	DEEP LEARNING DRIVEN PHENOTYPE PREDICTION IN RICE UNDER COMBINED WATER AND PATHOGEN STRESS	139
49	Dhaouadi	Aymen	MATHEMATICAL MODELING AND DIFFUSION ANALYSIS OF CONVECTIVE DRYING KINETICS IN OPUNTIA FICUS INDICA PEELS EFFECT OF ACETIC ACID PRETREATMENT ON DRYING BEHAVIOR AND QUALITY ATTRIBUTES	139
50	Ferjani	Dhaouadi	EFFECT OF GAMMA IRRADIATION ON THE CHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITIES OF FLAXSEED CRUDE EXTRACTS " CUCURBITA PEPO L."	140
51	Flihi	Jihene	LACTIC ACID BACTERIA FROM TUNISIAN DAIRY PRODUCTS ISOLATION AND ASSESSMENT OF ANTIBACTERIAL PROPERTIES	140
52	Gorsane	Faten	PLANT GROWTH PROMOTING RHIZOBACTERIA PGPR ENHANCES TOMATO GROWTH UNDER SALINE CONDITION	141
53	Guerbej	Hamadi	UTILIZATION OF BLUE CRAB PORTUNUS SEGNIS FORSKÅL WASTE AS A POTENTIAL ADDITIVE IN AQUACULTURE FEED	141
54	Henchiri	Selma	EVALUATION OF THE PROTECTIVE EFFECT OF PHELIPANCHE RAMOSA AGAINST CISPLATIN-INDUCED NEPHROTOXICITY	142

55	Imen	TRABELSI	BIOACTIVE PACKAGING BASED ON PROBIOTIC STRAIN A SUSTAINABLE APPROACH FOR FOOD SAFETY	142
56	Laafif	Jaweher	CULTURING NOSTOC SP FOR BIOACTIVE METABOLITES GROWTH DYNAMICS AND BIOCHEMICAL CHARACTERIZATION	143
57	Lazreg	Marwa	SCREENING OF FUNGAL STRAINS PRODUCING LIPASES AND PROTEASES OF INDUSTRIAL INTEREST FROM VARIOUS TUNISIAN EXTREME BIOTOPES	143
58	Lella	Mohamed Lemine	INTEGRATING GENOMIC ANALYSIS AND IN VITRO INVESTIGATION TO SUPPORT PROBIOTIC POTENTIAL OF THE POLYEXTREMOPHILIC STRAIN HALOMONAS DESERTIS G	144
59	Maaroufi	Karima	COMPARATIVE STUDY OF PHENOLIC COMPOUNDS IN SPIRULINA AND MELISSA OFFICINALIS AND EFFECT OL MELISSA AQUEOUS EXTRACT ON SERUM PARAMETERS AFTER IRON OVERLOAD	144
60	Mallek	Sana	QUALITY PARAMETERS AND ANTIOXIDANT ACTIVITY OF CUCUMIS MELO L. PEEL POWDERS AND THEIR VALORIZATION IN FOOD FORMULATIONS	145
61	Manai Djebali	Hedia	GARLIC-ENRICHED OLIVE OIL: INFLUENCE OF GARLIC FORM ON BIOACTIVE PROPERTIES AND CHEMICAL PROFILES	145
62	Mejri	Nahla	IDENTIFICATION OF SECONDARY MTABOLITES IN DATE SEED EXTRACTS BY LOW RESOLUTION MASS SPECTROSCOPIE ESIMSMS	146
63	Naourez	Ktari	EVALUATION OF THE PROBIOTIC POTENTIAL AND EFFECT OF ENCAPSULATION ON SURVIVAL FOR LACTIPLANTIBACILLUS PLANTARUM LC38 FROM TUNISIAN CAMEL MILK	146
64	Ouhibi	Aroua	OPTIMIZATION OF PHENOLIC RICH EXTRACTS FROM CHEMLALI OLIVE TREE BY PRODUCTS USING ADVANCED GREEN EXTRACTION TECHNIQUES	147
65	Yengui	Mariem	ANTIBIOTIC RESISTANCE PROFILES OF GRAM-NEGATIVE BACTERIA IN SOUTHERN TUNISIA: FOCUS ON ESBL, CARBAPENEM AND COLISTIN RESISTANCE	147
ENVIRONMENT				
66	Ben Abdallah	Syrine	CHARACTERIZATION OF A NOVEL BACILLUS THURINGIENSIS STRAIN TO BE USED AS A BIOPESTICIDE FOR INSECT CONTROL AND PLANT GROWTH PROMOTION	149
67	Driss	Fatma	A PROMISING BACILLUS PARALICHENIFORMIS STRAIN WITH A POTENTIAL BIOCONTROL AGENT TO MANAGE GRAY MOLD IN CHERRY TOMATOES	149
68	Falleh	Hanen	EXPLORING FATTY ACID COMPOSITION IN DATE WASTES: INSIGHTS INTO LIPID CONTENT AND DISTRIBUTION	150

69	Faouzi	Ben Rebah	CACTUS JUICE AS A SUSTAINABLE ALTERNATIVE TO SYNTHETIC POLYMERS IN COAGULATIONFLOCCULATION FOR WASTEWATER TREATMENT	150
70	Kourdali	Sidali	USE OF STRESS BIOMARKERS IN PERNA PERNA MUSSELS (LINNAEUS, 1758) FOR MONITORING COASTAL SEAWATER IN THE EASTERN REGION	151
71	Mensi	Fethi	VALORIZATION OF BLUE SWIMMING CRAB HYDROLYSATE FOR SUSTAINABLE FISH FEED DEVELOPMENT	151
72	Sellami	Badreddine	NANOPARTICLES INFLUENCE HAP TOXICITY IN THE MEDITERRANEAN MUSSELS	152
73	Werheni	Rim	SUSTAINABLE WATER REUSE WITH INNOVATIVE PURIFICATION AND SENSING SYSTEM FOR THE AGRIFOOD SUPPLY CHAIN	152
GENETICS AND IMMUNOLOGY				
74	Awadi	Asma	EVOLUTION AND DIVERSITY OF DRB LOCUS IN HARES LEPUS CAPENSIS FROM TUNISIA	154
75	Ben Jaafar	Sonia	AN OVERVIEW OF ANDROGEN RECEPTOR AR PROTEINPROTEIN INTERACTIONS PPI AND PATHWAY ENRICHEMENT POTENTIAL IMPLICATIONS IN DRUG REPURPOSING IN PROSTATE CANCER	154
76	Ben Jemia	Zeineb	MOLECULAR AND IMMUNOCYTOCHEMICAL MARKERS FOR EARLY DETECTION OF CERVICAL CANCER AMONG TUNISIAN WOMEN	155
77	Bourguiba	Hedia	METAGENOMIC ANALYSIS OF BACTERIAL COMMUNITIES IN APRICOT RHIZOSPHERIC SOIL FROM TUNISIA	155
78	Ghariani	Salma	EVALUATION DES PERFORMANCES AGRONOMIQUES DE LOLIUM PERENNE ET DE LA FETUQUE ELEVEE ENDOPHYTES PAR NEOTYPHODIUM EN CONDITIONS TUNISIENNES	156
79	Setti Boubaker	Nouha	SYSTEMIC IMMUNE INFLAMMATION RELATED MARKERS FROM A SIMPLE ROUTINE PREOPERATIVE COMPLETE BLOOD COUNT TO UTUC PATIENTS? POSTOPERATIVE OUTCOME PREDICTION	156
MICROBIOLOGY AND VIROLOGY				
80	Abassi	Sarra	SPIRULINA PLATENSIS ENRICHED WITH SILVER A NOVEL BIOALTERNATIVE AGAINST ANTIBIOTIC RESISTANCE IN TUNISIAN UROGENITAL MYCOPLASMA STRAINS	158
81	Abidi	Sabrine	ANTIBACTERIAL ACTIVITY OF LACTIC ACID BACTERIA STRAINS ISOLATED FROM TUNISIAN TRADITIONAL DAIRY PRODUCTS AGAINST PATHOGENIC BACTERIA	158
82	Aouadhi	CHEDIA	CHARACTERIZATION OF PRIMARY ACTION MODE THYMUS CAPITATUS OF ESSENTIAL OIL AGAINST STAPHYLOCOCCI AND GRAM NEGATIVE BACTERIA AS CAUSE OF BOVINE MASTITIS	159

83	Ayari	Wael	NETTLE URTICA MEMBRANACEA L EXTRACT ENHANCES PLANT GROWTH AND INDUCES TOLERANCE AGAINST TOMATO SPOTTED WILT VIRUS	159
84	Fakhfakh	Hatem	NETTLE URTICA MEMBRANACEA L EXTRACT ENHANCES PLANT GROWTH AND INDUCES TOLERANCE AGAINST TOMATO SPOTTED WILT VIRUS	160
85	Khadraoui	Nadine	ANTIMYCOPLASMAL POTENTIAL OF PEGANUM HARMALA SEED EXTRACT AND ITS SYNERGISTIC COMBINATION WITH CONVENTIONAL DRUGS	160
86	Khemakhem	Bassem	ISOLATION AND IDENTIFICATION OF A NEW BACILLUS GLYCINIFERMENTANS STRAIN FROM DATE PALM RHIZOSPHERE AND ITS EFFECT ON BARLEY SEEDS UNDER HEAVY METAL STRESS	161
87	Limam	Hajer	PHYTOCHEMICAL PROFILE AND BBOACTIVITIES OF TUNISIAN E ERYTHROCORYS A STUDY ON PHENOLIC COMPOUNDS AND ESSENTIAL OILS	161
88	Zmantar	Tarek	IN VITRO EVALUATION OF ANTIBACTERIAL AND ANTIBIOFILM EFFECTS OF MORINGA ETHANOLIC SEED EXTRACT AGAINST PERIIMPLANTITIS ASSOCIATED ORAL PATHOGENS	162
PHARMACOLOGY AND TOXICOLOGY				
89	Bedoui	Arij	PHYTOCHEMICAL CHARACTERIZATION NETWORK PHARMACOLOGY ANALYSIS AND THE THERAPEUTIC POTENTIAL OF O CRENATA AGAINST INDUCED HEPATOTOXICITY	164
90	Bourgou	Soumaya	EFFICACITY OF ARBUTUS UNEDO FOR COSMETIC APPLICATION: FORMULATION AND BIOLOGICAL ACTIVITY EVALUATION	164
91	Harigua	Emna	TOWARDS AN AIEMPOWERED MOBILE APPLICATION FOR MICROSCOPY IMAGE ANALYSIS IN LOW RESOURCES SETTINGS	165
92	Nourhne	Dhawefi	FORTUNELLA MARGARITTA INHIBITS INTESTINAL GLUCOSE ABSORPTION, IMPROVES GLUCOSE TOLERANCE AND PROTECTS AGAINST ALLOXAN-INDUCED DIABETES IN RAT	165
93	Othmani	Sirine	PHYTOCHEMICAL COMPOSITION OF NIGELLA SATIVA ESSENTIAL OIL AND ITS PROTECTIVE EFFECT AGAINST ISOPROTERENOLINDUCED MYOCARDIAL INFARCTION	166
94	Sadraoui	Raoudha	ANTIOXIDANT, ANTI-?-GLUCOSIDASE, ANTI-TYROSINASE, AND ANTI-ACETYLCHOLINESTERASE COMPONENTS FROM LEAVES OF MILLETAFERRUGINEA WITH MOLECULAR DOCKING STUDY	166
95	Chihaoui	Saif-Allah	PGPR INOCULATION IMPROVES SOIL HEALTH AND SALT TOLERANCE IN *FABA BEAN (VICIA FABA L.*) AND PROMOTES PLANT GROWTH IN SEMI-ARID AREAS	167

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BIOCHEMISTRY AND MOLECULAR BIOLOGY

ORAL COM N°: 1.

FROM ASSAY TO ACTION: QUANTITATIVE SCREENING OF LEISHMANIA MTAP AND REPURPOSING OF APPROVED DRUGS FOR LEISHMANIASES THERAPY

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Abstract: Drug repurposing is a promising strategy for identifying new treatments against Neglected Tropical Diseases such as Leishmaniases, offering the advantage of reduced development time and cost. In this context, computational and biochemical investigation of therapeutic targets plays a key role in guiding the selection of effective drug candidates. We previously developed a robust miniaturized assay for the recombinant *Leishmania infantum* MTAP protein (LiMTAP) and demonstrated its relevance for structure-based virtual screening. Virtual screening and docking of FDA-approved drugs using trimeric models of LiMTAP identified both known anti-leishmanial compounds and novel candidates, which are further investigated in this study through biochemical and biological experiments for the selection of potential hit compounds. The present study focuses on an *in vitro* validation of this approach through the biochemical screening of LiMTAP inhibitors among six predicted drug candidates and the biological evaluation of their antileishmanial effects. Two compounds (Comp315, Comp316) out of the six drug candidates inhibited the recombinant LiMTAP protein with IC_{50} values ranging from 200–400 µg/mL. These molecules showed anti-leishmanial activity with no significant toxicity toward THP-1 macrophages. Notably, Comp315 is described herein for the first time with an IC_{50} of ~30 µg/mL when tested on promastigote growth. This study consolidates the previous *in silico* findings through experimental validations *in vitro*, and reveals the selected drugs as novel anti-*Leishmania* effectors, confirming the relevance of our approach and calling for further investigations.

KEYWORDS: *LiMTAP, Leishmaniases, Drug repurposing, Biochemical assay, Microplate-based screening, Comp315, promastigotes*

ORAL COM N°: 2.

DECIPHERING THE MOLECULAR BASIS OF DROUGHT TOLERANCE IN FABA BEAN (*VICIA FABA* L.) THROUGH LEAF TRANSCRIPTOME SEQUENCING AND DE NOVO ASSEMBLY

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Abstract: Drought is a major abiotic stress factor that severely limits faba bean (Vicia faba L.) production worldwide, including in Tunisia, where climate variability and declining water resources intensify its impact. Despite its agronomic importance and nutritional value, the molecular mechanisms underlying faba bean responses to drought stress remain poorly understood, limiting the progress in breeding drought-tolerant varieties. In this context, a comprehensive transcriptome analysis using RNA sequencing (RNA-seq) was performed on faba bean leaf tissues to investigate the gene expression patterns associated with drought stress and to uncover molecular networks involved in stress response and adaptation.

Using a de novo assembly approach, a total of 26,728 differentially expressed genes (DEGs) were identified in leaves subjected to drought conditions. Among these, 13,920 genes were significantly upregulated, while 12,808 were downregulated, indicating a complex and dynamic regulatory response to water deficit. In addition to gene expression changes, 10,800 simple sequence repeats (SSRs) and 2,130 transcription factors (TFs) were identified, many of which are associated with key metabolic and signaling pathways. Notably, these included genes involved in both abscisic acid (ABA)-dependent and ABA-independent signaling cascades—critical pathways in drought signal perception and response.

Gene Ontology (GO), Eukaryotic Orthologous Groups (KOG), and Kyoto Encyclopedia of Genes and Genomes (KEGG) enrichment analyses showed that the identified DEGs are involved in various biological processes and pathways, including photosynthesis, flavonoid biosynthesis, response to abiotic stress, reactive oxygen species (ROS) detoxification, signal transduction, biosynthesis of secondary metabolites, and transmembrane transport. Moreover, several drought-responsive protein families, such as late embryogenesis abundant proteins (LEAs), dehydrins (DHNs), and heat shock proteins (HSPs), exhibited strong upregulation under drought conditions, suggesting their crucial role in stabilizing cellular structures and protecting the plant during water-deficit stress.

The accuracy of RNA-seq data was validated by qRT-PCR analysis of 10 randomly selected DEGs, confirming the reliability of the expression patterns observed. Collectively, these findings provide valuable insights into the molecular basis of drought stress tolerance in faba bean and offer a useful resource for marker-assisted selection and genetic improvement programs targeting enhanced drought resilience in legume crops.

KEYWORDS: *Vicia faba, Drought stress, RNA-seq, Transcriptome assembly, Differentially expressed genes (DEGs)*

ORAL COM N° : 3.

CHEMICAL COMPOSITION, BIOLOGICAL ACTIVITIES AND FUNCTIONAL PROPERTIES OF POLYSACCHARIDES FROM *PINUS HALEPENSIS* CONES

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The agricultural and food-processing industries generate vast quantities of by-products each year, which have critical environmental and disposal problems. In the context of circulareconomy, the valorization of by-products has increasinglybecome a matter of scientificinterest, and specifically, throughtheirrecovery as bioactive compounds as functional food and feed ingredients. Among these compounds, plant polysaccharides have attracted considerable interest due to their diverse range of biological activities. This study investigates the extraction, characterization, and determination of the biological and functional properties of polysaccharides derived from *Pinus halepensis* cones. The polysaccharides were extracted using hot water extraction, a green and efficient procedure for the extraction of plant biomolecules and a series of purification processes including hot water extraction, ethanol precipitation, deproteinization, and dialysis. The structural and physicochemical properties of the extracted polysaccharides were characterized using Fourier Transform Infra red Spectroscopy (FTIR), X-ray Diffraction (XRD), Gas Chromatography-Flame IonizationDetection (GC-FID), and Gas Chromatography-Mass Spectrometry (GC-MS). GC-FID analysis enabled the identification of monosaccharide composition, while GC-MS was employed to investigate glycosidic linkages within the polysaccharide chains. The biological evaluation demonstrated notable antihypertensive activity. Hemolytic activity was also investigated. Additionally, functional properties such as water-holding capacity, solubility, and emulsifying capacity were investigated, demonstrating promising applications of these natural polymers in the pharmaceutical and food industries.

Keywords: *Pinus halepensis;* structural characterization; biological activities; functional properties.

ORAL COM N° : 4.

PRELIMINARY EVALUATION OF NEWLY SYNTHESIZED ACRIDINE DERIVATIVES WITH ANTIPROLIFERATIVE ACTIVITY AGAINST HUMAN CANCER CELL LINES

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Abstract: Acridine derivatives are an important class of heterocyclic compounds known for their DNA intercalating properties and potential anticancer effects. In the search for novel antiproliferative agents, we synthesized a series of five new acridine-based molecules and conducted preliminary biological evaluations on human cancer cell lines. Compounds 1–5 were synthesized through a multi-step process and structurally characterized. Their cytotoxic activity was assessed in vitro using the MTT assay on four human cancer cell lines: MCF-7 , A549, HCT-116 , and HeLa . Cells were exposed to increasing concentrations of each compound, and IC_{50} values were calculated after 72 hours. A non-tumoral human cell line was used to evaluate initial safety and selectivity. All five compounds exhibited varying degrees of cytotoxicity. Compound 3 demonstrated the most potent antiproliferative activity, with IC_{50} values below 26 μM in cell lines MCF-7, and A549 . The other compounds showed moderate to low activity depending on the cell line. Importantly, Compound 3 also displayed an acceptable safety profile, with minimal toxicity observed in normal human cells at active concentrations. These preliminary results highlight the potential of Compound 3 as a promising lead for anticancer drug development. Its selective cytotoxicity profile supports further investigation. Upcoming studies will focus on elucidating its mechanism of action and evaluating its therapeutic potential in vivo using appropriate cancer models.

KEYWORDS: Acridine derivatives, anticancer activity, drug development

ORAL COM N° : 5.

IMPACT OF MICROPLASTICS ON THE LIPID PROFILE OF RATS

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Abstract :

Microplastics (MPs) are ubiquitous pollutants in terrestrial and aquatic ecosystems. Their resistance to biodegradation and their ability to accumulate in living organisms raise serious public health problems. Recent studies have demonstrated their toxicity, in particular by inducing oxidative stress, inflammatory responses and metabolic disturbances. The involuntary ingestion of MPs by animals and potentially by humans could have a significant impact on cell physiology. The aim of this study is to evaluate the acute effects of microplastics on blood and tissue lipid profiles in rats.

Male Wistar rats (200-250 g) were divided into four groups : a control group receiving physiological saline and three experimental groups treated by gavage with increasing doses of microplastics. Twenty-four hours after administration, the levels of total cholesterol, triglycerides, HDL and LDL were measured in plasma and tissue extracts using biochemical assays.

A dose-dependent alteration in the lipid profile was observed in both blood and tissue samples. Rats exposed to microplastics showed a significant increase in total cholesterol, triglycerides, and LDL levels, along with a decrease in HDL ($p < 0.05$). Signs of lipid accumulation were also detetcted in liver tissue.

Acute exposure to microplastics induces rapid and dose-dependent metabolic disturbances, significantly affecting the lipid profile. Although determined after a short exposure period, these alterations may represent early indicators of more severe long-term metabolic disorders.

KEYWORDS: *Microplastic, inflammatory responses, lipid profile.*

ORAL COM N° : 6.

MAGNETIC FIELD EFFECTS ON MICROBIAL BIOREMEDIATION OF HEAVY METALS (LEAD AND MERCURY)

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Abstract:

Heavy metal pollution from lead (Pb) and mercury (Hg) poses a major environmental and health threat worldwide. In this presentation, we examine how applying a static magnetic field (SMF, 200 mT) enhances the bioremediation capacity of *Pseudomonas stutzeri* LBR. Without SMF, the bacterium reduces Pb by 54% and Hg by 97%, with intracellular accumulations of 89.5% (Pb) and 53% (Hg). Under SMF, reduction efficiencies increase to 98.4% for Pb and 99.16% for Hg, accompanied by greater exopolysaccharides production and elevated antioxidant responses (Reduced glutathione GSH, Glutathione peroxidase (GPx). These results indicate that SMF can effectively enhance microbial resistance and bioremediation efficiency, offering promising applications for heavy metal decontamination.

KEYWORDS: *Static Magnetic Field (SMF), Microbial Bioremediation, Heavy Metals*

ORAL COM N° :7.

NATURAL ADSORBENTS FOR IMPROVING THE QUALITY OF DESALINATED WATER THROUGH BORON REMOVAL AND NUTRIENT ENRICHMENT FOR AGRICULTURAL REUSE

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The The increasing scarcity of freshwater resources has highlighted the potential of desalinated water as an alternative source for agricultural irrigation. However, its use presents two major challenges, the elevated concentration of boron, which can be toxic to plants even at low levels, and the absence of essential nutrients that are vital for sustaining crop productivity. To address these limitations, this study explores an innovative and cost-effective approach using natural adsorbents to improve the quality of desalinated water. Three materials were tested: HJ1 clay from the Haria Jebbes formation, AM clay from Mazzouna, and coal-derived ash. Various concentrations and pH conditions were evaluated to determine optimal treatment parameters for boron adsorption and nutrient enrichment. The results revealed that the best adsorption efficiencies were achieved under alkaline conditions (pH 9.8 for HJ1, 9.4 for AM, and 9.5 for ash), with boron removal rates of 80.66% for HJ1, 72.23% for AM, and 75.6% for ash. In addition to effectively reducing boron levels, the use of coal ash significantly enriched the treated water with key macronutrients, increasing potassium content from 9.4 mg/L to 80 mg/L and phosphorus from 0 mg/L to 46.1 mg/L. These improvements make desalinated water not only safer for irrigation but also more beneficial for crop development. The results support the use of natural adsorbents as a promising and sustainable solution for optimizing desalinated water in agricultural applications, particularly in regions facing water scarcity.

Keywords: Desalinated water, boron removal, clay, coal ash, adsorption, nutrient enrichment, irrigation reuse, sustainable agriculture.

ORAL COM N° : 8.

TITLE: ASSOCIATION OF *PTEN* AND *TSC1* GENE VARIANTS WITH AUTISM SPECTRUM DISORDER PHENOTYPES

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Abstract: In the context of Autism Spectrum Disorder (ASD), single nucleotide polymorphisms (SNPs) are genetic markers that have been associated with the risk and manifestation of the disorder. This study aimed to investigate the possible associations of two common SNPs in the PTEN gene (*rs701848 T>C* and *rs34140758 C>A*) and two SNPs in the TSC1 gene (*rs739442 C>T* and *rs2809244 A>C*) with the risk of ASD in a Tunisian population.
From January 2022 to July 2023, a total of 108 diagnosed with ASD and 180 healthy control subjects were included in the study. The SNPs in the *PTEN* and *TSC1* genes were detected by polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP).
The results of the present study showed that the T allele of *rs701848* was associated with an increased risk of ASD (odds ratio [OR] = 1.34, 95% CI: 1.01–1.78). The C allele of *rs739442* was also associated with an increased risk of ASD, with an OR of 1.62 (95% CI: 1.14–2.32). In contrast, *rs34140758* and *rs2809244* were not significantly associated with ASD risk (OR = 0.76, 95% CI: 0.54–1.07).
In conclusion, based on our findings, we suggest that the *rs701848* and *rs739442* polymorphisms in the *PTEN* and *TSC1* genes, respectively, may be associated with an increased risk of ASD in the Tunisian population.

KEYWORDS: ASD, polymorphisms, *PTEN*, *TSC1*, PCR-RFLP.

ORAL COM N°: 9.

IMPACT OF MISSENSE MUTATIONS ON THE STRUCTURE-FUNCTION RELATIONSHIP OF HUMAN SUCCINYL-COA SYNTHETASE USING HOMOLOGY MODELING AND MOLECULAR DOCKING

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Abstract: The encephalomyopathic mtDNA depletion syndrome with methylmalonic aciduria is associated with succinyl-CoA synthetase (SCS) deficiency caused by pathogenic variants in genes encoding its two subunits. SCS is a mitochondrial enzyme involved in several metabolic pathways and acts as a heterodimer composed of α and β subunits encoded by *SUCLG1* and *SUCLA2* genes, respectively. The purpose of this study was to analyze the effects of the most pathogenic non-synonymous single nucleotide polymorphisms (nsSNPs) using different prediction tools. A filtering strategy was firstly applied on nsSNP from the databases and then 343 and 365 nsSNPs in *SUCLG1* and *SUCLA2* genes, respectively were retained and analyzed for their structural and functional effects using homology modeling and molecular docking. Results showed that most deleterious mutations selected for structural analysis were located in loop regions critical for protein stability and function, especially, variants altering glycine and proline residues in these regions supporting their importance. We also showed that variants leading to hydrophobic and hydrophilic residues can destabilize the folding and binding of the protein. Molecular docking has also been used to identify the most important regions of ligand binding site (CoA binding site, ADP-Mg^{2+} binding site and phosphate ion binding site) and between the two subunits themselves, which mainly involving the ligase CoA domain. Our structural analysis, performed on selected nsSNP, are in accordance with experimental studies reported in the literature and predicted that they would responsible to either nonfunctional protein, subunit instability resulting in reduced amounts of misassembled protein, or in a protein unable to phosphorylate ADP.

KEYWORDS: *Succinyl-CoA synthetase ADP- dependent, Missense SNPs, Homology modeling, Docking, Structure-function relationship*

ORAL COM N°: 10.

EXOPOLYSACCHARIDE–SELENIUM COMPOSITE NANOPARTICLES: SYNTHESIS, CHARACTERIZATION, BIOLOGICAL ACTIVITIES AND POTENTIAL USE AS A POSTHARVEST STRAWBERRY COATING

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ABSTRACT
Selenium nanoparticles (SeNPs) have attracted considerable attention for their distinctive properties, excellent bioavailability, and minimal toxicity, highlighting their potential for diverse applications in food, agriculture and medicine. In this study, EPS produced by the non-phytopathogenic bacterium *Erwinia wheatii* sp. nov. STN24 was employed as a stabilizing and capping agent for the synthesis of well-dispersed SeNPs. The morphology and physicochemical properties of EPS-SeNPs were analyzed using UV–visible spectroscopy (UV-Vis), transmission electron microscopy (TEM), X-ray diffraction (XRD), dynamic light scattering (DLS), Fourier transform infrared (FT-IR) spectroscopy, thermogravimetric analysis (TGA), and differential scanning calorimetry (DSC). These analyses confirmed that the EPS-SeNPs were purely amorphous, exhibited a uniform particle size distribution, and demonstrated excellent thermal stability. The biological activities of the EPS-SeNPs synthesized from EPS were evaluated. Compared to the native EPS, EPS-SeNPs with varying Se/EPS ratios exhibited enhanced radical scavenging activity against ABTS, as well as greater ferric-reducing antioxidant power. These findings indicate that conjugation with SeNPs significantly improved the antioxidant properties of EPS. Additionally, EPS-SeNPs demonstrated potent bactericidal and fungicidal effects against the tested pathogens. This study also assessed the effects of EPS and EPS-SeNP coatings on fresh strawberry fruits over a 16-day storage period, focusing on parameters such as shelf life, decay rate, weight loss, titratable acidity, total soluble solids (TSS), and anthocyanin content. The results showed that strawberries coated with EPS and EPS-SeNPs exhibited an extended shelf life and a reduced percentage of decayed fruits compared to the uncoated control group.

Keys words: EPS-SeNPs ; biological activities; coatings on strawberry fruits

ORAL COM N° : 11.

CONTRIBUTION OF MOLECULAR TOOLS IN THE STUDY OF *LEISHMANIA SPP.* TRANSMISSION IN TUNISIA

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Abstract : Leishmaniasis are parasitic diseases caused by protozoa of the genus *Leishmania* and transmitted by the bite of hematophagous insects, Phlebotomine sandflies. Molecular technics are knwon to be highly sensitive and specific methods allowing the precise identification of both parasite and vector species, even from minute biological samples.
This work aims to access the usefluness of (i) qPCR targeting kinetoplast DNA in screening *Leishmania* infection (ii) DNA barcoding in determining sandfly species and (iii) ITS1 PCR sequencing in *L. infantum* and *L. major* identification.
A sample of 1135 females was collected from leishmaniasis foci. DNA was extracted separately from each female individual and subjected to KDNAqPCR using taqMan probes. *Leishmania* infection was first screened by pools of 5 sandflies'DNA. Then, DNAs from each positive pool were analyzed individually to determine the positive specimens. All positive kDNAqPCR specimens were amplified by ITS1-PCR and *Leishmania* species were determined by ITS1 sequencing. Sandfly species of positive females were identified by barcoding targetting COI or cytb in the mitochondrial genome.
Real-time PCR identified 15 positive specimens. ITS1-PCR sequencing allowed the identification of *Leihmania* species in 8 specimens out of 15. They corresponded to *L. major* (7) and *L. infantum* (1). Sandfly species of infected females was molecularly identified as *Phlebotomus perniciosus* (4), *Ph. papatasi* (8) and *Sergentomyia dreyfussi* (3).
This simple molecular protocole allowed identification of sandfly species vector of *Leishmania spp* in Tunisia and could advance our understanding of leishmaniasis epidemiology.

***KEYWORDS** : Real-time PCR, kDNA, COI DNA, cytbDNA, Leishmania, sandfly*

ORAL COM N° : 12.

IMPACT OF FLAVONOID-RICH SYRAH GRAPE SEED EXTRACT ON GLUCOSE HOMEOSTASIS AND PRO-INFLAMMATORY CYTOKINES IN STZ-INDUCED DIABETIC MICE

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Abstract :
Grape seeds, a byproduct of the wine industry, are notable for their rich phenolic antioxidant components, which include both flavonoids and non-flavonoids. These compounds have been extensively studied for their biological activities, encompassing anti-inflammatory, anticancer, and antioxidant effects. It is within this framework that our research was initiated.
The present study was designed to evaluate the antidiabetic and anti-inflammatory effects of grape seed extract (GSE) in diabetic mice induced by streptozotocin (STZ).
Diabetes was induced in C57BL/6 mice through a single intraperitoneal injection of STZ. Successful induction of diabetes was confirmed eight days post-injection by measuring fasting blood glucose levels. The mice were subsequently divided into four groups: a control group, a treated control group, an untreated diabetic group, and a diabetic group treated with GSE at a dosage of 250 mg/kg.
At the end of the treatment period, we assessed the expression of genes involved in gluconeogenesis and metabolism, including fatty acid synthase (FAS), acetyl-CoA carboxylase (ACC), and phosphoenolpyruvate carboxykinase (PEPCK). Additionally, glucose levels and lipid profiles were determined. We also evaluated the expression profiles of pro-inflammatory cytokines, including interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-α).
In conclusion, the results indicate that grape seed extract (GSE) at a dosage of 250 mg/kg exhibits potent anti-inflammatory and antihyperglycemic activity by modulating glucose homeostasis through the downregulation of gluconeogenesis and inflammation. These findings suggest that GSE holds promise for the development of standardized phytomedicines to aid in the management of diabetes.

Keywords : Grape seed extract ; diabetes ; streptozotocin ; inflammation.

ORAL COM N° :13.

PROTEOLYTIC HOMEOSTASIS AS A NEW ACTOR IN INFLAMMATORY BOWEL DISEASES (IBD)

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Chronic relapsing disorders of the gastrointestinal tract, such as ulcerative colitis (UC) and Crohn's disease (CD), collectively referred to as inflammatory bowel diseases (IBD), represent a significant global health burden with rising incidence. Despite the availability of various therapeutic modalities, current interventions often fail to induce sustained remission, and the underlying mechanisms of IBD pathogenesis remain insufficiently elucidated. Recent studies have shown that IBD is associated with immune dysregulation, compromised intestinal barrier integrity, and marked alterations in gut microbiota composition. Additionally, several reports have identified an imbalance in proteolytic activity, which has been implicated in the pathophysiology of multiple gastrointestinal disorders. This aberrant proteolysis has been attributed primarily to serine proteases secreted by epithelial cells and infiltrating immune cells.
In this study, we aimed to quantify serine protease activities in fecal samples from both healthy individuals and IBD patients. Protease activities were measured using specific substrates and validated with selective inhibitors targeting distinct protease families. Our findings reveal a significant elevation of total protease activity in IBD patients compared to healthy controls, with serine proteases constituting the most active family. Further analysis identified trypsin, neutrophil elastase (HNE), proteinase 3 (PR3), and cathepsin G (CatG) as the predominant serine proteases present. These results provide new insights into the proteolytic landscape of IBD and support the exploration of serine proteases as potential therapeutic targets.

Keywords: Intestinal homeostasis, IBD, Serine proteases, Gut Microbiota, Inflammation.

ORAL COM N° : 14.

ESSENTIAL OILS COMPOSITION, TOTAL PHENOLIC AND ANTIOXIDANT PROPERTIES OF *ASTRAGALUS ARMATUS* STEMS AND ROOTS EXTRACTS

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Abstract: In the present study the chemical composition of essential oils (EOs) obtained from the stems and roots of *Astragalus armatus*, growing in Tunisia, was investigated by GC-MS analysis. Twenty-nine and forty-nine compounds were identified from the roots and stems, representing 91.0% and 96.2% of the whole EOs respectively. The main constituents of the EO from stems were hexanoic acid (24.4%), 1-decanol (11.8%), *p*-vinylguaiacol (6.2%) and nonanoic acid (5.0%). In the EO from roots, the main compounds were 1-octadecene (15.7%), isoelemicin (11.3%), hexanoic acid (10.8%), and 1-hexadecene (10.1%)**.** The total phenol contents varied between different Astragalus parts; root extract had higher total phenol content (20.04 mg GAE/g) than stem (8.92 mg GAE/g) extracts. The highest content of total flavonoids was observed in root (14.65 mg CE/g) extract. Antioxidant activities of the ethanolic extract from *Astragalus armatus* roots and stems were evaluated by using DPPH radical scavenging and reducing power assays. Ethanolic extract of different parts of *Astragalus armatus* showed better antioxidant activity.

KEYWORDS: *Astragalus armatus; essential oil; GC-MS; phenols; antioxidant activity*

ORAL COM N° : 15.

BIOPROSPECTING OF NOVEL MICROBIAL EXTREMOZYMES FROM TUNISIAN EXTREME BIOTOPES USING GENOMIC AND METAGENOMIC NGS APPROACHES

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Abstract: Enzymes play a crucial role in industrial biotechnology, with the global market expected to grow from €5.6 million in 2021 to €7.6 million by 2026. Despite their importance, genomic studies on extremophiles and their enzymes remain limited. Next-generation sequencing (NGS) is essential for understanding microbial functionality in extreme environments, requiring advanced omics techniques for analysis. As part of the Horizon Europe NGS-4-ECOPROD project (https://cordis.europa.eu/project/id/101079425), led by CBS (Tunisia) in collaboration with Université Claude Bernard Lyon 1 (UCBL, France) and Georg-August-Universität Göttingen Stiftung Öffentlichen Rechts (UGOE, Germany), this study aims to bridge NGS networking gaps for eco-friendly biotech applications, particularly extremozymes. Fifty microbial species—fungi, yeast, and bacteria—were isolated from diverse extreme biotopes across Tunisia, including hot springs, mountain peaks, saline lakes, and oil reservoirs. These microbes are being analyzed using Illumina and Oxford Nanopore sequencing technologies for whole-genome and metagenomic studies. Whole-genome sequencing (WGS) has been completed for 35 microbial strains, and data is being processed to identify genes encoding valuable extremozymes, with a focus on phospholipases. One promising strain, Streptomyces cyaneofuscatus CTM50504, was isolated from a Tunisian hot spring. It exhibits extracellular hydrolase activity, thriving at 50°C and pH 6-9. Genome sequencing revealed 770 protein-coding enzymes, including phospholipases, lipases, proteases, amylases, and chitinases. A novel phospholipase D (ScPLD) gene from CTM50504 was successfully cloned and expressed in *E. coli* BL21(DE3), producing a thermostable recombinant enzyme dependent on Ca^{2+}. These findings provide a foundation for developing efficient extremozymes with enhanced catalytic properties, offering significant biotechnological and industrial potential.

KEYWORDS: *extremophiles; extermozymes; whole-genome sequence; wet lab; dry lab.*

ORAL COM N° : 16.

SONOCATALYTIC REMOVAL OF METHYLENE BLUE USING ZNO NANOPARTICLES

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Abstract : Environmental pollution, particularly in aquatic systems, poses significant risks to ecosystems and human health. Dyes like methylene blue are particularly problematic due to their widespread use and persistence. Traditional treatment methods fail oftento remove effectively these contaminants. However, nanotechnology offers promising alternatives. This study investigates the effectiveness of combined effect of zinc oxide (ZnO) nanoparticles and acoustic stimulation using ultrasounds and music on the degrading of methylene blue. Our results showed that both music and ultrasounds enhance significantly the methylene blue removal efficiency. We suggest that
ultrasonic and music sounds enhance the dispersion and reactivity of ZnO nanoparticles, promoting the generation of hydroxyl radicals that break down dye molecules. These findings underscore the importance of optimizing both nanoparticles concentration and acoustic parameters to achieve maximum treatment performance.

KEYWORDS: *Dye degradation ; Zinc Oxide nanoparticle ; Sonocatalysis ;Methylene blue;*

ORAL COM N° : 17.

NEUROPROTECTIVE EFFECT OF CHITOSAN AGAINST ALPHA-SYNUCLEIN AGGREGATION IN PARKINSON'S DISEASE

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Abstract: Parkinson's disease (PD) is a progressive neurodegenerative disorder marked by dopaminergic neuron loss and pathological accumulation of misfolded alpha-synuclein. Current treatments are symptomatic, underscoring the need for novel neuroprotective agents. Chitosan, a natural biopolymer derived from Portunus segnis (blue crab) shell waste, valorized in collaboration with CHITELIX, represents a sustainable candidate with potential therapeutic effects in PD. This study investigates chitosan's effect on several aspects of neurodegeneration involved in PD. Using computational, cellular and animal models, the research shows that chitosan binds strongly to toxic alpha-synuclein oligomers and is non-toxic at specific doses. In PD mouse models and human cell lines, chitosan modulated key disease-related pathways, particularly the PI3K/AKT/mTOR signaling cascade, which is involved in protein aggregation and cell survival. Chitosan also showed anti- inflammatory effects. Overall, the results suggest that chitosan may reduce alpha-synuclein toxicity and limit inflammation, highlighting its promise as a sustainable therapeutic candidate for PD.

KEYWORDS: *Parkinson's disease, Chitosan, Alpha-synuclein, Neuroprotection, Valorization of marine byproducts*

ORAL COM N° : 18.

FROM LAB TO FIELD: PORTABLE DNA DETECTION OF ESCHERICHIA COLI AND THE CHALLENGES OF MINIATURIZED ELECTROCHEMICAL BIOSENSORS IN MEDICAL AND ENVIRONMENTAL DIAGNOSTICS

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Abstract: In the face of ongoing global health challenges, developing rapid, cost-effective, and accessible diagnostic tools is more critical than ever. This presentation outlines a practical biosensing strategy for detecting *Escherichia coli* DNA, using magnetic particles functionalized with capture probes that selectively bind the target DNA. Detection involves a secondary biotin-labeled probe coupled with streptavidin-conjugated alkaline phosphatase, enabling enzymatic signal generation. Depending on the substrate used, the system supports either electrochemical detection through enzymatic conversion of electroactive substrates or colorimetric detection for straightforward visual readout. For electrochemical measurements, a screen-printed electrode is modified with a nanocomposite material to increase conductivity and provide a stable, high-surface-area interface for detecting the enzymatic product, ensuring reliable and sensitive signal detection. To standardize colorimetric readings, a simple 3D-printed smartphone holder is used to control lighting and positioning, enabling consistent image capture and analysis. To make the workflow fully field-ready, bacteria from 50–100 mL water samples are concentrated using syringe-based filtration and then recovered into a smaller volume by backwashing the filter. DNA extraction is performed by heating the bacterial suspension in a buffering solution inside a common thermos, offering a practical, electricity-free method that feeds directly into the biosensing system. This integrated approach combines magnetic particle capture, enzymatic amplification, optimized electrode design, and straightforward sample preparation to provide a reliable, low-cost screening tool that complements conventional methods like PCR, helping prioritize samples and streamline pathogen detection workflows in medical and environmental contexts.

KEYWORDS : *Escherichia coli - Electrochemical biosensor - Magnetic particles - Point-of-care diagnostics*

ORAL COM N° : 19.

FISH BONE AS A SUSTAINABLE SOURCE OF GLYCOSAMINOGLYCANS: EXTRACTION PROCESSES, FINE CHARACTERIZATION AND MEDICAL APPLICATION

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Glycosaminoglycans (GAGs) are a class of linear polysaccharides composed of repeating disaccharide units. Each unit consists of a uronic acid either D-glucuronic acid (GlcA) or L-iduronic acid (IdoA) linked via β(1→3) or β(1→4) glycosidic bonds to a hexosamine, such as N-acetyl-D-glucosamine (GlcNAc) or N-acetyl-D-galactosamine (GalNAc). Fish bones are a rich and renewable source of (GAGs), a class of biologically important polysaccharides with diverse medical applications. In this study, GAGs were extracted from the bones of a Tunisian fish species () using a continuous extraction process and purified by DEAE-cellulose chromatography. Total sugar content was determined by the Dubois phenol–sulfuric acid method, uronic acid content by the m-hydroxydiphenyl method, and sulfate groups by ion-exchange high-performance liquid chromatography (HPLC). Structural characterization was done by Fourier-transform infrared spectroscopy (FTIR) and X-ray diffraction (XRD), which provided information on the functional groups and crystalline structures of the extracted compounds. 2D-NMR spectroscopy, with the TOCSY, COSY, DEPT, HSQC, and NOESY experiments, was employed for samples identification. The anticoagulant activity of the purified GAGs was assessed using both activated partial thromboplastin time (APTT) and prothrombin time (PT) assays, confirming their potential for biomedical applications. Glycosaminoglycans from marine by-products show intriguing pharmacological activities, providing more options for us to explore safer agents.

***Keywords**: By-products; glycosaminoglycans; characterization; anticoagulant activity.*

ORAL COM N° : 20.

CROSS PHARMACOLOGICAL, BIOCHEMICAL AND COMPUTATIONAL STUDIES OF THE NOVEL TOXIN MTX1 PURIFIED FROM SCORPION *MAURUS PALMATUS* VENOM

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Abstract: In the present study, we describe the isolation and characterization of a novel maurotoxin-like peptide, Maurotoxin 1, purified from the venom of the chactoid scorpion *Scorpio maurus.*
MTX1 was identified by double screening based on its ability to recognize specific antibodies produced against MTX and *in vivo* toxicity tests. MTX1 is lethal in mice and is eight times more toxic than MTX, with an LD50 of 0.01 µg/mouse. In vitro, it can compete with [125I] apamin and [125I] charybdotoxin in rat brain synaptosomes with IC50 of approximately 1.7 nM and 2 nM, respectively. MTX1 showed specificity in blocking Kv1.3 channels (IC50 180 nM) and exhibited a more selective profile than MTX for Kv1.2 channels (IC50 0.26 nM). Our in-depth bioinformatics analysis of the interaction between toxin channels showed that K23 and Y32 block the channel at the selective filter in a manner specific to all potassium channels. MTX1 is structurally related to MTX and belongs to the same class of short toxins bridged by four disulfide bridges, differing by only five amino acid residues. Molecular docking studies have highlighted the structure-function relationship between these two peptides and confirmed the impact of these substitutions on their pharmacological activity.

***KEYWORDS:** Scorpion venom; Voltage-gated K+ channels; Maurotoxin MTX – Short scorpion toxins – potassium channel – Kv: voltage-dependent potassium channel – SKca: calcium activated potassium channel.*

ORAL COM N° : 21.

EFFECT OF DRYING AND EXTRACTION PROCESSES ON THE RETENTION OF BETALAINS IN OPUNTIA SPP. PARTS

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Abstract: Prickly pear plants are well-known for their bioactive molecules, including polyphenol and betalain compounds. The latter is of particular importance because it is considered as a colorant and health-promoting compound. This research supports the use of betalains as a natural substitute for synthetic colourants extracted from different parts of *Opuntia spp.* (*Opuntia stricta* fruits and *Ficus-indica* peels). Both drying and extraction processes' effects were examined in order to reduce the betalain compound production's energy requirements and environmental impact.

This study examines the impact of freezing pretreatment on the convective drying of *Ficus-indica* peels as well as the use of microwave and ultrasonic technologies as an eco-friendly method for extracting betalain from the *Opuntia stricta* fruits. Drying is the most common energy-consuming process used in reducing the high moisture content of fresh products. This step is crucial to preserve the stability allowing to enhance the shelf life. In the same vein, conventional extraction methods using high temperatures and chemical inputs are energy intensive.

Ficus-indica peels, both fresh and frozen, were dried using a convective dryer. The results showed that, when compared to fresh peels, the drying times needed to reach the equilibrium phase in frozen peels were substantially decreased by 22.5–37% with drying temperatures ranging from 55 to 75°C. Simultaneously, the freezing pretreatment directly affected the betalain content, showing a decrease of about 43.3% at 75°C compared to fresh peels. This might be linked to the plant tissue's weakness during the freezing pretreatment, which altered the cell membrane's permeability to bioactive compounds.

As the extraction of the betalain is an energy requiring process, we were also interested in adopting mild environmentally methods such as microwave (MW) and ultrasound (US) technologies used alone or in combination for betalain extraction from *Opuntia stricta* fruits. The highest content of betalains was found in the MW (2 mn)+US (10 mn) and MW (2 mn) extraction methods, with 51.01±0.16 mg/100 g FW and 48.54±0.29 mg/100 g FW, respectively. An increase in betalain content of 13% and 18% added to a significant decrease in extraction time of 40 and 90% for MW (2 min) + US (10 min) and MW (2 min), respectively, was reported. These non-conventional extraction techniques enable shorter extraction times and lower energy use, which may provide an intriguing solution for industry.

Finally, the drying and extraction processes can both be adjusted with appropriate choice of pretreatments and non-conventional extraction processes to reduce energy consumption and expedite processing demands, making them highly efficient in raising betalain extraction yields from *Opuntia spp.* varieties.

KEYWORDS: *Betalain, Drying, Freezing, Non-conventional extraction, Opuntia spp.*

ANIMAL PHYSIOLOGY
BIOLOGY AND ECOLOGY

ORAL COM N° : 22.

MELILOTUS OFFICINALIS LEAF EXTRACT AS A NATURAL THERAPEUTIC AGENT AGAINST CARDIOMETABOLIC DISORDERS AND MYOCARDIAL INJURY

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Abstract: The phytochemical profile of *Melilotus officinalis* leaves extract (MOLE) was thoroughly investigated using LC-MS/MS, revealing a rich composition predominantly consisting of flavonoids and their glycosidic forms, alongside various organic and phenolic acids and their derivatives. These bioactive compounds are known for their potent pharmacological properties. In an in vivo experimental model, MOLE demonstrated a significant potential to attenuate cardiometabolic risk factors. This was evidenced by a marked reduction in serum total cholesterol and triglyceride levels and a notable suppression of inflammatory processes, as indicated by decreased plasma protein carbonyl (PC) levels. Moreover, MOLE exhibited a regulatory effect on key biomarkers of cardiac dysfunction, including creatine kinase-MB (CK-MB), lactate dehydrogenase (LDH), and troponin, which were all significantly reduced following treatment. These effects highlight its cardioprotective efficacy, particularly in isoproterenol-induced cardiotoxicity. The extract effectively mitigated oxidative stress, as shown by lowered lipid peroxidation, and simultaneously enhanced endogenous antioxidant defenses, notably superoxide dismutase (SOD) and catalase (CAT) activities.
Remarkably, MOLE also contributed to myocardial tissue repair and regeneration, as evidenced by the significant reduction in infarct size and the improvement of electrocardiographic parameters, including the normalization of ST-segment elevation and restoration of P wave patterns. The histopathological examination further corroborated these findings by revealing preserved cardiac architecture and diminished signs of cellular damage in treated groups. Complementary molecular docking studies reinforced the therapeutic potential of MOLE, suggesting strong interactions with key targets involved in inflammatory signaling pathways, thus supporting its role as a promising natural agent for cardiovascular protection and recovery.

KEYWORDS: *Melilotus officinalis; cardioprotection; LC-MS/MS; oxidative stress; myocardial regeneration*

ORAL COM N° : 23.

COPPER OXIDE NANOPARTICULES ENHANCE FEAR EXTINCTION MEMORY

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Abstract: Nanomaterials have garnered significant attention for their diverse medical uses, particularly in neurology. Among these, copper oxide nanoparticles (CuO-NPs) exhibit distinct nanoscale characteristics that enable effective cellular interactions, highlighting their promise as therapeutic agents for influencing synaptic plasticity and improving cognitive performance. Yet, their role in fear extinction memory and their impact on neuronal excitability and synaptic plasticity remain unexplored. In this study, we initially used transmission electron microscopy (TEM) to show that CuO-NPs effectively penetrate the blood-brain barrier (BBB) within 24 hours of administration. Through cued fear conditioning experiments in mice, we observed that a single intraperitoneal injection of CuO-NPs improved fear extinction memory, as evidenced by a notable reduction in freezing behavior compared to control groups. Further patch-clamp recordings revealed that CuO-NPs heightened the excitability of infralimbic cortex (IL) pyramidal neurons and caused a sustained reduction in fast, medium, and slow post-spike afterhyperpolarizations (fAHP, mAHP, and sAHP). These results offer novel perspectives on the possible use of CuO-NPs in modulating fear extinction memory.

KEYWORDS: *Copper oxide nanoparticles, Infralimbic, Neuronal excitability, Afterhyperpolarization*

ORAL COM N° : 24.

CAPE ASH LEAF EXTRACT MITIGATES HEPATOTOXICITY AND NEPHROTOXICITY INDUCED BY CCL_4 VIA ANTIOXIDANT AND ANTI-INFLAMMATORY MECHANISMS

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Abstract: In this study, we investigated the preventive potential of aqueous extracts of Cape Ash (*Ekebergia capensis*) leaves (ECLE) against CCl_4-induced hepatotoxicity and nephrotoxicity. LC-MS/MS profiling identified fifty bioactive compounds across various chemical classes. *In vitro* assays revealed that ECLE possesses significant antioxidant activity, as demonstrated by its performance in DPPH and ABTS radical scavenging tests. In vivo, pre-treatment with ECLE at doses of 50 and 100 mg/kg body weight effectively mitigated CCl_4-induced liver damage, as evidenced by the restoration of hepatic biomarkers (ALT, AST, LDH, ALP, GGT), normalization of malondialdehyde (MDA) levels, enhancement of antioxidant enzyme activities (SOD, CAT, and GSH), and inhibition of DNA fragmentation. Furthermore, ECLE administration led to a significant reduction in plasma creatinine and blood urea nitrogen (BUN) levels, indicating its nephroprotective capacity. This protective effect on kidney tissue was supported by reduced oxidative stress and prevention of DNA damage. The histological analysis further corroborated these findings, showing improved tissue architecture and decreased inflammation, alongside lowered plasma levels of pro-inflammatory cytokines TNF-α and IL-6. Collectively, these results provide preliminary pharmacological evidence supporting the potential use of Cape Ash leaf extract in the management of hepatic and renal inflammatory disorders.

KEYWORDS: *Ekebergia capensis; Nephroprotective; Hepatoprotective; Oxidative stress; Antioxidant; LC/MS*

ORAL COM N° : 25.

SPIRULINA MITIGATES LIPID MICELLE AND/OR LPS-INDUCED INFLAMMATORY AND OXIDATIVE DAMAGE IN CACO-2 CELLS

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Abstract: Damage to intestinal epithelial cells occurs in obesity and other diseases as a result of inflammatory and oxidative processes. This compromises the gastrointestinal barrier by killing enterocytes, altering intestinal permeability, and triggering abnormal immune responses that promote chronic inflammation. Recent evidence highlights spirulina as a potent natural compound with antioxidant and anti-inflammatory properties. Objectives: This study aimed to investigate the ability of spirulina (SP) to counteract oxidative stress, inflammation, and epithelial barrier disruption in Caco-2 cells exposed to lipopolysaccharide (LPS) and/or lipid micelles Methodes: An in vitro Caco-2 cell model was employed to examine the cytoprotective, antioxidant, and anti-inflammatory properties of SP following stimulation with lipopolysaccharides (LPS) and/or lipid micelles (LM), with particular attention to epithelial barrier integrity. Results: Our findings demonstrated that SP protected against endoplasmic reticulum (ER) stress and preserved tight junction proteins, thereby enhancing epithelial barrier integrity. Moreover, SP improved cell viability and exhibited both antioxidant and anti-inflammatory properties. Conclusions: Collectively, the results indicate that spirulina exerts beneficial effects on Caco-2 cells and may help maintain intestinal barrier function in oxidative and inflammatory conditions.

Keywords: *Spirulina (SP); LPS; lipid micelles; Caco-2 cells; oxidative stress.*

ORAL COM N° : 26.

PROTECTIVE EFFECT OF CUSCUTA AUSTRALIS EXTRACT AGAINST ETHYLENE GLYCOL-INDUCED NEPHROTOXICITY IN RATS

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Abstract: Renal lithiasis is a widespread condition, affecting between four and twenty percent of the population depending on the region. It can be managed through conventional pharmacological treatments or with medicinal plants. In the context of promoting the value of invasive plant species, this study investigated the protective effect of *Cuscuta australis* extract against calcium oxalate nephrolithiasis experimentally induced by 0.75 percent ethylene glycol. *Cuscuta australis* was found to be rich in polyphenols, flavonoids, and tannins, with contents reaching 39.63 milligrams gallic acid equivalents per gram of dry matter, 20.0 milligrams quercetin equivalents per gram, and 8.0 milligrams catechin equivalents per gram, respectively. These secondary metabolites contribute to the extract's strong antioxidant capacity, including reducing and radical-scavenging activities demonstrated in vitro. These effects were further supported in vivo, with antioxidant enzyme levels in the curative treatment group reaching 7.050 units per milligram of protein for superoxide dismutase, 0.05 international units per milligram of protein for catalase, and 0.28 micromoles per milligram of protein per minute for glutathione peroxidase. Similar improvements were observed in the preventive treatment group. Histological examination showed obstruction of renal tubules due to crystal deposits, leading to reduced glomerular filtration, as confirmed by decreased creatinine clearance. These pathological changes were accompanied by elevated plasma levels of creatinine and urea. Treatment with *Cuscuta australis* extract significantly improved urinary biochemical parameters in both the curative and preventive groups and led to a marked reduction in serum levels of renal markers such as uric acid, urea, and creatinine, which reached 5.10 milligrams per deciliter, 8.45 milligrams per deciliter, and 4.37 millimoles per liter, respectively, in the curative group. Based on these results, *Cuscuta australis* extract demonstrates potential as an effective agent for both the prevention and treatment of renal lithiasis.

KEYWORDS: *Cuscuta australis nephroprotection; LC-MS/MS; oxidative stress; nephrolithiasis*

ORAL COM N° : 27.

BIOCHEMICAL EXPLORATION OF PANCREATIC FUNCTION AND LIPID PROFILE BEFORE AND AFTER THE RAMADAN FASTING PERIOD

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Abstract:

Our study focuses on the biochemical exploration of the effects of Ramadan fasting on pancreatic function and lipid profile by comparing parameters measured before and after this period.

Ramadan fasting, by altering dietary habits and physiological rhythms, represents a natural model of intermittent feeding likely to influence glucose and lipid metabolism.

Our study aims to analyze variations in biochemical markers related to insulin secretion and pancreatic function, as well as lipid profiles, in order to better understand the metabolic adaptations induced by this practice.

These investigations allow us to assess the impact of fasting on glycemic regulation, insulin sensitivity, and lipid parameters such as cholesterol and triglycerides.

The objective is also to identify potentially beneficial or harmful effects of fasting on metabolic health, particularly in individuals at risk of metabolic or cardiovascular diseases. This work thus provides important scientific insight into the biochemical mechanisms underlying physiological adaptations during Ramadan, contributing to better guidance of this practice from a public health and clinical management perspective.

ORAL COM N° : 28.

PREVENTIVE POTENTIAL OF C.CASSIA EXTRACT ON THE OXIDATIVE DAMAGE INDUCED BY METHOMYL: EXPLORATION BASED ON DOCKING STUDY

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Abstract:

Exposure to pesticides can cause oxidative stress, which can lead to a number of health problems. Herbal medicine is a significant area that focuses on treating and preventing these illnesses. Therefore the present study was designed to assess the beneficial effects of polysaccharides derived from *Cinnamomum cassia* in mitigating oxidative stress induced by methomyl (MET) in the liver and kidneys of Wistar rats. Rats were divided into 4 groups: a control group (T), a group treated with polysaccharides (P), a group pretreated with a polysaccharide extract and then treated with MET (P+MET) and a group treated with MET (MET). There has been recent findings linking the administration of MET to possible liver and kidney dysfunction. Pretreatment with the polysaccharide extract normalized all biochemical and oxidative parameters. The beneficial properties of cinnamon are linked to the antioxidant effects of its bioactive polysaccharides. In addition, virtual screening using docking simulations against «*Drosophila melanogaster* Acetylcholinesterase» was conducted to assess the bio- insecticidal properties of specific polysaccharide compounds derived from *C.cassia*. The toxic effects of Methomyl were effectively mitigated in the liver ad kidneys by polysaccharides under our experimental conditions.

Keywords: *Cinnamomum cassia*; Methomyl; Oxidative stress; Polysaccharides; Docking.

ORAL COM N° : 29.

IDENTIFICATION OF SEX VOLATILE COMPOUNDS IN LADY BEETLES

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Abstract: Biological control using natural enemies was considered among the most efficient alternative method tested against a large number of insect pest. In this regard, lady beetles including *Harmonia axyridis* (Pallas) and *Adalia bipunctata* (Linnaeus) were reported as effective predators that fed mainly on aphids and other pests. However, the lack of information about the sexual communication of these two species may limit their potential use in biological control programs. In this context, we aimed to better understand the complexity of their chemical communication so that to identify possible emitted sex volatile compounds using the SPME (Solid Phase Micro-Extraction) technique. Adults of the two lady beetles' species were sexed since emerged and were put separately in aerated plastic boxes containing sugar, pollen and sponge soaked in water under controlled conditions (T=23±2°C; RH=30±10%; L : D=16 :8). After that, virgin females (one-month-age) were stimulated using aphids according to the method described by Fassotte et al. (2014). As a result, for *H. axyridis*, GC-MS analysis showed the presence of five sex pheromone compounds with β-caryophyllene as the major constituent. Moreover, our data revealed the presence of various terpenes produced by *A. bipunctata* adults including α-pinene, camphene, β-pinene and limonene. In conclusion, the present work highlight the presence of sex volatile pheromone produced only by *H. axyridis* females which help to develop more specific and efficient alternative control methods.

KEYWORDS: *Adalia bipunctata, biological control, Harmonia axyridis, SPME*

ORAL COM N° : 30.

THE TOXIC EFFECTS OF "VERTIN ABAMECTIN" ON BEHAVIOR AND HEPATIC TRANSMINASES IN WISTAR RATS

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Abstract:
Insecticides play an important role in protecting agricultural crops from intrusive insects, but they pose a threat to human health due to their toxic effect. Exposure to pesticides can alter brain activity and lead to behavioral disorders as well as permanent changes that can lead to death by poisoning. the study that we have done focuses on the toxicological impact of abamectin (ABM) on health, the experiment was carried out on rats of the wistar strain, these were separated into 3 batches 1 control and two treated who underwent a medium dose (0.25 ml) and a high dose (0.5 ml) successively by gastric gavage twice within experimentation. Our results showed a weight loss with a decrease in body weight and relative liver weight accompanied by a significant disturbance of biochemical parameters (TGO/TGP) as well as abamectin-induced neurological disorders observed in neurobehavioral tests: open field OF.

KEYWORDS: *neurotoxicity, behavior, abamectin, rats, anxiety*

ORAL COM N° : 31.

MODULATION OF HUMAN NEUTROPHIL FUNCTIONS BY HYDROETHANOLIC CLADODE EXTRACT OF *OPUNTIA FICUS - INDICA*

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Abstract: The *Opuntia ficus-indica* plant is known for its anti-inflammatory properties with potential health benefits. Its different parts are rich in bioactive compounds and are consumed in various traditional diets. However, its cellular and molecular targets are less known. Extending our previous research, which focused on the aqueous cladodes extract of *Opuntia ficus-indica* and its effects in both a colitis model and neutrophil assays. This study investigates the effect of hydroethanolic cladodes extract (HECE) on human neutrophil functions.
Bioactive compounds were characterized by high-performance liquid chromatography (HPLC), neutrophil chemotaxis was evaluated by using the agarose assay, and neutrophil degranulation was determined by the release of myeloperoxidase (MPO). Neutrophil ROS production was measured by luminol-amplified chemiluminescence, and superoxide anion production by cytochrome C reduction assay.
HPLC analysis revealed that the extract contains flavonoids and polyphenols that may contribute to inhibiting oxidative stress. The HECE significantly inhibited neutrophil chemotaxis, reduced MPO degranulation, and strongly reduced ROS production of phorbol 12-myristate 13-acetate (PMA)- stimulated neutrophils. The extract reacted with superoxide anion and strongly inhibited hydrogen peroxide production hydrogen peroxide.
The hydroethanolic cladodes extract of *Opuntia ficus-indica* inhibits major neutrophil functions and exerts an antioxidant effect. These results could explain the anti-inflammatory properties of this plant and may open future therapeutic applications in inflammatory diseases.

KEYWORDS: *Opuntia ficus-indica, Polyphenols, Neutrophils,, ROS, Oxidative stress, Inflammation.*

ORAL COM N° : 32.

PROTECTIVE ROLE OF ZIZIPHUS LOTUS AGAINST BPA-INDUCED OXIDATIVE STRESS IN LIVER AND KIDNEY

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Abstract

The present study aimed to investigate the underlying mechanisms associated with the aqueous extracts from Zizyphus lotus fruits and leaves (ZLFAE and ZLLAE), focusing on their protective roles against Bisphenol A (BPA)-induced oxidative stress and liver-kidney toxicity. Healthy male Wistar rats were divided into six equal groups : Control (0.4 ml/rat, corn oil), BPA (100 mg/kg, p.o.), and BPA co-administered with doses of increasing orders of ZLFAE and ZLLAE (150 and 300 mg/kg, p.o.) over 32 consecutive days. BPA exposure caused significant hepato-renal toxicity, as evidenced by increased lipid peroxidation, reduced thiol (-SH) groups, and depletion of antioxidant enzyme activities such as catalase (CAT) and superoxide dismutase (SOD) in both liver and kidney tissues. Histopathological analysis revealed structural alterations in these organs. However, co-administration of ZLFAE and ZLLAE significantly mitigated these biochemical and structural changes, restoring antioxidant enzyme activities and reducing tissue damage. ZLFAE and ZLLAE also prevents against inflammation induced by BPA expressed by the rise of inflammation biomarkers (C-reactive protein : CRP and alkaline phosphatase : ALP). In conclusion, ZLFAE and ZLLAE can potentially improve liver and kidney injuries associated with biochemical parameter deregulations, possibly by controlling oxidative stress and inflammation.

Keywords: BPA, Hepato- and nephroprotective, inflammation, oxidative stress, *Zizyphus Lotus*

ORAL COM N° : 33.

INTRASPECIFIC MORPHOMETRICAL VARIATION IN *BUTHUS TUNETANUS* (SCORPIONES: BUTHIDAE) FROM TUNISIA

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Abstract: Intraspecific variation among geographical separated samples has been documented in many scorpion species. This study focuses on morphometrical variation in *Buthus tunetanus*, in order to find morphometric features that could best distinguish different populations and highlight adaptative morphometric response. A set of 13 trait measurements was taken from 180 individuals;78 females and 102 males, belonging to six different populations, is targeted in this study. Results showed net intraspecific variability for males and females. Venomous apparatus (metasoma and telson) size represents the most discriminant factor behind the recorded variation, which makes it a great candidate of natural selection. This apparatus' morphology is strongly linked to the assault method and venom effectiveness which are controlled by each environment's level of risk, the size, quality, and availability of prey. The Sidi Bouzid's and Oueslatia's populations are the most discriminant ones when compared with other regions samples. Respectively, the first population is distinguished by its sizeable segments while the second one is characterized by its dwarf segments. We discuss these findings with available data on the geography and geology of these stations.

KEYWORDS: *adaptation, natural selection, metasoma, telson*

ORAL COM N° : 34.

MITIGATION OF ANTIBIOTIC-INDUCED DYSBIOSIS AND REPRODUCTIVE DYSFUNCTION BY FECAL MICROBIOTA TRANSPLANTATION IN MALE RATS

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Abstract:
The use of amoxicillin (AMX) as a model of dysbiosis reveals that disruption of gut microbiota correlates with impaired male fertility parameters. This study investigates the effects of oral AMX, administered alone or following fecal microbiota transplantation (FMT), in male rats. AMX was given at 30 mg/kg twice daily for 14 days, with a single FMT dose of 12 mg/kg on day 14. Results demonstrated that AMX induced a reduction in body weight gain, sperm density, motility, and viability—disruptions associated with alterations in microbiota composition. Biochemically, increased malondialdehyde (MDA) levels in intestinal and colonic tissues confirmed oxidative damage, while antioxidant enzymes such as superoxide dismutase and catalase showed significant activity changes across tissues. These alterations were accompanied by histopathological lesions in the colon and testes, underscoring the systemic impact of microbiota disruption on male reproductive health. FMT treatment partially restored microbiota balance, leading to recovery of fertility parameters and mitigation of tissue damage—actions likely mediated by microbiota metabolites. Ongoing studies aim to confirm these mechanisms and further elucidate the protective role of microbiota modulation.

KEYWORDS: *Antibiotic-Induced Dysbiosis, Fecal Microbiota Transplantation, Male Fertility, Microbiota Metabolites.*

ORAL COM N° : 35.

OPUNTIA FICUS-INDICA (L.) MILL FLOWER EXTRACT ATTENUATED ETHYLENE GLYCOL AND AMMONIUM CHLORIDE-INDUCED UROLITHIASIS IN RATS

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Abstract: This study investigated the therapeutic effects of *Opuntia ficus-indica (L.). Mill* flower extract in the treatment of urolithiasis and the alleviation of oxidative stress. The *in vitro* part of the study involved demonstrating the extract's antioxidant activity and identifying its phytochemical compounds. The study revealed that the flower extract is rich in antioxidants. In the *in vivo* part of the study, hyperoxaluria was induced by adding 0.75% of ethylene glycol and 2% of ammonium chloride to the rats' drinking water for 14 days, and histological sections were examined. Administering EG-AC to rats caused renal toxicity, as revealed by high levels of urea, uric acid and creatinine, as well as hepatic toxicity, as confirmed by high levels of ALAT and ASAT. Oxidative stress was evidenced by increased plasma levels of MDA and H_2O_2 and decreased enzyme activity (SOD and CAT). Interestingly, treatment with the flower extract alleviated oxidative stress and treated urolithiasis.

KEYWORDS: *urolithiasis, oxidative stress, Opuntia ficus-indica (L.) Mill flowers.*

PLANT PHYSIOLOGY
BIOLOGY AND ECOLOGY

ORAL COM N° : 36.

ENHANCING GRASS PEA TOLERANCE AND SOIL HEALTH UNDER SALINITY STRESS USING HALOTOLERANT PLANT GROWTH-PROMOTING RHIZOBACTERIA

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Abstract: Grass pea (*Lathyrus sativus* L.) is an annual legume, recognized as a stress-resilient crop, suitable for multifaceted sustainable food and feed production system in the arid and semi-arid regions of the world. In the Mediterranean region, climate change has amplified environmental instability, creating a fundamental need for enhancing plant tolerance to abiotic stresses such as drought and salinity. In this context, halotolerant plant growth-promoting rhizobacteria (PGPR) have the potential to mitigate abiotic stress, foster plant growth, and bolster the stress resistance capabilities of crops. The present study focuses on assessing the potential of PGPR (*Rhizobium leguminosarum*+ *Pseudomonas fluorescens* + *Luteibacter* sp. + *Variovorax paradoxus*) on physiological and biochemical parameters of grass pea exposed to NaCl treatment.
Results revealed that plants exposed to salt stress exhibited significantly reduced biomass, however, halotolerant PGPR inoculated plants demonstrated a markedly higher plant biomass. Likewise, under salt stress, PGPR inoculation decreased H_2O_2 and MDA levels in both leaves, roots and nodules thereby mitigating oxidative damage and preserving membrane integrity. Associated with the increased accumulation of osmoprotectant compounds, the high enzymatic activity of GPOX, CAT and SOD reflects the highly efficient antioxidant response of inoculated plants. Moreover, halotolerant PGPR inoculation significantly improved soil fertility including organic matter content, available phosphorus, total nirogen and potassium content, compared to the uninoculated soil, underscoring their potential in agricultural resilience against salinity. Results aso revealed that halotolerant bacteria enhanced overall soil microbial activity and induced alkaline phosphatase and urease activity, which are important indicators of soil health.
These halotolerant PGPR have the potential to work as defensive agents of *Lathyrus sativus* plants by enhancing growth and defense system as well as improving soil health under saline environments.

KEYWORDS: *antioxidative response, inoculation, Lathyrus sativus, NaCl, PGPR*

ORAL COM N° : 37.

ANALYSIS OF GENETIC VARIABILITY IN QUINOA GENOTYPES (*CHENOPODIUM QUINOA* WILLD.) DURING GERMINATION AND VEGETATIVE GROWTH

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Abstract
This study examines the genetic variability of eleven quinoa genotypes (*Chenopodium quinoa* Willd.) during germination and vegetative growth phases. Field trials were conducted at the CRRA experimental plot in Sidi Bouzid, focusing on morphological, physiological, biochemical traits, and yield-related parameters. A total of 27 quantitative traits were assessed, utilizing statistical analyses such as ANOVA, correlation matrix, principal component analysis (PCA), and hierarchical cluster analysis (HCA). Significant variability was observed among genotypes for germination parameters, with germination latency ranging from a few hours (Q45, Q4, Q12, and Q2) to two days (Q10), and final germination rates varying from 20% (Q41) to 100% (Q43 and Q4). The variance analysis highlighted that daily growth of the main axis (CP/j and LaP1BF) distinctly separated the Q8 genotype (New Mexico) from others, which exhibited the highest average growth in orthotropic growth. Conversely, the Q45 genotype from Ecuador demonstrated superior means for plagiotropic growth traits. PCA results illustrated the positional relationships of genotypes regarding their principal components, while HCA classified the eleven genotypes into three groups based on average plant height and phenotypic traits, as well as their photosynthetic activities and total leaf protein content. This study provides insights into the genetic potential of quinoa and emphasizes the importance of selecting appropriate genotypes for agricultural improvement.

Keywords: Genetic Variability; Quinoa; Germination; Phenotypic Traits; Statistical Analysis.

ORAL COM N° : 38.

THE ROLE OF THE PHOTORESPIRATORY ENZYME, GLYCOLATE OXIDASE 1, IN REGULATING POTASSIUM AND SODIUM HOMEOSTASIS IN *ARABIDOPSIS THALIANA* UNDER SALT STRESS

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Abstract
Soil salinization has emerged as a major environmental and socioeconomic challenge worldwide and is expected to intensify due to projected climate change. It is well established that salt stress inhibits crop growth by inducing osmotic stress, specific ion toxicity, and nutritional imbalances. One of the key impacts of salinity is the competitive inhibition of K^+ uptake by Na^+, owing to the physicochemical similarities between these two cations. To cope with salinity, plants regulate the uptake and transport of Na^+ and K^+ ions to maintain ionic homeostasis. Glycolate oxidase (GOX) is an enzyme that catalyzes the conversion of glycolate to glyoxylate during photorespiration, producing hydrogen peroxide (H_2O_2) as a byproduct. This study investigated the role of GOX1 in regulating K^+ and Na^+ homeostasis under short-term salt stress by comparing wild-type (WT) Arabidopsis plants with the GOX1 mutant (*gox1*). Plants were hydroponically grown in the presence or absence of 100 mM NaCl for 24 h. The results showed that salt stress significantly increased Na^+ concentrations in both shoots and roots of WT and *gox1* plants, with a more pronounced accumulation in WT. In contrast, K^+ concentrations in shoots and roots were more reduced in *gox1*. These findings were further supported by the expression analysis of ion transporter genes and ion flux measurements.

Keywords : *Arabidopsis thaliana*, Salt stress, ion homeostasis.

ORAL COM N° : 39.

INCIDENCE OF FOOT ROT DISEASE IN COMMERCIAL DURUM WHEAT GENOTYPES UNDER CONTINUOUS WHEAT CROPPING IN NORTHWEST TUNISIA.

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Abstract: Durum wheat is the main cereal crop in Tunisia. The increasing need for this food commodity leads to shorter rotation with frequent continuous wheat cropping. This would lead to increased incidence of soil-borne pathogens including *Fusarium* species responsible of foot and root rot. This study was designed to explore the incidence of foot rot caused by *Fusarium* species on five commercial durum wheat varieties ('Karim', 'Nasr', 'Maali', 'Oum Rabiaa' and 'Khiar') grown under one or two years of successive wheat cropping's. The trial was conducted during three cropping season 2016-2019 at the Agricultural Experimental Station of the Regional Crop Research Center in Beja Northwest Tunisia. The study results shows that the previous crop significantly ($p<0,001$) affect *F. culmorum* incidence. However, there was no significant differences between the cultivars. Average disease incidence reached to 7,16% after one year of wheat cropping and to 20,01% after two years of continuous durum wheat cropping. Furthermore, significant interaction between the cultivars and the number of years of continuous wheat cropping for the incidence of *F. culmorum.* 'Khiar' and 'Maali', showed the lowest incidence with 10% and 15% respectively under two-years of successive wheat cropping. In contrast, 'Karim' and 'Nasr' varieties showed the highest incidence (30% and 26% respectively). The study results also showed that there was no significant differences in the measured yield parameters after one and two years of wheat cropping. The high significant differences at ($p<0,001$) in grain yield means in the three cropping seasons indicates a potent effect of climate conditions on this parameter. The varieties 'Khiar' and 'Maali' seem to be the best choice for a continuous durum cropping. It would be useful to test this hypothesis under high foot and root rot pressure.

KEYWORDS: *durum wheat, varieties, fusarium, incidence, grain yield*

ORAL COM N° : 40.

DATABASE FOR TUNISIAN MEDICINAL PLANTS WITH ANTI-INFLAMMATORY POTENTIAL

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Abstract: Inflammation is a major contributor to the onset and progression of numerous chronic diseases, including rheumatoid arthritis, cardiovascular disorders, type 2 diabetes, neurodegenerative diseases (such as Alzheimer's and Parkinson's), and various forms of cancer. While pharmaceutical anti-inflammatory drugs are effective, adverse effects and contraindications often limit their use. This has led to growing interest in safer, natural alternatives. Tunisian flora offers an exceptional diversity of aromatic and medicinal plants (PAMs), many of which are deeply rooted in traditional medicine. These plants are rich in bioactive compounds such as polyphenols, flavonoids, tannins, saponins, and alkaloids that contribute to various biological activities, including anti-inflammatory, antioxidant, and antimicrobial effects. Their high content of secondary metabolites, combined with lower risk of side effects, makes them particularly promising for therapeutic applications (i.e. anti-inflammatory capacities).

Despite this potential, the full scope of Tunisia's medicinal plant biodiversity and application remains underexplored. The number of species with confirmed medicinal or aromatic properties is still uncertain, and consolidated scientific data remain scarce. However, recent studies, particularly those conducted at the Laboratory of Aromatic and Medicinal Plants in CBBC, have increasingly demonstrated the anti-inflammatory potential of many Tunisian plant species. These studies have identified numerous compounds capable of modulating key inflammatory pathways.

To bridge the gap between traditional knowledge and modern pharmacological research, this project aimed to develop an interactive scientific database named **"DockPAMsdb.Tn"** that compiles ethnobotanical information, phytochemical data, and results from *in silico* molecular docking analyses. This innovative platform aims to centralize and streamline access to information on the anti-inflammatory potential of Tunisian PAMs and to aid in the identification of active compounds.

KEYWORDS: *Tunisian flora, aromatic and medicinal plants, anti-inflammatory activity, database.*

ORAL COM N° : 41.

CHANGES IN PHYSICOCHEMICAL AND FUNCTIONAL QUALITY OF TWO HOT PEPPER (*CAPSICUM ANNUUM L.*) GENOTYPES UNDER COLD STORAGE

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Abstract : Storage temperature management is the most effective tool for extending the shelf life of fresh horticultural commodities. In this study, changes affecting antioxidants content (ascorbic acid, phenolic compounds and carotenoids) and physico-chemical compounds (sugars and organic acids) content as well as the antioxidant activity were monitored in fresh fruits (*Capsicum annuum L.*) of two hot pepper genotypes under cold storage. Pepper fruits were stored at 4 °C during 5 and 10 days to evaluate the effect of temperature in pepper fruits quality. The results showed that storage temperature strongly affected weight loss which attained 3% for 'Starter' and 0,4% for 'Baklouti' in fruits stored at 4°C at the end of the storage period. Comparing the two genotypes, the most notable increase in pH was observed in the 'Baklouti'. Soluble solid content showed a significant increase (11%) in 'Starter' and (2%) in 'Baklouti' at the end of the storage duration. A higher increase (7%) was observed in titratable acidity and soluble solid content, (57%) in Vitamin C, (43%) in total phenolics and (43%) in total carotenoids markedly accumulated in fruits stored at 4 °C during storage. The decreases were 55% for lipophilic antioxidant activity and 24% for hydrophilic antioxidant activity. Although the limited biological variability used within this study, the obtained results emphasize that the influence of cold storage duration on pepper quality traits is genotype-dependent. 'Baklouti' cultivar might be a suitable choice for the development of cultivar maintaining fresh-like quality traits during storage periods. However, 'Starter' seems more suitable for short storage duration.

Keywords: Pepper, cold storage, soluble solids, titratable acidity and functional quality.

ORAL COM N° : 42.

EFFECT OF EXOGENOUS APPLICATION OF SALICYLIC ACID ON DATE PALM (*PHOENIX DACTYLIFERA*) DEFENSE REACTION AGAINST FUSARIUM INFECTION

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Abstract : Fusarium is one of the most important fungal plant pathogens, which cause severe diseases on numerous crops. The diseases reduce crop yield, thereby resulting in economic losses. The aim of this study was to evaluate the toxic mechanism associated with Fusaruim infection and to investigate the possible mediatory role of Salicylic acid (SA) in protecting date palm from pathogens damage. Date palm seedling inoculated with Fusaruim schowed a decrease in roots leght and biomass production, as compared to uninfected plants. Concomitantly, Fusaruim enhanced lipid peroxidation as indicated by malondialdehyde (MDA) accumulation. Presoaking seeds with SA (100 µM) alleviated the negative effect of Fusaruim on plant growth parameters. Furthermore, SA mitigated the oxidative damages as evidenced by the lowered MDA contents and lead to a decrease in oxidative injuries caused by Fusarium infection. SA, particularly increased catalase (CAT) and guaiacol peroxidases (GPOD) activities accompanied by a significant reduction in SOD activities. Our study provides evidence that SA alleviated the Fusaruim-induced oxidative damage in date palm by enhancing the antioxidant defense system. As a whole, this study provides strong arguments highlighting the potential role of SA as a growth promoter for infected plant, notably by boosting the antioxidant defense system and improving membrane stability.

Keywords : *Phoenix dactylifera*, *Fusarium,* Acid salicylic, oxidative damages, antioxidants.

ORAL COM N° : 43.

CORK OAK FOREST TYPOLOGY AT BELLIF AND ADAPTIVE MANAGEMENT METHODS IN A CONTEXT OF CLIMATE CHANGE

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Abstract: A typological study was conducted in the Bellif Forest, located in the Mogods region in the northwestern part of Tunisia, where cork oak (*Quercus suber*) covers 70% of the forested area. The region falls within the lower humid bioclimatic zone with mild winters and is characterized by a Mediterranean climate with contrasting seasons. This forest, spanning approximately 3,181 hectares, is divided into two sections: Bellif I and Bellif II. It is dominated by cork oak, accompanied by other species such as pinion pine (4–11%), eucalyptus (4%), and scrubland (13–29%). The objective of this study is to identify cork oak stands in need of restoration and to recommend appropriate management practices in response to the major impacts of climate change observed in the forest. Following a preliminary literature-based study on the regional environment and the forest, field observations were conducted to complete the dataset. Sampling focused on several "pilot forests" identified during the preliminary phase as being highly representative of the region's variability. The typology revealed an old, dense, high forest dominated by tall, thick-trunked trees in moderate vegetative condition. Overall tree health appears satisfactory, with 95% of observed trees showing no signs of defoliation or branch dieback. However, when considering trunk condition, the situation is more concerning: 41% of trees exhibit rot and 37% show blackish sap exudation. These damages are often caused by scars from cork harvesting, with some trees having been stripped more than eight times. In these stands, the primary recommended actions are stand regeneration and thinning operations to allow more light to reach the ground and reduce water resource competition among cork oaks. A thinning was conducted to assess, first, the water balance in sites of different tree densities and, second, the growth characteristics of cork oaks in each site. The study compared two sites with different treatments: one unmanaged site that had never been thinned and one managed site that underwent thinning in February 2016. Two measurement campaigns were carried out on these sites, four years apart (2020 and 2024). The unmanaged site had a density of 861 stems/ha, while the managed site had 414 stems/ha. Each site covered approximately 1 hectare. Results showed that managing cork oak stands leads to microclimatic changes that significantly affect soil water dynamics, both in the surface and deeper layers, and positively influence tree growth, particularly diameter, along with improvements in cork oak leaf structural traits. Increased soil water availability enhances net photosynthesis and reduces the intensity and duration of water stress. These findings confirm that thinning is a viable forest management practice that supports carbon sequestration. Removing part of a stand induces microclimatic changes, which in turn affect tree ecophysiology, including photosynthesis, transpiration, growth, and crown architecture. Given the evident impacts of climate change, the future of cork oak in Tunisia appears uncertain; however, we now have decision-support tools that allow us to anticipate and take action.

KEYWORDS: *climate change, Quercus suber, Typology, thinning, regeneration.*

ORAL COM N° : 44.

PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES OF *CARTHAMUS TINCTORIUS* L. TO WATER STRESS UNDER FIELD CONDITIONS

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Abstract
This study aims to analyze the tolerance of safflower (*Carthamus tinctorius* L.) cultivated under open-field conditions with different irrigation regimes (100%, 75%, and 50% of crop evapotranspiration, ETc). At the full flowering stage, physiological parameters (biomass production, water potential, chlorophyll and carotenoid content, chlorophyll fluorescence) and biochemical parameters (contents of total sugars, proteins, proline, hydrogen peroxide, malondialdehyde, and antioxidant enzymes in the leaves) were evaluated.
The results reveal that safflower exhibits a complex and multidimensional response to water stress, significantly affecting all the evaluated physiological and biochemical parameters. Notably, deficit irrigation at 50% ETc led to a marked reduction in biomass production, with a 49% decrease in fresh aerial biomass and a 39.82% decrease in dry biomass, along with a reduction in hydration levels, particularly in the roots. Furthermore, leaf water potential (ΨHb) decreased with increasing stress intensity, reaching -13.29 bars at 50% ETc, while chlorophyll content dropped from 119.01 SPAD to 66.59 SPAD. Levels of chlorophylls and carotenoids also declined, indicating a reduction in photosynthetic efficiency. Biochemical analyses revealed important adaptive responses. Total sugar content increased, reaching 8.33 g/100g fresh weight at 50% ETc, while protein content decreased by 34.26%, suggesting a compromise in protein synthesis. Proline content increased significantly, highlighting its role in stress management. H_2O_2 accumulation showed stress-dependent variation, indicating regulation of antioxidant mechanisms, while MDA content rose, indicating cellular damage.
Despite these challenges, safflower was able to complete its growth cycle and produce seeds even under 50% ETc deficit irrigation. This demonstrates the plant's remarkable ability to withstand severe water stress conditions through effective adaptive mechanisms and strategies. These findings underscore the importance of understanding safflower's drought tolerance to optimize its cultivation in arid environments.
Keywords: *Carthamus tinctorius* L., water stress, physiological parameters, biochemical parameters, oxidative stress.

ORAL COM N° : 45.

IMPROVEMENT OF THE YIELD AND QUALITY OF DATES BY SELECTION AND VALORIZATION OF GENETIC RESOURCES OF DATE PALM POLLINATORS (*PHOENIX DACTYLIFERA* L.) ADAPTED TO CLIMATE CHANGE

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Abstract
The date palm is a dioeciously plant with male and female feet. For a good production of dates, pollination is a crucial operation. In the Arab countries producing dates, hundreds of research have been carried out on the female cultivars, however the male cultivars, although they also play a crucial role in the production cycle of dates, the research which is maintained on their characterizations and valuation are few. The selection of pollinators with favorable characters among the existing population is based on the characterization of pollinators and the study of the effect of pollen on dates. A large genetic heritage of date palm pollinators exists in the Djerid region but unfortunately little characterization and selection work has been undertaken. On the other hand with climate change which should lead to a reduction in precipitation and an increase in temperature, the threats to the sustainability of oasis systems are likely to worsen. Faced with this climatic risk, the adaptation of oasis systems is essential in the future, knowing that the oasis populations have acquired valuable know-how in the management of water scarcity and the natural variability of the climate in the environment arid and Saharan. The objective of this project is the characterization, selection and large scale multiplication of the genetic resources of date palm pollinators inducing good yield and good date palm quality in the face of these climate changes.
This project, through these different components, and in addition to its contribution to local genotype perseverance programs, will enable oasis actors and all stakeholders to draw their attention to the richness of this oasis heritage but also to its fragility in terms of environment and on the essential implementation of a strategy for safeguarding and adapting oasis systems in a context increasingly characterized by the constraining effects of climate change.
Keywords : date palm, pollinators, characterization, selection, valuation, climate change

ORAL COM N° : 46.

ANALYSIS OF VARIABILITY IN SUNFLOWER (*HELIANTHUS ANNUUS* L.) GENOTYPES USING SEED MORPHOMETRIC TRAITS

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Abstract : Sunflower (*Helianthus annuus* L.) seeds are one of the world's leading oil-producing seed. This study aimed to assess the morphometric traits of 32 introduced sunflower seed genotypes, cultivated in Tunisia. The analysis of variance revealed significant variation ($P \leq 0.05$) in seed morphometric parameters among the evaluated genotypes. The principal component analysis (PCA) performed on different traits showed that the first two components explained 87.04% of total variance. The first principal component (PC1) explained 57.48% of the total variation; it was related mostly to length, width, area, perimeter, equivalent diameter, fineness, eccentricity, Feret shape and crofton perimeter. The second principal component (PC2) contributed around 29.56% of the total variability, and it was defined by the strong correlation to thousand seed weight, interior length and rugosity. The PCA biplot grouped these genotypes into six clusters. Using hierarchical clustering, 32 sunflower genotypes were assigned into seven distinct groups. Correlation study performed by using Pearson's test established significant positive/negative correlations between some of the studied traits. These data present valuable genetic sources for breeding programs focusing on seed quality in sunflower.

KEYWORDS: *Morphometric traits, Sunflower, Seeds, Cluster, Correlation, Diversity analysis*

ORAL COM N° : 47.

POTENTIAL APPLICATIONS OF BIOGENIC NANOPARTICLES IN IMPROVING PLANT DEVELOPMENT AND CROP PROTECTION

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Abstract: Nanotechnology has facilitated various applications in agricultural and food industries due to the unique characteristics of nanoparticles (NPs), such as their large surface area, reactivity, ability to penetrate, and specific size and structure. The exploration of nanoparticles in agriculture is gaining interest because of their ability to reduce the use of agrochemicals (as pesticides and fertilizers) and significantly enhance plant growth and crop protection. Here, we provide an overview of some applications of biosynthesized metallic nanoparticles in enhancing plant development and protection. This work aimed to study the effect of ZnO, CuO, MgO and FeS_2 biosynthesized nanoparticles (NPs) as foliar application (nano-fertilzers) or seed priming (nano-priming) on germination, growth characters, some biochemical aspects, membrane lipid composition and antioxidants of some legume species under normal or stressful conditions. The synthesized NPs were analyzed using UV–Vis spectroscopy, Fourier-transform infrared spectroscopy (FTIR), Scanning electron microscope (SEM), Transmission electron microscopy (TEM), and Energy-dispersive X-ray (EDX) techniques. The study indicates that nano-fertilzation and nano-priming methods resulted in a substantial enhancement in growth and plant protection. Moreover, results suggests that there is a relationship between the dosage of NPs and their potential for improving plant biofortification. Results indicates that biosynthesized NPs may be an effective and sustainable product for managing diseases and increasing crop yields in agriculture.The potential benefits of nanotechnology for agriculture however need to be balanced against concerns for the soil, water and environment.

KEYWORDS: *biosynthesized nanoparticles, nanofertilization, nanopriming, plant growth, stress tolerance*

ORAL COM N° : 48.

EFFECT OF DIFFERENT POLLEN SOURCES ON THE MATURATION KINETICS OF 'DEGLET NOUR' DATES (*PHOENIX DACTYLIFERA* L.)

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Abstract

The selection of pollen used for pollinating date palm trees plays a key role in determining the final quality of the fruits, their maturation timing, and commercial value. Pollen not only affects fecondation but also influences phenotypic traits such as fruit size, texture, and maturation speed (metaxinia). As such, pollen selection has become a vital agronomic strategy. This study was carried out in the experimental plot of the regional oasis agriculture research center of Degache during the 2024 agricultural season. The work aims to evaluate the effect of different pollen sources on the maturation kinetics of the « *Deglet Nour* » variety by monitoring three key developmental stages**: «** Kimri » (active growth), « Bisr » (onset of ripening), and « Tamr » (full maturity). Results show that the pollen source has a significant impact on the rate of fruit maturation. At the « Kimri » stage, pollen P10 led to rapid development, with only 5% of green fruits remaining by August 20, compared to 70% for pollen P6. A similar trend was observed at the « Bisr » stage: pollens P10 and P11 reached peak ripeness by mid-August, whereas fruits pollinated with P6, P14, or Rad1 only reached this stage in September. At the « Tamr » stage, fruits pollinated by P10 and PSami reached full maturity as early as September 10 (160 days after pollination), while those from P6 or P15 took up to 200 days. Although slower, these latter pollens produced fruits of superior quality, with better texture and higher sugar concentration. Additionally, their late maturation helps the crop avoid extreme late-summer weather events. Therefore, late-inducing pollinators such as P6, P15, and Rad1 are valuable tools for climate change adaptation**,** while also enhancing the intrinsic quality of *Deglet Nour* dates. In conclusion, the choice of pollen source not only affects the earliness or lateness of fruit maturation but also plays a crucial role in climate resilience and fruit quality.

Keywords : Date palm, *Deglet Nour*, Pollen source, Maturation kinetics, Tamr stage, Late pollinators, Climate adaptation

ORAL COM N° : 49.

THE PROTECTIVE EFFECTS OF EXOGENOUS MOLYBDENUM AGAINST CADMIUM-INDUCED DAMAGE IN WHEAT (*TRITICUM TURGIDUM* L.).

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Abtract: This study investigates the protective role of molybdenum in mitigating the toxic effects induced by cadmium (Cd) exposure in wheat. The seeds were pretreated with 2 µM Mo for 12 hours, then germinated in 400 µM $CdCl_2$ solution. Molybdenum protected the integrity of the cell membrane: reduction in electrolyte leakage and improvement in cell viability. In addition, (i) an increase in antioxidant activities was recorded for superoxide dismutase, catalase, ascorbate peroxidase, glutathione peroxidase, and glutathione reductase in response to Cd-imposed stress in seedlings pre-treated with Mo and (ii) a stimulation of methylglyoxal detoxification pathway by enhancing glyoxalase I and II activities, thereby counteracting the excessive accumulation of methylglyoxal caused by Cd. Mo also fine-tuned proline levels by modifying its metabolism, mainly via the regulation of Δ1-pyrroline-5-carboxylate synthase and proline dehydrogenase activities.

Keywords: Molybdenum. Glyoxalase. Methylglyoxal. Cadmium. Proline. Wheat

ORAL COM N° : 50.

ZINC TOXICITY-INDUCED CHANGES IN GERMINATION, GROWTH DYNAMICS, AND OXIDATIVE STRESS MARKERS IN SWEET BASIL (*OCIMUM BASILICUM* L.)

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Abstract: In this study, the effects of elevated zinc (Zn) concentrations on germination, physiological, and biochemical responses were evaluated in sweet basil (*Ocimum basilicum* L.). The results showed that zinc excess (1–5 mM $ZnSO_4$) did not impair the germination rate but significantly reduced the vigor index and radicle elongation, while inducing oxidative stress. Exposure to 400 and 800 µM Zn markedly decreased the dry biomass of both shoots and roots, root length, and leaf number. These growth reductions were accompanied by the formation of branched and abnormally shaped brown roots. Zinc concentrations exceeding 100 µM also led to significant declines in chlorophyll content, total phenolics, and flavonoids. Furthermore, increased levels of thiobarbituric acid reactive substances (TBARS) indicated enhanced lipid peroxidation and oxidative stress in Zn-treated plants. Overall, these findings demonstrate that excess Zn negatively impacts basil growth, photosynthetic pigments, and secondary metabolite production, while promoting oxidative damage.

KEYWORDS: *Ocimum basilicum* L. · Zinc · Germination · Antioxidant activity · Secondary metabolites

ORAL COM N° : 51.

ENHANCEMENT OF BARLEY (*HORDEUM VULGARE* L.) GROWTH AND PRODUCTIVITY THROUGH SEED INOCULATION WITH PLANT GROWTH-PROMOTING RHIZOBACTERIA

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Abstract: This study investigated the comparative effectiveness of different application methods of Bacillus and Pseudomonas strains including seed priming, foliar spraying, and soil drenching on the growth, physiological responses, and yield components of the Tunisian variety of barley Manel. The experiments were conducted during the 2023–2024 growing season under the environmental conditions of the INRAT research station, using a randomized complete block design (RCBD) with four replications. The results revealed that the application of Pseudomonas fluorescens and Bacillus spp. significantly ($P \leq 0.05$) improved plant height, tillering capacity, photosynthetic parameters, and key yield attributes in barley. The highest grain yield was obtained with the combined treatment of seed inoculation and foliar application, resulting in a 17% increase compared to the control. Overall, the findings confirm that PGPR application significantly enhances barley growth and yield performance, underscoring its potential as a sustainable strategy for improving cereal crop productivity.

KEYWORDS: *Hordeum vulgare.* L., *Pseudomenas, Bacillus, photosynthetic parameters, growth, yield*

ORAL COM N° : 52.

HARNESSING BIOSTIMULANTS FOR SUSTAINABLE OILSEED RAPE CULTIVATION : EFFECTS OF SEED AND FOLIAR TREATMENTS

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Abstract: Oilseed rape (*Brassica napus* L.) is a major oilseed crop with high agronomic and economic importance, but its productivity is often limited by environmental stresses such as salinity, drought, and nutrient deficiencies. In this context, the use of biostimulants, particularly Plant Growth-Promoting Rhizobacteria (PGPR) represents a sustainable and eco-friendly strategy to enhance crop performance.

This research investigates the effectiveness of microbial biostimulants on the growth, stress resistance, and biochemical response of oilseed rape. Treatments were applied through both seed priming and foliar spraying, and comparative analyses were performed between treated and control plants. Agronomic, physiological, and biochemical parameters were systematically evaluated to assess plant vigour and productivity under different treatment conditions.

A specific focus was placed on the biochemical characterization of the antioxidant defense system. Advanced assays were conducted to quantify total phenolics, flavonoids, tannins, and anthocyanins, as well as free radical scavenging activity. The findings revealed a significant enhancement in the levels of secondary metabolites, particularly phenolics and flavonoids, suggesting their involvement in the plant's oxidative stress response mechanisms.

Overall, this study sheds light on the complex interactions between biostimulants and oilseed rape metabolism and highlights their potential to improve both yield and quality traits. The results contribute valuable insights toward the development of sustainable and resilient agricultural practices.

KEYWORDS: *Oilseed rape, Brassica napus, Biostimulant, secondary metabolites, Fatty acids*

ORAL COM N° : 53.

VALORISATION DE L'HUILE EXTRAITE DES RÉSIDUS DE LIN

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L'huile extraite à partir des déchets de lin a pour rendement égale à 5%. Sa composition en acides gras est dominée par les acides gras polyinsaturés (68,39 %), notamment l'acide alpha-linolénique (C18:3) à 54,29 %, un oméga-3 essentiel, suivi de l'acide linoléique (C18:2) à 14,1 %. Les acides gras mono-insaturés, avec une forte proportion d'acide oléique (21,67 %), et les acides gras saturés faibles (7,34 %) renforcent le caractère bénéfique de cette huile sur le plan nutritionnel. En plus de sa richesse en acides gras essentiels, le résidu de lin présente une quantité significative de calcium, fer et magnésium. Les indices de qualité physicochimique confirment également son potentiel de valorisation : l'indice de peroxyde est de 6 mEq O_2/kg, indiquant un niveau d'oxydation encore acceptable, tandis que l'indice d'acide, à 2,24 mg KOH/g, reste en dessous des limites critiques. La teneur en chlorophylle (1,836 mg/kg) et en caroténoïdes (3,235 mg/kg) suggère la présence de pigments naturels pouvant jouer un rôle antioxydant, mais aussi influencer la couleur et la stabilité de l'huile. Ces résultats démontrent que, bien que le rendement soit modeste, l'huile issue des coproduits de lin constitue une ressource à haute valeur ajoutée, valorisable dans une approche durable d'économie circulaire.

ORAL COM N° : 54.

SYNERGISTIC EFFECT OF EXOGENOUS MELATONIN AND CALCIUM ON ALLEVIATING CADMIUM-INDUCED STRESS BY ENHANCING ANTIOXIDANT DEFENSES AND CHLOROPHYLL STABILITY IN WHEAT SEEDLINGS

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This study was designed to evaluate the synergistic effects of melatonin (MEL) and calcium (Ca) on the morphology and physiology of wheat plants (*Triticum turgidum* L.) exposed to 200 µM $CdCl_2$. The application of MEL and Ca clearly activated plant defense mechanisms by mitigating the negative effects of Cd on plant growth and significantly improving membrane integrity, as evidenced by reduced electrolyte leakage and increased cell viability. Moreover, MEL+Ca treatment led to a marked reduction in the accumulation of reactive oxygen species (hydrogen peroxide and superoxide anion) and lipid peroxidation, as indicated by lower lipoxygenase activity and reduced malondialdehyde levels. The activities of the antioxidant defense system superoxide dismutase, catalase, ascorbate peroxidase and glutathione peroxidase were also enhanced. Furthermore, the MEL+Ca improved photosynthetic efficiency by increasing the content of photosynthetic pigments and upregulating chlorophyll fluorescence parameters. These findings highlight the synergistic action of MEL and Ca in enhancing wheat tolerance to Cd stress by reinforcing photosynthetic functions.

Keywords : Antioxydants. Cadmium. Calcium. Oxidative stress. Melatonin. Photosynthesis Wheat

ORAL COM N° : 55.

INFLUENCE OF CUTTING FREQUENCY ON NUTRITIONAL AND FORAGE QUALITY OF VETIVER

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Abstract

Vetiver grass (*Chrysopogon zizanioides* L. Roberty) is a perennial C4 grass native to India and widely known for its adaptability to a range of environmental conditions, including drought, high temperatures, and poor soils. This study aimed to evaluate the effect of different cutting intervals on the nutritional quality and biomass production of vetiver grass (*Chrysopogon zizanioides*) under field conditions. Optimizing the cutting frequency is essential to achieve a balance between forage yield and nutritional value. The experiment was conducted using a randomized complete block design with four blocks and four treatments, corresponding to cutting intervals of 3, 5, 7, and 9 weeks. Results indicated that cutting frequency had a significant impact on both dry matter concentration and forage yield. Longer intervals significantly improved fresh and dry biomass yield, with maximum yields recorded at the 9-week interval (11.19 t/ha dry matter). In contrast, shorter cutting intervals particularly at 3 weeks resulted in improved crude protein content, although overall biomass was lower. These findings suggest that selecting an appropriate cutting interval is crucial for maximizing both the forage potential and nutritional quality of vetiver grass.

Keywords: Vetiver grass; cutting frequency; forage yield; crude protein; dry matter; nutritional quality.

BIOTECHNOLOGY

ORAL COM N° : 56.

VALORISATION OF WILD SORGHUM IN BIOFORTIFICATION: PHYTOCHEMICAL COMPOUNDS AND ANTIOXIDANT CAPACITY OF WILD SORGHUM GRAINS

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Abstract

In Sudan, sorghum is the principal staple food of most people. It is cultivated in vast agricultural areas, producing millions of tons. Statistics and reports by the Ministry of Agriculture of Sudan show that 60 - 80% of this production is used locally as a staple food. It has been reported that the majority of Sudanese low-income people in rural areas, where both physical and economic access to nutrient-rich foods is limited, depend on sorghum for their dietary energy and micronutrient requirements. Sorghum grains are also used for animal feed and house and fence construction.

Wild sorghums might serve as an essential source of new genetic material for enhancing the nutritional value of sorghum grains. Therefore, this study aims to evaluate the nutritional value of different Sudanese wild sorghum grain genotypes in terms of phenolic compounds and antioxidant capacity. Findings revealed a significant variation among the wild sorghum germplasm for all the evaluated parameters. Moreover, the association between grain colour, phytochemical compound, and antioxidant activities was also discovered. The rich genetic diversity in phytochemical and antioxidant activity may serve as an opportunity for breeding for grain quality improvements of sorghum, an essential source of new genetic material for enhancing the nutritional value of sorghum grains.

Keywords: Wild sorghum; phytochemicals; γ-Aminobutyric acid; phenolic compounds; antioxidant activity.

ORAL COM N° : 57.

MORPHOLOGICAL AND PHYSICOCHEMICAL CHARACTERIZATION OF STARCH FROM ALGERIAN CHAYOTE (SECHIUM EDULE) FRUIT

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Abstract :

functional starch. This study focused on the morphological and physicochemical properties of starch isolated from chayote fruit grown in Algiers, Algeria. Granule morphology was investigated using standard light microscopy, polarized light microscopy (with Lucia software), and Scanning Electron Microscopy (SEM). The starch granules showed spherical, oval, and polygonal shapes with smooth surfaces. Their size ranged from 3.56 to 37.24 µm, in contrast to chayote tuber starch (7–50 µm). The amylose content was found to be 20.36%, higher than in tuber starch (12.81%), and comparable to conventional starch sources.

X-ray diffraction patterns revealed a B-type crystallinity. The Differential Scanning Calorimetry (DSC) analysis showed higher gelatinisation temperatures (66.89 °C) and a transition enthalpy of 15.79 J/g. These results demonstrate the unique characteristics of Algerian chayote fruit starch and highlight its potential as a new alternative source of starch.

Keywords: *Sechium edule,* starch, morphology, pasting properties, Amylose content
Scanning Electron Microscopy (SEM).

ORAL COM N° : 58.

SURFACTANT EFFECT, ANTIBACTERIAL EFFICIENCY AND BIOFILM DISRUPTION OF GALACTOLIPIDS FROM CHLOROPLAST-RICH FRACTION (CRF) OF *ULVA LACTUA* FOR OIL-BASED CHEMISTRY

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Abstract :

Surfactants, amphipathic molecules with hydrophilic and hydrophobic domains, are essential in numerous industrial and agro-industrial applications, yet most commercial variants originate from petrochemicals, raising environmental and health concerns. Biosurfactants derived from microorganisms offer eco-friendly alternatives, though their industrial-scale production remains limited, and their safety in food applications is under scrutiny. Marine macroalgae, particularly *Ulva lactuca*, represent a promising renewable source of bioactive lipids, notably polar galactolipids, which are underexplored yet possess potential as natural surfactants. This study introduces a sustainable, osmotic- assisted extraction to isolate chloroplast-rich fractions from *Ulva lactuca*, facilitating the extraction of galactolipids. Notably, the fatty acid composition of *Ulva lactuca* galactolipids revealed predominant fatty acids such as 16:0, 16:1 (n-7), 18:1 (n-9), 18:1 (n-7), 18:2 (n-6) and 18:3 (n-3), with additional C16 PUFAs like 16:3 (n-3) and 16:4 (n-3), mirroring the trends observed in phospholipids. The physicochemical characterization of these galactolipids demonstrated significant surface activity, efficient interfacial adsorption, and emulsification capacity, supporting their potential as eco-friendly surfactants. Preliminary assessments also indicated promising antimicrobial activity. These findings underscore the potential of macroalgal-derived galactolipids as sustainable, multifunctional surfactants for applications in food, pharmaceutical, and environmental fields, contributing to the valorization of marine resources and the development of environmentally friendly bioproducts

KEYWORDS: *Galactolipids, surfactant, Ulva, eco-friendly*

ORAL COM N° : 59.

DEVELOPMENT OF *AMMI VISNAGA* ESSENTIAL OIL-INFUSED HAND SANITIZERS: CHEMICAL CHARACTERIZATION AND DRUG-LIKENESS ASSESSMENT

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Abstract: In response to concerns about hydroalcoholic hand sanitizers post-COVID-19 and the recent epidemics, essential oil from Ammi visnaga flowers was investigated as a natural antibacterial alternative. GC-FID analysis identified tridecane (38.87%), γ-terpinene (25.95%), and α-phellandrene (14.04%) as the major constituents. Three hand gel formulations containing 0.5%, 1%, and 2% A. visnaga oil were formulated and evaluated. Handprint tests demonstrated strong antibacterial performance for all three formulations with the 0.5% gel being the most favored by users for sensory attributes. SwissADME analysis of key compounds showed favorable drug-like properties, including high gastrointestinal absorption, no violations of Lipinski's rule, absence of toxicity alerts (PAINS = 0) and good synthetic accessibility. Computational predictions further confirmed the antibacterial potential of α-phellandrene (PA = 0.368), γ-terpinene (PA = 0.262), and β-cyclocitral (PA = 0.380), supporting their role in the observed bioactivity.

KEYWORDS: *Hand sanitizer, Antibacterial, in silico, essential oil*

ORAL COM N° : 60.

COMBINED EFFECTS OF A-AMYLASE, XYLANASE, AND CELLULASE COPRODUCED BY *STACHYBOTRYS MICROSPORA* ON DOUGH PROPERTIES AND BREAD QUALITY AS A BREAD IMPROVER

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Abstract:

This study aims to explore the feasibility of introducing, during the manufacture of bakery bread, an enzymatic cocktail coproduced by the fungus Stachybotrys microspora: α-amylases, xylanases and cellulases, using wheat bran as a nutrient source. Among the characteristics of the alveograph (dough tenacity "P" and dough extensibility "L"), the addition of a cocktail of enzymes at a concentration of 2%, to weak wheat flour, has made it possible to significantly reduce its *P*/*L* ratio from 2.45 to 1.41. Furthermore, the use of enzyme cocktails at 2%, 4%, and 6% concentrations increases the brown color of the bread crust. The great reduction in the rate of bread firmness, during storage over 5 days, was obtained in the presence of an enzyme cocktail in comparison with bread control (65.13 N for the control and 22.99 N, 23.24 N, and 18.24 N for bread enriched with enzyme cocktail at 2%, 4% and 6% concentrations, respectively). In conclusion, the enzyme cocktail added can synergistically improve bread dough rheology and bread properties.

KEYWORDS: *Stachybotrys microspora; Enzyme cocktail; Lignocellulosic waste, Dough properties, Bread quality*

ORAL COM N° : 61.

ENHANCING SALT TOLERANCE IN QUINOA: THE ROLE OF ZINC OXIDE NANOPARTICLES

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Abstract: Quinoa (*Chenopodium quinoa* Willd.) is increasingly recognized as a resilient crop for sustainable agriculture in the context of climate change, due to its exceptional nutritional profile and adaptation to extreme environmental conditions, particularly salinity and drought. As a pseudocereal halophyte, quinoa has been widely used as model crop for understanding salt tolerance mechanisms in these species. The main objective of this study was to investigate the effect of the application of Zinc oxide nanoparticles (ZnO-NPs) on quinoa plants cultivated under saline conditions. To end this, two quinoa varieties (QQ57 and Rosa Jumin) with contrasting behaviour to salt stress were grown hydroponically in a controlled greenhouse. Two NaCl treatments (0 and 300 mM) combined with zinc oxide nanoparticules ZnO-NPs (50 and 100 mg/l) were applied for two weeks, in addition to the control. Plant growth, minerals contents (Na^+, K^+, Cl^-, Ca^{2+}, Mg^{2+}, Zn^+), chlorophyll content and photosynthetic parameters were measured. Two indicators parameters related to the oxidative stress was also assessed based on the content of Malondialdehyde (MDA) and Hydrogen peroxide (H_2O_2). Under control conditions, the exogenous application of ZnO-NPs improved plant biomass production in both genotypes, particularly in leaves. However, under saline conditions, this increase was significantly observed in roots whatever the genotype and in leaves only in the QQ57 one. This improvement effect of ZnO-NPs was more prominent with the relative growth rate (RGR) which remained constant under salt stress conditions specifically in the salt tolerant genotype QQ57. Whereas, the Na^+ accumulation showed a significant increase in leaves under (ZnO-NPs+NaCl) treatment, contrary to a reduction noted for K^+ levels. Malondialdehyde (MDA) remained stable in the salt sensitive genotype Rosa Jumin but increased under salt stress in QQ57 one. Hydrogen peroxide (H_2O_2) levels increased with ZnO-NPs, irrespective of salinity, suggesting enhanced antioxidant defense system. Overall, the application of ZnO-NPs constitues a prominsing tool in enhancing the tolerance of Quinoa species, cultivated in saline regions. Further research is also needed to optimize the use of other naporaticules for sustainable farming practices.

KEYWORDS*: Quinoa, salinity, nanoparticles, ZnO-NPs, plant growth, lipid peroxidation, oxidative stress*

ORAL COM N° : 62.

ROSMARINUS OFFICINALIS IN TUNISIA: PHYTOCHEMISTRY, ANTIOXIDANT, AND ANTI-INFLAMMATORY PROPERTIES

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Abstract: Due to their diverse biological activities and low toxicity, bioactive compounds are gaining distinction as a valuable source of antioxidant and anti-inflammatory therapies. This study investigated the bioactive properties of two Tunisian rosemary varieties, *Rosmarinus officinalis* var. typicus (R.AS and R.T) and Rosmarinus officinalis var. troglodytarum (R.M), to explore their potential as sources of valuable compounds. The research focused on antioxidant (DPPH, FRAP, total antioxidant capacity) and anti-inflammatory (Griess nitric oxide assay) activities, along with phytochemical profiling and the purification of carnosol. The results revealed that R.M exhibited the highest total phenolic content (151 mg GAE/gDW) and the strongest ferric reducing antioxidant power (FRAP). Carnosol, a key antioxidant compound, was successfully purified from R.M using centrifugal partition chromatography (CPC). Two rosemary extracts demonstrated dose-dependent anti-inflammatory activity by inhibiting nitric oxide (NO) production. Notably, R.AS showed the most significant inhibition, reaching 50% at a concentration of 3.84 µg/mL without inducing cellular toxicity. The aqueous sub-extract of R.AS displayed the strongest anti-inflammatory effect, likely attributed to its high rosmarinic acid content, as identified by HPLC analysis. This study highlights the potential of these Tunisian rosemary varieties as rich sources of bioactive molecules, suggesting their suitability for biotechnological applications.

KEYWORDS: *anti-inflammatory, CPC, Rosemary, carnosol, antioxidant capacity*
Acknowledgements: This study was supported by MESRS financial support thanks to P2ES2023-D1P2 project.

ORAL COM N° : 63.

AN INTEGRATED APPROACH BASED ON SEQUENTIAL FRACTIONATION AND SPECIFIC ENZYMATIC SACCHARIFICATION OF GREEN ALGAE *ULVA* SP. BIOMASS

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Abstract
Marine green algae of the *genus Ulva* are abundant worldwide. In the case of eutrophication, they can be stranded in large quantities, thereby causing ecological and economic problems. Compared to other macroalgae, this biomass remains underexploited on an industrial scale. Thus, the aim of this study was to develop an integrated downstream process applicable to the biomass of the green algae *Ulva* sp., allowing a major sequential recovery of high-added-value fractions corresponding to pigments, ulvan, alkali-soluble hemicelluloses, and cellulose. Indeed, the proposed concept using cascade extractions enable to produce 0.64 ± 0.16% of pigments rich in chlorophylls and caroténoids, 28 ± 0.8% of ulvan, 5 ± 0.3% of alkali-soluble hemicelluloses and 10 ± 0.4% of cellulose based on initial dry weight. Characterization of the extracted polysaccharides and verification of their purity were confirmed using FTIR and monosaccharide composition analyses. To better evaluate the biodegradability and the success of the extraction procedure, enzymatic saccharification was applied at the end of the cascade using the cellulose fraction as the substrate. In parallel, saccharification of the total algal biomass was also carried out under the same conditions. Results showed a significant improvement in conversion yields from 74.6 ± 0.85% to 84 ± 0.7% showing that *Ulva*'s cellulose fraction can be a promising candidate for biofuels production. This study presents a sustainable biorefinery approach that allows almost complete fractionation and bioconversion of green macroalgae, and integrates the concept of a circular bio-economy.

KEYWORDS: *Ulva · Biorefinery · Cascade extraction· Polysaccharides · Enzymatic saccharification*

ORAL COM N° : 64.

EXOGENOUS APPLICATION OF SALICYLIC ACID AND CALCIUM IMPROVES PHOTOSYNTHETIC PERFORMANCE OF QUINOA PLANT CULTIVATED UNDER SALT STRESS

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Abstract: Quinoa served as staple food for the Inca Empire in the Andean region for more than 5000 years, due to its high nutritional value. This pseudocereal contain high quality of proteins with a balanced essential amino acid profile, dietary fiber, minerals, vitamins and good quality fats. Quinoa has been widely used as model crop for understanding salt tolerance mechanisms in halophytes. The main objective of this study was to investigate the effects of exogenous application of salicylic acid and/or calcium on plant growth and photosynthetic performance of quinoa cultivated under salt stress. A salt sensitive quinoa variety was grown hydroponically in a climate-controlled green house. Two NaCl treatments (0 and 300 mM) combined with salicylic acid (SA 0.25 mM) and/or calcium sulphate ($CaSO_4$ 6 mM) were applied. Plant growth, chlorophyll content, gas exchanges, were measured and photosynthetic performance were assessed based on PSII and PSI photochemical activities using PAM analysis. Salt stress induced a decrease of plant DW and RGR by 48% and 45% as compared to the control, respectively. This negative effect was also observed on chlorophyll and carotenoids contents with a reduction of 51% and 66%, respectively. Regarding gas exchange parameters, a significant decrease about 51%, 26%, and 27%, respectively for CO_2 assimilation rate, Gs, and transpiration rate was detected. In addition, energy conversion and electron transport rate through both photosystems (PSI and PSII) were significantly affected by salt treatment and a decrease was detected in all following parameters: PSI and PSII quantum yields, ETRI, ETRII, NPQ and NO. Exogenous application of SA and Ca either separately or in combination improved plant behaviour in the presence of NaCl. Nevertheless, the best results in terms of growth, photosynthetic pigment concentrations were obtained in response to the $CaSO_4$ treatment. Additionally, $CaSO_4$ and/or SA treatments, improved PSII and PSI photochemical activities with a prominent effect under calcium treatment alone. The main message of this investigation is the flexibility of quinoa photosynthetic apparatus and the beneficial effect of calcium application on photochemical activities.

KEYWORDS: *Quinoa, salinity, salicylic acid, calcium, gas exchange, photochemical activities*

ORAL COM N° : 65.

IMPACT OF ULTRASONICATION ON PHYSICO-CHEMICAL, TECHNO-FUNCTIONAL, AND BIOLOGICAL PROPERTIES OF PROTEIN EXTRACTS FROM DEGLET NOUR DATE SEEDS

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Abstract : This study aims to extract, characterize, and valorize the protein fraction from Deglet Nour date seeds, typically regarded as waste, for potential use in the food industry. Two extraction methods were compared: an alkaline chemical extraction followed by isoelectric precipitation, and a combined method incorporating ultrasound treatment to enhance protein solubilization. The ultrasound-assisted extract (E-US) showed a higher protein content (13.70%) compared to the chemical extract (E-CH) at 12.25%. Ultrasound treatment also improved functional properties such as emulsifying (177.16 m²/g) and foaming (37.50% capacity) abilities, and increased the stability of emulsions (132.33 minutes). The phenolic content was higher in E-CH (16.83 g/100 g DM) than in E-US (15.41 g/100 g DM). Both extracts demonstrated significant antioxidant activities (DPPH and ABTS), with IC50 values of 25.38 and 34.97 µg/mL for E-CH, and 41 and 50 µg/mL for E-US, respectively, compared to ascorbic acid (3.55 and 9.72 µg/mL). Peroxidase inhibition followed the same trend, with E-CH showing better inhibition (33 µg/mL). Amylase inhibition was also notable, with approximately 90% inhibition at 52 µg/mL for both extracts. Importantly, no cytotoxicity was observed, indicating their safety for food applications. These findings suggest that date seeds are a promising source of plant-based proteins and bioactive compounds, and that ultrasound treatment enhances the yield and functional properties, making them a valuable resource in food formulations and sustainable food industry practices.

KEYWORDS: *Date seeds, Plant proteins, Biological activities, Techno-functional properties.*

ORAL COM N° : 66.

FROM CYANOBACTERIA TO COSMETICS: PHYCOCYANIN OF PHORMIDIUM VERSICOLOR AS A BIOACTIVE INGREDIENT

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Abstract

In this study, phycocyanin was extracted and purified from *Phormidium versicolor*, yielding 13% ± 0.84 with a post-dialysis purity index of 0.7. Fourier-transform infrared (FT-IR) spectroscopy revealed characteristic stretching vibrations corresponding to N–H, O–H, C=O, and C=NH^+ functional groups, confirming the integrity of the purified compound. The antioxidant potential of phycocyanin was demonstrated by its strong DPPH radical scavenging activity, further supported by FRAP assay results. Moreover, phycocyanin exhibited antimicrobial activity against various bacterial species. Cytotoxicity testing on HEK-293 cells revealed no toxic effects; instead, an improvement in cell viability was observed. Due to its favorable yield and bioactivity, phycocyanin was incorporated into a topical cream formulation at 6 mg/g. The formulation demonstrated bactericidal activity against microorganisms implicated in inflammatory skin conditions. The physical stability of the emulsions was monitored over 60 days at room temperature, 25 °C, and 45 °C. A noticeable color change to beige was observed in the batch stored at 45 °C after 7 days, indicating early signs of instability. In contrast, the formulations maintained at room temperature and 25 °C retained their appearance for up to 15 days. Centrifugation tests confirmed the stability of these formulations under the lower temperature conditions, whereas instability became evident in the 45 °C samples after the fifteenth day.

Overall, the findings support the potential application of phycocyanin as a natural antioxidant ingredient in cosmetic formulations. Nevertheless, further studies are required to evaluate its safety and efficacy in clinical settings.

Keywords: *Phormidium versicolor*, phycocyanin, biological activities, skin cream, stability.

ORAL COM N° : 67.

HEPATOPROTECTIVE ACTIVITY OF *OROBANCHE CRENATA* EXTRACT AGAINST CARBON TETRACHLORIDE (CCL_4)-INDUCED LIVER DAMAGE

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Abstract: Parasitic weeds of the *Orobanche* genus represent a significant threat to global agriculture due to their detrimental effects on crop yields and the challenges associated with their eradication. However, despite their agricultural impact, certain *Orobanche* species, including *Orobanche crenata*, have been traditionally used in folk medicine owing to their rich content of bioactive compounds with potential pharmacological properties. This study aimed to investigate the hepatoprotective effects of *O. crenata* extract in a rat model of liver injury induced by carbon tetrachloride (CCl_4). The extract was administered at doses of 25 and 50 mg/kg body weight before CCl_4 exposure to assess its protective potential. Biochemical analyses revealed a significant reduction in serum markers of hepatic damage, including ALT, AST, LDH, ALP, GGT, and bilirubin, indicating a marked improvement in liver function. Phytochemical profiling of the extract supported its therapeutic effects, revealing the presence of antioxidant and anti-inflammatory constituents. In addition, pretreatment with *O. crenata* extract mitigated oxidative stress by enhancing the activity of endogenous antioxidant enzymes glutathione (GSH), catalase (CAT), and superoxide dismutase (SOD) while decreasing malondialdehyde (MDA) levels, a marker of lipid peroxidation. The extract also exhibited anti-inflammatory activity, evidenced by downregulation of pro-inflammatory cytokines TNF-α and IL-1β, as well as modulation of NF-κB expression, a key transcription factor involved in the inflammatory response. Furthermore, molecular docking studies demonstrated strong interactions between phytoconstituents of the extract and target inflammatory proteins (NF-κB, TNF-α, IL-1β), reinforcing the *in vivo* findings and highlighting the potential of *O. crenata* as a source of hepatoprotective agents with antioxidant and anti-inflammatory properties.

KEYWORDS: *Orobanche crenata; Hepatoprotective; liver oxidative stress*

ORAL COM N° : 68.

ACTIVITE ANTILEISHMANIENNE PROMETTEUSE DE L'HUILE ESSENTIELLE DE *MICROMERIA NERVOSA* : ÉTUDES *IN VITRO* ET *IN SILICO*

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Résumé : La famille des Lamiaceae compte parmi les plantes les plus importantes et les plus valorisées sur le plan botanique, tant par son importance économique que par son patrimoine culturel. De nombreuses espèces sont cultivées pour leurs usages culinaires (thym, menthe, basilic), médicinaux (lavande, sauge) ou ornementaux (coleus, agastache). Riches en composés aromatiques, ces plantes jouent un rôle écologique majeur en attirant pollinisateurs et autres insectes bénéfiques. Parmi cette famille diversifiée se trouve le genre *Micromeria*, dont *Micromeria nervosa*- une plante vivace méditerranéenne utilisée traditionnellement en phytothérapie. Cette étude vise à évaluer le potentiel leishmanicide de l'huile essentielle (HE) de cette plante et à élucider son mécanisme d'action moléculaire par qPCR et par analyse *in silico.* La composition de l'HE, déterminée par chromatographie gazeuse couplée à la spectrométrie de masse (GC-MS), a révélé que les principaux composés sont l'α-pinène (26,44 %), le t-cadinol (26,27 %), l'oxyde de caryophyllène (7,73 ± 1,04 %) et l'α-cadinène (3,79 ± 0,12 %). L'HE de *M. nervosa* a montré un effet leishmanicide significatif contre les formes promastigotes (CI_{50} = 6,79 et 5,25 µg/mL) et amastigotes (CI_{50} = 8,04 et 7,32 µg/mL) de *Leishmania (L.) infantum* et *L. major*, respectivement. L'analyse moléculaire du mécanisme d'action a révélé une inhibition marquée de la voie de signalisation des thiols sous l'action de cette HE. En effet, la modulation ciblée de cette voie offre une stratégie prometteuse pour contourner les résistances aux traitements conventionnels. Par ailleurs, une modélisation moléculaire des principaux composés avec l'enzyme CYP51 a montré que le t-cadinol présentait la meilleure affinité (énergie de liaison de -7,5 kcal/mol), surpassant celle de l'α-cadinène (-7,3 kcal/mol), l'oxyde de caryophyllène (-7 kcal/mol) et même le fluconazole (-6,9 kcal/mol); utilisé comme un traitement conventionnel. Ces résultats suggèrent que l'HE de *M. nervosa* constitue un candidat prometteur pour le développement d'agents antileishmaniens alternatifs dans le traitement des leishmanioses. Une étude in vivo sera nécessaire pour confirmer son efficacité thérapeutique et évaluer son innocuité.

Keyworlds: *Leishmanicidal activity, cytotoxicity, Micromeria nervosa EO, Sterol and thiol pathways, Molecular docking.*

ORAL COM N° : 69.

BIOTECHNOLOGICAL VALORIZATION OF JOJOBA SEED CAKE VIA ENZYMATIC BIOTRANSFORMATION: A SUSTAINABLE STRATEGY FOR DETOXIFICATION AND HEPATOPROTECTIVE BIOACTIVE EXTRACT DEVELOPMENT

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Abstract: This study presents a biotechnological strategy for the valorization of jojoba (Simmondsia chinensis) seed cake through enzymatic biotransformation, aiming at both detoxification and development of hepatoprotective bioactive extracts. Simmondsins, the primary anti-nutritional factors, were targeted using water extraction and *Aspergillus niger* enzyme mixtures—Peclyve Lif Plus (P) and Viscozyme L (N). While water extraction enabled moderate detoxification through endogenous enzyme activity, reducing total simmondsins (Ts) from 5.0 to 1.88 g/L after 24 h, enzymatic treatment achieved up to 85% degradation. This enhancement was driven by the synergistic action of β-glucosidase, cellulase, and pectinase, which facilitated both simmondsins hydrolysis and carbohydrate matrix disintegration. Treated extracts showed significantly increased saccharification, with higher levels of glucose, uronic acids, arabinose, and galactose, confirming effective substrate bioconversion.

Three extract formulations—water extract (WE), partially hydrolyzed (PE), and fully detoxified (NE)—were evaluated in vivo for hepatoprotective efficacy against paracetamol-induced liver injury in rats. All extracts improved serum liver markers, oxidative stress parameters, and modulated inflammatory protein expression (TNF-α, Bax, Bcl-2). Despite its lower simmondsin and polyphenol content, NE exhibited superior hepatoprotective effects, likely due to synergistic interactions between newly liberated sugars and aglycones. Histological analysis confirmed reduced necrosis and inflammation.

These findings highlight the potential of enzyme-assisted bioprocessing not only to detoxify agro-industrial by-products but also to generate functional, health-promoting bioingredients for biotechnological and pharmaceutical applications.

KEYWORDS: *Enzyme extraction, Jojoba seed cake, Simmondsins detoxification, Waste Valorization, Hepatoprotective activity,*

ORAL COM N° : 70.

EFFECT OF COOKING PROCESSES ON THE NUTRITIONAL AND ANTINUTRITIONAL PROPERTIES OF QUINOA SEEDS

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Abstract: Quinoa is a pseudocereal of high nutritional value, often referred to as a 'superfood'. Over the past few decades, it has gained widespread popularity in food recipes across various regions, including Europe, the Americas, and Africa. In this study, we investigate the effect of boiling on the nutritional and antinutritional properties of quinoa, using five different varieties cultivated in two distinct regions of Tunisia. Our results showed that boiling significantly reduced the saponin (SAP), starch, and protein contents of quinoa, with the extent of reduction varying in a genotype-dependent manner. Secondary metabolites were also analyzed in both crude and cooked quinoa, revealing variability across all tested varieties. The SAP content in all quinoa seeds was reduced from approximately 2% to 0.5% in the majority of the tested varieties. Total phenolic compounds decreased after cooking by approximately 10% and 15% in varieties Q1 and Q2, respectively. However cooking could enhance the production of phenolic compounds in other varieties, especially in Q5 (80%). Total flavonoids compounds showed a significant decrease of 70% in Q5, while Q8 showed an increase from 2% to 20%. The tannin content increased in all tested varieties, except for Q5, which exhibited a decrease of 85%. Sugar and starch content were also affected during the cooking process, with a significant decrease in starch content. This reduction may be attributed to the leaching of starch into the water, which subsequently lowered the sugar content in all tested seeds. However, protein content exhibited strong adaptability to cooking across all varieties, with only a slight decrease observed. While the loss of some nutrients is noticeable, it remains relatively insignificant, and quinoa continues to retain its status as a superfood. Notably, the loss of starch into the cooking water could be beneficial for individuals with diabetes, as it may help regulate the glycemic index. Our results demonstrated significant variability among the quinoa varieties, which can be attributed to their geographic origin and the characteristics of the soil in which they were grown.

KEYWORDS: *quinoa, cooking process, saponin, starch, total phenolic compounds*

ORAL COM N° : 71.

THE VALORISATION OF ESSENTIAL OILS AS BIOSTIMULANTS ON PLANTS APPLIED BY SEED COATING ON WHEAT AND ROOTFEEDING ON TOMATO.

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Due to climate change, emerging problems more severe foliar and soil diseases are causing losses on strategic crops such as wheat and tomato. Therefore, coating seeds and application by root feeding with plant extracts as biostimulants appears to be a promising approach to maintain the productivity of plants under stressed conditions. The effect of essential oils extracts in inducing defense response of the plant to fungal diseases was evaluated. In this study, we tested thyme and lemongrass essential oil, for their ability to control fungal disease both under controlled conditions and in field. These biostimulants were tested on seedlings driven in a hydroponic medium in an oxygenated nutrient solution. Daily sampling of the leaves carried out made it possible to carry out on the one hand biochemical analysis. On the other hand, infections by pathogenic fungus (*Botrytis cinerea* for tomato and *Septoria tritici* for wheat) can reveal the induction of defense reactions according to the evolution of the necrotic spots on leaves. Later on, inoculations are made by Fusarium into the nutrient solution for tomato as well as wheat. Biochemical analysis were also performed according to kinetics in an infectious context. These data were also confirmed through molecular analysis performed at the leaf level which revealed an acquired systemic resistance response through the overexpression of genes involved in defense response. Altogether these results allowed highlighting the presence of priming effect of the biostimulants tested and showed an effect that can lead to the protection of the target plant.

This research was financially supported by PRIMA Foundation

***Sessions of interest or appropriate**:*

Appropriate sessions:

Biocontrol, natural compounds and plant defense stimulants- Biocontrol of plant pathogens: recent advances and future challenges.

Please select your preferred type of presentation but please note that all submitted abstracts will be peer reviewed by the Scientific Committee and their selection will be final, taking into account also the sessions structure and timing.

Oral X

Poster ϒ

ORAL COM N° : 72.

DEVELOPMENT AND VALIDATION OF A SIZE EXCLUSION CHROMATOGRAPHY METHOD FOR MOLECULAR WEIGHT DETERMINATION OF EXOPOLYSACCHARIDES: A CASE STUDY OF *ARTHROSPIRA MAXIMA*

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Abstract: Exopolysaccharides (EPSs) produced by cyanobacteria have garnered increasing attention due to their structural diversity and promising biotechnological applications. Accurate molecular weight determination is essential for understanding the functional properties of these biomolecules. In this study, we report the development and validation of a Size Exclusion Chromatography (SEC-HPLC) method for the molecular weight characterization of EPS derived from the cyanobacterial strain *Arthrospira maxima*, cultivated under saline stress conditions. The SEC method was optimized by selecting suitable mobile phase conditions, column type, and calibration strategy using polyethylene glycol standards of known molecular weights. Method validation was carried out according to ICH guidelines, evaluating linearity, precision, accuracy and robustness. The results demonstrated that the method is reliable and reproducible for the analysis of high molecular weight polysaccharides.
This validated analytical approach provides a robust tool for the structural characterization of cyanobacterial EPS and can be applied in the context of developing novel bioactive compounds for food, pharmaceutical, or cosmetic industries.

KEYWORDS: *Exopolysaccharide (EPS), Arthrospira maxima, size exclusion chromatography (SEC), molecular weight, analytical method validation.*

ORAL COM N° : 73.

EXPLORATION OF THE EFFECTS OF JASMONIC ACID ON MORPHOGENESIS AND SECONDARY METABOLITE PRODUCTION IN *LAVANDULA STOECHAS*: AN *IN VITRO* PERSPECTIVE

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Abstract: *Lavandula stoechas*, classified in the Lamiaceae family, is well known for its high-value secondary metabolites and, consequently, for its various biological effects. The aim of this study was to investigate the effects of jasmonic acid on the morphogenesis and production of secondary metabolites in *L. stoechas* plants *in vitro*. Additionally, the antioxidant activity of methanolic extracts isolated from wild and in vitro plants was evaluated for the first time. The morphological responses of nodal segment explants to jasmonic acid at different concentrations (0, 10, 20, and 40 µM) were assessed. The highest multiplication and biomass production were achieved in a medium without jasmonic acid (0 µM). Compared to wild plants, the MS medium significantly enhanced the production of phenolic compounds in methanolic extracts. *In vitro*-cultured plants were more effective in producing these compounds than wild plants. Remarkable differences in antioxidant power were observed between methanolic extracts from wild and *in vitro* plants.

KEYWORDS: *Lavandula stoechas, In vitro plants, Jasmonic acid, Lamiaceae*

ORAL COM N° : 74.

POLYSACCHARIDES EXTRACTED FROM *DEVERRA TORTUOSA* WASTES: STRUCTURAL, FUNCTIONAL, ANTIOXIDANT, ANTIHYPERTENSIVE AND CYTOTOXIC PROPERTIES

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Abstract

Water soluble polysaccharides were extracted from waste residues after the industrial production of the essential oil from *Deverra tortuosa* plant as novel approach for valorization of these wastes. The extraction yield was 7.82%. The chemical composition, structural characterization, functional, antioxidant, antihypertensive and cytotoxic properties of the *Deverra tortuosa* water-soluble polysaccharides (DTWSP) were treated. This study was carried out using different techniques such as FT-IR, NMR, XRD, zeta potential and DSC to obtain the structural characterization of DTWSP. The X-ray pattern revealed the semi-crystalline behavior of DTWSP. The analysis of the monosaccharide composition by GC-MS showed the presence of glucose galactose, mannitol, gluconic acid, xylose and ribose. In addition, DTWSP exhibited important techno-functional properties (SWC, WSI, WHC and OHC). Antioxidant activities of DTWSP were determined using different antioxidant assays: DPPH radical-scavenging capacity (IC50 = 1.26 mg/ml), reducing power, ABTS assay and ferrous chelating capacity. The findings indicated that DTWSP displayed excellent antihypertensive (98.92% at 0.8 mg/ml) and antioxidant activities but low cytotoxic effects on HeLa cell lines. Overall, the results suggested that WMRP presents a promising natural source of antioxidants and antihypertensive agents.

Keywords: *Deverra tortuosa* polysaccharides, Waste valorization, Structural, Functional, Antihypertensive, Antioxidant, Cytotoxic

ORAL COM N° : 75.

OUTCOMES OF SALINITY AND IRON DEFICIENCY EITHER APPLIED ALONE OR IN COMBINATION ON THE PHYSIOLOGICAL TRAITS OF QUINOA

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Quinoa (*Chenopodium quinoa Willd*.) is set to be a major food for future generations and an important alternative crop, considering the challenges caused by climate change. Quinoa is also reputed for its exceptional nutritional profile and adaptation to extreme environmental conditions, as well as salinity and mineral deficiency. Calcareous soils approximately covered 30% of the worldwide arable soils, which are commonly alkaline. Plants in these soils are harmed by iron deficiency constraint due to the low accessibility of this noble element to the plant roots. The aim of this study was to explore the effects of iron deficiency and salt stress either applied alone or in combination, on the plant growth development, photosynthetic pigment composition, and the nutritional status in addition to the activity of root Fe-chelate reductase (FCR) enzyme in two quinoa varieties. According to our finding, salinity and iron deficiency decreased shoot, stems and root growth as well as chlorophyll content. In the combined treatment of reduced iron supply and salinity, all of these metrics decreased additively. These effects were notably dependent on the stress applied and the variety. The overall data suggests that both quinoa genotypes were able to maintain plant growth and to preserve adequate chlorophyll synthesis under iron-limiting conditions, probably due to their better Fe-use efficiency. Quinoa constitutes a promising model to be cultivated under low Fe soils and/or saline regions.

KEYWORDS: *Quinoa, salinity, iron deficiency, nutritional status, oxidative stress,* Fe-chelate reductase.

ORAL COM N° : 76.

SEED PRIMING IMPROVES SALT TOLERANCE IN BASIL THROUGH PHYSIOLOGICAL AND BIOCHEMICAL ADJUSTMENTS

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Abstract: This study explores the impact of seed priming on the physiological and biochemical responses of *Ocimum basilicum* L. (basil) grown under saline conditions. The results demonstrate that hydropriming effectively alleviates the detrimental effects of NaCl on basil growth, whereas osmopriming and hormonal priming intensified salt-induced stress, resulting in decreased biomass accumulation. Hydroprimed plants exhibited lower Na^+ accumulation in shoots, improved potassium homeostasis, and reduced malondialdehyde (MDA) levels, indicating enhanced membrane stability under salinity. Interestingly, under non-stress conditions, seed priming reduced total polyphenol and flavonoid levels in aerial tissues. However, under salt stress, hydropriming significantly increased polyphenol and flavonoid accumulation in both shoots and roots. These findings suggest a potential role of phenolic compounds in oxidative stress mitigation, contributing to the superior salt tolerance observed in hydroprimed basil plants.

KEYWORDS: *Ocimum basilicum* L. · *Priming, germination, growth, nutrition, secondary metabolites*

ORAL COM N° : 77.

QUINOA FOR SALT AFFECTED SOILS: CHALLENGES AND PERSPECTIVES FOR INTEGRATING QUINOA INTO A SUSTAINABLE AGRICULTURAL SYSTEM IN TUNISIA

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Abstract: Developing new faming system based on climate resilient crops has been identified as an alternative approach for ensuring consistent food production and conserving critical water resources under climate change conditions. Quinoa has actually gained a great potential for expansion in world agriculture due to its resilient characters of productivity under marginal environment. It is considered as the 21st Century Golden Grain and the most popular healthy foods, owing to its exceptional nutritional value. In this study we attend to the valorization of salt-affected soils in Tunisia through quinoa cultivation based on different agroecological practices. To end this, two study sites of quinoa cultivation were performed (Grombalia and Douz regions). Five quinoa varieties (Titicaca, Amrilla sacaca, Puno, Faro and QQ57) and two cereal species (oat and wheat) were used, based on RCBD field layout using different culture practices (crop rotation and intercropping). All tested quinoa varieties showed highest biomass production in demosite Grombalia as compared to the study site Douz. Faro and QQ57 varieties showed the highest seed yield at Northen demosite and Amarilla sacaca displayed a high capacity of adaptation to the salty soil in demosite Douz with high plant biomass production, high seed yield, under sole cropping system as in palm-based agroforestry. The evaluation of the soil quality and physical properties before and after quinoa cultivation showed a decreased in the Na^+ content available in the soil (20 cm in deep) before sowing by 35% in demosite Douz, suggesting that quinoa should be considered as a rotational crop, particularly in saline soils. Mixed cropping "quinoa with oat" showed a beneficial effect on oat plant growth and yield via enhancing plant growth, nutrient availability, maintaining soil moisture, and discharging soil from toxic ion Na^+. The significance of this study includes the identification of valuable parameters (plant density, date of sowing, and best agricultural practices) to ensure high seed yield in salt-affected soils.

KEYWORDS: *Quinoa, salinity, crop diversification, intercropping, food security*

ORAL COM N° :78.

DIAGNOSIS OF CUTANEOUS LEISHMANIASIS: FROM GENE MARKER TO POINT-OF-CARE MOLECULAR TEST

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Abstract: Cutaneous Leishmaniases (CL) are a group of diseases considered as the most NTDs. In Tunisia and many countries in MENA region CL present a complex epidemiological situation with the proven implication of at least 3 *Leishmania* species (*L. infantum, L. major, L. tropica*). Detection and identification of *Leishmania* species are essential for etiological diagnosis, patient's management, control and surveillance. Diagnosis methods applied for detection and identification of *Leishmania* depend on laboratory equipment and facilities. The aim of this study was to develop a set of innovative, sensitive and specific molecular tools for detection and identification of *Leishmania* species adapted for well or poorly equipped laboratories, accordingly. Using comparative genomic analyses of *Leishmania* genomes we selected species-specific and distinctive targets and designed a range of PCR primer pairs that we assessed for taxa-specific DNA amplification of *Leishmania* species encountered in MENA region. Four primer pairs were retained. Three of them, showing species-specific amplification, were investigated to develop a PCR multiplex coupled to lateral flow chromatography (LF) on a customized microfluidics for DNA-DNA hybridization. This test requires basic equipment such as a thermocycler. Readout for detection and identification is made in 3min on the LF after a 2h PCR. Another pair was designed for generic amplification of a *Leishmania* DNA fragment containing species-specific SNPs adequate for PCR High Resolution melting analysis (PCR-HRM) as an alternative test, in well-equipped centers, with the advantage of detection and identification made by the machine software at the endpoint (1h30min). Both approaches reduce time to result delivery and obviate the need for agarose gel electrophoresis. Tested on characterized *Leishmania* strains, the developed tests were shown to consistently identify the studied *Leishmania* species and to have an analytical sensitivity of detection of 0.001ng and 0.002ng for the PCR-LF and the PCR-HRM, respectively. Tested on cutaneous samples, the developed tests showed promising sensitivity and specificity. The study delivers simple, specific, and sensitive tools for accurate simultaneous detection and identification of *Leishmania* parasites in clinical samples that should be validated for use as diagnosis tests.

KEYWORDS: *Leishmania, Cutaneous leishmaniases, PCR HRM, Multiplex PCR, Lateral flow, diagnosis*

ORAL COM N° : 79.

OPTIMIZING LEMON PEEL DRYING: A COMPARATIVE ANALYSIS OF THERMAL TECHNIQUES AND THEIR IMPACT ON QUALITY PARAMETERS

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Abstract: The transformation of lemon peel from food waste to value-added product demands precise post-harvest processing to preserve its beneficial properties. Known for its richness in antioxidants, organic acids, and flavonoids, lemon peel holds significant potential in nutritional, environmental, and industrial sectors. Ensuring the retention of these bioactives during drying is critical to product quality and shelf life.

This study investigates the efficiency of two thermal drying methods—convection drying (CD) and infrared drying (IR)—applied at three temperature levels (50 °C, 60 °C, 70 °C) on lemon peel. The evaluation focused on drying behavior, bioactive compound preservation, and physical characteristics such as color and structure. Infrared drying at 50 °C proved most effective in maintaining peel color and surface integrity, whereas IR at 60 °C and 50 °C showed superior retention of polyphenols and flavonoids, respectively.

These findings highlight the importance of selecting appropriate drying conditions to enhance the functional value and commercial appeal of lemon peel-based products.

KEYWORDS: *Lemon peel, convection, infrared, polyphenols, flavonoids, color*

ORAL COM N° : 80.

NUTRACEUTICAL POTENTIAL ACE-INHIBITORY PEPTIDES DERIVED FROM MARINE BY-PRODUCTS HYDROLYSATE

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Abstract:
In the past 30 years, the number of people aged 30–79 with hypertension increased from 650 million to 1.28 billion. For the global medical community, preventing and treating hypertension has grown to be a challenging feat. It is clear that angiotensin I converting enzyme (ACE) makes a positive contribution to hypertension and therefore, inhibition of ACE has become the main target in treatment of hypertension. In this study, a barbel muscle protein hydrolysate (MPH), obtained by enzymatic treatment and showing ACE-inhibiting activity was fractionated by size exclusion chromatography on a Sephadex G-25. The ACE-inhibitory peptides were further purified by reversed-phase high performance liquid chromatography (RP-HPLC). The molecular masses and amino acid sequences of these peptides were determined using ESI-MS and ESI-MS/MS, respectively. Nine ACE-inhibitory peptides in sub-fractions P3-4 (IC50= 0.185 mg/mL) and P3-5 (IC50= 0.064 mg/mL) separated by RP-HPLC were identified. The structural modeling of anti-ACE peptides from the most active sub-fraction (P3-5) through docking simulations results showed that these peptides are able to bind to ACE with high affinity. These bioactive peptides could serve as candidates against hypertension and could be used as functional food ingredients.

KEYWORDS: *Enzymatic hydrolysate, ACE-inhibitory peptide, mass spectrometry.*

ORAL COM N° : 81.

ASSESSMENT OF QUINOA RESPONSE TO WATER DEFICIT AND EVALUATION OF ITS RECOVERY CAPACITY

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Abstract: Quinoa (*Chenopodium quinoa* Willd.) is a pseudo-cereal from the Chenopodiaceae family, known for its high nutritional value. Consideres as a good source for fibers, minerals (iron, copper, zinc, manganese, phosphorus, magnesium), and vitamins (B9, B2, B1). Daily consumption of quinoa helps prevent cardiovascular diseases, diabetes, cancer, obesity, and anemia. Quinoa is also recognized for its tolerance to harsh environmental conditions, including drought and salinity. It has high physiological plasticity, allowing it to adjust its growth according to water availability. Some varieties can withstand periods of moderate drought without significant yield loss. The aim of our study is to analyze the variability in quinoa's response to water deficit and evaluate its recovery capacity. To this end, a field experiment was conducted with four quinoa varieties (Q1, Q2, Q3, Q4) at a research site located in the Grombalia region. The plants were divided into two groups : one group was well irrigated (control plants), and the second group was subjected to a 21-day irrigation stop. Our results showed that variety Q1 was the most productive under control conditions. Water deficit led to a reduction in the growth of leaves, stems, and roots in all quinoa varieties. However, varieties Q2 and Q4 proved to be the most tolerant to water stress, exhibiting the smallest reductions in leaf and root biomass compared to the control plants. Quinoa's tolerance is also evident at the germination stage, where most of the studied varieties maintained a high germination capacity even in the presence of high concentrations of salt or PEG (80% and 90%, respectively).
The recovery capacity study revealed a strong potential for quinoa to recover after severe water deficit. Our results even indicate that plants rewatered after the stress period produced more biomass than the control plants. The significance of this study lies in highlighting quinoa's strong adaptive potential to challenging environmental conditions, particularly drought. This species stands out for its ability to preserve the integrity of its photosynthetic system and to recover well after severe water stress.

KEYWORDS: *quinoa, drought stress, recovery, adaptation, germination*

ORAL COM N° : 82.

MONOPOTASSIUM PHOSPHATE SEED PRIMING IMPROVES PHOSPHORUS DEFICIENCY TOLERANCE IN CHENOPODIUM QUINOA

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Abstract: Phosphorus (P) shortage is a major factor limiting crop productivity in many soils worldwide notably in calcareous soils, which are frequent in Mediterranean regions. To mitigate P deficiency effects, various strategies are adopted such as seed priming. Our study was carried out to investigate the potential of seed priming with monopotassium phosphate to alleviate the adverse effects of P deficiency stress in *Chenopodium quinoa* Willd. Seeds of *Chenopodium quinoa* (var. Titicaca) were soaked for 8 h in KH_2PO_4 solution (200 mM) and then washed three times with distilled water and dried back at room temperature. Unprimed and primed seeds were germinated in plastic pots filled with inert sand. After one month, an initial harvest was made and the remaining plants were divided into two groups: control (medium containing sufficient P rate) and P deficiency treatment (medium containing only 5 µM P). After 32 days of treatment, a final harvest was carried out. For plants from unprimed seeds, P deficiency decreased shoot and root growth, shoot P content, shoot water content and led to a significant decrease in photosynthetic parameters. Interestingly, seed priming with KH_2PO_4 alleviates P deficiency stress in quinoa plants showing a significant improvement effect on shoot and root growth, photosynthetic activity, chlorophyll and carotenoids content and nutritional status. This beneficial effect was associated with a low level of MDA, particularly in leaves. However, no significant effect was detected in leaf osmotic potential, anthocyanin content and acid phosphatase activity when comparing plants derived from primed with those from unprimed seeds. Our results indicate that KH_2PO_4 seed priming enhances quinoa's tolerance to phosphorus deficiency. This improved tolerance in plants derived from primed seeds is likely due to multiple mechanisms, primarily involving the preservation of the photosynthetic apparatus, increased root biomass, and improved nutritional status. Hence, quinoa seed priming with KH_2PO_4 seems to be a reliable procedure to increase plant productivity in calcareous soils.

***KEYWORDS**: Quinoa, phosphorus deficiency, seed priming, photosynthesis, water status, nutritional status.*

ORAL COM N° : 83.

DEVELOPMENT OF BIO-BASED EGGSHELL WASTE CARRIER FOR *R. ORYZAE* LIPASE IMMOBILIZATION

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Abstract:

A challenge for sustainable biowaste management for circular economy strategies is its conversion into matrices for enzyme immobilization. In this context, *R. oryzae* lipase (ROL) was immobilized on membrane-free eggshells (MFE), named ROL@MFE.The optimal conditions are an initial lipase concentration of 15794 IU, a contact time of 30 min, and a stirring speed of 380 rpm, resulting in an immobilization yield of 99.55%. Freundlich and Langmuir models fit the experimental data better than other models, with correlation coefficients (R2) of 0.997 and 0.993, respectively. Kinetic studies revealed that the adsorption of ROL on MFE is best described by the intraparticle diffusion model, which approached an initial fast adsorption of proteins. Zeta potential and particle size measurements confirmed a successful immobilization process. A comparison of MFE diffraction patterns before and after immobilization of ROL revealed that this process occurred on its surfaces. In addition, the electrical conductivity of MFE was improved after ROL adsorption, which could enhance its bioactivity and stability. Scanning electron microscopy of ROL@MFE revealed abundant ROL agglomerates on its surfaces. In terms of biochemical properties, the immobilized ROL was stable against many factors, indicating its potential for biocatalysis and promoting its future application.

***KEYWORDS:** Eco-sustainable matrix, R. oryzae lipase, immobilization, adsorption isotherm, kinetic models.*

ORAL COM N° : 84.

IDENTIFICATION, PURIFICATION, AND FUNCTIONAL CHARACTERIZATION OF TWO NOVEL THIOL PEROXIDASES (TP24P15 AND TP37M5) DISCOVERED THROUGH METAGENOMIC LIBRARY SCREENING

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Abstract: Metagenomics enables the discovery and expression of heterologous bacterial genes without requiring the cultivation of source organisms. This approach provides access to novel enzymatic activities from diverse microbial ecosystems, unlocking valuable biocatalysts for industrial applications. In this study, a functional metagenomics strategy was applied to explore the enzymatic repertoire of camel fecal microbiota, a highly adapted microbial community suited to extreme environments. The goal was to identify novel enzymes with applications in animal feed supplementation and lignocellulose degradation. Using a high-throughput robotic screening platform, a fosmid library was constructed and systematically analyzed for clones exhibiting enzymatic activity. Promising candidates were selected, characterized, and further validated through biochemical assays to assess their catalytic efficiency, substrate specificity, and potential industrial utility. This work specifically focused on peroxidase activity, highlighting two promising clones, 24p15 and 37m5. The exploration of dromedary microbiota through functional metagenomics presents a valuable opportunity to uncover enzymes capable of breaking down recalcitrant lignocellulosic materials. Two thiol peroxidases, TP24p15 and TP37m5, were successfully expressed using the pET-21(a+) vector and purified via single-step affinity chromatography. TP24p15 exhibited a molecular mass of ~14 kDa, while TP37m5 measured ~17 kDa. Both were classified as non-heme thiol peroxidases and were fully inhibited by DTNB and NEM. Their optimal catalytic conditions differed: TP24p15 demonstrated peak activity at pH 10 and 70°C, whereas TP37m5 functioned best at pH 4.5 and 50°C. Notably, their thermostability was significantly enhanced by copper ions at concentrations of 2 mM (TP24p15) and 5 mM (TP37m5). These enzymes exhibited broad substrate specificity, efficiently acting on phenolic compounds such as 2,4-dichlorophenol (2,4-DCP) and 2,6-dimethoxyphenol (2,6-DMP). Given their robust catalytic properties and enhanced stability, TP24p15 and TP37m5 hold considerable promise as additives for improving animal feed digestibility and facilitating lignocellulose degradation for industrial applications.

KEYWORDS: *metagenomics; thiol peroxidase; functional screening; lignocellulose degradation; enzyme purification.*

ORAL COM N° : 85.

EXTRACTION AND CHARACTERIZATION OF CHICKPEA AQUAFABA FOR THE FORMULATION OF VEGAN PASTRY PRODUCTS

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Abstract:

Aquafaba, a liquid by-product from the soaking and cooking of legumes, is often discarded despite its rich protein, carbohydrate content, and functional properties. It is increasingly recognized as a valuable vegan egg white substitute due to its advantageous techno-functional properties. This study aimed to optimize the ultrasound extraction of this by-product, using the response surface methodology, and to characterize it. The research also explored the impact of incorporating both liquid and freeze-dried aquafaba from two chickpea varieties, with the goal of valorizing them in the production of vegan products such as cake, meringues and ice cream etc. The results demonstrated that chickpea flour possesses valuable nutritional components and promising techno-functional properties. The findings revealed that the optimal conditions of the aquafaba extraction were a liquid to solid ratio of 1.6/1, an extraction time of 60 min and an extraction temperature of 90°C. Under these conditions, the extracted aquafaba exhibited interesting techno-functional properties such as stable foams over time. The yield of freeze-dried aquafaba was approximately 3%, and its antioxidant activity, measured by inhibition power, was around 61.59%, compared to 18.40% for liquid aquafaba. Additionally, the foaming property of freeze-dried aquafaba was enhanced, making it a promising egg substitute in food formulations. Cakes enriched with aquafaba showed higher protein content than those made with egg whites, while maintaining acceptable rheological properties and good microbiological quality. Vegan meringues made with aquafaba were larger, harder, and had better color after baking compared to those made with egg whites. Overall, aquafaba proved to be an excellent substitute for egg whites in vegan pastry products.

Keywords: chickpea, aquafaba, techno-functional, nutritional, vegan pastry products

ENVIRONMENT

ORAL COM N° : 86.

LYSINIBACILLUS FUSIFORMIS STRAIN ZC: A BIOLOGIC POWERFUL TOOL FOR BIO-TREATMENT AND BIO-LEACHING ASSAYS OF THE TUNISIAN PHOSPHATE LAUNDRIES WASTEWATER AND ROCK FROM METLAOUI-GAFSA BASIN

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Abstract: The chemical characterization of phosphate effluent and rock was done. In fact, the phosphate-rich effluent, from the Metlaoui phosphate laundries wastewater (MPLW), showed an alkaline pH, saline, highly turbid, rich in suspended matter and total solids. MPLW samples were loaded with potentially toxic metals, presented in decreasing order as follows: magnesium (5655 mg L^{-1}), potassium (45 mg L^{-1}), lead (1 mg L^{-1}), iron (0.7 mg L^{-1}), cadmium (0.5 mg L^{-1}), copper (0.3 mg L^{-1}) and zinc (0.1 mg L^{-1}). Due to the high COD/BOD_5 ratio, a poorly biodegradable organic load is underlining. For the rock phosphate characterization, X-ray diffraction (XRD), combined with binocular mineralogical analysis and chemical analysis, showed the presence of carbonate-fluorapatite, illite, and montmorillonite was revealed in the C(II) (+71 µm) size fraction, whereas in the C(I) (−71 µm) size fraction, carbonate-fluorapatite, calcite, quartz, sanidine, clinoptilolite, and taramovite were identified. The P_2O_5 and CaO contents were greater in the C(II) layer than the C(I) layer, whereas SiO_2, MgO, CO_2, Cd, Zn, and CO_{rg} were higher in the C(I) than the C(II) layer. In order to biotreat MPLW effluent and phosphate rocks, an indigene strain, isolated from the MPLW, was identified as *Lysinibacillus fusiformis,* using 16S rDNA sequencing analysis. The strain ZC, used as a biological tool for MPLW treatment, showed a reduction in the metal ion contents due to accumulation and/or adsorption, showing a bioprocessing performance of the newly isolated *L. fusiformis*. The bioleaching of Cd from phosphate rock samples was investigated using the powerful *L. fusiformis*. A decrease in cell viability was noticed when phosphate C(I) and C(II) samples showed toxicity in the samples. The use of this strain was powerful to reduce the Cd content, which increased from 13.31% to 29.07%, when the C(II) (+71 µm) and C(I) (−71 µm) size fraction samples were added to the medium. The isolated strains could be used as a biological tool for bioleaching.

Keywords: *Lysinibacillus fusiformis, phosphate laundries wastewater, phosphate rock, heavy metal ions, bioleaching, biotreatment*

ORAL COM N° : 87.

PROMOTING THE INTEGRATION OF OLIVE LEAVES IN FOOD FORMULATIONS: A STEP FORWARD TO INCREASE THE ADDED VALUE OF THE OLIVE FARMING

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Abstract: The present work is aiming at the valorization of olive farming byproducts, in particular olive leaves. As a largely produced biomass in Tunisia and in many other countries, olive leaves still luck an efficient vision for a sustainable valorization. In fact, the incorporation of olive laves in several industrial sectors could be proposed as a promising strategy for the enhancement of their added value. This approach would integrate either botanical extracts or pure compounds in medicinal, cosmeceutical, nutraceutical and functional foods formulations.
As a target of our study, we are suggesting the integration of olive leaves extracted bioactive compounds as natural and safe additives in a fatty food preparation. For this reason, a food compatible extraction method is proposed. The main focus of the study considered the inhibition or the delay of the oxidation process of the lipids. This was investigated with both crude extract from olive leaves and with purified compound. Significant data are evidenced under both conditions. Indeed, olive leaves extract and pure compound significantly delayed the oxidation process in the food matrix stored under room temperature conditions. These results showed an interesting potential of olive leaves and supported the extending of their use beyond food preparations.

KEYWORDS: *Olive leaves, valorization, antioxidants, foods oxidation, sustainability*

ORAL COM N° : 88.

ISOLATION AND CHARACTERIZATION OF HYDROCARBON-DEGRADING MICROORGANISMS FOR ENVIRONMENTAL BIOREMEDIATION

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Abstract:
Hydrocarbon pollution remains a critical environmental issue due to the persistence of these compounds and their mutagenic and carcinogenic properties. Bioremediation, which exploits the degradative potential of microorganisms, offers a sustainable alternative to conventional remediation methods.
In this study, two yeast strains were isolated from hydrocarbon-contaminated samples. Their ability to use various hydrocarbons as sole sources of carbon and energy was evaluated. The strains exhibited growth on polycyclic aromatic hydrocarbons such as naphthalene, phenanthrene, and pyrene, as well as on alkanes like decane and pentadecane, and even on complex mixtures such as crude oil. Chromatographic analysis using GC-FID revealed that the strains degraded over 80% of the naphthalene present in the medium within 3 days of incubation and more than 90% of the pyrene after 7 days. Furthermore, GC-MS analysis confirmed the degradation of crude oil by the isolated yeasts.
These results highlight the potential of microorganisms for efficient and eco-friendly bioremediation of hydrocarbon-contaminated environments.

KEYWORDS: *Bioremediation, Yeast, Hydrocarbons, Biodegradation.*

ORAL COM N° : 89.

EFFECT OF FRUIT AND VEGETABLES WASTE DIGESTATE ON PEPPER GROWTH AND NITROGEN MINERALIZATION IN SOIL

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Abstract: Anaerobic digestion (AD) represents an attractive option for sustainable organic waste management with respect to human health and environment. ADprocess is performed by bacterial and archaeal communities cooperationg together to convert organic matter into biogas and digestate. Digestate has excellent fertilizing properties and is efficient and eco-friendly. It can compete with mineral fertilizers in agriculture, landscaping and horticulture. For these reasons, we used the digesate (FVD) produced from a fruit and vegetables waste (FVW) AD, in our laboratory, to ferti-irrigate pepper plants in a farmer's field. For that, 48 plants were divided according to the Latin Square device and each 12 plants were irrigated by the same digestate dilution (10, 20 and 30%), in addition to the farmer irrigation solution (control). The ferti-irrigation was monitered 6 times (for 3 months) in which several mesearments were taken for every plant such as plant size, number of leaves, flowers and number and weight of mature peppers. Results showed that FVD increased the number of flowers (dilution 30%) and the weight of mature peppers (all dilutions with maximun at 10%). The effect of FVD on nitrogen mineraliation in farmer's soil was evaluated using the same dilutions as ferti-irrigation, according to the international standard ISO 14238. Results showed that FVD increased nitrate and carbon availability in the soil. So, it preserved soil flora and enhance soil fertility. Then, FVD can be used as a safe and efficient bio-fertilizer.

KEYWORDS: *anaerobic digestion, digestate, ferti-irrigation, soil, nitrgen mineralisation*

ORAL COM N° : 90

PERFORMANCE COMPARISON OF CHEMICAL-BASED VS NATURAL-BASED COAGULANT IN VEGETABLE OIL REFINERY WASTEWATER TREATMENT FOR A SAFE AND SUSTAINABLE REUSE

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Abstract: Soybean oil is one of the most widely used edible oils in the world. With the improvement in standards of living and changing diets, the demand for quality edible oil is increasing. Thus, refining crude soybean oil is a necessary step in the production of soybean oils. Accordingly, Vegetable Oil Refinery sector plays important role for the economic development in Tunisia, but environmental concerns are arising due to the pollution caused by the discharge of untreated wastewater. In fact, large amounts of high-strength organic wastewater are released during the crude soybean oil refining process, which usually includes degumming, deacidification, neutralization, bleaching, and deodorization steps to remove the undesirable components before making the oil available for human consumption**.** The refined soybean oil wastewater (SOW) has a high concentration of chemical oxygen demand (COD) and contains large amounts of sodium salts, free fatty acids, oil, grease, sulfates, and phosphates. The harmful effluent discarded in its raw form causes substantial impacts on the environment. Effective wastewater management is essential to mitigate the environmental impacts. The Coagulation/Flocculation (CF) process is a commonly employed technique for purifying industrial wastewaters. The CF process is renowned for its simplicity, cost-effectiveness and low-energy requirements, making it a versatile and efficient solution in various industries, typically using conventional coagulants. Conventionally, chemical coagulants like aluminum sulfate (alum) reduce water turbidity, but they have drawbacks such as high costs, chemical waste generation, and adverse health effects. The residual aluminum in water can harm the central nervous system and is linked to diseases like Alzheimer's. Given these concerns, evaluating plant species as natural and ecofriendly coagulants is crucial.

This research aims to compare the performance of chemical-based (alum) and plant-based (*Moringa Oleifera* seeds extract) coagulants in treating SOW to provide a more sustainable and cost-effective solution for wastewater treatment in order to be safety reused. Several Jar Test trials were carried out in order to optimize the operating conditions for the proper functioning of coagulation process using response surface methodology (RSM). The use of 1.9 g/L of alum coagulant leads to achieve impressive results of a maximum COD removal of 99.7 % with a total turbidity elimination (100 %), while plant-based coagulant showed a lower COD removal of 92.55 % with a total turbidity elimination (100 %) under a higher concentration of 3.94 g/L (double dosage).

Although the amount used of natural plant-based coagulant (PB-C) to properly treat wastewater is higher (double) than that of chemical coagulant, the PB-C are preferred if taking an environmentally friendly approach, because they have more advantages than chemicals, in addition to high efficiency in water treatment, they are safe, environmentally friendly, biodegradable and inexpensive. These benefits encourage their use in industrial wastewater treatment.

KEYWORDS: *Vegetable Oil Refinery Wastewater, Coagulation/Flocculation, Aluminum Sulphate, Plant-Based coagulant, Moringa Oleifera.*

ORAL COM N° :91.

OPTIMIZING HYDROPRIMING DURATION TO ENHANCE WHEAT GROWTH IN CONVENTIONAL AND SOILLESS AGRICULTURAL SYSTEMS

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Abstract:

The continuous development of alternative farming methods remains crucial to address challenges facing conventional agriculture such as high water demand, climate change, and food security particularly in countries heavily reliant on cereal grains for sustenance and economic stability. Among these cereals, wheat holds a pivotal role in human nutrition requires innovative approaches to enhance its productivity. Hydropriming a simple and cost effective strategies involving controlled hydration has shown potential in enhancing germination and plant growth of wheat in both traditional (soil-based systems) and soilless (aquaponics, hydroponics) cultivation systems.

This study focused on optimizing hydropriming duration for fifteen wheat cultivars cultivated in Tunisia. We evaluated its effects on germination, growth, seedling vigor, root development, and biomass accumulation during 10 days *in Vitro.* The same parameters were also studied *in Vivo* over 10 and 30 days in conventional systems (with using tap water or aquaonic solution for irrigation) and in soilless cultures (hydroponics, aquaponics).

The results demonstrated that hydropriming significantly enhanced germination and plant growth in all the tested systems, with optimal priming duration varying based on wheat variety and cultivation method. *In vitro* hydropriming was more effective after 32 hours of treatment with the highest improvement observed in the Carioca variety compared to the other cultivars. The conventional farming showed more limited responses in all seedling growth parameters compared to the soilless cultivation systems, notably with the untreated seeds of the Sculptur variety. Hydroponic techniques offered controlled advantages for certain varieties such as Salim and Maali while aquaponic system showed the best results in most tested cultivars compared to the other cultivation systems particularly after 32 hours of treatment. The aquaponic system, along with the use of aquaponic solution for irrigation, presented promising results due to its nutrient-rich environment which significantly enhanced root system development especially with the Karim variety.

These findings suggest that optimizing hydropriming strategies can enhance wheat productivity across diverse cultivation methods, offering practical insights for sustainable agriculture.

Keywords: *Seed Hydropriming optimization, wheat, in vitro, in vivo, conventional agriculture, aquaponic, hydroponic.*

ORAL COM N° : 92.

PERFORMANCE OF UASB REACTOR TREATING WASTE ACTIVATED SLUDGE: EFFECT OF ELECTRO-CHEMICAL DISINTEGRATION ON THE ANAEROBIC MICROBIAL POPULATION STRUCTURE AND ABUNDANCE

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Abstract: The electro-chemical disintegration using iron electrodes was performed for the pretreatment of waste activated sludge (WAS). The effect of this electro-chemical pretreatment on anaerobic digestion (AD) performance and microbial population structure was studied. An improvement of biodegradability and bioaccessibility of organic matter was demonstrated. AD of pretreated WAS in an up-flow anaerobic sludge blanket reactor (UASB) resulted to an increase of biogas production by 60 % compared to control reactor without disintegration. PCR- DGGE and real-time qPCR analyses showed that the high abundance of bacteria and the coexistence of Coprothermobacter in the UASB digestate fed with disintegrated sample established a stable bacterial association which is in line with the AD performance. Besides, the increased number of methanogens along the process allowed the improvement of methane production in comparison to control reactor. This increase went from 0.47% in raw sludge to 1.92% in pretreated sludge of the archaeal community.

KEYWORDS: *Waste activated sludge, Electro-chemical disintegration, Biogas production, UASB reactor, Microbial community structure*

ORAL COM N° : 93.

TITLE: TREATMENT OF TUNA WASTEWATER USING *YARROWIA LIPOLYTICA*, TIO_2 NANOPARTICLES AND ACOUSTIC WAVES

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Abstract: The current study explored the potential of the oleaginous yeast *Yarrowia lipolytica* to valorize tuna washing process wastewater (TWPW), aiming to both depollute the waste and generate value-added byproducts. The yeast was cultivated with titanium dioxide nanoparticles (TiO_2-NPs) and exposed to various acoustic frequencies including low frequency (LF, 64 Hz − 7,500 Hz), medium frequency (MF, 0 Hz − 10,000 Hz), and high frequency (HF, 0 Hz − 19,000 Hz). The effects of sound tone on the growth of *Y. lipolytica* and metabolites production were analyzed and discussed. In glucose-based media containing 12.5 mg/L TiO_2-NPs the yeast biomass significantly increased under the influence of low frequency sound waves. In TWPW, the biomass significantly rose when *Y. lipolytica* was exposed to acoustic sounds in the presence of TiO_2-NPs, reaching the highest value (3.9 g/L) under LF sounds. The highest COD reduction (85.7 %) was noticed under TiO_2 + LF conditions. The concentrations of minerals, proteins, lipids, as well as the salinity, conductivity and color values in decreased significantly. The combination of *Y. lipolytica*, low frequency acoustic sounds and TiO_2-NPs have high ability to treat the TWPW wastewater along with simultaneous production of high interest metabolites.

KEYWORDS: *Yarrowia lipolytica · Sound waves · Titanium dioxide · Biological treatment*

ORAL COM N° : 94.

UTILIZATION OF AGRO-FOOD RESIDUES FOR LACTIC ACID BACTERIA GROWTH: SAFETY ASSESSMENT AND BIOPROCESSING INSIGHTS

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Abstract:
The agro-food industries have grown steadily around the world, resulting in a large amount of agricultural food residue. These residues can be interesting materials to exploit, particularly for direct valorization in the design of added-value foods. Indeed, these remains comprise several reusable matters with significant economic potential. Several tentative attempts were taken towards the bioprocessing of fruit and vegetable by-products using lactic acid bacteria (LAB). The fermentation allows the production of LAB biomass and positively modulates the attributes of the matrices.
Nevertheless, food can be a vehicle for pathogens and hazard molecules as well. Theses contaminants are categorized into three main groups, including chemicals, biologicals and/or physicals. Chemical contaminants encompasses pesticides residues, mycotoxins, heavy metals, chemical materials added to the food for special purposes. Biological contaminants include microbes, parasites, and viruses. Whereas physical hazards include any additional matter normally not existing in the food, and can cause injury, disease or psychological trauma to the consumer. These foreign matters can be pieces of glass, metal or plastic; items related to the food, such as fragments of bone in meat products; parts of the food itself, like crystals of sugar or salt that are mistaken for glass and finally to insects/pests both live or dead.
The present study focuses on evaluating the safety of agro-food residues, followed by assessing the ability of selected LAB strains to grow and ferment a laboratory-prepared medium formulated from various fruit, vegetable, and dairy industry by-products.

KEYWORDS: *agro-food, valorization, bioprocessing, lactic acid bacteria, contaminants*

ORAL COM N° : 95.

EVALUATION OF THE CONTENTS AND CHARACTERIZATION OF MICROPLASTICS IN TWO SPECIES OF EDIBLE FISH COLLECTED FROM THE SOUTHERN COAST OF TUNISIA

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Abstract:
The accumulation of microplastics (MPs) in the aquatic environment presents an emerging threat to the living organism. This study aims to determine the presence of MPs in the two most consumed fish species in southern coast of Tunisia, *Liza aurata* and *Diplodus annularis*. Samples were collected from Kerkennah (south Tunisia) at March 2024 and November 2024. Five fish at post-spawning stage were analyzed per species. Results have revealed that 58.81% of fishes had MPs in the digestive tract, 67.25% had MPs in the gills, 40.76% had MPs in the Gonads and 33.16% in Muscle. Overall, MPs concentrations varied from 2 ± 1.22 to 3.6 ± 1.67 particles/individual and from 0.2 ± 2.25 to 5.60 ± 2.30 particles/individual, respectively in *Liza aurata* and *Diplodus annularis*. Three types of MPs including fibers, fragments and films were identified. Fibers were the most detected in all fishes then fragments and finally films. Several colors have been detected such as black, transparent, blue, red, green, yellow and white. In the two species, black, blue and red fibers are the most dominant. Red, yellow, black and blue fragments are the most found. Concerning film transparent, red and black are the most dominant. Size of the isolated MPs varied between 0.033 mm to 5 mm with a predominant of the smallest size class (0.033 to 0.5 mm) in all tissues of *Liza aurata* and *Diplodus annularis* collected. Data of this study could be used as reference of the monitoring of plastic pollution.

Key words: Microplastics, *Liza aurata*, *Diplodus annularis*, Tunisian south coast.

ORAL COM N° : 96.

ASSESSMENT OF THE BIOLOGICAL TREATABILITY IN DAIRY AND BEVERAGE WASTE MIXTURES USING NATURAL COAGULATION PRIOR FERMENTATION

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Abstract: The dairy and beverage industries generate significant waste from returned products, which are typically discharged into wastewater treatment plants (WWTPs). However, their high organic load often disrupts WWTP performance. To address this issue, this study proposes an upstream biological treatment for such waste streams. Different mixtures of dairy waste (DW) and cola beverage waste (B) were evaluated for their pollution load. A 1:1 mixture (DW-B50)—combining dairy waste with phosphoric acid-rich cola waste—achieved initial reductions of 52% in COD and 72% in turbidity. Further treatment with 10 g/L Moringa oleifera seed aqueous extract (50% v/v) as a natural coagulant significantly enhanced removal efficiencies, reaching 92% COD and 93% turbidity reduction. This outperformed chemical coagulation with 10% $FeCl_3$ (60 g/L), which achieved only 78% COD abatement. Next, biological treatment using indigenous microflora reduced COD by 76% and residual sugars by 15%. However, inoculation with kefir grains (1% and 3%) substantially improved sugar consumption rates to 58% and 73%, respectively. This integrated approach not only enhances the treatability of DW-B waste mixtures but also enables recovery of milk proteins for potential valorization.

KEYWORDS: *Dairy waste, Cola beverage, Coagulation, Moringa oleifera seeds, Fermentation*

ORAL COM N° : 97.

TOWARDS SUSTAINABLE REUSE OF TREATED VEGETABLE OIL REFINERY WASTEWATER: A COMPARATIVE STUDY OF MEMBRANE FILTRATION AND COAGULATION/FLOCCULATION

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Abstract: Protecting the environment has become a major economic and political issue, and every country in the world is concerned about safeguarding water resources. Industrial activities can have harmful impacts on the environment through the exploitation of natural resources such as water and/or the emission of polluting products. In this context, the vegetable oil refinery is one of the industries that uses a large quantity of water and, consequently, a major producer of wastewater highly toxic and heavily contaminated with organic and inorganic matter, Oils and greases, volatile fatty acids and suspended solids.

Industrial wastewater is generally treated using biological processes. Microbes use pollutants as a source of carbon and convert them into harmless products by secreting appropriate metabolites. However, biological treatment needs a long residence time and a large area, and activated sludge microorganisms might be intolerant to oils and greases in oily wastewater. At present, coagulation/flocculation (CF) as an indispensable oily wastewater treatment technology receives much attention because it is very well established, economical, practical and relatively efficient. Nevertheless, in the application of physical–chemical treatment by CF to wastewaters, a large amount of sludge is generated. On the other hand, membrane filtration (Mf) is considered the most effective approach for the treatment of oily wastewater due to its high separation efficiency, simple operation process, cost-effectiveness, low energy consumption, and minimal secondary pollution. Nonetheless, Oil droplets with high affinity to the membrane can wet the membrane and permeate into the pores, leading to serious fouling.

In this context, the aim of this work is to study the effectiveness of the two physicochemical depollution methods applied to the treatment of wastewater from the refining of vegetable oils extracted from soybeans (VORW) : CF using aluminum sulphate (AS) as the coagulant and a cationic flocculant, and membrane filtration using microfiltration (MF) membranes with a pore size of 0.2 µm, in order to select the most appropriate method for improved purification with a view of reuse/recovery. These different technologies were evaluated in terms of their effectiveness in reducing chemical oxygen demand (COD) and oils and greases removal.

The results show that CF treatment of VORW achieves 99.9% COD removal and 100% of oils and fats removal. When MF-0.2 µm membrane is used, COD and oil and grease removals reaches maximum rates of 99.4% and 99.97%, respectively.

In summary, MF and CF treatment methods for wastewater from soybean vegetable oil refineries are effective in removing oils and fats and reducing COD. It is crucial to choose the right method, in compliance with standards and based on purification performance. Finally, to provide a proper choice in practical application, the operating cost of CF and Mf technologies have to be studied and compared.

KEYWORDS: Wastewater treatment, Soybean vegetable oil refinery, Microfiltration, Coagulation/Flocculation.

ORAL COM N° : 98.

MONITORING AND EVALUATION OF PLANT BIODIVERSITY IN A SYLVO-PASTORAL ECOSYSTEM IN THE NORTHWEST REGION OF TUNISIA

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Abstact :

The study was carried out in 2023-2024 in the Sejnane region located in the northwest of Tunisia. The region is characterized by a Mediterranean climate with a subhumid altidunal gradient. This work was conducted in the Sidi Mechereg forest, Sejnane. The objective was to determine the influence of exposure and topographical position on the dendrometric parameters of the dominant tree, the characteristics of the forest canopy, and the use of shrubby and herbaceous vegetation.

The single-point neighborhood method was used to measure the distances separating the sampling point from the nearest tree in each neighborhood. Qualitative and quantitative analyses were conducted on the vegetation to assess the plant biodiversity of the study area. The four nearest trees were measured for their crowns and crown diameters. These measurements and the measured distances were used to calculate the density and coverage rate of the forest canopy. Nine sampling points were taken per exposure (north or south) and position (low or high slope), resulting in 36 point plots or replicates. At 1 m² (1 x 1 m) plots, vegetation samples were also taken, found in the shrub and herbaceous strata. In these plots, vegetation cover was measured using the ocular method "Doubenmine 1962." The grass from the current growing season was then cut using scissors. The results we demonstrated: Significant distances between trees were found on lower slopes (9.3 m on average) compared to higher slopes (6.4 m). This difference is reflected in the ease of purchasing trees for legal or illegal felling in the forest valley.

Floristic richness in the understory was negatively correlated with density, canopy cover, and mean diameter of sampled trees. Herbaceous species biomass was also negatively related to forest density.

Keywords *: Tunisia, Mediterranean, species richness, biomonitoring, sylvopastoral ecosystem, biodiversity conservation.*

ORAL COM N° : 99.

BIOCHEMICAL AND MOLECULAR EVALUATION OF AMMONIUM TRANSFORMATION POTENTIAL BY SOIL BACTERIAL STRAINS

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Abstract: This study aims to evaluate the ability of two bacterial strains (*Paenibacillus pabuli S5* and *Sphingomonas sp.* N1) to mitigate ammonia pollution in wastewater. These microorganisms have demonstrated a high tolerance to elevated ammonium concentrations, up to 1000 mg/L, making them particularly suitable for bioaugmentation applications. Biotransformation tests revealed a significant reduction in ammonium (75 to 89% within 24 hours at 30°C) to nitrates by these strains, even in the presence of high initial concentrations (750 mg/L). This activity was correlated with increased levels of key enzymes involved in ammonium detoxification (glutamine synthetase GS, glutamate synthase GOGAT and hydroxylamine oxidoreductase HAO) with the most pronounced effects observed under the treatment at concentration 750 mg/L. GS activity increased by up to 43% and 40% (peaking at 48h), GOGAT by 48% (48h) and 31% (72h) and HAO by 76% and 51% with S5 et N1 respectively at 48h compared to the control, indicating effective bacterial adaptation to this stress. Strains *Paenibacillus pabuli S5* and *Sphingomonas sp.* N1 show promising potential to complement the pre-defined bacterial consortium in the laboratory due to their ability to reduce the impact of contaminants on crops irrigated with wastewater, particularly by mitigating plant abiotic stress. Their integration could either directly optimize wastewater treatment (tertiary) or enhance plant growth through soil inoculation.

KEYWORDS: *bioaugmentation, glutamate synthase, glutamine synthetase, hydroxylamine oxidoreductase, soil microorganisms, wastewater*

ORAL COM N° : 100.

SMART REMEDIATION OF PHOSPHATE WASTEWATER: A STUDY ON TOXICITY, CHARACTERIZATION, AND AI-GUIDED TREATMENT

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Abstract: Phosphate industry effluents pose significant environmental challenges due to their high load of heavy metals, suspended solids, and residual chemical reagents. This study focuses on the comprehensive characterization, toxicity assessment, and optimization of treatment strategies for phosphate wastewater. Physicochemical analysis revealed elevated concentrations of contaminants such as cadmium (Cd), lead (Pb), and titanium (Ti), which exceeded permissible environmental limits. The ecotoxicological impact was evaluated through phytotoxicity tests using four plant species, highlighting inhibition of germination, biomass reduction, and morphological alterations at increasing effluent concentrations. To address these risks, an eco-friendly treatment approach using an adsorbent was developed and optimized. Artificial Intelligence (AI) was applied interpret the adsorption efficiency under varying operational conditions. AI-based optimization identified optimal treatment parameters, significantly enhancing heavy metal removal efficiency, with an average removal rate exceeding 70%. This integrated approach demonstrates the potential of AI in advancing sustainable wastewater management strategies and provides a scalable model for industrial effluent treatment.

KEYWORDS: *wastewater, toxicity, heavy metals, artificial intelligence*

ORAL COM N° : 101.

TREATMENT EFFICIENCY OF MICROALGAE–BACTERIA CONSORTIA FOR AQUACULTURE WASTEWATER

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Abstract: The main objective of this study is to assess the purification efficiency of locally isolated microalgae for treating aquaculture effluent, and to investigate their synergistic interaction with bacterial communities. Initially, five microalgal strains were cultured in BG11 medium under optimal growth conditions (temperature, light, and aeration) and were preliminarily identified by light microscopy. These strains were subsequently screened using wastewater from red tilapia aquaculture to identify the most effective candidate. The most promising strain, identified as 5 CNR, was selected for further experiments involving both suspended and immobilised cultures. In both modes, the strain was tested in combination with the native bacterial consortium from activated sludge. The results revealed that strain 5 CNR exhibited rapid growth in both BG11 medium and aquaculture effluent. In suspended cultures, the microalgae–bacteria consortium showed enhanced growth performance and achieved high removal efficiencies for ammonium and phosphate (up to 99%), though lower reductions were observed for COD, nitrates, and nitrites compared to treatments with activated sludge alone. In the immobilised culture mode, bacterial addition did not significantly improve microalgal growth. However, a notable improvement in pollutant removal was recorded, with COD removal reaching 88.17% for microalgae alone and 84% for the consortium, and near-complete nutrient elimination (99–100%). These findings emphasize the critical role of immobilisation in enhancing the treatment efficiency of aquaculture effluents and reducing environmental pollution.

KEYWORDS: *Microalgae, Activated sludge, Symbiotic co-culture, Immobilisation, Aquaculture wastewater treatment.*

GENETICS AND IMMUNOLOGY

ORAL COM N° : 102.

STRUCTURAL DESTABILIZATION AND FUNCTIONAL DISRUPTION OF TGF-B1 BY PATHOGENIC VARIANTS: MECHANISTIC AND THERAPEUTIC IMPLICATIONS IN IDIOPATHIC PULMONARY FIBROSIS

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Abstract :

Idiopathic Pulmonary Fibrosis (IPF) is a chronic interstitial lung disease characterized by progressive deterioration in respiratory function. Transforming growth factor β1 (TGF-β1), belonging to the TGF superfamily, contributes to pulmonary fibrosis by activating fibroblasts, stimulating extracellular matrix deposition and inhibiting collagen degradation, thereby promoting tissue remodeling and IPF progression. This study explores the link between pathogenic nucleotide polymorphisms (SNPs) in the TGF-β1 gene and the pathogenesis of IPF, by analyzing the functional and structural consequences of these variants on the protein. An integrative approach combining bioinformatics algorithms was employed to assess the impact of mutations on protein stability, sites of post-translational modifications, ligand-protein interactions and phenotypic effects. The FATHMM, POLYPHEN2, PROVEAN and SIFT tools identified deleterious non-synonymous SNPs, while Pmut, PhD-SNP, SNAP, MutPred, TMHMM, MARCOIL and DisProt predicted structural perturbations and conformational disorders. The stability of the mutated protein was modeled via INPS-MD, and MODPRED mapped potential post-translational modifications. The results reveal that 14 pathogenic variants significantly alter TGF-β1 stability, with a majority inducing structural destabilization, as confirmed by I-Mutant, MUpro and INPS-MD. The R205W, R185W, R180Q, D86Y and I300T variants disrupt post-translational modifications and molecular interactions, affecting the protein's biological function. These mutations target conserved regions, including alpha helices, random structures and extracellular loops, thus altering the charge, hydrophobicity and spatial architecture of TGF-β1. These data shed light on the molecular mechanisms by which TGF-β1 variants influence pulmonary fibrosis, offering prospects for the development of targeted therapies and personalized strategies in the management of IPF and other inflammatory lung pathologies.

KEYWORDS: *TGF-β1, Idiopathic pulmonary fibrosis, nsSNP, Bioinformatics*

ORAL COM N° : 103.

EXPLORATION OF THE GENETIC DIVERSITY STRUCTURE IN *ROSA* L. SPECIES IN TUNISIA.

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Abstract:

The assessment and characterization of genetic diversity in rose species are essential steps for conservation and enhancement efforts. This study represents the first genetic diversity analysis of various rose species at different ploidy levels in Tunisia, aiming to elucidate the genetic structuring of the *Rosa* genus by incorporating both wild and cultivated species, including local and introduced varieties. A total of 114 accessions representing eight *Rosa* L. species were collected. Genetic diversity structuring was established using Hierarchical Ascending Clustering, the model-based Bayesian clustering approach, and Principal Component Analysis. The results highlight a clear distinction between fragrant rose accessions (*R. damascena*, *R. centifolia*, and 'Rose of Ariana') and the rest of the rose accessions. This differentiation enabled the selection of wild roses and a group of modern roses, including English roses bred by David Austin. Our findings also provided insights into the phylogeny of 'Rose of Ariana'.

These findings will enable the establishment of a core collection and the identification of key genes related to adaptability, ornamental value, and fragrance, which can be utilized in the breeding of new *Rosa* varieties.

Keywords: *Rosa* spp.; microsatellite primers; germplasm; genetic diversity

ORAL COM N° : 104.

TLR9 A NOVEL IMMUNE SIGNATURE ASSOCIATED WITH TUMORIGENESIS, PREDICTION AND PROGNOSIS OF CERVICAL CANCER, COLORECTAL CANCER AND MELANOMA

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Abstract:

Recent studies have highlighted the expression of Toll like receptors not only on immune cells but also on cancer cells. The evaluation of their role in tumor induction and tumor progression is currently a controversial topic, and current results do not yet provide sufficient knowledge to support their use as pro- or anti-tumor vectors. In this work, we explore clinical applications as a tumor marker for colorectal cancer, melanoma, and cervical cancer.

Formalin-fixed, paraffin-embedded (FFPE) tissue samples from 32 patients with various types of metastatic melanoma, 48 patients with sporadic colonic and rectal adenocarcinoma (ADK), and 53 cases of cervical cancer (precancerous and cancerous) are included in this study. TLR9 expression was performed using immunohistochemistry (IHC) technique. Correlation between the expression of this receptor and histo-prognostic parameters in patients with colorectal cancer (CRC) and melanoma and cervical cancer was performed using SPSS20 software. For cervical cancer. Nested PCR and the Reverse line blott were used to determine HPV genotypes, SPSS 20 and R software package was used to study the correlation between TLR9 expression, HPV16 and grade of disease severity.

47.9% of CRC cases expressed weakly TLR9 and 52.08% expressed strongly this receptor). No significant association was observed between TLR9 expression and different clinicopathological parameters including sex, tumor location, tumor grade and stage, lymph node metastasis and overall survival. In melanoma patients, high TLR9 expression was observed in 90.3% of patients.The association between TLR9 expression and clinicopathological characteristics, sex, age, pigmentation, UV exposure, location and histological type shows no association. For cervical cancer, TLR9 expression progressively increased from CIN1 (80% low intensity) to CIN2 (83.3% moderate intensity), CIN3 (57.1% high intensity), and ICC (100% very high intensity). It was absent in normal cervical tissue and low in 71.4% of condylomas. Multiple correspondence analysis (MCA) between grade severity lesions, HPV16 and TLR9 expression shows a coefficient of Correlation (R) between severity of grade, HPV16 and TLR9 were respectively 0.893 0.807 and 0.767

our results show a significant overexpression of TLR9 during the course of cervical carcinogenesis and in most cases of melanoma and CRC. In CC This expression is highly associated with HPV16 genotype, the main causes of CC. These results highlight TLR9 as a new therapeutic target in CC, CRCs and melanoma.

KEYWORDS: *TLR9, Cervical cancer, Colorectal Cancer, Melanoma, tumor Progression*

ORAL COM N° : 105.

GENETIC AND COMPUTATIONAL INVESTIGATION OF A RARE HOMOZYGOUS *SNIP1* VARIANT IN TWO SIBLINGS WITH A NEURODEVELOPMENTAL DISORDER

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Abstract: Neurodevelopmental disorders (NDDs) represent a genetically and clinically heterogeneous group of conditions that impair brain development and function. Elucidating their genetic basis is essential for uncovering molecular mechanisms and establishing genotype–phenotype correlations to improve diagnosis and therapeutic strategies. I this study, we investigated a large consanguineous Tunisian family with a complex clinical phenotype, including neurodevelopmental manifestations such as intellectual disability, epileptic seizures along with sensorineural deafness and systemic metabolic disturbances. The proband, a 19-year-old female, was first hospitalized at the age of 2 years and 9 months due to psychomotor regression. Her clinical presentation included psychomotor regression, refractory epilepsy, dystonia, sensorineural deafness, and 3-methylglutaconic aciduria. Whole-exome sequencing (WES) revealed a rare homozygous variant in the terminal domain of SNIP1, a protein implicated in transcriptional regulation. Segregation analysis confirmed autosomal recessive inheritance in two affected siblings. In silico pathogenicity predictions and cross-species conservation analysis supported the deleterious nature of the variant, aligning with the observed clinical phenotype. Our findings associate SNIP1 dysfunction with a severe neurodevelopmental disorder and highlight the value of integrated computational approaches in elucidating the mechanistic impact of the *SNIP1* missense variant on the observed clinical features.

KEYWORDS: *Neurodevelopmental disorder, SNIP1 gene, whole-exome sequencing, epilepsy, Computational analyses*

ORAL COM N° : 106.

ANTILEISHMANIAL EFFECTS AND IMMUNE RESPONSE OF REPURPOSED LOCAL ANESTHETICS: *IN VITRO* AND *IN VIVO* EVALUATION OF PRILOCAINE AND DIBUCAINE AGAINST CUTANEOUS LEISHMANIASIS

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Abstract: Drug repurposing is a cost and time effective strategy for identifying new treatments for Neglected Tropical Diseases (NTDs) such as leishmaniases. In this context, our group developed a machine learning pipeline to screen FDA-approved drugs for potential anti-*Leishmania* activity. Based on these predictions, we selected ten candidate compounds to be evaluated for their antileishmanial efficacy through *in vitro* and *in vivo* validation.

First, we assessed the molecules' efficacy *in vitro* against both promastigote and intracellular amastigote forms of *Leishmania* parasites. Then, based on structural similarity and selectivity index, two anesthetics Dibucaine and Prilocaine, were selected for *in vivo* validation using Balb/c mice that were subcutaneously infected with *L. major* in the footpad. Two weeks post-infection, mice were daily treated with Dibucaine or Prilocaine for two weeks. Amphotericin B-treated group served as a positive control. Footpad swelling was monitored weekly for six weeks. At the endpoint, parasite burden in footpads and draining lymph nodes was quantified by qPCR. Humoral immune responses were evaluated by measuring the level of specific immunoglobulin G (IgG) antibodies and their isotypes IgG1, and IgG2a using Enzyme linked immunosorbent assay.

In vitro screening identified five active compounds: Dibucaine, Domperidone, Prilocaine, Acebutolol, and Phenylephrine. Interestingly, we highlighted for the first time the anti-leishmanial effectiveness of Prilocaine, Acebutolol, and Phenylephrine on intracellular amastigotes with IC50 values ranging from 22 to 66 µg/mL.

Compared to mock-treated mice, both Prilocaine and Dibucaine significantly reduced footpad swelling *in vivo*. This effect was associated with increased levels of IgG2a antibodies and a higher IgG2a/IgG1 ratio, suggesting a shift toward a protective Th1-type immune response.

These findings validate the potential of our AI-based drug repurposing pipeline, which successfully identified three novel anti-*Leishmania* drug candidates: Prilocaine, Acebutolol, and Phenylephrine. Moreover, *in vivo* studies confirmed the therapeutic efficacy of two FDA-approved anesthetics, Prilocaine and Dibucaine, suggesting their potential use either alone or in combination with existing anti-leishmanial therapies

KEYWORDS: *Leishmaniases, Drug repurposing, Dibucaine, Prilocaine, In vitro effect, In vivo activity, Immune response.*

MICROBIOLOGY AND VIROLOGY

ORAL COM N° : 107.

DOWNREGULATION TOLL-LIKE RECEPTOR GENE EXPRESSION AMONG HEPATITIS B VIRUS-POSITIVE HUMAN PATIENTS

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Abstract

Chronic Hepatitis B virus (HBV) infection, a global health burden affecting over 250 million individuals, often progresses to severe liver disease. Toll-like receptors (*TLRs*), notably *TLR9*, are critical for recognizing viral DNA and driving innate immune responses. To investigate downregulation *TLR* gene expression in HBV-infected patients, elucidating their role in innate immunity. A cohort of 434 HBV-positive patients was analyzed for *TLR* gene expression via real-time PCR. HBV S Genotype D (57.6%) was more prevalent than genotype C (42.4%) (p = 0.001). *TLR1*, *TLR2*, *TLR3*, *TLR4*, *TLR5*, *TLR6*, *TLR7*, *TLR8*, and *TLR9* were significantly downregulated in both genotypes compared to controls, with genotype D showing greater downregulation of *TLR1*, *TLR5*, *TLR6*, and *TLR7* among HBV-positive patients. Human *TLR* gene expression levels are downregulated due to HBV infection, with genotype D predominance suggesting differential immune regulation. These findings underscore the need for targeted HBV therapies informed by genotypic and immunological profiles.

Keywords: *Hepatitis B Virus, Toll-like receptors, gene expression, genotypes, mRNA.*

ORAL COM N° : 108.

PROFIL D'ANTIBIORÉSISTANCE DES CONTAMINANTS BACTÉRIENS ET PATHOGÈNES ISOLÉS DES EAUX USÉES DE BASSINS PISCICOLES DANS LA WILAYA DE BÉCHAR, SUD-OUEST DE L'ALGÉRIE

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Abstract: Cette étude examine les contaminants bactériens et les espèces pathogènes isolés des eaux usées de bassins piscicoles dans la wilaya de Béchar, au sud-ouest de l'Algérie, et évalue leur profil de résistance aux antibiotiques. Un total de 21 échantillons des eaux usées de bassins piscicoles ont été soumis à une analyse microbiologique afin d'isoler les contaminants bactériens par la technique de filtration sur membrane. Après purification, les isolats bactériens ont été caractérisés par des tests biochimiques, puis soumis à des tests de sensibilité selon la méthode de Kirby-Bauer sur gélose MH. Une recherche de résidus d'antibiotiques a également été réalisée à l'aide de la méthode microbiologique par tube.

Nous avons isolé 68 isolats bactériens, classés en six groupes : Non-Entérobactéries (41,18 %), Entérobactéries (38,24%), *Streptococcaceae* (8,82 %), *Pseudomonadaceae* (7,35%), *Erwiniaceae* (2,94%) et *Neisseriaceae* (1,47%). Les espèces isolées comprenaient *Aeromonas hydrophila hydrophila*, *Streptococcus* spp, *Enterobacter* spp, *Serratia* spp, *Escherichia coli*, *Citrobacter* spp, *Klebsiella* spp, *Plesiomonas shigelloides*, *Kluyvera* spp, *Pseudomonas aeruginosa*, *Pantoea* spp, *Chromobacterium violaceum*, *Salmonella choleraesuis* et *Vibrio* spp. Les tests de sensibilité ont révélé des réponses variables selon les souches, avec une résistance accrue aux antibiotiques bêta-lactamines. Les résultats de l'antibiorésistance ont montré que 17 souches (25%) présentaient un indice MAR (*Multiple Antibiotic Resistance*) compris entre 0,28 à 0,68, avec une résistance contre 3 à 6 classes d'antibiotiques. Aucune substance inhibitrice de croissance n'a été détectée dans les échantillons d'eaux usées.

KEYWORDS: *Eaux usées, contaminants bactériens, Multirésistance, Résidus d'antibiotiques, Bassins piscicoles, Béchar (Algérie).*

ORAL COM N° : 109.

IN SILICO TARGETING OF VIRF BY GAMMA-IRRADIATION-MODIFIED FATTY ACIDS: A MOLECULAR INSIGHT INTO ATTENUATED VIRULENCE IN *SHIGELLA SONNEI*

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Abstract: Understanding how external stressors influence bacterial virulence regulators is critical for developing non-antibiotic antimicrobial strategies. In this study, we investigated the effects of gamma irradiation on *Shigella sonnei*, with a particular focus on the in silico interaction between irradiation-modulated fatty acids and VirF, the master transcriptional activator of the *Shigella* virulence system. Gas chromatography revealed that gamma irradiation (0.5 and 1 kGy) significantly altered the fatty acid composition of *S. sonnei* membranes, notably decreasing the unsaturated/saturated FA ratio. Using molecular docking, we evaluated the binding affinities of several fatty acids to the DNA-binding domain of VirF. Linoleic acid and gamma-linolenic acid showed the strongest binding energies and stable interactions, effectively blocking the active site involved in virulence gene activation. These in silico findings suggest that specific endogenous fatty acids, enhanced or generated under irradiation stress, may serve as natural inhibitors of bacterial virulence. Experimental data—such as plasmid destabilization, decreased expression of extracellular virulence proteins, and impaired invasion capacity—further support the proposed mechanism. Our work positions fatty acid–VirF interaction modeling as a novel approach to understanding and potentially controlling bacterial virulence via structure-based anti-virulence strategies.

Keywords: *Shigella sonnei; gamma irradiation; VirF; in silico docking; fatty acids; anti-virulence; molecular modeling; stress adaptation*

ORAL COM N° : 110.

ENHANCED ANTIMICROBIAL POTENTIAL OF *ARTEMISIA VULGARIS* OVER *LAURUS NOBILIS* AGAINST GASTROINTESTINAL PATHOGENS: A COMPARATIVE STUDY

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Abstract

Gastroenteritis, caused by a wide range of bacteria, viruses, and fungi, remains a major public health concern, often linked to foodborne pathogens and increasing microbial resistance to conventional antibiotics. This comparative study focused on the chemical composition and antimicrobial activity of *Artemisia vulgaris* and *Laurus nobilis* extracts. Extracts obtained using ethyl acetate were tested against various pathogenic bacterial and fungal strains. The results showed that *Artemisia vulgaris* contains higher levels of bioactive phenolic and flavonoid compounds which contribute to its stronger antimicrobial activity. Indeed, its extracts exhibited larger inhibition zones and lower minimum inhibitory concentrations (MICs), particularly against *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, and *Candida albicans*. In contrast, *Laurus nobilis* extracts showed more limited efficacy, especially against Gram-negative bacteria and yeasts. Therefore, *Artemisia vulgaris* stands out for its broader spectrum and superior antimicrobial potential, making it a promising candidate for applications in the food and pharmaceutical industries, especially in the prevention and control of gastroenteritis-related pathogens.

***Key words*:** *Artemisia vulgaris*; *Laurus nobilis*; antimicrobial activity; phytochemicals; foodborne pathogens; gastroenteritis; medicinal plants; ethyl acetate extract.

PHARMACOLOGY AND TOXICOLOGY

ORAL COM N° : 111.

CROSS-SECTIONAL STUDY OF ADDICTION TO PSYCHOACTIVE SUBSTANCES AT THE CHLEF DRUG ADDICTION CENTER (ALGERIA)

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Abstract:

Addictive behaviors constitute a major challenge for our society, both from a medical and social point of view, which must be addressed and taken seriously. Our present work aimed to provide an updated view of the socio-demographic and toxicological characteristics of psychoactive substances (PAS) users. A cross-sectional epidemiological survey with a descriptive and analytical was conducted at the drug addiction center of Chlef on a sample of 140. The data from this study showed that the number of patients increased during the years 10 % in 2016, 12.9% in 2017, 30% in 2018, 16.4% in 2019 and 2020, and 14.3% in 2021 with predominance of male sex (97.9%). The majority of users were single (72.9%) and workers (48.6%). Besides, the age of beginning of consumption was between 15 and 20 years (26.4%) with a frequency of regular consumption of 53.6%. Cannabis was the most common illicit substance (80.7%), followed in descending order by cocaine (16.4%), ecstasy (12.1%) and finally heroin (0.7%). In terms of licit substances, psychotropic drugs (62.9%) were in the lead, followed by tobacco (42.9%) and alcohol (40.1%). This work made it possible to highlight certain parameters related to addiction as well as the impact of the psychoactive substance on the patient in Chlef province.

Key words: Addiction, psychoactive substances, addict, Chlef.

ORAL COM N° : 112.

STUDY OF THE THERAPEUTIC CAPACITY OF GREEN MANGANESE FERRITE NANOPARTICLES DOPED WITH COBALT ($CO_{0.5}MN_{0.5}FE_2O_4$) ON REPRODUCTIVE FUNCTION IN MALE WISTAR RATS

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Abstract: The aim of this study was to assess the therapeutic potential of green manganese nanoparticles (NPs) doped with cobalt $Co_{0.5}Mn_{0.5}Fe_2O_4$ on reproductive function in male Wistar rats. In this work, we adopted a subchronic treatment (20 days) of $Co_{0.5}Mn_{0.5}Fe_2O_4$ NPs at a dose of 10 mg/kg BW (i.p) followed by ethanol (EtOH) administration to simulate toxicity and approve the state of oxidative stress. Our results indicate that cobalt-doped manganese green NPs exhibit protective activity against the adverse effects of EtOH, resulting a significant ($p<0.0001$) improvement in sperm viability and motility and a restoration of oxidative status (MDA and SOD) compared with EtOH-induced alteration. These results were confirmed by histopathological examination, which showed normal or even excessive spermatogenesis in the seminiferous tubules of co-treated animals compared with controls. In addition, we observed an increase in prostatic and seminal vesicle secretion, suggesting that these NPs could play a beneficial role in the development of the male reproductive system.

KEYWORDS: *green nanoparticles, reproductive function, male, oxidative stress.*

ORAL COM N° : 113.

ASSESSMENT OF THE PHYTOCHEMICAL COMPOSITION, ANTIMICROBIAL ACTIVITY EFFECTS OF TUNISIAN HALOPHYTE EXTRACTS AND THEIR CAPACITY TO EXTEND THE SHELF LIFE OF RAW MINCED BEEF

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Abstract : In this study, the phytochemical composition of Tunisian halophyte extracts and their antimicrobial properties were evaluated. The extracts were tested against a panel of foodborne pathogens and spoilage bacteria to evaluate the antimicrobial properties of the plant. In addition, the study investigated the potential use of *L. maritima* extract, as a source of natural antioxidants, to preserve meat quality. The results showed that the aqueous extracts (AE) had the highest content of total phenolics (325.15 mg GAE/g) and total flavonoids (87.44 mg QE/g). The LC-MS analysis revealed that flavonoids and phenolic acids were the predominant phenolic group in AE. Furthermore, *L. maritima* AE showed high antimicrobial activity against a panel of foodborne pathogenic bacteria. In the second part of the study, the addition of *L. maritima* extract to minced beef was shown to have a significant effect on its microbiological, physicochemical and sensory properties and on lipid oxidation stability during storage. In conclusion, AE extract could be an important source of phenolic components with antioxidant and antibacterial activity, which can protect and enhance the quality of meat products.

KEYWORDS: *Tunisian halophyte, phenolic composition, shelf life extension.*

ORAL COM N° : 114.

CHEMICAL AND MICROBIOLOGICAL PROPERTIES OF PLANT PSYCHOTROPIC DRUGS

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Abstract

Plant-based drugs can be composed of plant parts or entire plants, such as marijuana (flowering tops of Indian hemp), coca (leaves of the coca plant), hallucinogenic mushrooms (entire fungi), or result from coarsely prepared plant products such as hashish (hemp resin) and opium (poppy latex).

The psychoactive effects of these plants are caused by chemical substances they contain. These include alkaloids that can be extracted and purified from the plants, yielding highly active drugs at very low doses such as cocaine, morphine, mescaline, etc. They can also be chemically transformed into semi-synthetic products, such as heroin, which are even more potent than their natural precursors.

These legal substances have been diverted from their intended uses, similarly to many psychotropic medications and various organic solvents. Although narcotics can act as analgesics and euphorics, excessive and prolonged use leads to tolerance and dependence, which may have serious health consequences.

Our study focused on the identification of three plant-derived narcotic substances—cocaine, cannabis resin, and heroin—through chemical, chromatographic, and spectrometric analyses, as well as the detection and identification of potential microbial contaminants.

Keywords: Plants, drugs, analysis, health effects.

ORAL COM N° : 115.

UNLOCKING BIOMOLECULES FROM ANIMAL VENOM FOR TREATING PARKINSON'S DISEASE

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Parkinson's disease represents a growing global health concern due to their progressive course and the current lack of curative therapies. Animal venoms have recently emerged as a rich source of highly selective bioactive molecules capable of interacting with neuronal membrane targets, including ion channels, ;key players in neuroprotection and cell signaling. This presentation explores the therapeutic promise of venom-derived compounds, emphasizing their potential to modulate neuroinflammatory responses, protect neuronal integrity, and alter disease progression in neurodegenerative contexts. Purified venom biomolecules were investigated for their binding specificity to voltage-gated potassium channels and integrins. A combination of in vitro and in vivo experimental models of Parkinson's disease was employed to assess the effects of these molecules on synaptic function, oxidative stress, and inflammatory cascades. The tested venom-derived compounds exhibited high affinity for neuronal targets, successfully modulating neuroinflammatory processes and promoting neuroprotection. In Parkinson's disease models, these agents enhanced synaptic stability, reduced oxidative stress levels, and attenuated neuroinflammation, supporting their relevance as novel therapeutic candidates. These findings highlight the translational potential of animal venom-based molecules in the treatment of neurodegenerative diseases. Their mechanism-driven specificity, particularly via modulation of potassium channels pathways, addresses core pathological processes in diseases like Parkinson's. However, significant hurdles remain in translating these compounds to clinical use, including safety profiling, optimized delivery methods, and large-scale production. Nonetheless, venom-derived therapeutics offer a promising frontier in the search for innovative, mechanism-based interventions in neurology.

Keywords: Neurodegeneration, venom-derived molecules, ion channels, Parkinson's disease,

ORAL COM N° : 116.

EXTRA VIRGIN OLIVE OIL MITIGATES HEMATOTOXICITY, OXIDATIVE STRESS AND LIVER DNA DAMAGE INDUCED BY GLYCIDAMIDE IN ADULT RATS

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Abstract: Glycidamide (GLY) is a dietary contaminant derived from a wide range of foods through the Maillard-reaction during the cooking process. The present study focused on the hematotoxic effects of GLY and the protective efficacy of Extra Virgin olive oil (EVOO) in alleviating hematotoxicity, liver DNA damage and oxidative stress in erythrocytes of adult rats.

Rats were divided into four groups of six each: group 1, serving as negative controls, received distilled water; group 2 received by gavage GLY at a dose of 40 mg/ kg body weight; group 3 received by gavage GLY supplemented with EVOO (300 µL); group 4,serving as positive controls, received only EVOO by gavage. All groups were sacrificed after three weeks.

Glycidamide induced a significant increase in white blood cells (WBC), erythrocyte osmotic fragility (OF) and a decrease in red blood cells (RBC), hemoglobin (Hb) and hematocrit (Ht). While mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and MCH concentration (MCHC) remained unchanged. Furthermore, exposure of rats to ACR induced erythrocytes oxidative stress with an increase of malondialdehyde, hydrogen peroxide, and protein carbonyls levels. A reduction in antioxidant status, enzymatic (catalase, glutathione peroxidase and superoxide dismutase) and non enzymatic (reduced glutathione, non protein thiols and vitamin C) was observed when compared to controls. EVOO supplementation alleviated significantly hematotoxicity induced by glycidamide as evidenced by restoring the biochemical markers cited above to near normal values. Liver DNA damage confirmed also the biochemical parameters and the beneficial role of EVOO.

Our results revealed that extra virgin olive oil, a main component of olive Mediterranean diet, was effective in preventing erythrocytes damage and oxidative stress.

Keywords: *Glycidamide, rats, erythrocytes, antioxidant status, extra virgin olive oil*

ORAL COM N° : 117.

NEUROPROTECTIVE POTENTIAL OF QUERCETIN AGAINST STYRENE OXIDE-INDUCED CYTOTOXICITY VIA MODULATION OF OXIDATIVE STRESS AND APOPTOSIS

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Abstract: The present study aimed to explore *in vitro* the mechanisms of SO cytotoxicity (0.5-4mM) in primary cortical neurons and to evaluate the neuroprotective potential of quercetin (Q). Our results showed that exposure to SO decreased viability of cortical neurons in a concentration-dependent manner. In the presence of Q, cell viability was increased significantly ($p<0.001$). The neuroprotective effects of Q were associated with the reduction of intracellular reactive oxygen species, the decrease in calcium overload and the restoration of mitochondrial membrane depolarization caused by SO. Additionally, to evaluate neuronal death mechanisms triggered by SO, cells were incubated with Ac-DEVD-CHO, Calpeptin and Necrostatin-1, pharmacological inhibitors of caspase-3, calpains and necroptosis respectively. The data showed that the three inhibitors reduced cell death induced by SO and suggested the implication of apoptotic, necrotic and necroptotic pathways. Taken together, these data indicated that the cytotoxicity of SO was mediated by oxidative stress and apoptosis, necrosis and necroptosis mechanisms, while the neuroprotection provided by Q against SO depended mainly on its anti-apoptotic activity.

KEYWORDS: quercetin, oxidative stress, apoptosis, necroptosis.

ORAL COM N° : 118.

MECHANISMS AND THERAPEUTIC POTENTIAL OF SEA ANEMONE-DERIVED BIOMOLECULES TARGETING POTASSIUM CHANNELS IN PARKINSON'S DISEASE

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Abstract: Parkinson's disease (PD) is a neurodegenerative disorder characterized by the formation of Lewy bodies particularly in the substantia nigra. This pathological hallmark disrupts normal neuronal function and recent studies suggest that potassium (K^+) channels play a critical role in the disease's pathophysiology and progression. This study investigates the therapeutic potential of ShK-192, a sea anemone-derived peptide *Stichodactyla helianthus*, in modulating K^+ channels to slow PD progression. Molecular docking revealed interactions between Shk-192 and kv1.3 channels. In vitro studies demonstrated inhibition of α-synuclein aggregation in N2a cells using the LIPA system, with similar inhibitory effects observed in iDA cells derived from iPSCs. Western blot analysis of C8D1A and α-synuclein+U2OS cell cultures showed signs of reduced neuroinflammation and effective Kv1.3 modulation, respectively. These findings highlight the effect of Shk-192 on modulating K^+ channel activity, improving neuronal survival and reduced PD-related pathology. This study aims to provide insights into ion channel-targeted therapies and contribute to novel pharmacological strategies for PD.

KEYWORDS: *Parkinson's disease, potassium channels, sea anemone biomolecules, ShK-192, native ShK, neuroinflammation.*

ORAL COM N° : 119.

NEUROPROTECTIVE EFFECTS OF CURCUMINOIDS ON AGE-RELATED BRAIN DECLINE: INSIGHTS FOR PARKINSON'S DISEASE PREVENTION

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Abstract: Brain aging is a complex biological process marked by progressive molecular and cellular changes that compromise neural function. Key features include mitochondrial dysfunction, oxidative stress, loss of protein homeostasis, and neuroinflammation factors that also contribute to the development of Parkinson's disease (PD). Age-related vulnerability of dopaminergic neurons creates a permissive environment for PD pathology, exacerbating processes such as neuroinflammation and α-synuclein aggregation. Therefore, slowing brain aging may serve as a preventive strategy against neurodegenerative diseases like PD. This study investigates the neuroprotective potential of curcuminoids natural polyphenolic compounds from turmeric known for their antioxidant and anti-inflammatory properties on brain aging as a modifiable risk factor for PD. Using a model of physiological aging in rats habituated for over 18 months, we assessed a multidisciplinary approach combines in vivo evaluations, in silico modeling and molecular analyses: behavioral assessments analysis showed curcuminoid treatment normalized behavior and reduced anxiety-like symptoms. In silico docking demonstrated meaningful interactions of curcuminoids with P2X7, RAGE, and TNFR1 receptors involved in brain aging and Parkinson's disease. Toxicity tests showed no signs of toxicity overall. ELISA results demonstrated an immunomodulatory effect. Western blot analysis suggests a modulatory effect on neuroinflammation and a potential modulation of oxidative stress. these findings highlight curcuminoids as promising neuroprotective agents that may mitigate brain aging processes and reduce the risk or progression of Parkinson's disease.

KEYWORDS Curcuminoids, brain aging, Parkinson's disease, neuroprotection, anti-inflammatory, immunomodulation.

ORAL COM N° : 120.

PHARMACOLOGICAL POTENTIAL OF TUNISIAN *EUCALYPTUS* ESSENTIAL OILS (*E. MAIDENII* AND *E. CAMALDULENSIS*): CHEMICAL PROFILE AND MULTIFACETED BIOLOGICAL ACTIVITIES STUDY

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Abstract

This study is part of the growing interest in aromatic medicinal plants and their secondary metabolites in recent years. The aim of this research is to explore the benefits of the essential oils of two Tunisian *Eucalyptus* species, highlighting their unique chemical profiles and biological activities (antioxidant, antibacterial, and anti-inflammatory).

In fact, the essential oils were extracted by hydrodistillation (Clevenger) and identified by GC/MS. Antioxidant activity was evaluated using the DPPH and FRAP tests. Antibacterial activity was tested using the disk-agar diffusion method and by determining the MIC and MBC against both Gram-positive and Gram-negative bacterial strains. Anti-inflammatory activity was assessed using a colorimetric method with the Griess reagent to measure nitric oxide (NO) release from RAW 264.7 murine macrophage cells stimulated by lipopolysaccharide (LPS).

Results showed that *E. maidenii* essential oil had a much higher yield (6.16 ± 1.55%) compared to *E. camaldulensis* (0.77 ± 0.22%). Despite the lower oil yield, *E. camaldulensis* exhibited strong biological activity, particularly in its anti-inflammatory (PI= 81% at 25µg/ml) and antibacterial properties. The oil demonstrated significant antibacterial effects against *Serratia marcescens* (Gram-negative), with an inhibition zone of 25.33 ± 2.84 mm and a MIC of 0.93 mg/mL. The major compound in *E. camaldulensis* essential oil was the oxygenated sesquiterpene spathulenol (32.89 ± 2.9%). This indicates that the biological activity of *E. camaldulensis* essential oil is not solely attributed to the presence of 1,8-cineole but may also be linked to the oxygenated sesquiterpenes, especially spathulenol. These findings highlight the potential of *E. camaldulensis* essential oil as a natural antimicrobial agent, offering promising prospects for future therapeutic applications.

In light of these results, the essential oils extracted from *Eucalyptus* leaves can be used in various applications, such as in the pharmaceutical and food industries, as natural additives.

Keywords: *Eucalyptus* leaves, essential oils, 1.8- cineole, spathulenol, antioxidant activities, antibacterial activities, cytotoxicity, anti-inflammatory activity.

ORAL COM N° : 121.

EXPLORATION OF THE PREVENTIVE POTENTIAL OF GREEN COPPER FERRITE NANOPARTICLES $CUFE_2O_4$ AGAINST ETHANOL-INDUCED HEPATORENAL DAMAGE

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Abstract: Our work aims to evaluate the protective and preventive potential of green copper ferrite nanoparticles (NPs) $CuFe_2O_4$ against ethanol (EtOH)-induced hepatorenal damage. Green NPs were synthesized using a hydrothermal method combined with a bioligand (*Ficus carica*). Their characterization revealed a homogeneous cubic crystallographic structure with an average size of between 20 and 30 nm. Our sub-chronic treatment (20 days) with green NPs at 5 and 10 mg/kg BW (i.p) showed a slight deregulation ($p>0.05$) of hepatic and renal biomarkers (ASAT, ALAT, LDH, urea and creatinine) as well as oxidative stress indicators (MDA and SOD). On the other hand, the high dose of NPs (10 mg/kg) induced more pronounced damage, leading to the development of an oxidative stress state. However, preventive co-treatment with $CuFe_2O_4$ green NPs provided protection against EtOH-induced hepatorenal damage, particularly for the low dose (5 mg/kg), by normalizing hepatorenal biomarkers, boosting antioxidant status and, on a histopathological scale, reducing congestion of the central veins of the hepatic lobules and restoring the toxic-induced atrophy of the renal tubules.

KEYWORDS: *green nanoparticles, copper ferrites, ethanol, hepatorenal, oxidative stress.*

ORAL COM N° : 122.

FROM CELL LINES TO IDAS: KV1.3 INHIBITION REDUCES A-SYNUCLEIN AGGREGATES IN PD.

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Abstract: Parkinson's Disease (PD) is a widespread neurodegenerative disorder affecting over 10 million individuals worldwide, leading to significant disability. Current treatments alleviate symptoms but do not address disease progression or target underlying mechanisms like protein misfolding. Indeed, a hallmark of PD is the accumulation of α-synuclein (α-syn) aggregates and Lewy bodies, which contribute to neuronal dysfunction and degeneration, highlighting α-syn as a key therapeutic target. Building on evidence suggesting the toxic nature of extracellular α-syn aggregates binding to cell surface receptors, this study explores the role of ion channels, specifically the potassium channel Kv1.3, in the formation of pathological α-syn aggregates. Kv1.3 is upregulated in experimental PD models and post-mortem PD brain tissue, making it a promising therapeutic target. We investigated the impact of selective Kv1.3 blockers, the chemical compound PAP-1, on α-syn aggregation. Utilizing a novel PD cell model with lightinduced α-syn aggregation, we demonstrated, via confocal microscopy, that these compounds significantly reduced α-syn aggregates in both neuron-like N2A cells and induced pluripotent stem cell (iPSC)-derived dopaminergic neurons (iDA). Although additional studies are needed to confirm these results, our findings highlight Kv1.3 blockade as a potential strategy for targeting α-syn aggregation in PD. This approach may pave the way for novel therapies that address the underlying pathology of PD and improve patient outcomes.

KEYWORDS: *Parkinson's Disease, α-synuclein, protein aggregation, ion channels, iPSC-Derived Dopaminergic Neurons.*

ORAL COM N° : 123.

FROM TOXICITY TO THERAPY: HOW PUMPKIN JUICE FIGHTS MERCURY- INDUCED BRAIN DAMAGE

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Abstract : Mercury (Hg) is a well-known neurotoxic heavy metal linked to cognitive and behavioral impairments, including potential associations with autism spectrum disorders (ASD). Epidemiological studies suggest that prenatal and early-life exposure to mercury increases ASD risk, with affected children showing higher mercury levels in brain tissue, blood, and hair compared to neurotypical peers. Given the limited treatment options for mercury toxicity, this study investigated whether Cucurbita pepo (pumpkin), known for its antioxidant properties, could mitigate mercury-induced neurobehavioral and biochemical damage in mice. The experiment involved 21 male mice divided into three groups: a control group (drinking water only), a mercury-exposed group ($HgCl_2$, 1 mg/kg/day via intraperitoneal injection), and a mercury-exposed group treated with pumpkin juice (diluted 1:2 in drinking water). Over 30 days, behavioral tests (forced swim test, locomotor activity, Morris water maze) and biochemical analyses (liver enzymes AST/ALT, urea, creatinine) were conducted. Results showed that mercury exposure induced behavioral disorders, reduced immobility time (indicating depressive-like behavior), and elevated liver enzymes (ALT) and urea levels, confirming hepatotoxicity and mild kidney dysfunction. Pumpkin juice treatment significantly reversed these effects, normalizing locomotor activity, reducing oxidative stress markers, and restoring liver enzyme levels. The Morris water maze test revealed no major memory deficits, suggesting mercury's primary impact was on behavior rather than spatial learning in this model. The protective effects of pumpkin are likely attributed to its high β-carotene, amino acids (arginine, glutamate), and antioxidant compounds, which counteract mercury-induced oxidative damage and enhance detoxification. These findings align with clinical observations linking mercury to ASD and support the potential of dietary interventions (e.g., pumpkin extract) in reducing neurodevelopmental risks from heavy metal exposure. However, further research is needed to validate these effects in humans, particularly in vulnerable populations such as pregnant women and children. This study highlights the importance of nutritional strategies in mitigating environmental toxicant-related disorders, including autism.

***Key words** : Mercury toxicity, mitigating effect, autism, Pumpkin*

POSTER COMMUNICATIONS

BIOCHEMISTRY AND MOLECULAR BIOLOGY

POSTER N° : 1.

DICHLOROACETATE ENHANCES CHEMO-SENSITIVITY IN BREAST CANCER BY MODULATING ABCG2 AND NKG2DL

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Abstract: The protein JUND is a member of the AP-1 (activator protein-1) transcription factor family, which regulates gene expression in response to a variety of cellular stimuli. It plays a significant role in cell proliferation, differentiation, and apoptosis. Thus dysregulation of JUND expression is associated with many cancer specifically hematological cancer. In the context of leukemia, particularly acute myeloid leukemia (AML), JUND overexpression has been implicated in disease's progression and proliferation. However, JUND can also act as a tumor suppressor in some cancer cases making its role unclear. Given its dual role, therapies targeting JUND must be approached carefully, as its regulation may vary depending on the type of leukemia and the molecular environment within the cells.
In our study we evaluate the potential role of Dichloroacetate (DCA), which known by its ability to shift cancer cell metabolism and induces apoptosis in cancer cells, on the JUND expression. Our result shown that DCA can induce cell apoptosis by decreasing JUND expression.

KEYWORDS: protein JUND, Leukemia, Overexpression, Dichloroacetate, apoptosis

POSTER N° : 2.

STRUCTURE AND BIOLOGICAL ACTIVITIES OF POLYSACCHARIDE PURIFIED FROM SENEGRAIN SEED

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Abstract:
A polysaccharide named Senegrain Water-Soluble Polysaccharide (SWSP) was extracted and purified from Senegrain seeds. The physicochemical properties of SWSP were evaluated by Thin-layer chromatography (TLC), High Performance Liquid Chromatography (HPLC), Scanning Electron Microscopy (SEM), and Differential Scanning Colorimeter (DSC). TLC results showed that SWSP is a gluconic acid polymer. It had a network with a large number of cavities. This polysaccharide with a semi-crystalline structure has an average molecular weight of 47.42 kDa. On other trend, obtained data exhibited potent antidiabetic and antibacterial activities of SWSP. Additionally, the antioxidant activities of SWSP were studied in vitro, and demonstrated that this polymer displayed an interesting ABTS radical scavenging activity as well as a protective effect on the hydroxyl radical-induced DNA damage. The effects of SWSP on oxidative processes in minced raw beef during refrigerated (4 °C) storage were investigated. The results proved that SWSP decreased the TBARS value and inhibited the MetMb accumulation during the period of refrigeration storage. Overall, the finding demonstrated the potential applications of SWSP in food industries

KEYWORDS: Senegrain seed, Physicochemical, Structure, Antidiabetic activity, Antibacterial activity, Antioxidant activity

POSTER N° : 3.

INTERPRETING THE FORMATION MECHANISM OF A BIOACTIVE HETEROCYCLE USING ELECTRON INTERACTION THEORY

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Abstract: Heterocyclic compounds play a crucial role across numerous fields due to their presence in both simple and highly complex molecular frameworks. They form the structural core of a wide range of natural products, including vitamins, alkaloids, macrocycles, and flavonoids. Moreover, heterocycles are ubiquitous in synthetic biologically active molecules such as pharmaceuticals and agrochemicals. Their ability to engage in diverse non-covalent interactions with biological targets makes them especially significant in drug design—indeed, over 90% of newly approved drugs feature at least one heterocyclic moiety. As such, heterocyclic chemistry continues to be at the forefront of the interface between chemistry and biology, where major scientific advancements and applications are taking place. In this context, the intramolecular [3+2] cycloaddition (IMDC) reaction involving a nitrone–alkene system, derived from m-allyloxybenzaldehyde, was investigated using density functional theory (DFT) at the B3LYP/6-31G(d) level. The calculated energy profiles suggest a clear kinetic preference for the formation of the fused-endo product, consistent with experimental observations. Solvent effects appear to have minimal influence on the reaction pathway or selectivity, although they do slightly increase the activation energy and reduce the overall exothermicity of the process. Electron Localization Function (ELF) analysis of the preferred fused-endo pathway reveals that bond formation (C–O and C–C) occurs via a synchronous but non-concerted one-step mechanism. Additionally, Non-Covalent Interaction (NCI) and Quantum Theory of Atoms in Molecules (QTAIM) analyses of the transition state structure highlight a stabilizing hydrogen bond that likely drives the selectivity toward the fused-endo product.

KEYWORDS: *MEDT, NCI, Reactivity, Molecular mechanism, Selectivity*

POSTER N° : 4.

EFFECTS OF PASTEURIZATION AND THERMOSONICATION ON THE PHYSICOCHEMICAL AND ANTIOXIDANT PROPERTIES OF ORANGE JUICE

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Abstract

Preserving nutritional quality while ensuring microbial safety remains a major challenge in the beverage industry. This study compares the effects of traditional thermal pasteurization and thermosonication treatments on the physicochemical properties, antioxidant activity, and retention of bioactive compounds in orange juice. Samples were treated using three thermal pasteurization protocols (90 °C for 1 minute, 80 °C for 5 minutes, 70 °C for 15 minutes) and various thermosonication treatments (30 °C, 45 °C, and 60 °C for 15, 23, and 30 minutes).

Key quality indicators, including pH, titratable acidity, total phenolic content, flavonoids, carotenoids, and antioxidant activities (DPPH, FRAP, ABTS), were analyzed. The results demonstrated that thermosonication, particularly at 45 °C for 30 minutes, significantly enhanced the levels of phenolic compounds (up to 38.07 mg GAE/100 mL), flavonoids (180.13 mg QE/100 mL), carotenoids (9.00 mg/100 mL), and antioxidant activities (FRAP: 620.67 µmol Fe^{2+}/L; DPPH: 88.23%) compared to untreated and thermally pasteurized samples. In contrast, thermal pasteurization, while effective for microbial reduction, caused significant degradation of bioactive compounds. Specifically, phenolic content decreased to 18.82 mg GAE/100 mL, accompanied by a reduction in antioxidant activity in the samples treated at 90 °C for 1 minute.

Keywords: thermosonication, pasteurization, orange juice, bioactive compounds, antioxidant activity

POSTER N° : 5.

ASSESSMENT OF LUNG BIOPSIES FOR MOLECULAR EGFR TESTING: INSIGHTS FROM THE INSTITUT PASTEUR DE TUNIS

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Lung adenocarcinoma is the most prevalent cancer in the world. In Tunisia, this cancer represents a major public health problem with 3,108 cases in 2022 (WHO, 2022). Screening for EGFR mutation status is essential before starting any treatment with targeted therapies for patients with metastatic pulmonary ADK. However, a significant number of patients do not benefit from these therapies due to sampling issues. To this end, we conducted a study of 133 cases of pulmonary ADK to screen for EGFR mutations.

Our results show 35% of cases were mutated, 55% were wild-type, and 10% of cases were inconclusive. The causes determining test failure were the small size of the sample in 9% of cases. To overcome these failures, we recommend planning genetic tests (EGFR test) from the initial diagnosis before exhausting the FFPE sample for immunohistochemistry (IHC). This guarantees the availability of tumor material necessary for relevant molecular analysis, which is particularly critical in the case of small biopsies.

POSTER N° : 6.

PHYSIO-BIOCHEMICAL RESPONSES TO EXOGENOUS SELENIUM APPLICATION OF TOMATOES (*SOLANUM LYCOPERSICUM* L.) CULTIVATED IN THE FIEL UNDER SALINE IRRIGATION

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Abstract: Abstract Climate change has become one of the most complex challenges actually because of its impact on agrosystems (aggravated drought, salinity, etc.) and its subsequent risks on the global food security. Salinity stress (both soil salinity or saline irrigation water) is a significant threat to food security and agrosystems resilience. Selenium (Se) has been reported to mitigate abiotic stress effects, such as salinity, on various plant species. The purpose of the current study was to investigate **the** impact of an exogenous supply of Se on the alleviation of salinity stress in tomato plants cultivated in the field. For this purpose, a field experiment was conducted on the Firenze cultivar cultivated in the agricultural plot of the Regional Centre for Agricultural Research (CRRA), Sidi Bouzid, Tunisia (9°430 E, 35° 010 N). Plant irrigation was made using underground water with adjusted salinity for moderate stress (MS, 50 mM NaCl) and severe stress (SS, 100 mM NaCl). Two levels of Se were applied to sprayed plants (0.5 mM, Se0.5 and 1 mM, Se1 in the form of Na2SO4), in addition to the non-sprayed plants (Se0). Plant growth, photosynthetic pigments, photosynthesis and gas exchange, osmotic and water potentials, relative osmolyte content (ROC) and ionic compartmentation were deeply analysed, and their interrelationships were established.

Obtained results demonstrated the beneficial effect of exogenous Se application on alleviating salinity stress in tomato plants. Spraying plants with Se significantly increased photosynthetic pigment (particularly chlorophyll a, chl-a, and carotenoids, car), potassium (K), and relative osmolyte content (ROC) in shoots, improved photosynthesis (Pn), and increased osmotic potential (Ψo, negatively), allowing the maintenance of adequate shoot hydration. The increased K/Na ratio in shoots following Se application plays a key role in the overall plant metabolism under salinity by promoting K-dependent functions (stomates opening, etc.) and decreasing Na-dependent toxicity. The established correlations demonstrated the interdependence of plant growth and photosynthesis on shoot K, Na, ROC, K/Na ratio, and chl-a

KEYWORDS: *gas exchange, osmotic potential, saline irrigation, selenium, Solanum lycopersicum L., water potential*

POSTER N° : 7.

OXIDATIVE AND INFLAMMATORY STATUS IN CHRONIC RENAL FAILURE AND TYPE 2 DIABETES MELLITUS

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Abstract:
Chronic renal failure (CRF) is a major health problem in Tunisia and worldwide, with increasing prevalence, especially among diabetic patients. Diabetic nephropathy, as a complication of diabetes, is one of the main causes of CRF, which can progress to a terminal stage requiring haemodialysis or even a kidney transplant.
Beyond the accumulation of uremic toxins, chronic renal failure is accompanied by numerous metabolic disturbances, often early, such as oxidative stress, which is a key factor in the progression of this disease.
The main aim of our study is to estimate the effect of chronic renal failure and type 2 diabetes on the lipid profile as well as on the oxidative and inflammatory status. Patients were divided into 3 groups, those who suffer from CKD, type 2 diabetes and both pathologies together. All patient groups were compared to a group of control subjects-age and sex matched.
We found that, compared to healthy subjects, there is a severe dyslipidaemia, persistent inflammation, as assessed by high CRP levels, and a decrease in antioxidant defence in patients with renal failure as well as in those with IRD and type 2 diabetes. Indeed, we found a negative correlation between superoxide dismutase (SOD) activity and the concentration of sd-LDL (small-dense LDL) in patients with IRD, suggesting a deficiency in SOD activity in an atherogenic profile.

KEYWORDS: *CRF, oxidative stress, inflammation, type-2 diabetes, dyslipidemia, C-RP, SOD*

POSTER N° : 8.

CYNARA CARDUNCULUS AS A POTENTIAL SOURCE OF MILK COAGULATING PROTEASE

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Abstract: Plant-based coagulants like *Cynara cardunculus* offer a sustainable alternative to animal rennet, reducing the carbon footprint of dairy industries and supporting ethical food production. *Cynara cardunculus*, traditionally used in Mediterranean artisanal cheeses, provides a regionally adaptable and culturally relevant solution for sustainable dairy processing. The purpose of the present study was firstly to evaluate the potential use of *Cynara cardunculus* flowers as a new source of milk-clotting proteases by studying the effect of pH extraction on physico-chemical properties and enzymatic activities of crude extracts. The most reliable, quick and efficient buffer was found to be phosphate one (pH=6.5) with a 6 hours maceration time which was used throughout this study. *Cynara cardunculus* extract (CE) was found to have higher clotting and proteolytic activities. The enzyme extracted was found to be very stable against a wide range of pH values as well as of temperature. Secondly, to monitor gel formation and to compare gelation properties of curd produced by these coagulants, using dynamic rheology and turbiscan instrument. A comparison was made with skimmed, whole and enriched cow's milk with milk powder to reveal interactions and to better understand what happens when such a coagulant is used in cheese making process The evolution of both elastic (G′) and viscous (G″) moduli was monitored with time. Gels from whole milk enriched with milk powder exhibited higher elastic (G′) and viscous (G″) moduli compared to other milk types. Coagulum stability was evaluated using turbiscan. Textural properties and the curd firming rate of coagulum were also determined. In conclusion, CE prepared could be an efficient milk-clotting agent in the production of dairy products.

KEYWORDS: *Cynara cardunculus, extraction, coagulant, milk clotting, dairy products*

POSTER N° : 9.

BIOCHEMICAL AND MOLECULAR DIAGNOSIS OF GAUCHER DISEASE IN A TUNISIAN FAMILY: GENOTYPE–PHENOTYPE CORRELATIONS

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Abstract:
Gaucher disease (GD) is a common autosomal recessive lysosomal storage disorder caused by mutations in the GBA1 gene, leading to glucocerebrosidase deficiency and lipid accumulation in macrophages. It is characterized by wide clinical heterogeneity, the mechanisms of which remain incompletely understood. We report a diagnostic approach for Gaucher disease in a family from the Sahel region of Tunisia, combining biochemical screening and molecular analysis. The study focused on a 50-year-old index patient and his two children. Biochemical testing revealed a marked deficiency in glucocerebrosidase enzyme activity in the index patient, consistent with Gaucher disease. Molecular analysis targeted two common GBA1 mutations: p.Asn370Ser (N370S) and p.Leu444Pro (L444P). The index patient was found to be homozygous for the N370S mutation, while both children were identified as heterozygous carriers. Notably, the 55 bp deletion at nucleotide 1263 was absent in all three individuals. These findings were confirmed by direct Sanger sequencing.Homozygosity for the N370S mutation is generally associated with non-neuronopathic type 1 Gaucher disease, characterized by a milder clinical phenotype and absence of neurological involvement findings that are consistent with the clinical profile of the index case. This case highlights the relevance of combined biochemical and genetic approaches for early diagnosis and tailored clinical management. Our findings contribute to the growing understanding of genotype–phenotype correlations and support the development of more personalized therapeutic strategies

Keywords: *Gaucher disease, genotype diagnosis, mutation, biochemical diagnosis , Tunisian population*

POSTER N° : 10.

IDENTIFICATION AND FUNCTIONAL ANALYSIS OF DELETERIOUS NON-SYNONYMOUS SNPS IN THE HUMAN SLC22A1 GENE ASSOCIATED WITH IMATINIB RESPONSE IN CHRONIC MYELOID LEUKEMIA

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Abstract
Non-synonymous single nucleotide polymorphisms (nsSNPs) in the *SLC22A1* gene, which encodes the hOCT1 transporter, may influence imatinib uptake and contribute to treatment resistance in chronic myeloid leukemia (CML). This study aimed to prioritize deleterious nsSNPs in *SLC22A1* and assess their potential association with imatinib therapy failure.Using eight computational prediction algorithms, we analyzed 270 coding SNPs to identify potentially damaging variants. High-confidence nsSNPs were further characterized based on evolutionary conservation, protein stability, post-translational modifications, and solvent accessibility to evaluate their structural and functional impact.Our analysis identified 18 high- risk pathogenic nsSNPs, including 12 new variants implicated in hOCT1-mediated imatinib transport. Three mutations—P283L, G401S, and R402G—were predicted to significantly alter protein structure, function, and stability. Molecular modeling revealed key differences between mutant and wild-type residues, including changes in size, charge, interaction patterns, and hydrophobicity.These findings provide a refined dataset for investigating uncharacterized nsSNPs and their potential role in imatinib resistance, offering insights for personalized therapeutic strategies in CML.

Key words: *hOCT1, CML, nsSNP, Imatinib resistance, In silico analysis*

POSTER N° : 11.

ROLE OF THE *PRNCR1* SNP RS13252298 IN COLORECTAL CANCER SUSCEPTIBILITY IN A TUNISIAN POPULATION

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Abstract

Colorectal cancer (CRC) remains one of the leading causes of cancer-related mortality worldwide, and is increasingly prevalent in developing countries, particularly Tunisia, where lifestyles and eating habits are changing rapidly. Often diagnosed at an advanced stage, CRC represents a major clinical and public health challenge. Its etiology is multifactorial, with a significant genetic component, notably the involvement of non-coding regulatory elements.

Among these, long non-coding RNAs (lncRNAs) are attracting growing interest for their role in gene regulation during tumorigenesis. The *PRNCR1* gene, encoding a lncRNA associated with prostate cancer, contains several single nucleotide polymorphisms (SNPs), some of which may be involved in CRC development.

In this retrospective case-control study, we analyzed the association between the rs13252298 (A/G) polymorphism of the *PRNCR1* gene and CRC risk in a Tunisian population. Genotyping was performed by PCR-RFLP on a sample comprising 88 CRC patients and 132 healthy controls. Statistical analyses were performed using SNPStats and SPSS 18.0.

The results highlighted a significant association between the rs13252298 A/G polymorphism and CRC (P value <0.0001 / OR = 0.24), suggesting a protective role against the disease and potential favorable prognostic implications.

Keywords: Colorectal cancer, PRNCR1, Long non-coding RNA, SNP, Tunisia

POSTER N° : 12.

ENHANCING TOMATO RESILIENCE: COMPARATIVE EFFICACY OF MICROALGAE APPLICATION METHODS ON GROWTH AND STRESS TOLERANCE

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The present study investigates the different application methods of microalgae that affect tomato plant performance and stress resilience in tomato. We compared four application techniques—foliar spray, seed priming, suspension, and powder—by evaluating critical physiological parameters including photosynthetic pigment content, proline accumulation, and water retention capacity. Results demonstrate that powder application significantly enhanced chlorophyll and carotenoid concentrations while improving drought stress tolerance in tomato plants. Seed priming also yielded notable improvements in growth parameters, whereas foliar spray showed more modest effects. The differential responses observed across treatments suggest that application method substantially influences biostimulant efficacy. The enhanced photosynthetic efficiency and stress mitigation capabilities are likely attributable to bioactive compounds in microalgae, including phytohormones, amino acids, and antioxidants, which activate specific metabolic and defense pathways in tomato. These findings highlight *the* potential of microalgae as a sustainable input for tomato cultivation, though additional field trials are warranted to validate its long-term performance under varying environmental conditions and commercial growing systems.

Keywords: Microalgae, biostimulant, plant growth, physiology, sustainable agriculture

POSTER N° : 13.

COMPARATIVE PHENOLIC PROFILING OF LEAVES FROM FOUR MEDITERRANEAN PLANTS IN RELATION TO THEIR ENVIRONMENTAL ORIGIN

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Abstract: The chemical composition of plants is highly influenced by various factors such as environmental and climatic conditions, geographical location, drought stress, disease incidence, sampling period, and the plant's developmental stage. In this context, the present study investigated the phytochemical profiles of four Mediterranean plant species — *Pistacia lentiscus* L., *Phillyrea latifolia* L., *Globularia alypum* L., and *Ceratonia siliqua* L. The analysis was carried out using UPLC-PDA-MS/MS-tQ to identify their major bioactive compounds, alongside determining their total phenolic content (TPC) and total flavonoid content (TFC) relative to their collection sites.

Among the studied species, *G. alypum* recorded the highest phenolic content (7.92 mg GAE/g DW), while *P. latifolia* exhibited the greatest flavonoid concentration (8.31 mg QE/g DW), both notably in samples collected from site 3 (latitude 36°21′88.893″ N; longitude 10°06′22.593″ E; altitude 850 m). The UPLC-PDA-MS/MS-tQ analysis identified several dominant compounds across all four species, including digalloylquinic acid, trigalloylquinic acid, verbascoside, myricetin-rhamnoside, apigenin-diglycoside, luteolin-hexose, and quercetin-3-O-rutinoside.

This study is the first to comprehensively report on the phenolic profiles of these species in relation to their environmental growing conditions. The results underscore the potential of *P. lentiscus*, *P. latifolia*, *G. alypum*, and *C. siliqua* leaves as valuable sources of bioactive phenolic compounds, suggesting their promising applications in pharmaceutical formulations and functional food products.

KEYWORDS:*Leaves, Flavonoids, Phenols,*

POSTER N° : 14.

ASSOCIATION OF *NFKB1* GENE POLYMORPHISMS WITH THE RISK OF RECURRENT PREGNANCY LOSS IN A TUNISIAN POPULATION

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Abstract

Recurrent Pregnancy Loss (RPL) is defined as the occurrence of two or more consecutive fetal losses during the first trimester of pregnancy. Although numerous causes have been identified, nearly 50% of cases remain unexplained, suggesting a potential genetic contribution. The *NFκB1* gene, a key regulator of immune and inflammatory responses, has been proposed as a potential susceptibility gene in RPL.

We conducted a case-control study to evaluate the association between three *NFκB1* polymorphisms (rs4648143, rs41275743, and rs28362491) and RSA risk in a Tunisian cohort. Genotyping by PCR-RFLP revealed that the rs41275743 A allele was significantly less frequent in cases compared to controls (0.04 vs. 0.07, $p = 0.013$), with a protective effect observed for the G/A genotype. The rs4648143 variant also showed a strong protective association ($p < 0.0001$) across all genetic models. In contrast, our results indicate that rs28362491 (insATTG) is significantly associated with increased RPL risk ($p < 0.0001$), particularly in individuals with the ins/ins genotype.

These findings support the involvement of *NFκB1* polymorphisms in the pathophysiology of RPL and highlight the value of genetic studies in improving our understanding of the underlying mechanisms of this complex reproductive disorder.

Key words: RPL, NFκB1, genetic polymorphism, PCR-RFLP, Case-control study

ANIMAL PHYSIOLOGY
BIOLOGY AND ECOLOGY

POSTER N° : 15.

IN VITRO ANTIOXIDANT EFFICACY OF SPIRULINA AQUEOUX EXTRACT AND IN SILICO MOLECULAR DOCKING OF ITS MAJOR BIOACTIVE COMPOUNDS

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Abstract: Spirulina, a blue-green microalga rich in bioactive compounds, is known for its potent antioxidant properties, largely attributed to its high protein content. Objectives: This study aimed to evaluate the antioxidant potential of spirulina aqueous extract (SPAE) using both in vitro assays and in silico molecular docking approaches. Methods: The in vitro antioxidant activity of SPAE was assessed using three established assays: ABTS, DPPH, and FRAP. To further elucidate the mechanism at the molecular level, an in silico molecular docking study was performed focusing on C-phycocyanin, one of spirulina's major active compounds and its interactions with two key antioxidant enzymes: catalase (CAT) and superoxide dismutase (SOD). Results: SPAE exhibited strong free radical scavenging activity and reducing power across all assays, confirming its effectiveness as a natural antioxidant source. Molecular docking simulations showed favorable binding interactions between C-phycocyanin and both CAT and SOD, suggesting a potential modulatory role in the cellular antioxidant defense system. Conclusions: These findings demonstrate that SPAE possesses significant antioxidant activity both experimentally and computationally, supporting its potential as a therapeutic agent in conditions associated with oxidative stress.

Keywords: Spirulina aqueous extract (SPAE); C-phycocyanin; antioxidant activity; catalase (CAT); superoxide dismutase (SOD); molecular docking

POSTER N° : 16.

NUTRITIONAL ANALYSIS AND EVALUATION OF THE ANTIOXIDANT POTENTIAL OF THE FLESH AND BY-PRODUCTS OF UNUSABLE FARMED MUSSELS (*MYTILUS GALLOPROVINCIALIS*) WITH A VIEW TO THEIR USE IN HUMAN NUTRITION.

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Abstract: The aim of this study is to valorize by-products from inedible farmed mussels (*Mytilus galloprovincialis*) through the evaluation of their nutritional composition and antioxidant activity. Non-commercialized broken farmed mussels were sorted and cleaned, the flesh was separated from the shell, and the byssus was air-dried and ground. The results revealed a high protein content in both the flesh and the byssus of the mussel (11.58 % and 78 %, respectively), with low levels of lipids and carbohydrates. Mineral analysis showed high concentrations of calcium and magnesium in the flesh and by-products of the mussel, while heavy metals were present in minimal amounts. Furthermore, the capacity of scavenging DPPH free radicals in the mussel flesh, byssus and shell is considerable (1.6%, 0.98%, and 0.93%, respectively). In conclusion, mussel by-products should be valorized due to their remarkable nutritional and therapeutic potential, offering sustainable alternatives for human nutrition and contributing to waste reduction in the aquaculture industry.

KEYWORDS: *Mussels, by-products, Valorization, Antioxidant activity*

POSTER N° : 17.

THE HYPOGLYCEMIC AND ANTI-INFLAMMATORY EFFECT OF MAGNESIUM ON RATS WITH TYPE 2 DIABETES

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Abstract: The objective of this study is to explore the hypoglycemic and anti-inflammatory effect of magnesium supplementation in Wistar rats with type 2 diabetes. Diabetes is induced by ingestion of a high-calorie diet (HL), followed by a low dose injection of streptozotocin (STZ). The DT2 rats were divided into two groups, each consuming for 30 days the HL diet supplemented with magnesium (DT2-Mg) at a rate of 50 mg/kg rat/day or unsupplemented (DT2). After 1 month of experimentation, a significant decrease in body weight (-10%), blood glucose (42%), insulinemia (-12%), HbA1c (%) (-20%) and total cholesterol (-40%), are noted in the DT2-Mg group versus DT2. In addition, inflammatory parameters such as TNFα and CRP and LDL activity showed a decrease (-30%, -51% and -58%, respectively). In conclusion, magnesium supplementation plays a key role as a potent hypoglycemic factor while regulating glucose and insulin levels. In addition, Mg appears to decrease the level of inflammatory markers.

KEYWORDS: *Rat, DT2, High-calorie diet, Magnesium, inflammation, Blood sugar,*

POSTER N° : 18.

ATRIPLEX HALIMUS AQUEOUS EXTRACT MITIGATES HIGH-CALORIE DIET-INDUCED RENAL TOXICITY IN RAT

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Abstract: Today, obesity has become a real public health issue due to its major role in the increase in morbidity and mortality linked to multiple health disorders. This study aimed to better understand the relationship between obesity-induced oxidative stress, renal steatosis, and kidney dysfunction. We also investigated the potential protective effects of an aqueous extract of *Atriplex halimus* (orach halimus (AH)) against these alterations. For six weeks, rats were fed either a standard diet or a high-calorie diet enriched with lipids and carbohydrates, with or without treatment with AH aqueous extract. The high-calorie diet led to triglyceride accumulation in renal tissue and disrupted several renal function parameters, changes that were closely related with oxidative stress. Remarkably, The AH aqueous extract effectively reversed nearly all the renal disturbances caused by the high-calorie diet. The AH aqueous extract exhibited significant nephroprotective effects against high-calorie, unbalanced diet, underscoring its potential as a therapeutic agent in broader renal pathologies.

KEYWORDS: *renal steatosis, kidney dysfunction, high-calorie diet, Atriplex halimus*

POSTER N° : 19.

MORPHOMETRIC STUDY OF A MARINE CONGER EEL POPULATION FROM BÉNI-SAF BAY, WESTERN ALGERIAN COASTS

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Abstract: The biometric study of European conger eel (*Conger conger* Linnaeus, 1758) was conducted monthly from the Western coast of Algeria, from Béni-Saf, for 12 months. In total, 172 specimens, 92 females and 80 males were sampled and treated in detail at the laboratory. A series of eighteen (18) morphometric measurements were carried out on each sampled fish. These measurements were made on the basis of previous studies to obtain maximum information about the studied fish.
Monthly comparisons, performed using both univariate (ANOVA) and multivariate (MANOVA) statistical tests, revealed significant differences in the morphometric variables measured on the European conger eel (*Conger conger*). However, no significant variation was observed between males and females with regard to these variables.

KEYWORDS: European conger eel, Béni-Saf bay, biometric study, morphometric measurements.

POSTER N° : 20.

EFFECTS OF AQUEOUS EXTRACT OF JUJUBE FRUIT (*ZIZIPHUS JUJUBA*) ON MPO ACTIVITY AND ROS PRODUCTION BY HUMAN NEUTROPHILS *IN VITRO*

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Abstract: The increased production of reactive oxygen species (ROS) by human neutrophils can lead to oxidative imbalances and several diseases, such as inflammatory bowel disease (IBD). *Ziziphus jujuba*, commonly known as jujube, belonging to the Rhamnaceae family that is widely cultivated in Asia, particularly in China. It is valued for its nutritious fruit, which is rich in vitamins, minerals, amino acids, and phytochemicals such as flavonoids and polysaccharides. These compounds possess various pharmacological properties, including antioxidant, anti-inflammatory effects. *The aim* of this study was to test the effects of aqueous extract of jujube fruit (AEJ) on human neutrophil inflammatory functions.
Bioactive compounds were assessed using high-performance liquid chromatography (HPLC), ROS production was assessed by luminol-amplified chemiluminescence, while hydrogen peroxide (H_2O_2) was specifically detected in a cell-free system in the presence of horseradish peroxidase (HRPO). Degranulation by neutrophils was determined by measuring the release of myeloperoxidase (MPO).
HPLC analysis showed that AEJ is rich in term of phenolic compounds such as: gallic acid, protocatechuic acid, cinnamic acid, caffeic acid, and quercetin. Furthermore, AEJ inhibited significantly neutrophil ROS production, including H_2O_2, and markedly reduced myeloperoxidase neutrophil degranulation. Our results showed that aqueous extract of jujube fruit exhibits significant anti-inflammatory properties by restoring oxidative balance, suggesting its potential as a source of novel therapeutic agents.

KEYWORDS: *Ziziphus jujuba,, neutrophils, chemiluminescence, ROS, myeloperoxidase, inflammatory.*

PLANT PHYSIOLOGY
BIOLOGY AND ECOLOGY

POSTER N° : 21.

EXOGENOUS MOLYBDENUM MITIGATES CHROMIUM TOXICITY IN BEAN (*PHASEOLUS VULGARIS* L.) BY ENHANSING PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES.

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Abstract: Chromium (Cr) is a highly toxic metal that impairs plant physiological processes, particularly growth and photosynthesis. Conversely, molybdenum (Mo), an essential micronutrient, plays a critical role in abiotic stress acclimation. This study investigates the potential of Mo to alleviate Cr toxicity in 21-day-old bean plants. Plants were exposed to Cr (10 µM) with or without Mo supplementation (0.5-2 µM) via root or foliar application. Chromium reduced biomass and elongation dose-dependently, while Mo alone at 0.5 and 1 µM stimulated growth but was inhibitory at 1.5 and 2 µM. Chromium (10 µM) induced reactive oxygen species (ROS) overproduction and accelerated chlorophyll degradation. However, Mo supplementation (via culture medium or by foliar spray) restored plant physiological and biochemical parameters including: (1) improved shoot elongation and biomass, (2) upregulation of catalase and peroxidase activities, (3) reduced ROS accumulation and (4) preserved chlorophyll content and leaf fluorescence. These findings suggest that Mo alleviates Cr toxicity by enhancing antioxidant defenses and protecting photosynthetic machinery, supporting its integration into agricultural strategies for Cr-contaminated soils.

KEYWORDS: *Antioxidant enzymes, Chlorophyll, Chromium, Fluorescence, Molybdenum, Phaseolus vulgaris.*

POSTER N° : 22.

FUNCTIONAL VALIDATION OF LOBULARIA MARITIMA THIOREDOXIN-H2 PROTEIN FOR ITS ABILITY TO COMBAT BACTERIAL AND FUNGAL INFECTIONS

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Abstract: Thioredoxins (Trxs) belong to a family of multifunctional redox proteins that is critical for maintaining and regulating the cellular redox environment during plant cell growth. Also, they are important for the development of plant's response to biotic and abiotic stress; however, the specific biological functions of h-type thioredoxins (Trxhs) in plants have not been fully elucidated. Herein, we investigated the role of LmTrxh2, a specific member of the Trxh family, in response to various biotic stress simulants, including mechanical wounding, exposure to jasmonic acid (JA), picolinic acid (PA), salicylic acid (SA), ethephon (ETP), and hydrogen peroxide (H2O2). We observed that LmTrxh2 transcripts were significantly upregulated upon exposure to these stress simulants. The characterization of enzymatic activity revealed that the recombinant LmTrxh2 protein functions as a disulfide reductase. While the role of Trx proteins in redox regulation is well known, their involvement in antimicrobial activity is still unexplored. Therefore, we assessed the antimicrobial effect of LmTrxh2 towards various micro organisms and observed a concentration-dependent inhibition of microbial growth. The minimum inhibitory and minimum bactericidal concentrations and the diameters of the inhibition zones were 40–1250 µg/mL, 40–1250 µg/mL, and 12.5–32.5 mm, respectively. In addition, we used previously developed LmTrxh2-transgenic tobacco lines and found that they showed enhanced resistance to fungal infections triggered by Fusarium graminearum and Aspergillus niger. This resistance was associated with an upregulation of known defense-related genes. Overall, our findings suggest that LmTrxh2 is responsive to multiple biotic stress simulants and plays a critical role in the basal resistance of plants to pathogen infections. These results highlight the potential of LmTrxh2 in the devel opment of strategies to protect crops from various stress factors and emphasize its importance in the adaptation of plants to different stress conditions.

KEYWORDS: *Biotic stress; Defense signaling; LmTrxh2 protein; Lobularia maritima ; Antimicrobial activity*

POSTER N° : 23.

THE COMBINED EFFECTS OF DROUGHT AND *OROBANCHE CRENATA* PARASITISM ON FABA BEAN (*VICIA FABA* L.) GENOTYPES

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Abstract
Faba bean (*Vicia faba* L.) is a major traditional pulse crop grown widely across the arid and semi-arid regions of the Mediterranean. However, its productivity is increasingly challenged by water deficit and *Orobanche crenata* infestation, which are two key abiotic and biotic stresses. In this study, we evaluated the physiological responses of five faba bean genotypes (Badii, Bachaar, Najeh, Chams, Chourouk), selected for their contrasting behavior under the combined effect of drought and parasitic stress, each tested under both infested and non-infested conditions. The results revealed significant genotypic variation, particularly large variation in transpiration rate (TR), and indicating distinct strategies for soil water conservation under the two stress conditions. Orobanche sensitive genotypes such as Badii and Bachaar exhibited low breakpoints, ranging from 0.38 in non-infested to 0.45 in infested plants, indicating an early reduction in transpiration as evaporative demand increased. Thus, Najeh exhibited a higher FTSW threshold, initiating stomatal closure earlier to conserve water as soil moisture declined. In contrast, Chams maintained transpiration until lower FTSW thresholds were reached, but showed overall lower transpiration rates, thus limiting water loss. Root architecture analysis confirmed a significant reduction in root area due to infestation across all varieties and water regimes. Furthermore, variation in Orobanche development and biomass between treatments highlighted the influence of water status on the parasite's life cycle, particularly in genotypes like Badii and Najeh. Overall, the findings underscore the importance of genotypic screening under combined stresses and identify promising traits and candidate genotypes, such as Chams, for the development of faba bean cultivars with improved tolerance to drought and parasitic infestation. Other experiments could be conducted in order to understand reasons of the transpiration limitation observed in Chams variety.

Key words: *Orobanche crenata*; transpiration rate; breakpoint; faba bean; root architecture; Fraction of transpirable soil water.

POSTER N° : 24.

BENEFICIAL EFFECTS OF HYDROGEN SULFIDE ON GROWTH AND PHOTOSYNTHETIC PEROFORMANCE IN *BRASSICA NAPUS* (L.) PLANTS UNDER POTASSIUM DEFICIENCY

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Abstract
In their natural habitats, plants often face a limited supply of various essential nutrients. Among these, potassium (K^+) deficiency is a significant environmental stressor that hampers plant growth and negatively impacts crop yield and quality. Hydrogen sulfide (H_2S), a gaseous signaling molecule, is vital for regulating a wide range of developmental processes and stress responses throughout the plant life cycle. However, its role in mitigating K^+ deficiency remains unclear. The aim of this study was to investigate the interaction between K^+ deficiency and H_2S in *Brassica napus*. Plants were grown under two potassium regimes: sufficient potassium (K^+ control, 3 mM) and potassium deficiency (K^+ deficient, 20 µM), in the presence or absence of 200 µM sodium hydrosulfide (NaHS), an H_2S donor. Results showed that K^+ deficiency caused a substantial reduction in fresh biomass production across all plant organs compared to control plants, resulting in decline in total plant growth. However, the exogenous application of NaHS to K^+-deficient plants significantly improved biomass production of vegetative organs. A modulation of photosynthetic activity was also oberved. Taken together, these results demonstrate that NaHS is a highly effective strategy for promoting plant growth under K^+-deficient conditions.

Keywords : *Brassica napus*, K^+ deficiency, Growth, Hydrogen sulfide

POSTER N° : 25.

ENDOGENOUS PHYTOHORMONES IMPROVE SALT TOLERANCE IN DURUM WHEAT (TRITICUM DURUM DESF.) BY MODULATING IONIC COMPARTMENTATION AND GAS EXCHANGE

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Abstract: Saline constraint is one of the most serious abiotic stresses that has become common for the world population. Being aggravated by climate change. Recent studies estimated the soil salinization at the rate of ~3 ha/min, invading now the irrigated agrosystems. Some reports have indicated that salinity is reducing the area of irrigated areas worldwide by 1 to 2% per year and continues to be further aggravated in semi-arid and arid areas, where 25% of irrigated land is already salinized. Climate change and the use of unconventional water in irrigation continue to exacerbate the problem. Thus, the gap between conventional water resources and the demand for irrigation has become large.

In Tunisia, the issue of food security remains mainly dependent on cereal supply, due to a diet based on cereal products and their derivatives. However, 94% of cereal crops are rainfed; largely impacted by climatic hazards, they offer production that is not only fluctuating but always well below demand. However, the main constraint, even in irrigated areas, remain the soil and water salinity. A high level of soil or water salinity affects the yield and quality of the wheat.

Plant growth regulators are endogenous small signaling molecules, including auxin (AIA), gibberellins (GA), cytokinin (CK), abscisic acid (ABA), ethylene, brassinosteroids, salicylic acid (SA), and jasmonic acid (JA). Among these hormones, auxin, gibberellin and cytokinin are known to play a major role in the developmental responses of plants; while ABA, SA, JA, and ethylene are involved in modulating plant defense responses against biotic and abiotic constraints. Phytohormones facilitate plants' rapid responses to salt stress. Some hormones exert positive regulatory effects on plant salt tolerance, such as ABA and JA, while others have negative regulatory roles, such as GA.

Different approaches can be used to reduce the negative impact of salinity stress on plant growth and yield. However, exploring the variability of response to salt stress among various durum wheat cultivars, and elucidating the useful traits and markers of tolerance remains the least expensive and most sustainable approach. Accordingly, four cultivars of durum wheat (Karim, Maali, Trigo aristado, and Trigo mocho) were subjected to salinity stress in a semi-controlled condition. Endogenous hormone production and distribution are investigated, and the corresponding interrelationships are established.

Obtained results showed hampered growth hormones against significant induction in stress hormones.

a significant reduction in cytokinin precursors under salt stress was observed. Indeed, zeatin decreased as a result of salinity effect on both forms (trans zeatin, tZ, and zeatin riboside, Zr). Isopentenyladenine was also significantly affected by sal stress. Cytokinin and gibberellin are also no exception of the harmful effect of salinity. Inversely, the stress hormones detected in this study behaved inversely to growth hormones in response to salt stress. Indeed, salt stress significantly increased leaf concentrations in SA, ABA, and JA.

Regarding all these hormones, the cultivar Karim showed the highest ability to maintain high stress hormone production with a less affected growthy hormones under salinity stress condition, allowing it to be the most tolerant one. This mechanism helped preserve gas exchange, ionic compartmentation, and improved biomass production.

KEYWORDS: *Abscisic acid, cytokinin, durum wheat, Jasmonic acid, salinity, salicylic acid*

POSTER N° : 26.

ARE THE EFFECTS OF JASMONIC ACID ON THE GROWTH AND AMMONIUM-METABOLIZING ENZYME ACTIVITIES OF WHEAT SEEDLINGS DEPENDENT ON THE PHASE OF SALT STRESS?

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Abstract : Salinity is a major abiotic stress that negatively affects plant growth and productivity. Thus, the development of suitable management practices to minimize the deleterious effects of this constraint has become necessary. Among these methods, supplementation of exogenous regulators has emerged as alternative and efficient method. Furthermore, as the physiological process of plant tolerance to salt stress is related to its antioxidant system and N metabolism–related enzymes, The present work was undertaken (i) to investigate the effects of 1 mM jasmonic acid (JA) on the growth, ascorbate contents as well as glutamine synthetase (GS), glutamate synthase (GOGAT) and glutamate dehydrogenase (GDH) activities of wheat seedlings (*Triticum durum* cv. Karim) submitted for 3 weeks to 100 mM NaCl, and (ii) to check if these effects were dependent on the phases of salt stress. Obtained results revealed that salt stress significantly reduced biomass production, leaf area and ascorbate contents as well as GS, GOGAT and GDH activities in leaves and roots during the two phases of salt stress. However, the application of JA to salt-stressed seedlings increased all measured-growth parameters, did not affect GS and GOGAT activities and significantly increased GDH activity and ascorbate contents in leaves and roots at the first phase of salt stress. At the second phase of salt stress, JA application did not affect ascorbate contents; whereas significant increases biomass production as well as GS, GOGAT and GDH activities were observed in leaves and roots. Taken together, these results indicate that (i) the ascorbate content and the activities of ammonium-metabolizing were dependent on the phase of salt stress, and (ii) the maintenance of high ammonium-metabolizing enzyme activities and, hence, an adequate nitrogen metabolism is crucial for plant survival under saline conditions.

Key words: *Triticum durum*, salt stress, jasmonic acid, growth, ascorbate, nitrogen enzymes.

POSTER N° : 27.

EXTENDED COLD STORAGE'S IMPACT ON DIFFERENT POTATO GENOTYPES' FUNCTIONAL QUALITY ATTRIBUTES

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Abstract: A common staple food in Tunisia, potatoes (Solanum tuberosum L.) are a source of several secondary metabolites that are beneficial to human health. However, the bioactive qualities and functional quality of potato tubers are impacted by cold storage. Few researches have looked at how long-term cold storage affects the quality of potato tubers, despite how important this fact is. Thus, assessing the impact of cold storage on the primary quality attributes of several potato genotypes cultivated in Tunisia was the aim of the current study. In this study, four commercial potato varieties—Selena, Elbeidha, and Naima—as well as a chosen clone, CL27, were farmed under late cropping season circumstances, with early fall planting and winter tuberization. The trial's tubers were kept at 8°C for ninety days. The findings demonstrated that storage at 8°C for 90 days had a significant impact on the quality characteristics of potato tubers. Furthermore, after 90 days of storage at 8°C, the concentrations of total carotenoids, phenolics, and flavonoids rose considerably, regardless of genotype. Nonetheless, genotypic variations that underlie the antioxidant activity in both lipophilic and hydrophilic fractions were found, indicating that they are susceptible to cold storage. Breeders working on potato genotypes that can be stored for a long time and farmers keeping their material at cold temperatures for a long time may find this study helpful.

KEYWORDS: *Cold storage, potato, functional quality, genotypes*

POSTER N° : 28.

PRIMED BY THE DESERT: A PRELIMINARY INVESTIGATION ON THE EFFECTIVENESS OF *CITRULLUS COLOCYNTHIS* L. SCHRAD. IMMATURE SEED FIXED OILS AS ENHANCERS OF PLANT VIGOR PERFORMANCE.

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Abstract

Citrullus colocynthis L. Schrader is medicinal annual plant, belonging to the Cucurbitaceae family, that is widely distributed in the arid areas of the Mediterranean basin. Due to the biological activity that extracts from different organs have shown during decades of scientific investigation, the applications of this species in the most various contexts are continuously increasing. With the aim to evaluate the possible beneficial effect of fixed oil extracts from *C. colocynthis* seeds in the improvement of plant vigor for both conservation and agricultural purposes, we analysed their effect on model species such as *Sorghum vulgare* (sorghum), *Raphanus sativus* (radish) and *Lactuca sativa* (lettuce). A gas chromatography-flame ionization detection (GC-FID) was performed in order to explore the fatty acids composition of fixed oils, that resulted to differ from literature available data. Experiments conducted *in vitro* and greenhouse conditions revealed that fixed oils of immature seeds improved the germination and seedling growth of tested species, acting as vigor promoters. Immature seed extract exhibited the best performance on sorghum.

Keywords : *Citrullus colocynthis L. Schrad., seeds fixed oil, germination performance, seedling priming, plant vigor*

POSTER N° : 29.

PHYTOCHEMICAL DIVERSITY AND ALLELOPATHIC ACTIVITY OF *ARTEMISIA HERBA-ALBA*: TOWARDS A SUSTAINABLE BIOHERBICIDE

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Abstarct : The management of invasive species, such as bermuda grass (*Cynodon dactylon* (L.)), represents a major challenge in agriculture. This research explores the bioherbicide potential of *Artemisia herba-alba,* a plant collected in two Tunisian regions: Ouled Haffouz-Sidi Bouzid (central Tunisia) and Zerkine-Gabès (southern Tunisia).
The essential oils were extracted by hydrodistillation and analyzed by GC-MS. Comparative analysis reveals distinct chemical profiles between the two essential oils, although both are dominated by ketones. The essential oil of *Artemisia herba-alba* from the Zerkine-Gabès region is characterized by a high and relatively balanced content of alpha α -thujone (24.65%) and ß-thujone (27.18%), including notable amounts of sabinyl acetate (11.65%) and chrysanthenone (8.85%).
while, the essential oil from the Ouled Haffouz-Sidi Bouzid region, retaining a high proportion of thujone, presents a more marked dominance of ß-thujone (42.15%) and is distinguished by a significantly higher concentration of camphor (15.356% compared to 2.97% for the Zerkine-Gabès oil).
Furthermore, the allelopathic potential of these oils was evaluated *in vitro* against two model monocotyledonous species (*Hordeum vulgare* L. and *Triticum aestivum* L.), as well as against *Cynodon dactylon* (L.). At low doses (10 µL), both essential oils demonstrated significant allelopathic properties, inhibiting the germination and growth of barley and wheat. At the same time, the *in situ* application of aqueous extracts obtained by maceration (at 30% and 60%) showed an encouraging reduction in the growth of bermuda grass, multiplied by rhizomes. These data suggest a strong potential for the design of sustainable bioherbicides based on *Artemisia herba-alba* for the control of this weed.
KEYWORDS*: Artemisia herba-alba* Asso, Essential oil, GC/MS, Aqueous extracts, Allelopathic potential. *Cynodon dactylon* (L.)

POSTER N° : 30.

TRUE POTATO SEED TECHNOLOGY: IS IT A SUITABLE SOLUTION FOR SMALLHOLDERS UNDER ONGOING CLIMATE CHANGE AND GLOBAL WARMING CONTEXT?

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Abstract: The potato is a strategic horticultural crop cultivated under various climatic conditions. Tuber formation decreases at temperatures above 17°C, and potatoes are also sensitive to frost; temperatures below 0°C can cause severe damage. Researchers have employed simulation models to assess the effect global warming might affect potato production. Predictions indicate that higher temperatures could decrease both the yield and quality of potatoes, as observed in numerous regions around the world.
Smallholder farmers face multiple challenges, including rising costs for energy, seeds, agricultural inputs, and phytosanitary treatments. There is an urgent need for adaptive practices to sustain potato productivity and implement effective strategies. Climate change adaptation involves anticipating the negative impacts of environmental changes, taking measures to mitigate these risks, and capitalizing on potential opportunities that may arise. Therefore, adjustments to current or anticipated climate conditions and their impacts should be considered. These adjustments could include changes to the agricultural calendar, exploring new cultivation areas, highland or inland farming, and the use of bio-stimulants.
Recently, the use of True Potato Seeds (TPS) has emerged as an innovative and cost-effective alternative to traditional potato seeds. In an earlier experiment conducted by our research team, 50 kg of conventional potato seeds yielded 500 kg of tubers, while just 1 gram of TPS produced the same amount. Thus, only 150 grams of TPS is required to plant 1 hectare. With TPS priced at 220 euros per kilogram, one kilogram can be used to cultivate almost 7 hectares. In contrast, the traditional method for planting 1 hectare of potatoes requires 6000 DT for seeds (approximately 1875 euros) and 4000 DT for various agricultural inputs (around 1250 euros).
KEYWORDS: *True Potato Seeds, climate change, sustainable agricultural production, potato tubers*

POSTER N° : 31.

PHYSIOLOGICAL PLASTICITY IN CORK OAK (*QUERCUS SUBER L.):* A COMPARATIVE STUDY OF PROVENANCE RESPONSES TO MODERATE DROUGHT STRESS

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Abstract: Environmental stress and selective pressures may drive to the phenotypic plasticity and local adaptation in plant species, enabling them to better adapt to shifting climatic conditions. Intra-specific variability, often overlooked in ecological studies, is a key factor in assessing the adaptive capacity of species such as cork oak (*Quercus suber L.*), a sclerophyllous tree endemic to the western Mediterranean Basin. This species occupies a wide range of contrasting habitats, from humid to semi-arid regions, and is known for its resilience to drought, high solar radiation, and low temperatures. This study investigates the physiological responses of *Q. suber* seedlings from two ecologically distinct provenances: Feija (humid) and Gaâfour (semi-arid), subjected to moderate drought stress. Four-year-old seedlings, previously grown under common garden conditions, were exposed to soil water content (*SWC*) levels below 10% for one month, and compared with well-watered controls (SWC 25–30%). Key physiological traits were assessed, including leaf relative water content (*RWC*), gas exchange parameters, chlorophyll fluorescence, and pigment concentrations. Under drought conditions, both provenances exhibited reduced photosynthetic activity and stomatal conductance, with *RWC* dropping to 52%. While *gs* and *Ci* remained similar across provenances, net photosynthesis was notably higher in Gaâfour seedlings. Drought had no significant effect on chlorophyll content or specific leaf area (*SLA*), though it significantly elevated the light compensation point (*LCP*), particularly in Feija plants. Apparent quantum yield (*Φ*) decreased only in Feija under stress, indicating a provenance-specific limitation in carbon assimilation driven by both reduced Φ and CO_2 diffusion constraints. These findings highlight the existence of adaptive physiological differentiation among *Q. suber* provenances and emphasize the importance of considering intra-specific variability in the context of forest resilience and climate change adaptation strategies.

KEYWORDS: *Quercus suber, water stress, light curve, photosynthesis, provenance.*

POSTER N° : 32.

ROLE OF SELENIUM IN PREVENTING COPPER TOXICITY IN BEAN (*PHASEOLUS VULGARUS*) SEEDLING

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Abstract:
The aim of this study was to evaluate the toxic mechanism associated with Cu exposure and to investigate the possible mediatory role of Se in protecting plants from Cu toxicity. The exposure of bean (*Phaseolus vulgarus*) seedlings to 100 µM Cu inhibited biomass production, decreased chlorophyll (Chl) and carotenoids (Cars) contents and intensively increased the accumulation of Cu in both roots and shoots. Concomitantly, Cu application enhanced hydrogen peroxide (H_2O_2), protein carbonyl (PCO) content and lipid peroxidation as indicated by malondialdehyde (MDA) accumulation. Presoaking seeds with Se (5, 10 and 20 µM) alleviated the negative effect of Cu on plant growth parameters and lead to a significant increase of Chl and Cars contents. Furthermore, Se application mitigated the oxidative damages as evidenced by the lowered H_2O_2, PCO and MDA contents and lead to a decrease in oxidative injuries caused by Cu toxicity. Se particularly induced an increase in catalase (CAT), ascorbate peroxidase (APX) and glutathione peroxidase (GPX) activities accompanied by a significant reduction in SOD activities. Our study provides evidence that Se alleviated the Cu-induced oxidative stress in sunflower seedlings by enhancing the antioxidant defense system. As a whole, this study provides strong arguments highlighting the potential role of Se as a growth promoter for bean seedlings submitted to Cu stress, notably by boosting the antioxidant defense system and improving leaf membrane stability.

Keywords *: Selenium, Cu, Phaseolus vulgarus, oxidative damages, antioxidants.*

POSTER N° : 33.

INTEGRATED BROOMRAPE MANAGEMENT (IBM) TO CONTROL *OROBANCHE FOETIDA*

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Abstract: Broomrapes (*Orobanche* spp.) are chlorophyll-lacking that parasitize many dicotyledonous species. Several control strategies were tested in combating Orobanche, but none of them have resulted in a complete and successful control of the parasite because the majority of contamination and damage occurs before emergence. In this study, 24 treatments were carried out, including agronomic chemical and genetic treatments. Two consecutive field experiments were conducted (2022-2022, 2022-2023) under high *Orobanche. foetida* infested plot at the Oued Beja research station, Tunisia, to test the tolerance of the local variety "Chourouk", the efficiency of the intercropping system with fenugreek, the timing of sowing and the efficacity and selectivity for two herbicides (Glyphosate and imazamox) in controlling this parasite, and to investigate an effective strategy to reduce the negative effects of this weed that especially increase faba bean yields and reduce Orobanches Shoot number. A randomized block design with 3 replicates was adopted. The data show that the virulence of the attacks was mitigated by combining these strategies with each other.

KEYWORDS: Control methods, integrated broomrape/Orobanche management (IBM/IOM), *O. foetida*, parasitism, faba bean crop.

BIOTECHNOLOGY

POSTER N° : 34.

MOLECULAR CHARACTERIZATION OF HYDROPHOBIC COATING PROTEINS IN *SCLEROTINIA SCLEROTIORUM*

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Abstract:
Sclerotinia sclerotiorum is a species of parasitic fungus belonging to the *Sclerotinia* genus. The disease, known as white rot, has been observed to affect a variety of plant species, including rapeseed, sunflower, beans, carrots and tobacco. *S. sclerotiorum*, like all filamentous fungi, produce small hydrophobic proteins, named hydrophobins, that coat the surface of the fungal hypha and conidia. These proteins have attracted attention due to their physicochemical and structural properties, which render them suitable for use in a variety of biotechnological applications. The objective of this study was to characterize sequences that encode hydrophobins in *Sclerotinia sclerotiorum*. The analysis encompassed the examination of their expression patterns and their correlation to the infectious process of the phytopathogenic fungus.
Bioinformatic analysis revealed the presence of six hydrophobin-encoding genes in the genome sequence of *S. sclerotiorum*. The genomic DNA was extracted and checked via agarose gel electrophoresis to ascertain the efficacy of the isolation process. In addition, total RNA was isolated from mycelia harvested at two developmental stages (2 and 5 days of culture). Consequently, reverse transcription-polymerase chain reaction was conducted in order to assess the expression of the six hydrophobins. Concurrently, a synthetic sequence of one hydrophobin sequence has been cloned into the pPICZαA vector. The recombinant vector was then used to transform *Pichia pastoris* strains X33 and SMD1168 via electroporation method for heterologous expression. Multi-copy transformed clones were selected on increased zeocin concentrations ranging from 100 to 600 µg mL^{-1}. Furthermore, several recombinant clones were induced with methanol at 28°C during 24, 48, 72 and 96h. SDS-PAGE and Native-PAGE were performed to analyze the expression profile of the recombinant hydrophobin. This work highlights technical challenges associated with conducting gene expression studies in *S. sclerotiorum* hydrophobins.

KEYWORDS: *Sclerotinia sclerotiorum, hydrophobins, RT-PCR, Pichia pastoris, heterologous expression*

POSTER N° : 35.

MICROBIALLY INDUCED CALCITE PRECIPITATION: IDENTIFICATION OF NOVEL STRAINS FROM EXTREME ECOSYSTEMS

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Abstract: Microbially induced carbonate precipitation (MICP) is a promising advancement for biocementing soils and producing ecological materials using ureolytic bacteria like *Bacillus pasteurii*. Identifying new MICP-involved strains remains less explored. This study isolated urease-producing strains from extreme Algerian ecosystems. Thirty-four strains grew at 47°C, with 11 optimal at 55°C. Screening on UNB medium selected strains with the best calcium carbonate precipitation. 16S rRNA gene sequencing confirmed the taxonomy of top performers. Calcite crystal formation was confirmed microscopically after three days. Application on construction sand showed selected strains could solidify granular structures via biocementation. 16S rRNA sequencing revealed the best strains mainly belong to *Brevibacillus*, *Paenibacillus*, and *Anoxybacillus*. These genera were previously little-described for MICP, broadening their targeted application in sustainable engineering. These identified strains offer new avenues for optimizing MICP in extreme conditions, reducing the environmental impact of traditional construction materials.

KEYWORDS: *MICP, Biocementation, Extremophiles, Ureolytic Bacteria*

POSTER N° : 36.

QUANTIFICATION OF MITOCHONDRIAL DNA COPY NUMBER IN PATIENTS WITH SUSPECTED MITOCHONDRIAL DISEASES USING QUANTITATIVE PCR

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Abstract: Mitochondrial diseases are a group of genetic disorders characterized by defects in oxidative phosphorylation, caused by mutations in either nuclear DNA (nDNA) or mitochondrial DNA (mtDNA) that encode structural mitochondrial proteins or factors involved in mitochondrial function. Among these disorders, those characterized by marked reduction in mtDNA copy number referred as mtDNA depletion leading to impaired cellular energy metabolism.

The objective of this study was to evaluate the utility of qPCR-based mtDNA copy number quantification from peripheral blood samples as a non-invasive diagnostic tool for mitochondrial diseases. Total DNA was extracted from peripheral blood, and mtDNA content was assessed by quantifying two mitochondrial genes, ND4 and COX, normalized to two nuclear genes, beta-2 microglobulin (β2M) and Glyceraldehyde-3-phosphate dehydrogenase (GAPDH). These targets were selected for their specificity and stability in detecting relative mtDNA content.

Results showed a significant reduction in mtDNA copy number in a subset of patients compared to healthy controls. In fact, in our patients, the reduction in mitochondrial DNA content ranged from 34% to 89%. This marked mtDNA depletion may contribute to mitochondrial dysfunction by impairing cellular energy production, increasing oxidative stress, and disrupting essential metabolic pathways. The observed mtDNA depletion could be related to mutations in genes involved in various mitochondrial functions, which will be further investigated in our cohort.

In conclusion, this qPCR-based method offers a reliable, sensitive, and minimally invasive approach for detecting mtDNA depletion. It may support the molecular diagnosis and clinical management of mitochondrial diseases, especially in cases where tissue biopsy is not feasible.

KEYWORDS: Mitochondrial diseases, qPCR, depletion.

POSTER N° : 37.

UPCYCLING SPENT COFFEE GROUNDS TO ENHANCE QUALITY AND PROLONG SHELF LIFE OF REFRIGERATED BEEF

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Abstract:

Spent coffee grounds (SCG) leading to huge generation have caused an enormous environmental concern. Nevertheless, SCG are a complex mix of bioactive compounds which are slowly being explored for their efficiency in agri-food applications. In the present study the possibility of using SCG as a natural source of antioxidants for the meat preservation has been tested. Phytochemical, antioxidant and antimicrobial activities of extract were determined. The LC-MS/MS study revealed that the major constituent was caffeoylquinic acid. SCG extract was added at 0.125% (SCGE1), 0.25% (SCGE2), and 0.5% (SCGE3) of the formula rate and its effect on the chemical stability, microbiological quality, instrumental color, and sensory attributes of beef were monitored over 14 days of refrigerated storage.. SCGE resulted in a reduced effect of chemical oxidation, microbial growth, and an improved of instrumental color and sensory traits. Moreover, synchronized relationships were formed between all the parameters, suggesting the complexity of its changes during the refrigeration storage. The use of the SCGE for novel applications in the agri-food sector was highlighted in this investigation.

KEYWORDS: *Spent coffee grounds, phenolic contents, Bioactivities, minced beef meat*

POSTER N° : 38.

BIODIVERSITY OF FABA BEAN (*VICIA FABA M.*) IN RESPONSE TO THE PHYTOPATHOGENIC FUNGUS *ASCOCHYTA FABAE* AND THE ROLE OF SYMBIOTIC/PGPR BACTERIA IN PLANT TOLERANCE

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Abstract: Faba bean (*Vicia faba* M.), an important legume crop, is highly susceptible to *Ascochyta fabae*, a fungal pathogen that causes significant biomass losses. This study aimed to assess the response diversity of 12 faba bean genotypes to *A. fabae* infection and to investigate the potential of symbiotic and plant growth-promoting rhizobacteria (PGPR) in mitigating disease effects. The results revealed notable genotypic variation. One resistant genotype maintained high biomass and elevated antioxidant enzyme activities (CAT and GPOX), while another genotype was highly susceptible. Two Rhizobia strains, exhibiting strong in vitro antagonistic activity against *A. fabae* and producing indole-3-acetic acid (IAA), siderophores, and hydrolytic enzymes, were selected. In vivo assays showed that bacterial inoculation significantly reduced disease severity and improved shoot biomass in both resistant and susceptible genotypes. These findings highlight the potential of selected symbiotic/PGPR strains as natural biofungicides and as contributors to enhanced physiological and biochemical tolerance of faba bean to *A. fabae*.

Keywords: *Vicia faba*, *Ascochyta fabae*, PGPR, varietal biodiversity, biocontrol, fungal resistance.

POSTER N° : 39.

PHYSIOLOGICAL, BIOCHEMICAL AND METABOLIC RESPONSES OF TWO *MEDICAGO SATIVA* VARIETIES TO PESTICIDE STRESS

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Abstract: The intensive use of pesticides in agriculture raises concerns regarding their effects on plant physiology and metabolism. This study aims to compare the stress responses of two *Medicago sativa* genotypes Gabes and Polesana, following exposure to pesticides.

Through integrated physiological, biochemical, and metabolomic analyses, Polesana demonstrated a markedly higher tolerance to pesticide stress. This was evidenced by improved biomass retention, sustained chlorophyll content, and preserved photosynthetic capacity. On the biochemical level, Polesana exhibited upregulated antioxidant defense systems, including elevated activities of superoxide dismutase and guaiacol peroxidase, as well as increased accumulation of polyphenols and flavonoids.

Metabolomic profiling (NMR and UPLC) reveal that pesticide treatments significantly alter Polesana's metabolic profile, characterized by a reduction in major soluble sugars (glucose, fructose, sucrose), enhanced accumulation of stress responsive amino acids such as proline, and the induction of specific flavonoids, notably Tricin and Medicarpin.

These findings indicate that Polesana activates a coordinated multi layered defense strategy, integrating metabolic adjustments and antioxidant regulation, thereby highlighting its potential as a resilient genotype under agrochemical stress.

KEYWORDS: *Medicago sativa*, pesticide, antioxidant response, primary metabolites, secondary metabolites, NMR, UPLC.

POSTER N° : 40.

SALVIA OFFICINALIS L. ESSENTIAL OIL: CHARACTERIZATION AND APPLICATION FOR THE BIOPRESERVATION OF RAW WHITE CHICKEN MEAT

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Abstract:
The objectives of this study were to extract the essential oil (EO) from dried sage leaves (*Salvia officinalis* L.), determine its chemical composition by GC-MS, characterize its physicochemical, organoleptic, antimicrobial and antioxidant properties, and assess its biopreservation effect on raw white chicken meat (poultry meat) during 10 days at 4°C. The extraction was carried out by hydrodistillation with the Clevenger apparatus and the yield was 1.24%. The GC-MS identified 22 chemical compounds in this EO with the dominance of oxygenated monoterpens (67.55%) and confirmed the α-Thujone chemotype. The physicochemical parameters (density = 0.8353; pH = 3; acidity index = 1.6833) and organoleptic characteristics (appearance: liquid, color: very light yellow, odor: spicy and camphoraceous) were in agreement with the international standards. Furthermore, *Salvia officinalis* L. EO exhibited *in vitro* potent antimicrobial activities ($P<0.05$) against various spoilage and pathogenic microorganisms (13 Gram-positive and Gram-negative bacteria and one yeast: *Candida albicans*) with inhibition zone diameters ranging from 13.00±0.67 mm to 33.00±0.00 mm. In addition, sage EO showed interesting *in vitro* antioxidant activities using DPPH (82.05±0.68 %) and ABTS (87.27±0.81 %) tests. Regarding its direct application in raw white chicken meat, sage EO allowed a strong ($P<0.05$) *in situ* antimicrobial activity against aerobic plate counts and Enterobacteriaceae, significantly inhibited ($P<0.05$) the formation of metmyoglobin (MetMb) from the oxidation of myoglobin, and relatively stabilized ($P<0.05$) the organoleptic quality of treated white chicken meat in terms of color, odor and appearance, which ultimately allowed extending the shelf life of refrigerated raw poultry meat up to 7 days at 4°C. Finally, results obtained herein strongly attest that *Salvia officinalis* L. EO possessed very interesting protective properties suggesting its future use as natural preservative in white meat industry.

KEYWORDS: *Essential oil, Salvia officinalis L., GC-SM, Antimicrobial activity, Antioxidant activity, Biopreservation, White meat.*

POSTER N° : 41.

BIOSURFACTANT PRODUCTION BY LACTOBACILLUS STRAINS ISOLATED FROM TUNISIAN TRADITIONAL FERMENTED FOOD PRODUCTS

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Abstract: Biosurfactants are surface-active molecules produced by different microorganisms, including Lactobacillus strains, with emulsifying properties. For their emulsifying activities as well as for the inhibition of some pathogenic microorganisms, biosurfactants produced by lactobacilli could find important applications in food industry. The aim of this study was to screen for biosurfactant production in several lactic acid bacteria (LAB) strains. Ten LAB strains selected previously for antifungal activities were used in experiments. The biosurfactant production was evaluated both in supernatant and in cells cultivated in Man-Sharp-Rogosa (MRS) broth. Oil spreading test, emulsification activity, and drop collapse methods were used for evaluation the biosurfactant production. Antimicrobial action of biosurfactants against Escherichia coli, Bacillus cereus, Staphylococcus aureus, and mycotoxigenic fungi was also examined. Molecular analyses were performed for characterization of selected bacteria. Three out of ten tested LAB strains exhibited clear biosurfactant production.

KEYWORDS: *biosurfactants, Lactobacillus, emulsification of edible oils, microbial activity*

POSTER N° : 42.

CHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY OF OIL FROM THE SEEDS OF THREE TUNISIAN DATE (PHOENIX DACTYLIFERA L.) CULTIVARS

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Abstract: Date fruit seeds constitute a large portion of date by-products. This study evaluates and compares the composition in bioactives and the antioxidant activity of seed oils from three Tunisian date palm (*Phoenix dactylifera* L.) varieties (Deglet-Nour, Allig, Bouhattem). Fatty acids, Chlorophylls, carotenoids and total phenol contents, as well as antioxidant activity were quantified. The obtained results demonstrate that oil yield range from 6.9 to 8.3 g oil/100g dried seeds. TPC values of the various date seed oils showed a considerable difference among varieties and indicate that are quite poor in phenolics. This is due to the poor solubility of phenolics in the lipid fraction Moreover, date seed oil analysis revealed a high content on monounsaturated fatty acid with potential health benefits (oleic acid). In particular, Deglet-Nour oil present the higher content of oleic acid (65.3%). However, the oil of the Allig variety contains more bioactive substances with antioxidant activity such as cholorophylls, carotenoids and polyphenols. This gives it the highest antioxidant activity. Considering the above, date seed oil is rich in nutritional components beneficial for health, which can be used in dietary diets as well as in the cosmetics industry.

KEYWORDS: *Phoenix dactylifera, Seed oil, Biochemical characterization, Antioxidant activity.*

POSTER N° : 43.

FUNCTIONAL VALIDATION OF LOBULARIA MARITIMA THIOREDOXIN-H2 PROTEIN FOR ITS ABILITY TO COMBAT BACTERIAL AND FUNGAL INFECTIONS

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Abstract: Thioredoxins (Trxs) belong to a family of multifunctional redox proteins that is critical for maintaining and regulating the cellular redox environment during plant cell growth. Also, they are important for the development of plant's response to biotic and abiotic stress; however, the specific biological functions of h-type thioredoxins (Trxhs) in plants have not been fully elucidated. Herein, we investigated the role of LmTrxh2, a specific member of the Trxh family, in response to various biotic stress simulants, including mechanical wounding, exposure to jasmonic acid (JA), picolinic acid (PA), salicylic acid (SA), ethephon (ETP), and hydrogen peroxide (H2O2). We observed that LmTrxh2 transcripts were significantly upregulated upon exposure to these stress simulants. The characterization of enzymatic activity revealed that the recombinant LmTrxh2 protein functions as a disulfide reductase. While the role of Trx proteins in redox regulation is well known, their involvement in antimicrobial activity is still unexplored. Therefore, we assessed the antimicrobial effect of LmTrxh2 towards various micro organisms and observed a concentration-dependent inhibition of microbial growth. The minimum inhibitory and minimum bactericidal concentrations and the diameters of the inhibition zones were 40–1250 μg/mL, 40–1250 μg/mL, and 12.5–32.5 mm, respectively. In addition, we used previously developed LmTrxh2-transgenic tobacco lines and found that they showed enhanced resistance to fungal infections triggered by Fusarium graminearum and Aspergillus niger. This resistance was associated with an upregulation of known defense-related genes. Overall, our findings suggest that LmTrxh2 is responsive to multiple biotic stress simulants and plays a critical role in the basal resistance of plants to pathogen infections. These results highlight the potential of LmTrxh2 in the devel opment of strategies to protect crops from various stress factors and emphasize its importance in the adaptation of plants to different stress conditions.

KEYWORDS: *Biotic stress; Defense signaling; LmTrxh2 protein; Lobularia maritima ; Antimicrobial activity*

POSTER N° : 44.

ULTRASONIC EXTRACTION PROCESS OPTIMIZATION OF POLYSACCHARIDES FROM *LEPIDIUM SATIVUM* BY BOX-BEHNKEN DESIGN

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Abstract: Abstract The Box-Behnken design (BBD) and response surface methodology (RSM) were used to optimize the yield of the extraction of cress water-soluble polysaccharides (CWSP) from Lepidium sativum using ultrasound-assisted extraction (UAE) parameters. The results obtained showed that the maximal UAE-yield of CWSP was 8.49±0.18% under the optimal conditions (extraction temperature 74°C, extraction time 60 min and ratio solid:water: 1:26). CWSP contained 82% of total carbohydrate with more different monosaccharides. CWSP exhibited an important functional properties as shown Water and Oil Holding Capacities (WHC and OHC) and emulsions capacities. Furthermore, CWSP also displayed remarkable scavenging activities on DPPH*, ABTS*+ and reducing power *in vitro*, DNA damage protection, antibacterial activities with a Minimum Inhibitory Concentration (MIC) of 2.5 mg/mL against *Salmonella Typhimurium* and *Pseudomonas aeruginosa*, and no cytotoxicity

KEYWORDS: *Box-Behnken, optimization, extraction, polysaccharides*

POSTER N° : 45.

ULTRASONIC EXTRACTION PROCESS OPTIMIZATION OF POLYSACCHARIDES FROM *LEPIDIUM SATIVUM* BY BOX-BEHNKEN DESIGN

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Abstract: Abstract The Box-Behnken design (BBD) and response surface methodology (RSM) were used to optimize the yield of the extraction of cress water-soluble polysaccharides (CWSP) from Lepidium sativum using ultrasound-assisted extraction (UAE) parameters. The results obtained showed that the maximal UAE-yield of CWSP was 8.49±0.18% under the optimal conditions (extraction temperature 74°C, extraction time 60 min and ratio solid:water: 1:26). CWSP contained 82% of total carbohydrate with more different monosaccharides. CWSP exhibited an important functional properties as shown Water and Oil Holding Capacities (WHC and OHC) and emulsions capacities. Furthermore, CWSP also displayed remarkable scavenging activities on DPPH*, ABTS*+ and reducing power *in vitro*, DNA damage protection, antibacterial activities with a Minimum Inhibitory Concentration (MIC) of 2.5 mg/mL against *Salmonella Typhimurium* and *Pseudomonas aeruginosa*, and no cytotoxicity

KEYWORDS: *Box-Behnken, optimization, extraction, polysaccharides*

POSTER N° : 46.

YEAST PRODUCTION FROM DATE PALM

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The food industry uses annually large amounts of dates, whether to preserve the fruit, package and export it or transform the dates into by-products such as flour, fiber, syrups, creams or jams. For this purpose, the present work is part of the quest for the new industrial potential to broaden the product range of dates by side achieving a culture medium containing syrup of dates for the production *Saccharomyces cerevisiae*. This medium to circumvent the problems of beet molasses to know a less expensive and nontoxic. A syrup base scrap Deglet Nour has been prepared and characterized by its Brix, solids, ash, minerals and soluble sugars. Strains produced from dates are compared by their macroscopically and morphological characteristics. Breathing mode, ethanol production, carbohydrate assimilation and growth in the presence of salt are used to better identify the strain. The results obtained showed that the date syrup contains fermentable sugars (32.39%) directly assimilated by the yeast so that the molasses contains sucrose instead. The morphological characteristics and microscopic observations of yeast produced on both media have enabled us to conclude that they belong to the family Saccharomycetaceae. For growth on solid medium, the 1st Stain presented a brilliant green color and a round shape, smooth and rounded and the 2nd Strain has a partially green color and a round shape, smooth and rounded. The respiration of aerobic-anaerobic yeast is optional. By testing the smell after three days of incubation of culture media for yeast, we noticed the appearance of the smell of ethanol. Thus, these yeasts have the ability to produce the alcohol. Furthermore, the two strains are able to ferment glucose and galactose as carbon source while they are incapable of assimilating mannitol. Only strain 2 is unable to use the sucrose and maltose. The strain could not grow in the presence of NaCl. This confirms that the strains belonging to the species *Saccharomyces cerevisiae*. The syrup prepared with scrap Deglet Nour can serve a medium to product yeast for food use.

POSTER N° : 47.

PLANT GROWTH PROMOTING RHIZOBACTERIA (PGPR) ENHANCES TOMATO GROWTH UNDER SALINE CONDITION

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Salinity poses a significant challenge to agricultural systems, negatively impacting plant growth and yield. This study explores the role of plant growth-promoting bacteria (PGPR), specifically *Bacillus velezensis*, in enhancing the tolerance of tomato plants to salt stress through the seed priming technique. In the experiment, seeds were subjected to salt stress (150 mM NaCl) with and without bacterial priming. The results indicated that priming with PGPR significantly alleviated salt stress. This was reflected in improved germination rates, enhanced root and shoot growth, and better plant maintenance, resulting in more favorable phenotypic classifications based on a predetermined scale. Molecular analyses revealed that the differential expression of ion transport channels plays a crucial role in the tomato plant's response to salt stress. Therefore, seed priming emerges as a promising strategy for enhancing the sustainability and resilience of crops against abiotic stresses like increasing soil salinity.

Keywords: Salinity, Tomato, PGPR , Seed priming, Sustainable agriculture.

POSTER N° : 48.

DEEP LEARNING-DRIVEN PHENOTYPE PREDICTION IN RICE UNDER COMBINED WATER AND PATHOGEN STRESS

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Abstract: This research investigates the application of deep learning (DL) to improve the prediction of phenotypic traits in *Oryza sativa* under water stress conditions. By integrating genomic data, artificial intelligence, and insights from genetic mutation analysis, we developed a predictive model using the Selene deep learning library, enabling phenotype inference directly from genotype information. The model was trained on RNA-Seq data obtained from two rice cultivars BPT5204 (drought-tolerant) and TN1 (drought-sensitive) exposed to both water deficit and pathogen stress. For evaluation, chromosomes 6, 8, and 9 were used as a test set, while chromosomes 1, 3, and 4 served as the validation set. The model demonstrated strong performance, achieving an area under the curve (AUC) of 88.6% and an average accuracy of 86.9%, indicating its effectiveness in predicting drought resilience in rice.

KEYWORDS**:** *Phenotype Prediction, Deep Learning, Artificial Intelligence, Genomic Data, RNA-Seq, Oryza sativa, Drought Tolerance, Selene Library*

POSTER N° : 49.

MATHEMATICAL MODELING AND DIFFUSION ANALYSIS OF CONVECTIVE DRYING KINETICS IN *OPUNTIA FICUS-INDICA* PEELS : EFFECT OF ACETIC ACID PRETREATMENT ON DRYING BEHAVIOR AND QUALITY ATTRIBUTES

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Abstract : The effect of a chemical pretreatment (25% acetic acid solution) on the drying kinetics and quality parameters of prickly pear peels (Opuntia ficus-indica) was investigated at three convective drying temperatures: 55 °C, 65 °C, and 75 °C.

The influence of this pretreatment on drying behavior, moisture content, water activity, and color was evaluated. Seven mathematical models were applied to the experimental data, and their goodness of fit was assessed using the coefficient of determination (R^2) and the reduced chi-square (χ^2) statistic.

The Page and diffusion models provided the best fit for describing the convective drying behavior of Opuntia ficus-indica peels.

The chemical pretreatment significantly reduced the drying time compared to untreated samples, with reductions of 80 minutes at 55 °C, 30 minutes at 65 °C, and 50 minutes at 75 °C. It also led to a more pronounced decrease in both moisture content and water activity.

Drying kinetics were analyzed to determine the diffusion coefficient during the falling rate drying phase. This coefficient increased with rising temperature and the use of a chemical pretreatment.

At 55 °C, the diffusion coefficient was $4.7\times10^{-8} \pm 4.6\times10^{-11}$ m²/s without pretreatment, and it increased to $5.7\times10^{-8} \pm$ 00 m²/s with chemical pretreatment.

At 75 °C, the coefficient was $7.9\times10^{-8} \pm 9.18\times10^{-11}$ m²/s without pretreatment, and it reached $9.5\times10^{-8} \pm 6.7\times10^{-9}$ m²/s following the application of the chemical pretreatment. The activation energy increased from 24.69 kJ/mol without pretreatment to 33.48 kJ/mol with chemical pretreatment.

KEYWORDS: *Chemical pretreatment - Convective drying – Opuntia ficus-indica - peels - Diffusion coefficient - Drying kinetics – Mathematical models.*

POSTER N° : 50.

EFFECT OF GAMMA IRRADIATION ON THE CHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITIES OF FLAXSEED CRUDE EXTRACTS " *CUCURBITA PEPO L.*"

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Abstract

This study evaluates the chemical composition of extracts from pumpkin seeds *Cucurbita pepo L.* treated by irradiation and/or germination, and their antioxidant and enzymatic activities.

Aqueous, methanolic, and hexanolic extracts were prepared. Lipid analysis was performed by gas chromatography, and phenolic compounds were quantified spectrophotometrically. Antioxidant activities (DPPH, ABTS tests) and anti-diabetic activity (enzyme inhibition test) were assessed.

Aqueous extracts from irradiated seeds showed high levels of polyphenols, flavonoids, and condensed tannins. Hexane extracts revealed a proportion of unsaturated fatty acids four times higher than saturated fatty acids, enhanced by irradiation and germination. Methanolic extracts from irradiated and germinated seeds showed the lowest IC50 values in DPPH and ABTS tests, and potent anti-diabetic effects (α-amylase and α-glucosidase inhibition).

Chemical and biological analyses indicate that irradiation and germination enhance the nutritional qualities and potential health benefits of **Cucurbita pepo* L.* seeds, confirming their value as a functional food.

Key words: «*Cucurbita pepo L.* », Irradiation, Germination, Antioxidant activity, Enzymatic activity

POSTER N° : 51.

LACTIC ACID BACTERIA FROM TUNISIAN DAIRY PRODUCTS: ISOLATION AND ASSESSMENT OF ANTIBACTERIAL PROPERTIES

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Abstract: The intake of fermented food products has been extensively linked to beneficial effects on human health. These health-promoting properties are generally attributed to both the viable microorganisms present in the final product and the bioactive compounds synthesized as metabolic by-products during the fermentation process. In particular, fermented dairy products are frequently associated with the activity of lactic acid bacteria (LAB), which represent the predominant microbial group responsible for driving the fermentation. In light of their functional importance and antimicrobial capabilities, the present study focuses on assessing the antibacterial activity of LAB strains isolated from a range of traditional dairy products originating from multiple regions, with the aim of identifying candidates with strong inhibitory effects against pathogenic microorganisms. A total of nine lactic acid bacteria (LAB) strains exhibited notable resistance against a spectrum of pathogenic microorganisms, including *Escherichia coli*, *Pseudomonas spp.*, *Salmonella spp.*, *Staphylococcus aureus*, *Listeria monocytogenes*, *Klebsiella spp.*, and *Enterococcus spp.*. The antibacterial activity of these isolates was assessed using cell-free supernatants obtained from cultures grown in Man-Rogosa-Sharpe (MRS) broth and M17 medium, both of which are optimized for LAB growth. The observed inhibitory effects suggest that these strains produce antimicrobial compounds—potentially including organic acids, bacteriocins, or hydrogen peroxide—that contribute to their antagonistic activity. These findings highlight the potential of these LAB isolates as candidates for biopreservation or probiotic applications targeting foodborne and clinical pathogens.

KEYWORDS: *Lactic Acid Bacteria, Lactobacillus, antibacterial activity, biopreservation*

POSTER N° : 52.

PLANT GROWTH PROMOTING RHIZOBACTERIA (PGPR) ENHANCES TOMATO GROWTH UNDER SALINE CONDITION

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Salinity poses a significant challenge to agricultural systems, negatively impacting plant growth and yield. This study explores the role of plant growth-promoting bacteria (PGPR), specifically *Bacillus velezensis*, in enhancing the tolerance of tomato plants to salt stress through the seed priming technique. In the experiment, seeds were subjected to salt stress (150 mM NaCl) with and without bacterial priming. The results indicated that priming with PGPR significantly alleviated salt stress. This was reflected in improved germination rates, enhanced root and shoot growth, and better plant maintenance, resulting in more favorable phenotypic classifications based on a predetermined scale. Molecular analyses revealed that the differential expression of ion transport channels plays a crucial role in the tomato plant's response to salt stress. Therefore, seed priming emerges as a promising strategy for enhancing the sustainability and resilience of crops against abiotic stresses like increasing soil salinity.

Keywords: Salinity, Tomato, PGPR , Seed priming, Sustainable agriculture.

POSTER N° : 53.

UTILIZATION OF BLUE CRAB (PORTUNUS SEGNIS, FORSKÅL, 1775) WASTE AS A POTENTIAL ADDITIVE IN AQUACULTURE FEED

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Abstract: The first specimens of blue crab (*Portunus segnis* FORSKÅL, 1775) were reported along the Tunisian coast of the Gulf of Gabès in October 2014. Due to the challenges posed by this invasive species—particularly its impact on local fisheries and the reluctance of consumers to adopt it—the focus has shifted toward innovative processing methods for both biowaste and co-products. Biotechnological approaches play a crucial role in the valorization of these marine by-products. One promising solution is enzymatic hydrolysis of blue crab powder, which yields a protein concentrate with potential applications, including animal feed. Characterization of the resulting protein hydrolysate revealed notable antimicrobial activity, specifically against Aeromonas hydrophila strain ATCC 7966^T and *Vibrio alginolyticus* strain ATCC 33787^T. In terms of proximal composition, the hydrolysate provides a protein content of approximately 29.4% (dry matter). The amino acid profile highlights the presence of several essential amino acids, including leucine, lysine, isoleucine, and threonine. To evaluate its potential in aquaculture, three experimental diets were formulated with varying levels of protein hydrolysate: 0%, 5%, and 10%. Gilthead seabream (*Sparus aurata* Linnaeus, 1758) were fed either a control diet or one of the supplemented diets for 60 days. The results demonstrated that a 10% protein hydrolysate supplementation significantly improved fish flesh quality, particularly in terms of essential amino acids such as valine, methionine, phenylalanine, and lysine. Although preliminary, this study presents a promising approach for valorizing blue crab (*Portunus segnis* FORSKÅL, 1775) biowaste and co-products in aquaculture feed. The refinement of these marine by-products into high-value amino acid sources underscores their potential as sustainable additives in aquaculture nutrition.

Keywords*: Bleu Crabe, Biowaste valorization, Aquaculture nutrition, Essential amino acid*

POSTER N° : 54.

EVALUATION OF THE PROTECTIVE EFFECT OF *PHELIPANCHE RAMOSA* AGAINST CISPLATIN-INDUCED NEPHROTOXICITY

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Abstract: This study investigated the phytochemical constituents and therapeutic potential of *Phelipanche ramosa* against lithiasis induced by cisplatin in Wistar rats. Using LC-MS/MS^2, the metabolic profiling of the hydromethanolic extract of the *Phelipanche ramosa* was characterized, revealing various metabolites. The experimental design included the administration of two *Phelipanche ramosa* doses (20 and 40 mg/kg bw) to rats, followed by cisplatin in their drinking water to induce urolithiasis. The results demonstrated that *P. ramosa* significantly reduced urinary calcium oxalate crystals following Csp-administration. Furthermore, *Phelipanche ramosa* caused an elevation in urinary volume, suggesting the potential of MISE as a natural diuretic agent for helping to remove crystal debris. In addition, the renal oxidative stress induced by cisplatin was mitigated by *Phelipanche ramosa* administration as manifested by the decreased MDA content and the enhancement of the SOD and CAT activities. The above results were confirmed by the dosage of plasma parameters markers (creatinine, urea, and uric acid) and histopathological evaluations. This study underscored the potential of *Phelipanche ramosa* as a candidate for developing herbal treatments against urolithiasis.

Key words: *phelipanche ramosa*, oxidative stress, bioactive molecules, Nephro-Protective.

POSTER N° : 55.

BIOACTIVE PACKAGING BASED ON PROBIOTIC STRAIN: A SUSTAINABLE APPROACH FOR FOOD SAFETY

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Abstract: The search for sustainable and functional food packaging materials plays a crucial role in reducing environmental impact and improving food preservation. In this study, we developed bioactive and biodegradable films using starch extracted from potato processing co-products. The objective was to develop an alternative to synthetic plastic packaging while extending the shelf life of perishable food products.
Structural characterization confirmed that the starch is composed of glucose polymers. Among the different formulations tested, films containing 2% starch exhibited the best thermal stability and showed improved antioxidant and antimicrobial activities.
To further enhance the film's bioactivity, a probiotic strain isolated in our laboratory was incorporated into the film matrix. Its addition increased antimicrobial effectiveness and introduced potential probiotic functionality, in accordance with the principles of active packaging.
Future studies will focus on evaluating the starch-based probiotic packaging system to extend the shelf life of various food products, such as fresh-cut fruits, vegetables, and meat fillets. Additionally, these materials offer an environmentally friendly solution that may promote both food safety and consumer health.

KEYWORDS: *Bioactive Packaging, Probiotic Strain, Shelf Life Extension, Environmental Impact*

POSTER N° : 56.

CULTURING *NOSTOC* SP. FOR BIOACTIVE METABOLITES: GROWTH DYNAMICS AND BIOCHEMICAL CHARACTERIZATION

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Abstract: The exploration of microalgae as a source of health-beneficial compounds is gaining significant attention. This study investigates the cyanobacterium Nostoc sp. within this context, focusing on the selection and culture strategies for the production of such valuable metabolites.The research encompassed the optimization of culture conditions, growth monitoring, biomass collection, and detailed biochemical characterization of Nostoc sp. Specifically, growth was monitored under two different culture conditions: with and without bubbling, to evaluate the effect of aeration. Furthermore, the impact of lyophilization on the secretion of polysaccharides, lipids, and proteins was assessed by comparing lyophilized biomass with fresh cultures. Biomass was harvested and analyzed after one and two weeks of culture to observe temporal changes in polysaccharide, lipid, and protein content. Biochemical analyses included pigment quantification, DPPH assay, and the determination of nitrates, polysaccharides, proteins, and lipids.

Furthermore, GC-MS analysis provided insights into the specific lipid and other organic components present. The results demonstrated that bubbling significantly enhanced the growth of Nostoc sp., with biomass increasing by 82.88% after two weeks. Lyophilization led to a 54.94% reduction in polysaccharide content, suggesting potential degradation during the process. lipid content decreased by 24.12%, and protein content decreased by 61.19%. Additionally, for comparative purposes, the growth of Baaleninema sp. and Baaleninema simplex was monitored under the same conditions. Baaleninema sp. showed a slight increase in growth between the first and second week, whereas Baaleninema simplex experienced a decrease in biomass during the second week, indicating its inability to thrive under these culture conditions.

In conclusion, this study highlights the influence of culture conditions and processing methods on the biomass and bioactive compound content of Nostoc sp., providing valuable information for its potential biotechnological applications.

POSTER N° : 57.

SCREENING OF FUNGAL STRAINS PRODUCING LIPASES AND PROTEASES OF INDUSTRIAL INTEREST FROM VARIOUS TUNISIAN EXTREME BIOTOPES

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Abstract:
With the increasing demand for sustainable development and energy efficiency, this study investigates fungal hydrolases—specifically lipases and proteases—as eco-friendly alternatives to conventional chemical processes. Hydrolases are enzymes that catalyze the hydrolysis of chemical bonds using water, playing a crucial role in advancing greener industrial applications. Among them, lipases and proteases are widely utilized in various industries due to their efficiency in breaking down fats and proteins. We screened 500 newly isolated fungal strains from various Tunisian extreme biotopes for hydrolases (lipases and proteases) production. These enzymes play a crucial role in advancing greener industrial applications. Strains were cultured on Potato Dextrose Agar (PDA) solid medium, with lipolytic activity assessed using a medium supplemented with 1% olive oil (OO) and 0.1% Rhodamine B, and proteolytic activity evaluated on nutrient agar containing milk. Cultures were incubated at 28 ± 2 °C, with lipase-producing strains identified via fluorescent halos under UV light, and protease activity confirmed by clear zones surrounding colonies. Quantitative lipase activity was determined using a pH-STAT device (Metrohm 902 Titrando, Herisau, Switzerland) to counteract the pH reduction caused by fatty acid (FA) release, with sodium hydroxide ([NaOH] = 0.1 N) used as a neutralizing agent. Protease activity was measured following the Kembhavi method (1994), employing casein as the substrate. Of the 500 strains screened, 35 demonstrated significant hydrolase activity on solid medium and were subsequently preserved. Preliminary assays in liquid medium revealed lipase activities ranging from 1 to 42 U/mL using tributyrin (TC4) as the substrate, while protease activity analyses remain underway.

KEYWORDS: *Screening, Fungi, Enzymes, Lipases, Protease, Purification, Biochemical.*

POSTER N° : 58.

INTEGRATING GENOMIC ANALYSIS AND I*N VITRO* INVESTIGATION TO SUPPORT PROBIOTIC POTENTIAL OF THE POLYEXTREMOPHILIC STRAIN *HALOMONAS DESERTIS* G11

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Abstract : Nowadays, probiotic products are becoming more popular on the market thanks to their safety for food, feed and pharmaceutical applications and their crucial role in health promotion and disease treatment and management. Indeed, probiotics are involved in immune system activation, gut microbiota stabilization, regulation of host metabolic activities, protection of the host from infectious agents and prevention and reduction of the risk of chronic diseases including diabetes. In this study, *Halomonas desertis* G11, an extremophilic strain isolated from a Tunisian hypersaline desert lake, was investigated for its safety and probiotic properties based on its genomic and functional characteristics. The presence of an adaptative immune CRISPR/Cas system and the absence of genes of potential virulence factors including antibiotic resistance, in the *H. desertis* genome suggested that G11 is a safe strain. The probiogenomic assessment results demonstrated that *H. desertis* G11 has multiple genes involved in probiotic functions, including the flexibility and adaptability to environmental stress and the biosynthesis of numerous bioactive compounds and secondary metabolites like toxins-antitoxins, a colicin V-like bacteriocin, ectoine and hydroxyectoine osmoprotectants, a β-lactone ring, a non-ribosomal peptide metallophore, and a ribosomally synthesized and post-translationally modified peptide. *In vitro* experiments confirmed that *H. desertis* G11 was sensitive to antibiotics, adheres to intestinal epithelial cells and exhibited bile salt and acid tolerance. Moreover, G11 strain possessed significant antioxidant and antimicrobial activities. Moreover, our results reinforce the hypothesis that probiotic strains have the potential to inhibit target enzymes which are associated with type 2 diabetes. Based on these findings, *H. desertis* G11 can be considered as a promising extremophilic producer strain of a variety of biologically active compounds and as a safe probiotic candidate in food and feed industries.

KEYWORDS: *Halomonas desertis*, genome mining, safety assessment, probiotic, health promoting properties, novel bioproducts, *in-vitro* anti-diabetic effect.

POSTER N° : 59.

COMPARATIVE STUDY OF PHENOLIC COMPOUNDS IN SPIRULINA AND *MELISSA OFFICINALIS* AND EFFECT OL MELISSA AQUEOUS EXTRACT ON SERUM PARAMETERS AFTER IRON OVERLOAD

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Abstract

The aim of this study was firstly to compare the content of secondary metabolites (polyphenols, flavonoids and reducing sugars) and the antioxidant and antibacterial activities of aqueous extracts of spirulina and lemon balm(*Melissa officinalis*) , and secondly to assess the effect of lemon balm aqueous extract on serum parameters following iron overload. Spirulina has a high polyphenol content (4.56 mg EAG/g). Lemon balm was rich in flavonoids (6.291 mg EAG/g dry matter), followed by polyphenols (5.742 mg EAG/g dry matter), which explains the high antioxidant activity of Lemon balm (0.0049 mg/ml), compared with spirulina (47.229 mg/ml) for DPPH. Antibacterial activity results show good susceptibility to the *E. coli* following low MIC (1.5 mg/ml) and CMB (3.12 mg/ml) values for lemon balm. Iron overload at a dose of 30 mg/kg induces an increase in plasma iron associated with an increase in creatinine. The use of aqueous lemon balm extract corrects the iron-induced effects.

***Key words*:** *Spirulina; Melissa officinalis; antioxidant activity; antibacterial activity, serum parameters*

POSTER N° : 60.

QUALITY PARAMETERS AND ANTIOXIDANT ACTIVITY OF *CUCUMIS MELO* L. PEEL POWDERS AND THEIR VALORIZATION IN FOOD FORMULATIONS

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Abstract: Melon (*Cucumis melo* L.) is one of the most consumed crops worldwide due to its sweetness, juicy taste and pleasing flavour. This fruit is known for nutritive and medicinal properties of pulp. However, during consumption and industrial processing, inedible parts of the fruit is wasted such as melon peels and seeds. To our knowledge, data concerning biochemical features of melon peels are scare in literature, compared to the pulp part. The present study provides a preliminary biochemical characterization of melon peels, evaluating total polyphenol and flavonoid contents through specific spectrophotometric methods, as well as the antioxidant activity by means of FRAP and DPPH assays. The identification and the quantification of the phenolic compounds of *Cucumis melo* rinds were performed by high performance liquid chromatography apparatus. The obtained results indicate that hydroxybenzoic acids and flavones constitute their main phenolic classes. Moreover, 3-Hydroxybenzoic acid is the major phenolic compound by 33.45 mg/100 g, followed by apigenin-7-glycoside (29.34 mg/100 g) in the melon peels. Among all, polyphenol compounds show antioxidant activity, delaying or inhibiting the oxidation of lipids and other molecules, so protecting cells from damage. The polyphenolic extract from melon peels may be considered as potential source of natural antioxidants for food formulations and cosmetic products. These by-products are still rich in phytochemicals, such as polyphenols, carotenoids, and other biologically active components, which have a positive influence on health and preventing aging effects. On the other hand, the recovery of high values-added biomolecules contributes to the reduction of biomasses that cause environmental pollution and, consequently, to the lowering of related disposal costs.

KEYWORDS: *Cucumis melo L. peels, phytochemicals, polyphenols, flavonoids, bioactive molecules, antioxidant activity, food formulations.*

POSTER N° : 61.

GARLIC-ENRICHED OLIVE OIL: INFLUENCE OF GARLIC FORM ON BIOACTIVE PROPERTIES AND CHEMICAL PROFILES

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Abstract: Virgin olive oil and garlic are both renowned for their rich profiles of bioactive compounds and associated health benefits. Combining these two ingredients offers a promising approach to enhance the nutritional and functional properties of olive oil through natural enrichment. This study investigates the enhancement of virgin olive oil (VOO) through enrichment with garlic in various forms—fresh, oven-dried, and freeze-dried—focusing on its chemical composition, antioxidant capacity, and antibacterial activity. Garlic-enriched virgin olive oils were prepared using ultrasonic-assisted maceration. Their quality was evaluated through a comprehensive analysis of physicochemical parameters, including quality indices (free acidity, peroxide value, and UV characteristics), pigment concentrations (chlorophylls and carotenoids), bioactive compound contents (total phenols and flavonoids), as well as antioxidant activity (DPPH assay) and antimicrobial properties. Comparative analyses revealed that the oil enriched with freeze-dried and fresh garlic, exhibited improved quality indices—including lower peroxide values and UV characteristics—alongside significantly elevated levels of chlorophylls, carotenoids, total phenols, and flavonoids, resulting in enhanced antioxidant capacity as demonstrated by lower IC_{50} values in the DPPH radical scavenging assay. Furthermore, antibacterial assays revealed significant inhibition zones, with freeze-dried and fresh garlic oils exhibiting the most potent effects. These oils produced notably larger inhibition diameter (ID) and lower minimum inhibitory concentration (MIC) values, against both Gram-negative and Gram-positive bacteria confirmed their potent antibacterial activity. Based on these results, freeze-dried garlic proved to be the most effective form for enriching virgin olive oil, demonstrating superior antioxidant and antimicrobial properties along with higher levels of phenolic and flavonoid compounds compared to fresh and oven-dried garlic oils. These findings support the potential of garlic-enriched VOO as a functional food ingredient with enhanced antimicrobial and antioxidant properties, while also highlighting the impact of garlic drying methods on the oil's bioactive and chemical composition.

KEYWORDS: *Virgin olive oil, garlic, maceration, antioxidant, antimicrobial*

POSTER N° : 62.

IDENTIFICATION OF SECONDARY METABOLITES IN DATE SEED EXTRACTS BY LOW-RESOLUTION MASS SPECTROSCOPY ESI–MS/MS

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Abstract: The valorization of agricultural by-products is crucial for sustainable practices. The extraction of bioactive compounds from date seeds were analyzed for phenolic profiles by Mass Spectroscopy ESI–MS/MS in the negative ionization mode ($[M–H]^-$). This analytical technique provided valuable insights into the phenolic compound composition, revealing the presence of 18 compounds in date seed extract based on their mass-to-charge ratios, retention times (RT), and fragmentation patterns in MS^2 spectra. The resulting metabolite profile was dominated by phenolic acids, flavonoid glycosides, flavan-3-ols, and other structurally diverse polyphenolic derivatives. Among the phenolic acids, key compounds identified included protocatechuic acid, which fragmented to a major ion at m/z 109, corresponding to the loss of a carboxyl group. Caffeoylshikimic acid exhibited characteristic product ions at m/z 289, 179, and 161, indicative of caffeic acid fragmentation, while glucosyringic acid was identified based on its molecular ion and daughter ions (m/z 197). The extract also contained a diverse group of flavonoid glycosides, including quercetin 3-O-rutinoside and quercetin 3-O-glucoside. In addition, luteolin and isorhamnetin glycosides, such as isorhamnetin-3-O-rutinoside (m/z 623), were also detected, supporting the presence of methylated flavonols with extended bioactivity. Sulfated flavonoids, such as quercetinhexoside sulfate (m/z 543). The class of flavan-3-ols was particularly abundant, including (+)-catechin and (−)-epicatechin (both m/z 289) and a range of procyanidin oligomers such as dimers (m/z 577) and trimers (m/z 865). These compounds are significant contributors to the strong radical-scavenging and metal-chelating activities of the extract. These findings underscore the potential of date palm by-products as valuable resources for developing functional products, contributing to sustainability and a circular economy.

Keywords: Date seed extract, Mass Spectroscopy, phenolic compounds, sustainability.
This work was elaborated under the framework of the PRIMA project “MEDGOAT”

POSTER N° : 63.

EVALUATION OF THE PROBIOTIC POTENTIAL AND EFFECT OF ENCAPSULATION ON SURVIVAL FOR *LACTIPLANTIBACILLUS PLANTARUM* LC38 FROM TUNISIAN CAMEL MILK

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Abstract: The global consumption of probiotic foods and feeds has increased considerably in recent years. The current study aimed to investigate the probiotic characteristics of lactic acid bacteria strains isolated from camel milk and screened for several criteria. The selected probiotic strain, named *Lactiplantibacillus plantarum* LC38, was encapsulated with different coating materials, including Kappa-carrageenan, sodium alginate and/or chitosan to evaluate its viability and its antibacterial activity. The findings revealed strain LC38 sensitivity to several antibiotics, antimicrobial activities against pathogenic bacteria and high surface hydrophobicity that enhanced its adhesion ability to epithelial cells. This potent probiotic bacterium was selected to be encapsulated. The alginate-chitosan and carrageenan-chitosan used as coating materials improve probiotic strain survival both during storage at different temperatures and in gastrointestinal condition. Also, encapsulated probiotic with alginate-chitosan enhanced antibacterial activity of the cells.

KEYWORDS: *Probiotic, lactic acid bacteria, camel milk, encapsulation*

POSTER N° : 64.

OPTIMIZATION OF PHENOLIC-RICH EXTRACTS FROM 'CHEMLALI' OLIVE TREE BY-PRODUCTS USING ADVANCED GREEN EXTRACTION TECHNIQUES

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Abstract: Olive by-products are valuable sources of bioactive compounds, with significant potential for valorization in various industrial applications. This study aimed to evaluate and compare the efficiency of various advanced extraction techniques for obtaining polyphenol-rich extracts from the by-products (leaves, branches and pomace) of *Olea europaea* L. cv. *Chemlali*, the predominant olive cultivar in Tunisia, relative to conventional maceration methods (CM). Green extraction methods employed in this study are ultrasound-assisted extraction (UAE) using both bath and probe systems, microwave-assisted extraction (MAE), and accelerated solvent extraction (ASE). To evaluate the efficiency of these extraction methods, the total phenolic content, carbohydrate levels, and protein yield were quantified. Among the tested methods, ultrasound-assisted extraction, particularly with the probe system, proved to be the most effective and time-efficient approach, with olive leaves showing the highest concentration of bioactive compounds. These findings confirm the suitability of green methods for enhancing the phenolic yield from olive by-products for various value-added applications.

KEYWORDS: *Green Extraction Methods, Olive By-Products, Phenolic Compounds*

POSTER N° : 65.

ANTIBIOTIC RESISTANCE PROFILES OF GRAM-NEGATIVE BACTERIA IN SOUTHERN TUNISIA: FOCUS ON ESBL, CARBAPENEM AND COLISTIN RESISTANCE.

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Abstract: The main objective of this cross-sectional study was to investigate the prevalence of bacteria resistant to beta-lactam antibiotics (cephalosporins or carbapenems) or to colistin, isolated from urine samples in two private polyclinics located in the Sfax region, in southern Tunisia. From September 2021 to August 2022, 116 strains resistant to β-lactams or colistin were isolated, identified by MALDI-TOF, and their antibiotic susceptibility was assessed by disk diffusion. Resistance genes were detected by real-time PCR, standard PCR, and sequencing. The results revealed that the 116 strains consisted predominantly of *Enterobacteriaceae* (92.2%) and non-fermenting bacteria (7.8%). Among these strains, 18.1% were resistant to carbapenems, and 2.7% were resistant to colistin, including two strains of *Klebsiella pneumoniae* (1.7%) that exhibited resistance to both carbapenems and colistin. In *Enterobacteriaceae*, $bla_{\text{CTX-A}}$, bla_{SHV}, and bla_{TEM} were found in 79.5%, 46.7%, and 40.2% of strains, respectively. For these strains, the minimum inhibitory concentrations (MICs) of imipenem and ertapenem ranged from >32 to 6 µg/mL and >32 to 2 µg/mL, respectively, with $bla_{\text{OXA-48}}$ and bla_{NDM} detected in 21.7% and 19.6% of isolates, respectively. Seven *A. baumannii* isolates resistant to imipenem and meropenem) carried $bla_{\text{OXA-23}}$ (n=5) and $bla_{\text{OXA-24}}$ (n=2). In addition, mutations in the *mgrB* gene conferring colistin resistance were identified in two isolates. Two *K. pneumoniae* were colistin-resistant and carried the $bla_{\text{OXA-48}}$ gene. These results highlight the urgency of developing new strategies for the identification and surveillance of pathogenic strains in humans to effectively combat this growing public health threat in Tunisia.

KEYWORDS: *urine; ESBL; carbapenemase; colistin.*

ENVIRONMENT

POSTER N° : 66.

CHARACTERIZATION OF A NOVEL *BACILLUS THURINGIENSIS* STRAIN TO BE USED AS A BIOPESTICIDE FOR INSECT CONTROL AND PLANT GROWTH PROMOTION

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Abstract: Biological control is gaining prominence as a sustainable and eco-friendly alternative to chemical pesticides in agriculture. In this context, *Bacillus thuringiensis* (Bt), a well-known entomopathogenic bacterium, produces crystalline protein inclusions predominantly composed of Cry toxins, which are responsible for its insecticidal activity against larval stages of various insect pests. BUPM14 is a recently isolated Bt strain evaluated for its dual functionality as a biocontrol agent and a plant growth-promoting rhizobacterium (PGPR). It exhibited a moderate antibacterial activity against *Agrobacterium tumefaciens* and a strong antifungal effect against *Botrytis cinerea*. Toxicity assays conducted on second-instar larvae of the Lepidopteran insect *Ephestia kuehniella* revealed a median lethal concentration (LC50) of 120.70 ± 27.20 µg/g, which is comparable to that of the reference strain HD1 (116 ± 26.16 µg/g), thereby confirming its insecticidal potential. As a PGPR, BUPM14 demonstrated several plant-beneficial traits, including robust biofilm formation, atmospheric nitrogen fixation, cellulase production, and endophytic colonization of tomato plant tissues, with population densities reaching 30 CFU/mL in roots and 1.6×10^3 CFU/mL in stems. Moreover, its application significantly improved seed germination, enhanced root development, and led to a slight increase in plant fresh weight, indicating a positive phytostimulatory effect. Collectively, these findings underscore the promising dual role of *B. thuringiensis* BUPM14 as a biopesticide and a PGPR, making it a valuable candidate for sustainable and integrated crop management strategies.

KEYWORDS: *Bacillus thuringiensis*, biopesticide, PGPR, biocontrol, sustainable agriculture

POSTER N° : 67.

A PROMISING *BACILLUS PARALICHENIFORMIS* STRAIN WITH A POTENTIAL BIOCONTROL AGENT TO MANAGE GRAY MOLD IN CHERRY TOMATOES

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Abstract: Each year, the agricultural sector is threatened by a multitude of agents including fungi. These latter cause significant reductions in both crop quality and productivity. This study aims to select a biocontrol agent against *Botrytis cinerea*, the causal agent of gray mold disease on cherry tomatoes, a fruit widely cultivated and valued for its taste and high nutritional level, which represents a considerable danger for this agricultural sector. For this purpose, 82 *Bacillus* strains were isolated from different regions in Algeria, and 42 strains exhibited antifungal activity, 11 of which possessed a broad spectrum against all seven tested fungi (*B. cinerea*, *F. oxysporum*, *A. niger*, *F. culmorum*, *A. alternata*, *F. graminearum*, and *Z. tritici*). *In vitro* studies showed that each isolate produced at least one lytic enzyme (chitinase, glucanase, amylase, protease, or lipase) reported to be involved in the fungal growth inhibition. Based on 16S rRNA sequencing, all strains were classified within the *Bacillus subtilis* group. Greater interest has been given to strain H12, identified as *B. paralicheniformis*, which significantly decreased the gray mold decay in cherry tomatoes. Indeed, tomatoes treated with H12 showed less weight loss (weight index 0.04) than the control group (0.104). We showed that the fungal growth inhibition was more pronounced by the direct contact between the diffusible compounds of the bacterium and the vegetative mycelium than by its soluble compounds. The production of such compounds was ascertained by *in vitro* tests. It was concluded that strain H12 is a promising *Bacillus* strain that can be used as a biological control agent to manage gray mold in cherry tomatoes.

KEYWORDS: *Bacillus paralicheniformis*, biocontrol agent, gray mold, cherry tomatoes.

POSTER N° : 68.

Exploring Fatty Acid Composition in Date Wastes: Insights into Lipid Content and Distribution

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Abstract. Fatty acids are of significant interest due to their high nutritional, functional, and industrial value. They offer diets rich in mono-unsaturated and poly-unsaturated fatty acids, both beneficial for human health. In addition to traditional oleaginous species, recent research has explored alternative sources of functional vegetable oils, notably including date wastes. The objective of this research was to estimate the lipid content and fatty acids composition at different parts of date wastes notably seeds, periander and stems. Considering the adopted methodology**,** the total lipid content (TLC) was quantified after lipid diethyl ether extraction using soxhlet. A rapid methylation of fatty acids was carried out in the presence of sodium methoxide. The incorporation of a known quantity of C17:0 makes it possible to quantify the different fatty acids as well as their total quantity. The methyl esters obtained are analyzed by Gaz Chromatography. The obtained results depicted that TLC was equal to 6.56, 1.47 and 1.2 grams of fat/100 grams of powder respectively on seeds, periander and stems. Moreover, oleic (C18:1) and linoleic (C18:2) acids were the more present as unsaturated fatty acids in all date wastes with percentages of 65.8%, 56.5% and 55.4% respectively in seeds, periander and stems. Myristic acid was the major saturated fatty acid in date seeds (15.22%) followed by palmitic acid (13.15%); whereas palmitic acid was the more persistent as a saturated fatty acid in date periander (18.33%) and stems (26.43%) then the stearic acid with 14.88% and 8.76% respectively. As a whole, Gaz Chromatography demonstrates the similarity of fatty acid composition in date seeds, periander and stems but a large difference in quantity of total lipid content (TLC).

This work was elaborated under the framework of the PRIMA project "MEDGOAT"

POSTER N° : 69.

CACTUS JUICE AS A SUSTAINABLE ALTERNATIVE TO SYNTHETIC POLYMERS IN COAGULATION-FLOCCULATION FOR WASTEWATER TREATMENT

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Abstract: The conventional coagulation–flocculation process using chemicals (alum, polyacrylamide, lime, etc.) was applied by most industries in the world. In this study, the cactus juice was used to substitute the polyacrylamide in the coagulation–flocculation process for treatment of wastewaters. Depending on the wastewater's origin, the bioflocculant showed removal efficiencies for suspended solids (83.3–88.7%) and for chemical oxygen demand (59.1–69.1%). Interestingly, the addition of lime enhance the process efficiencies for both suspended solids and chemical oxygen demand (>90%). In order to understand the flocculating properties of cactus, various cactus juice preparations were tested on synthetic and real industrial and leachate wastewaters. It was found that the crude cactus juice had a flocculating activity of 89 ± 2.2% which is significantly higher than dried (60°C oven-dried) sample (37.8 ± 2.5%). Interestingly, both crude and dried samples showed the ability to flocculate kaolin suspensions within a wide pH range from 3 to 11. Crude bioflocculant showed to be thermally stable. Both crude and dried cactus juice removed chemical oxygen demand for both petrochemical and leachate wastewaters (>69%). In the same context, the removal efficiency of naproxen (an emerging pollutant) from the kaolin suspension was evaluated showed a level that does not exceed 32%. Interestingly, the physico-chemical analysis revealed that the bioflocculant is mainly composed of polysaccharide. Finally, it was concluded that the use of cactus in the coagulation flocculation process fits well with the definition of sustainability and it is appropriate for regions where cactuses grow naturally.

KEYWORDS: *coagulation–flocculation, bioflocculant, cactus juice, industrial wastewater, emerging pollutant, flocculating activity, naproxen, opuntia*

POSTER N° : 70.

USE OF STRESS BIOMARKERS IN *PERNA PERNA* MUSSELS (LINNAEUS, 1758) FOR MONITORING COASTAL SEAWATER IN THE EASTERN REGION

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Abstract : The Algerian coastline is characterised by various industrial activities that could threaten coastal waters and their living resources. The effects of xenobiotics carried by effluents (organic and/or inorganic) on different aquatic species, resulting in biochemical and even physiological disturbances, are entirely distinct. In this context, the aim of this study is to observe changes in biological responses (catalase enzyme activity and total proteins) in the flesh of African mussels 'Perna perna' fished on the Algerian coast (Figuier, W. Boumerdes; Bateau cassé, W. Algiers) over a five-month period (January to May). At the same time, physico-chemical measurements and other pollution parameters (nitrites, nitrates, ammonium and phosphates) were taken for seawater samples. The results for catalase activity and total protein showed that mussels at both sites are relatively less stressed during the winter period (January, February and March) for the two study sites respectively. The peak of stress is recorded in May for the Figuier site and in April-May for the Bateau cassé site. This stress is probably caused by environmental conditions and/or pollution. In addition, by monitoring the evolution of the enzymatic responses obtained in all the samples, we were able to qualify catalase as a highly sensitive and rapid non-specific defence biomarker.

Key words: Biomarkers, Stress, Pollution, Monitoring, Coastal waters.

POSTER N° : 71.

VALORIZATION OF BLUE SWIMMING CRAB HYDROLYSATE FOR SUSTAINABLE FISH FEED DEVELOPMENT

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Abstract:

The blue swimming crab (*Portunus segnis*) is an invasive species originating from the western Indian Ocean and the Red Sea, introduced into the Mediterranean Sea via the Suez Canal through maritime traffic and ballast water. Over time, it has rapidly colonized the Tunisian coast, reaching as far as the Bizerte lagoon. This species exhibits sexual dimorphism, undergoes internal fertilization, and reaches maturity at one year. It inhabits intertidal zones up to 50 meters deep, favoring muddy and sandy environments, and follows an omnivorous diet, primarily consuming benthic organisms such as fish and bivalves. To address the crab waste issue and promote sustainable development in crab processing, its valorization in fish feed is explored. This study investigates the use of microbial hydrolysis-derived crab hydrolysate as a feed ingredient. Crab powder was produced by crushing, air-drying, and fine grinding the shells, followed by enzymatic hydrolysis using trypsin, maintaining pH (7–8) and temperature (37°C). The biochemical composition of the hydrolysate and sediment was analyzed for protein, fat, carbohydrates, and ash content. Findings revealed that crab hydrolysate had low dry matter content (≤3%), low protein levels, and high mineral content, limiting its nutritional value. Despite challenges in feed production due to high dilution and drying costs, enzymatic hydrolysate contained minerals but lacked sufficient protein, restricting its use in gilthead seabream (*Sparus aurata*) diets (maximum 20% inclusion). Although the drying process could allow its use as hydrolysate meal, the residue's low protein and high mineral levels make direct application difficult.

KEYWORDS: *Blue swimming crab; Aquaculture sustainability; Nutritional composition.*

POSTER N° : 72.

NANOPARTICLES INFLUENCE HAP TOXICITY IN THE MEDITERRANEAN MUSSELS

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Abstract: Laboratory experiments on the interaction between nanoparticles and emerging contaminants in aquatic organisms are still few in number. To measure the consequences of these effects at the population and community level, we need to be able to determine the effects at different levels in individuals. In this study, the mussel Mytilus galloprovincialis exposed to $AuTiO_2$ nanoparticles and a PAH (Benz anthracene (Ba)) showed a level of sensitivity dependent on the organ and the chemical nature of the contaminant. Thus, if we consider the unique effect of each contaminant, the gills are highly sensitive to contamination by polycyclic aromatic hydrocarbons. Studying the effect of the binary mixture induced an antagonistic effect observed at the level of the two organs.
These observations highlight complex processes that may be linked to specific metabolic reactions in each organ or to chemical interactions between the tested products.
This study showed that gills can be used as a target organ for hydrocarbon contamination. Furthermore, interactions between pollutants are a complex phenomenon that requires further research to better understand the impact of chemical compounds on the biological components of the ecosystem.

KEYWORDS: *Nanoparticles, hydrocarbons, Mytilus galloprovincialis, Antagonism, Biomarkers*

POSTER N° : 73.

TITLE: SUSTAINABLE WATER RE-USE WITH INNOVATIVE PURIFICATION AND SENSING SYSTEM FOR THE AGRI-FOOD SUPPLY CHAIN

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Abstract: The tomato processing industry generates significant volumes of wastewater which, if not properly managed, can have negative environmental impacts. However, this water can be valorized for agricultural irrigation, offering a sustainable solution for water resource utilization and pollution reduction. This study was conducted within the framework of the SWIRPS project, which aims to assess the impact of reusing unconventional water from the agri-food industry. Microbiological analyses of raw effluents collected from the COMOCAP treatment plant in Tunis revealed inadequate sanitary quality. Our Project WP4 aims to tackle two important aspects to raise awareness and confidence in the use of purified water for soil irrigation. First, WP4 will complement the online monitoring analysis of soil with microbiological and physicochemical analyses. For the field study, we will perform soil analyses: physical and chemical and microbial analysis. Additionally, we will track the irrigation effect in soil compared with control soil (for three periods of the tomato plant cycle) in the second year of the project, based on physical, chemical, and microbiological analyses at different depths (0-20, 20-40, and 40-60 cm). In the third year, we will try to ameliorate the quality of purified water used for irrigation through biological processes (phytoremediation and bioaugmentation) in the lab.The wastewater was treated by a biological process using activated sludge supplemented by a nanofiltration system. The physicochemical analysis showed that the quality of the water was improved and tested for tomato plant irrigation. The microbiological analysis proved that pathogens were detected in soil irrigated with the effluent, specifically 102 UFC/mL total coliforms and 10 UFC/mL E. coli bacteria. Phenotypic identification of the counted bacteria confirmed the presence of Pseudomonas aeruginosa, E. coli, and Klebsiella pneumoniae in soil irrigated with biologically treated water. These bacteria were not detected in soil irrigated with water from the supplemented nanofiltration treatment. The microbiological analyses conducted on COMOCAP's wastewater, both before and after biological treatment, have demonstrated the critical role of these tests in ensuring the efficiency of wastewater treatment processes and safeguarding the environment.

KEYWORDS: Wastewater, biological process, Fungi, bacteria, soil, Irrigation

GENETICS AND IMMUNOLOGY

POSTER N° : 74.

EVOLUTION AND DIVERSITY OF DRB LOCUS IN HARES (*LEPUS CAPENSIS*) FROM TUNISIA

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Abstract: Genes associated with the major histocompatibility complex (MHC) are crucial for studying adaptive variation, with their diversity being influenced by both selective and non-selective evolutionary mechanisms. In this study, we examined the spatial distribution of diversity in the MHC class II DRB exon 2 gene in Tunisian hares (*Lepus capensis*) across all major bioclimatic regions and most of the geographic distribution of the species in Tunisia to better understand the processes contributing to this diversity. Our results revealed 26 DRB alleles among 133 hares. Our studied populations showed varying distribution patterns of the common and frequent DRB alleles, as well as differing levels of private alleles in combination with other rare alleles. Such a relatively high level of diversity and spatial differentiation was consistent with earlier observations for DQA and DQB loci. While we found clear evidence of positive selection affecting the DRB gene, recombination seemed to have a more significant role in the evolution of this locus. Furthermore, our statistical models indicated that climatic factors have a significant impact on the presence of specific alleles, regardless of their geographic distribution. This suggests an adaptation to spatial variations in pathogen pressure.

KEYWORDS: *MHC, DRB, hares, positive selection*

POSTER N° : 75.

AN OVERVIEW OF ANDROGEN RECEPTOR (AR) PROTEIN-PROTEIN INTERACTIONS (PPI) AND PATHWAY ENRICHEMENT : POTENTIAL IMPLICATIONS IN DRUG REPURPOSING IN PROSTATE CANCER

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Abstract

One of the major therapeutic challenges in managing Prostate cancer (PCa) is resistance to hormone therapy. Despite the central role of the androgen receptor (AR) in disease progression and hormone therapy, resistance often develops, leading to castration-resistant prostate cancer (CRPC). This fact highlights the involvement of additional pathways beyond AR signaling in therapy resistance.

Here in, We aim to perform an in silico enrichment analysis to predict signaling pathways and common interacting genes/proteins that may be involved in the regulation of hormone therapy's mechanism, with a focus on identifying druggable targets that could be repurposed to overcome current challenges.

Pathway Enrichment Analysis was performed using the Database for Annotation, Visualization, and Integrated Discovery DAVID (https://davidbioinformatics.nih.gov). Protein-Protein Interaction (PPI) was conducted using STRING software (V.12.0) (https://string-db.org). Targeted proteins' drug interactions was carried out using DGIdb (https://dgidb.org) database. Finally, cytoscape software (V.3.10.1) (https://cytoscape.org/) was used to construct biological networks for enriched pathways and protein/gene drug interaction.

Strong high-confidence interactions were revealed between AR, FOXA1, MDM2, KLK3, HSP90AA1, HSP90AB1, NCOA3, KDM1A, CTNNB1, NCOA2 and NCOA4, many of which are directly related to hormonal regulation, transcription, or cancer occurrence and or/progression. **The main commun enriched pathways were Androgen Receptor (AR) Signaling, Transcriptional Regulation by Nuclear Receptors, PI3K-AKT Signaling, Wnt/β-Catenin Pathway, HSP90 Chaperone Cycle for Steroid Hormone Receptors, TP53 Regulation Pathway, Chromatin Modification and Prostate Cancer Pathway** *mainly related to* **hormone signaling, transcription and chromatin regulation, oncogenic survival pathways and stress response.**

Taken together, this analysis underscores a potential collective contribution to treatment resistance mechanisms. These genes seems to cooperate orchestrating transcriptional programs, and their interactions is likely playing a pivotal role in modulating hormonal signaling pathways and driving cancer progression. Finally, AR, HSP90 and FOXA1 were the main highlighted potential druggable tragets. Pairing AR inhibitors with HSP90 inhibitors could be conceivable as an emerging startegy to overcome resistance mechanisms. FOXA1 is under clinical investigation, offering promissing avenues for multi-targeted strategies to improve outcomes.

These preliminary findings will help guide subsequent laboratory experiments aimed at validating these genes as potential biomarkers and therapeutic targets.

Key words : Prostatic Neoplasms, Androgen Receptor, bioinformatical analysis; Protein Interaction Maps, Drug Repositioning

POSTER N° : 76.

MOLECULAR AND IMMUNOCYTOCHEMICAL MARKERS FOR EARLY DETECTION OF CERVICAL CANCER AMONG TUNISIAN WOMEN

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Abstract: Cervical cancer (CC) remains a major health challenge in Tunisia, with approximately 414 new cases and 210 deaths in 2022. Persistent infection with high-risk human papillomavirus (HPV), notably HPV16 and HPV18, drives carcinogenesis. The HPV16 oncoprotein E6 promotes ubiquitination-mediated degradation of p53 via E6AP, impairing DNA repair and fostering malignant transformation. Despite screening by cytology and HPV testing, no diagnostic tool reliably identifies which high-risk HPV–positive women will progress to high-grade lesions or invasive cancer. Overexpression of p16INK4a and Ki-67 by immunocytochemistry (ICC) has emerged as a surrogate marker for HPV-induced cellular dysplasia, while TP53 mutations further predict progression independently of HPV status. Our objective is to develop a reliable diagnostic tool capable of stratifying progression risk among high-risk HPV–positive Tunisian women by comparing p16/Ki-67 immunocytochemistry with molecular analysis of the TP53 rs1042522 mutation. In patients who test positive for high-risk HPV, we perform Immunocytochemistry for p16 and Ki-67 on liquid-based cervical specimens and a molecular analysis of the TP53 rs1042522 mutation via PCR and targeted sequencing of the rs1042522. Our findings show promising concordance between p16/ Ki67 expression and mutation status of TP53. Further experiments are needed to validate these results and define clinical thresholds.

KEYWORDS: Cervical cancer, TP53 mutation, p16INK4a, Ki-67, immunocytochemistry, early detection, Tunisian women.

POSTER N° : 77.

METAGENOMIC ANALYSIS OF BACTERIAL COMMUNITIES IN APRICOT RHIZOSPHERIC SOIL FROM TUNISIA

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Abstract: Distinct bacterial communities are closely associated with host plants, shaping their phenotype and overall fitness. While interest in plant microbiomes has grown considerably, the bacterial assemblages in the rhizosphere of perennial fruit trees remain insufficiently explored. This study offers an in-depth investigation of the microbiome of *Prunus armeniaca* L. from Tunisia, focusing on the composition and diversity of bacterial communities in rhizospheric soil by high-throughput DNA sequencing of the V3-V4 region of 16S rRNA gene using Illumina technology. Our findings demonstrate that both the structure and composition of rhizosphere bacterial communities vary significantly with geographic location. Indeed, the plant's environment plays a key role in shaping the taxonomic and functional profiles of these bacterial populations. Overall, the identified rhizobacteria play a beneficial role for the apricot tree by enhancing its growth and mitigating the effects of abiotic stress.

KEYWORDS: *Prunus armeniaca L.; Bacterial communities; 16S rRNA; Illumina sequencing; Rhizosphere soil.*

POSTER N° : 78.

EVALUATION DES PERFORMANCES AGRONOMIQUES DE *LOLIUM PERENNE* ET DE LA FETUQUE ELEVEE ENDOPHYTES PAR *NEOTYPHODIUM* EN CONDITIONS TUNISIENNES

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Abstract: L'effet de la présence de l'endophyte sur les performances agronomiques de *Lolium pérenne* et de la fétuque élevée ont été testé en utilisant des plantes sauvages et cultivées infectées ou non par *Neotyphodium*. Les plantes expérimentales ont été soumises à des traitements de nutriments et d'eau.

Bien que l'infection par l'endophyte améliore généralement les performances des graminées pérennes, ses effets jouent un rôle actif dans la production directe d'alcaloïdes ou en stimulant la synthèse de métabolites secondaires chez la plante hôte identifiés par chromatographie en phase liquide en tendem couplée à la spectrométrie de masse (LC-ESI-MS/MS).

Neotyphodium améliore la tolérance au stress, réduisant ainsi la nécessité d'une forte accumulation de proline dont son dosage a montré une forte variabilité entre les accessions analysées.

L'interaction entre l'endophyte et les graminées pérennes ont été définis comme une défense de mutualisme. Au cours de cette association, l'endophyte produit différentes classes d'alcaloïdes ou stimule la plante à synthétiser les métabolites secondaires qui permettent leur protection contre les herbivores, les insectes et les nématodes.

KEYWORDS: *alcaloïdes, graminées pérennes, métabolites secondaires, Tunisie*

POSTER N° : 79.

SYSTEMIC IMMUNE INFLAMMATION RELATED MARKERS: FROM A SIMPLE ROUTINE PREOPERATIVE COMPLETE BLOOD COUNT TO UTUC PATIENTS' POSTOPERATIVE OUTCOME PREDICTION

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Abstract

An imminent interest has been recently raised toward the potential assessment of preoperative hematological systemic inflammation related markers in patients with urothelial carcinomas. Our objective was to assess the prognostic value of the preoperative neutrophil-to-lymphocyte ratio (NLR), monocyte-to-lymphocyte ratio (MLR), platelet-to-lymphocyte ratio (PLR), systemic immune-inflammation index (SII), and systemic immune-inflammation response index (SIRI) in patients with upper tract urothelial carcinoma (UTUC) treated with radical nephroureterectomy (RNU).

Within this frame, one hundred seven patients were retrospectively enrolled at Urology Department of Charles Nicolle Hospital (Tunis, Tunisia). Chi-square (k^2) tests were adopted to assess the association of the inflammatory ratios and indexes to clinical risk factors. Overall survival (OS), metastasis-free survival (MFS), local, lymph node, and contralateral recurrence-free survival (RFS) were estimated by the Kaplan–Meier method and the corresponding curves were compared using log-rank test. Univariate and multivariate survival analysis were performed using general linear models to identify risk factors for prognosis.

Interestingly, NLR, MLR, PLR, SII, and SIRI were predictive of OS (p=0.024, p=0.025, p=0.004, p=0.006, and p=0.03, respectively). Besides, PLR was predictive of local (p<0.001) and lymph node RFS (p=0.014) and SII was associated to lymph node and contralateral RFS prediction (p=0.034 and p=0.023 respectively). All candidate markers adding high NLR+high MLR+high PLR combination were independent risk factors of OS. PLR was an independent risk factor of local and lymph node RFS whereas the above cited combination and NLR were independent prognosticators of local and contralateral RFS respectively. All markers were correlated to poor postoperative clinical characteristics mainly pathological grade (p<0.05).

Overall, we demonstrated the prognostic value of pre-treatment NLR, MLR, PLR, SII, and SIRI in patients who underwent RNU for UTUC. As emerging non-invasive, easily assessed, and repeatable prognostic indicators, they may be potentially useful in guiding urologists setting up more accurate clinical decisions and rational individualized treatment regimens.

Key words : Carcinoma; Inflammation; Lymphocytes; Neutrophils; Prognosis

MICROBIOLOGY AND VIROLOGY

POSTER N° : 80.

SPIRULINA PLATENSIS ENRICHED WITH SILVER: A NOVEL BIOALTERNATIVE AGAINST ANTIBIOTIC RESISTANCE IN TUNISIAN UROGENITAL MYCOPLASMA STRAINS

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Abstract: An alarming emergence of resistance in *Mycoplasma hominis* and *Ureaplasma* spp. prompt to act for identifying alternatives to conventional antibiotics. *Spirulina platensis*, a cyanobacteria rich in bioactive compounds, is evaluated for its antibacterial activity against resistant urogenital mycoplasmas. This study tests both unprocessed and silver-enriched spirulina (SpAg) using the microdilution method. Clinical strains' susceptibility to antibiotics was assessed, and two spirulina batches with varying silver concentrations were tested to explore enhancement of antibacterial effects. High rates of resistance and multiresistance were revealed among *M. hominis* and *Ureaplasma* spp. strains. Treatment of mycoplasma strains with spirulina supplemented or not with silver particles showed promising results with MICs varying between 2000 and 15.6 µg/ml. The antimycoplasmic activity of the two SpAg batches exhibited higher antibacterial activity than with the unprocessed spirulina.

In summary, our results highlight the efficiency of *spirulina platensis* combined to silver particles and support its use as an effective mean for combating antibioresistance in mycoplasmas.

Key words: *Urogenital mycoplasmas, antibioresistance, Spirulina platensis, silver particles.*

POSTER N° : 81.

ANTIBACTERIAL ACTIVITY OF LACTIC ACID BACTERIA STRAINS ISOLATED FROM TUNISIAN TRADITIONAL DAIRY PRODUCTS AGAINST PATHOGENIC BACTERIA

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Abstract : This study was inspired by problems encountered in the dairy industry and illustrates the antibacterial importance of lactic acid bacteria against spoilage germs.Fourteen (14) strains, noted (C7,C8,C9,C10,C12,F,K,R,H1,H,H3 and Z1 for lactic acid bacilli and (S1,J3)for lactic cocci, were isolated from traditional dairy products from different regions marketed in TUNISIA , on MRS and M17 selective media. Identification based on morphological and biochemical characteristics allowed the isolates to be assigned to the following genera: Lactobacillus (C7,C8,C9,C10,C12,F,K,R,H1,H,H3 and Z1) and Streptococcus (S1,J3). The antibacterial activity results indicate that the isolated lactic acid strains all have an inhibitory effect against the pathogens tested, namely Staphylococcus aureus , except for strain C10 and S1, which had no effect .Three strain (C7,C8,J3) had an inhibitory effect against Escherichia coli .Ten strain (C10,C12,J3,F,K,R,H3,H,H1 and Z1) had an activity on Salmonella . This activity is likely due to the synthesis of inhibitory substances by lactic acid strains, such as organic acids, hydrogen peroxide, carbon dioxide, diacetyl, and bacteriocins, known for their antagonistic properties against many pathogenic bacteria.

Keywords : Lactic bacteria, antibacterial , activity ,pathogens

POSTER N° : 82.

CHARACTERIZATION OF PRIMARY ACTION MODE *THYMUS CAPITATUS* OF ESSENTIAL OIL AGAINST STAPHYLOCOCCI AND GRAM NEGATIVE BACTERIA AS CAUSE OF BOVINE MASTITIS

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Abstract

In this study, eight essential oils (EOs) were evaluated for their antimicrobial activity against six antibiotic-resistant *Staphylococcus* species (*S. epidermidis*, *S. cohnii*, *S. warneri*, *S. sciuri*, *S. chromogenes*, *S. pasteuri*), three methicillin-resistant *Staphylococcus aureus* (MRSA) strains, and two extended-spectrum β-lactamase (ESBL)-producing *Escherichia coli* strains, all implicated in bovine mastitis. The antimicrobial effectiveness of the EOs varied significantly depending on both the oil type and the bacterial strain. *Thymus capitatus* and *Trachyspermum ammi* oils exhibited strong antibacterial activity against all tested strains, with inhibition zone diameters ranging from 20 to 45 mm. In contrast, EOs from *Artemisia absinthium*, *Eucalyptus globulus*, *Eucalyptus camaldulensis*, *Myrtus communis*, and *Mentha pulegium* showed moderate activity, while the efficacy of *Cymbopogon citratus* was strain-dependent—most notably effective against *S. warneri*, *S. epidermidis*, *S. cohnii*, *S. pasteuri*, and MRSA (EC 39+). Notably, *T. capitatus* EO had a pronounced lytic effect on MRSA strains, indicating higher sensitivity of Gram-positive bacteria compared to Gram-negative ones. Mode-of-action studies of *T. capitatus* EO revealed its ability to disrupt bacterial cell walls and membranes, leading to the leakage of cytoplasmic contents and inhibition of DNA synthesis, ultimately resulting in bacterial death. These findings highlight the promising potential of *T. capitatus* EO as a natural antimicrobial agent against multidrug-resistant pathogens responsible for bovine mastitis.

Keywords: Essential oil; antimicrobial activity; mechanism of action; *Staphylococcus*; Gram-negative bacteria; bovine mastitis

POSTER N° : 83.

NETTLE : (*URTICA MEMBRANACEA* L.) EXTRACT ENHANCES PLANT GROWTH AND INDUCES TOLERANCE AGAINST TOMATO SPOTTED WILT VIRUS.

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2: Faculté des Sciences de Bizerte, Université de Carthage

Tomato spotted wilt virus (TSWV) is a polyphagous, thrips-transmitted pathogen that causes significant economic losses in agriculture, particularly in tomato crops. Traditional management strategies, such as deploying resistant cultivars and extensive pesticide use, have become less effective. This situation calls for innovative methods to manage the disease.The objective of this study was to determine whether Aqueous Nettle Extract (ANE) could be successfully used as a biostimulant to tomato production under TSWV infection. To achieve this, we assessed the effect of ANE on tomato plants by evaluating growth parameters, physiological indicators and plant tolerance to TSWV following mechanical inoculation and qRT-PCR. Three treatment groups were considered: MOCK untreated control (C), plants inoculated with TSWV only (V), and plants inoculated with TSWV and subsequently treated with ANE (ANE+V). Our results showed a significant effect of ANE on all monitored morphological and physiological parameters. qRT-PCR assays confirmed the sensitivity of the tomato cultivar. Importantly, viral loads quantified at 21 and 30 days post-inoculation (dpi) were significantly lower in the ANE+V treatment compared to the V treatment, indicating that ANE may enhance antiviral defense responses in tomato plants. These results support the role of ANE as a biostimulant improving plant health and contributing to environmental sustainability by reducing reliance on synthetic fertilizers and pesticides.

Keywords : Tomato, TSWV, *Urtica membranacea* L., biostimulant.

POSTER N° : 84.

NETTLE (*URTICA MEMBRANACEA* L.) EXTRACT ENHANCES PLANT GROWTH AND INDUCES TOLERANCE AGAINST TOMATO SPOTTED WILT VIRUS.

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Tomato spotted wilt virus (TSWV) is a polyphagous, thrips-transmitted pathogen that causes significant economic losses in agriculture, particularly in tomato crops. Traditional management strategies, such as deploying resistant cultivars and extensive pesticide use, have become less effective. This situation calls for innovative methods to manage the disease.The objective of this study was to determine whether Aqueous Nettle Extract (ANE) could be successfully used as a biostimulant to tomato production under TSWV infection. To achieve this, we assessed the effect of ANE on tomato plants by evaluating growth parameters, physiological indicators and plant tolerance to TSWV following mechanical inoculation and qRT-PCR. Three treatment groups were considered: MOCK untreated control (C), plants inoculated with TSWV only (V), and plants inoculated with TSWV and subsequently treated with ANE (ANE+V). Our results showed a significant effect of ANE on all monitored morphological and physiological parameters. qRT-PCR assays confirmed the sensitivity of the tomato cultivar. Importantly, viral loads quantified at 21 and 30 days post-inoculation (dpi) were significantly lower in the ANE+V treatment compared to the V treatment, indicating that ANE may enhance antiviral defense responses in tomato plants. These results support the role of ANE as a biostimulant improving plant health and contributing to environmental sustainability by reducing reliance on synthetic fertilizers and pesticides.

Keywords : Tomato, TSWV, *Urtica membranacea* L., biostimulant.

POSTER N° : 85.

ANTIMYCOPLASMAL POTENTIAL OF PEGANUM HARMALA SEED EXTRACT AND ITS SYNERGISTIC COMBINATION WITH CONVENTIONAL DRUGS

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Abstract : Mycoplasmas have lately gained an increased attention of microbiologists. Most species are host-specific and are associated with chronic infections in both animals and humans. Notably, they exhibited an increased level of resistance towards a wide range of conventional antibiotics, underscoring the need to discover novel antibacterial compounds. To address this concern, the present study aimed for pinpointing phytotherapy based alternative. *Peganum harmala* seed extract was tested as an antibacterial agent against multidrug-resistant urogenital and avian Mycoplasmas strains using the microdilution method. Synergistic combination of the identified compound and conventional antibiotics was also assessed. Our results showed that *P. harmala* expressed significant activity against all tested Mycoplasma strains with MIC values ranging from 7.8 to 250 µg/mL. The identified compound exhibited a synergistic combination with conventional drugs with FIC values varying from 0.25 to 0.37. In conclusion, *P. harmala* could be considered as potential candidates for the treatment of mycoplasmosis in both human and veterinary medicine.

KEYWORDS: Multidrug resistance, *Mycoplasma*, *Peganum harmala*, Synergistic activity

POSTER N° : 86.

ISOLATION AND IDENTIFICATION OF A NEW *BACILLUS GLYCINIFERMENTANS* STRAIN FROM DATE PALM RHIZOSPHERE AND ITS EFFECT ON BARLEY SEEDS UNDER HEAVY METAL STRESS

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Abstract: Soil contamination by heavy metals is one of the major problems that adversely decrease plant growth and biomass production. Inoculation with the plant growth-promoting rhizobacteria (PGPR) can attenuate the toxicity of heavy metals and enhancing the plant growth. In this study, we evaluated the potential of a novel extremotolerant strain (IS-2 T) isolated from date palm rhizosphere to improve barley seedling growth under heavy metal stress. The species-level identification was carried out using morphological and biochemical methods combined with whole genome sequencing. The bacterial strain was then used in vitro for inoculating *Hordeum vulgare* L. exposed to three different Cr, Zn, and Ni concentrations (0.5, 1, and 2 mM) in petri dishes and different morphological parameters were assessed. The strain was identified as *Bacillus glycinifermentans* species. This strain showed high tolerance to pH (6–11), salt stress (0.2–2 M), and heavy metals. Indeed, the minimum inhibitory concentrations at which bacterium was unable to grow were 4 mM for nickel, 3 mM for zinc, more than 8 mM for copper, and 40 mM for chromium, respectively. It was observed that inoculation of *Hordeum vulgare* L. under metal stress conditions with *Bacillus glycinifermentans* IS-2 T stain improved considerably the growth parameters. The capacity of the IS-2 T strain to withstand a range of abiotic stresses and improve barley seedling development under lab conditions makes it a promising candidate for use as a PGPR in zinc, nickel, copper, and chromium bioremediation.

Keywords: Plant growth promoting rhizobacteria (PGPR), Heavy metals, Hordeum vulgare L, *Bacillus glycinifermentans*, Rhizosphere.

POSTER N° : 87.

PHYTOCHEMICAL PROFILE AND BIOACTIVITIES OF TUNISIAN *E. ERYTHROCORYS*: A STUDY ON PHENOLIC COMPOUNDS AND ESSENTIAL OILS

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Abstract

In recent years, interest in the secondary metabolites of aromatic medicinal plants has grown due to their applications in medicine, cosmetics, and the food industry. *Eucalyptus erythrocorys* is known for its richness in phenolic compounds with antioxidant properties and essential oils with antibacterial effects. The aim of this study is to demonstrate these bioactivities correlated with the plant's chemical profiles.

The phenolic compounds of *E. erythrocorys* were extracted from their air-dried leaves by maceration (80% methanol) and then analyzed by HPLC. The Essential oils were extracted by hydro distillation (Clevenger) and identified by gas chromatography-mass spectrometry (GC/MS). The antioxidant activity of these extracts was evaluated by the scavenging ability of the free radical DPPH and the iron reducing power. The antibacterial activity of essential oils was determined using two methods; the diffusion method on disk-agar and the method of determination of the minimum concentration of inhibition (MIC) and the minimal bactericidal concentration (MBC). Both negative and positive bacterial strains were used.

The phenolic acid, gallic acid, was the main compound in the methanolic fraction, with 47.50 ± 3.83%. The methanolic extract was characterized by appreciable antioxidant capacity, with its scavenging ability of the free radical DPPH being the most notable, showing an IC_{50} of 5.07 ± 0.54 µg/mL, which is higher than that of the synthetic standard (BHT) and significantly higher than that of the essential oil. The yield of essential oil extracted from *E. erythrocorys* was 1.45 ± 0.06%, and the main chemical class was oxygenated monoterpenes, with 1,8-cineole (eucalyptol) as the most representative compound (60.74 ± 0.08%). This essential oil showed notable activity against infectious bacterial species. The strongest effect was observed against *Pseudomonas aeruginosa* (Gram-negative), as shown by two methods: an inhibition zone of 24.00 ± 1.07 mm in diameter and a minimum inhibitory concentration (MIC) of 3.75 mg/mL.

These findings highlight the potential of phenolic and terpenic compounds from *E. erythrocorys* leaves as natural bioactive agents, supporting their use in cosmetic, pharmaceutical, and food industries.

Keywords: *Eucalyptus erythrocorys*, Phenolic compounds, Gallic acid, Essential oil 1,8-cineole, Biological activities.

POSTER N° : 88.

IN VITRO EVALUATION OF ANTIBACTERIAL AND ANTIBIOFILM EFFECTS OF MORINGA ETHANOLIC SEED EXTRACT AGAINST PERI-IMPLANTITIS-ASSOCIATED ORAL PATHOGENS

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Abstract

Peri-implantitis is a common complication of dental implants, characterized by the inflammation of the periodontal tissues due to bacterial colonization on implant surfaces. If left untreated, it can lead to implant failure, and even affect the patient's health. The bacterial strains involved often show high resistance to conventional antibiotics, complicating treatment efforts.

This study evaluated the antibacterial and antibiofilm activity of ethanolic extracts of Moringa (*Moringa oleifera*) seeds against *Staphylococcus aureus*, *Porphyromonas gingivalis* and *Streptococcus mutans.* The assays used included well diffusion assays for preliminary screening, minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) determination, and biofilm inhibition assessment using a microtiter plate assay in polystyrene and scanning electron microscopy (SEM) in the dental implants surface.

The ethanolic extract exhibited antibacterial activity, with inhibition zones observed against all tested strains. The MIC values (10 mg/ml to 25 mg/ml) confirmed its bacteriostatic properties. In addition, microtiter plate readings revealed a decrease in biofilm formation on polystyrene and treated by the extract. As for SEM image, disrupted bacterial structures and reduced biofilm density were observed on treated titanium surfaces compared to control.

The findings suggest that arugula seed ethanolic extract possesses promising antibacterial and antibiofilm properties that can be used as a natural adjunctive agent in peri-implantitis management and prevention.

Keywords: Peri-Implantitis, Moringa, oral pathogens, antibacterial , Antibioflm.

PHARMACOLOGY AND TOXICOLOGY

POSTER N° : 89.

PHYTOCHEMICAL CHARACTERIZATION, NETWORK PHARMACOLOGY ANALYSIS, AND THE THERAPEUTIC POTENTIAL OF *O. CRENATA* AGAINST INDUCED HEPATOTOXICITY

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Abstract: Hepatic failure, a progressive condition often culminating in severe and irreversible diseases such as cirrhosis and hepatocellular carcinoma, remains a major global health challenge. In the pursuit of preventive and supportive therapies, growing attention has been directed toward traditional medicinal plants due to their rich repertoire of bioactive compounds with potential hepatoprotective effects. Within this context, *Orobanche crenata* despite being widely regarded as a parasitic weed has emerged as a promising candidate owing to its diverse phenolic constituents. In the present study, we employed LC-MS/MS analysis to characterize the phytochemical profile of *O. crenata* extract, revealing the presence of multiple bioactive compounds including phenolic acids, flavonoids, and phenylethanoid glycosides. To explore their therapeutic potential, we integrated a network pharmacology approach using platforms such as GeneCards and SwissTargetPrediction to predict molecular targets of the identified compounds. A total of 525 potential targets were retrieved, with 73 showing significant overlap with genes implicated in hepatic failure.
Gene Ontology (GO) and KEGG pathway enrichment analyses highlighted strong associations with key biological processes and pathways, particularly those involved in inflammatory response, lipid metabolism dysregulation, and fibrogenesis. Further, compound-target-disease interactions were visualized using STRING and Cytoscape, enabling the identification of several key hub genes that may mediate the hepatoprotective effects of *O. crenata*. Molecular docking studies corroborated these findings, demonstrating high binding affinities between major compounds in the extract and pivotal proteins implicated in hepatic inflammation and lipid homeostasis.
An in vivo study was conducted using a carbon tetrachloride (CCl_4)-induced hepatotoxicity rat model to validate these predictions. Administration of *O. crenata* extract resulted in marked improvements in liver function biomarkers (ALT, AST, ALP, LDH, GGT, and total bilirubin), normalization of lipid profiles (total cholesterol, triglycerides, LDL-C, HDL-C), and a significant reduction in pro-inflammatory cytokines such as TNF-α and IL-6.
Collectively, these findings highlight *Orobanche crenata* as a rich natural source of hepatoprotective agents, offering a promising preventive strategy against liver failure and its associated inflammatory disorders. This study provides a scientific foundation for valorizing this underexplored plant in hepatoprotective phytotherapy.

KEYWORDS: *Orobanche crenata, Hepatic failure, Phenolic compounds, Network pharmacology, Molecular Docking*

POSTER N° : 90.

EFFICACITY OF *ARBUTUS UNEDO* FOR COSMETIC APPLICATION: BIOLOGICAL ACTIVITY EVALUATION AND FORMULATION

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Abstract : Phenolic compounds are promising agents in cosmetic products. They display skin protective potential and play an important role in preserving cosmetic formulations due to their ability to neutralize free radicals. The current study aims to evaluate the potential of *Arbutus unedo* as natural source of skincare product for developing a cosmetic cream. The chemical composition and the antioxidant, anti-inflammatory, and anti-tyrosinase activities of several extracts from the plant were investigated and compared. Samples were obtained by maceration, reflux, and ultrasound using water and ethanol. Chemical analysis showed a wide range of phenolic compounds, comprising phenolic acids and flavonoids. Among the extracts, the water reflux possesses a promising whitening effect with high anti-tyrosinase activities. Furthermore, it shows no cytotoxicity and exhibit anti-inflammatory activity on RAW 264.7 cells as well as a significant antioxidant power. A cosmeceutical formulation was prepared which demonstrated optimal pH, stability, antioxidant activity as well as high consumer acceptability through sensory analysis.

Keywords: *Arbutus unedo*; phenolic compounds; cosmetic effect; cytotoxicity; formulation

POSTER N° : 91.

TOWARDS AN AI-EMPOWERED MOBILE APPLICATION FOR MICROSCOPY IMAGE ANALYSIS IN LOW RESOURCES SETTINGS

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Abstract:

Infectious diseases constitute significant global health challenges, requiring accurate diagnosis and therapeutic solutions. Addressing such challenges requires research efforts and technological development that can be used and deployed in low resource settings, particularly in LMICs. We aim at developing an AI-based software that is able to quantify intracellular parasites, such as *Leishmania* amastigotes, based on light microscopy images acquired using a smartphone. The software will then be deployed as a mobile application for use in laboratories with limited access to advanced microscopy equipment and expertise.

We collected Giemsa-stained microscopy images of macrophages infected with *Leishmania* parasites. We annotated all pixels into three classes: host-cells, nucleus and amastigotes. The annotated dataset was exported in the COCO format. Then, we implemented two models. First, a modified architecture of U-Net with a pretrained VGG16 backbone was trained in two-phases: first as a binary classifier, then as a multi-class segmentation classifier. We optimized both models (phase 1 and 2) under different conditions and we employed Dice loss as the loss function for both models, for its effectiveness in handling class imbalances and improving segmentation performance. In the second step, we trained and refined the YOLOv8 model.

We were able to acquire and annotate 67 images, containing 5479 amastigotes. The pixel distribution revealed that amastigotes accounted for only 0.65% pixels. We generated instance segmentation masks tailored for multiclass segmentation and split the dataset into training (50), validation (10) and test (7) sets. We then performed data augmentation to the training set, through introducing spatial variations through geometric transformation, and intensity variations to simulate changes in lighting or color. We simulated realistic conditions by introducing noise or blurs. The VGG16-Unet model achieved satisfactory performances of 71% precision and 48% recall, while fine-tuned YOLOv8 achieved 86% and 70%, respectively. Further refinement of the models is ongoing, and an integration of both models into a software will be performed.

Our project now aims at automating the detection and counting of amastigotes in Giemsa-stained microscopy images using customized U-Net architecture and YOLOv8. A combination of both models will be deployed as a mobile application to serve as a scalable user-friendly enabling fast and accurate analysis of microscopy images in low resource settings.

KEYWORDS: *Artificial intelligence, microscopy, Leishmania, Macrophage*

POSTER N° : 92.

FORTUNELLA MARGARITTA INHIBITS INTESTINAL GLUCOSE ABSORPTION, IMPROVES GLUCOSE TOLERANCE AND PROTECTS AGAINST ALLOXAN-INDUCED DIABETES IN RAT

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ABSTRACT

Purpose *Diospyros kaki* fruits have been frequently utilized in traditional medicine for the treatment of different pathologies. This delicious fruit offer excellent benefits to the human health. **Methods:** The present study aimed to evaluate the nutritional value of *Diospyros Kaki* and the effect of the extraction solvent on phenolic compounds levels and biological activities in terms of antioxidant power and antibacterial capacity. We also evaluated the in vitro digestibility of fruits in ruminants by the gas production technique. **Results:** The HPLCPDAESIMS/MSLC-HRESIMS analysis proved the presence of 12 phenolic compounds and demonstrated that the quinic acid is the major constituent of the three types of extracts. The result of this study has strongly indicated that the total polyphenols, flavonoids and tannins were significantly higher in the hydro-ethanolic extract compared to other extracts. Similarly, the hydro-ethanolic extract presented the high antioxidant and antibacterial activities. In the other hand, the obtained results showed that the digestibility of dry matter by the in vitro fermentation revealed a significant difference between the animal species. **Conclusion:** In conclusion, our findings showed that the different extraction solvents selected exerted significant biological activities (antioxidant and antimicrobial potentials) and a chemical composition that could be suitable for ruminant feeding. They can be considered as potential natural antioxidants and antibacterials.

Key words: *Diospyros kaki*, chemical properties, phytoactive compounds, antioxidant and antibacterial capacities, *in vitro* digestibility.

POSTER N° : 93.

PHYTOCHEMICAL COMPOSITION OF *NIGELLA SATIVA* ESSENTIAL OIL AND ITS PROTECTIVE EFFECT AGAINST ISOPROTERENOL-INDUCED MYOCARDIAL INFARCTION

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Abstract: This study investigates the potential cardioprotective effects of essential oil from *Nigella sativa* (NSEO) against isoproterenol-induced myocardial infarction in rats. Wistar rats were pretreated with NSEO (200 or 300 mg/kg/day) or clopidogrel (100 µg/kg/day) before receiving two consecutive injections of isoproterenol (ISO) on the 29th and 30th days to induce myocardial infarction. The results demonstrate that NSEO administration normalized ST-segment elevation and reduced cardiac risk parameters, including altered lipid biomarkers and plasma ionic levels. NSEO alleviated cardiac oxidative stress induced by ISO injection by enhancing the activity of antioxidant enzymes (GSH, CAT, SOD, and MDA), thereby decreasing lipid peroxidation and protein oxidation. Furthermore, histopathological examination revealed reduced muscle separation and fewer inflammatory cells in rats treated with ISO and NSEO. These findings underscore the cardioprotective potential of NSEO against isoproterenol-induced myocardial infarction.

KEYWORDS: *Nigella* sativa, *Isoproterenol, Myocardial infarction, Antioxidant.*

POSTER N° : 94.

ANTIOXIDANT, ANTI-A-GLUCOSIDASE, ANTI-TYROSINASE, AND ANTI-ACETYLCHOLINESTERASE COMPONENTS FROM LEAVES OF *MILLETAFERRUGINEA* WITH MOLECULAR DOCKING STUDY

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Abstract: *Milletaferruginea*, a leguminous plant native to certain tropical regions, has long been used in traditional medicine for treating conditions such as inflammation, pain, and digestive disorders. This study investigates the inhibitory effects of various solvent extracts and isolated bioactive compounds from leaves of *M. ferruginea* on α-glucosidase, tyrosinase, and acetylcholinesterase (AChE) and their antioxidant activities. The hot water extract (100 °C) demonstrated strong antioxidant potential in DPPH, ABTS, superoxide, and FRAP assays. The methanol extract showed the highest α-glucosidase inhibitory activity, while the ethanol extract exhibited potent AChE inhibition, and the acetone extract was the most effective against tyrosinase. Five major bioactive compounds were isolated and evaluated for their biological activities. Among them, kaempferol and quercetin showed significant antioxidant activity in DPPH and ABTS assays. Notably, kaempferol exhibited the strongest α-glucosidase inhibition, physcion was the most potent AChE inhibitor, and quercetin showed the highest tyrosinase inhibitory activity. Molecular docking studies further indicated strong binding affinities between these bioactive compounds and their target enzymes, sometimes exceeding those of the positive controls. These findings suggest that extracts and active constituents from *Milletaferruginea* may serve as promising natural candidates for antioxidant, anti-α-glucosidase, anti-AChE, and anti-tyrosinase agents, potentially useful in managing oxidative stress-related conditions such as hyperglycemia, pigmentation disorders, and neurodegenerative diseases.

KEYWORDS:*Milleta ferruginea;* anti-α-glucosidase; anti-acetylcholinesterase; anti-tyrosinase; molecular docking

POSTER N° : 95.

PGPR INOCULATION IMPROVES SOIL HEALTH AND SALT TOLERANCE IN *FABA BEAN (VICIA FABA L.)* AND PROMOTES PLANT GROWTH IN SEMI-ARID AREAS

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Abstract: Soil salinization represents a major constraint to the efficiency and sustainability of global agricultural production, posing substantial challenges to the achievement of sustainable development goals across environmental and economic dimensions. Faba bean plays an important role in the agriculture and diet of many developing countries and represents a key source for human nutrition as well as for animal feed. However, salt stress is a major potential constraint for faba bean. Recently, research on improving soil health and crop tolerance to boost yield performance under salt stress by halotolerant plant growth-promoting rhizobacteria (PGPR) has gained considerable attention. The present study focuses on assessing the impact of field inoculation with *Rhizobium leguminosarum* and *Pseudomonas* sp as halotolerant PGPR on growth and yield of faba bean plants as well as soil quality and fertility. The experimentation was carried out in a semi-arid region.

Obtained Results indicated that the in situ inoculation with halotolerant PGPR significantly increased the shoot, root and nodule dry weights at the flowering stage, compared to uninoculated plants. Moreover, the highest number of seeds per pod as well as the best yield and 1000 grain weight, are obtained in inoculated plots. Significant improvements in soil chemical characteristics, both at flowering and maturity stages, were registered in inoculated plots in terms of nitrogen status, organic matter content, available phosphorus and potassium content, compared to the uninoculated ones. Likewise, inoculation with halotolerant PGPR stimulated the activity of soil enzymes, including β-glucosidase, urease and alkaline phosphatase.

The eco-friendly PGPR contribute to improved soil health and stimulate plant development and crop productivity. By mitigating the adverse effects of soil salinity, these microorganisms enhance agricultural output on marginal lands, thereby supporting food security and advancing sustainable agricultural practices

KEYWORDS: *Faba bean, halotolerant PGPR, inoculation, salt stress, soil health*

Index

Abassi	Sarra	158,60	Belkahla	Sana	112
Abbes	Zouhaier	9, 54, 65, 76, 125, 126,130,142,164	Ben Abdallah	Syrine	149
Abbes	Chiraz	12,42	Ben BRAEIK	Olfa	135
Abdelhai	Moufida	71	Ben Dhif	Yosr	103,108
Abdelkrim	Yosser Zina	40,98,165	Ben Farhat	Leila	135,158
Abdelkrim	Souhir	60	Ben Hlel	Takoua	72
Abdelwahed	Syrine	15,132	Ben Hmad	Ines	73
Abid	Ghassen	40,60	Ben Hsouna	Anis	104,124,136
Abidi	Sabrine	158	Ben Jaafar	Sonia	154
ABIDI	Ferid	135,140,158	BEN JEMAA	Mariem	6,20,107,
Afoua	mufti	52,166	Ben Jemia	Zeineb	155
Ahmadi	Salwa	(*)	Ben Jouira	Hatem	73,78,80,81,83
Alimi	SOUMAYA	41,49	Ben Mansour	Rim	74
Allala	Fawzi	132	Ben Mansour	Bouchra	21
Ammar	Rahma	52	Ben Mhadheb	Manel	100
Amri	Raja	133	Ben Mohamed	Hatem	136
Amri	Moez	9, 54,76,130	Ben Rhouma	Khemais	
Aouadhi	CHEDIA	101,144,159	Ben Saad	Rania	124
Arraouadi	Soumaya	60,64	Ben Saad	Rania	136
Arrari	Fatma	53,120,121	Ben Salah	Riadh	112
Attia	Nabil	6,115	Ben Salah	Riadh	137,142,146
Awadi	Asma	154	Ben Salah	Raouf	(*)
Ayadi	Dorra	133	Ben Selma	Walid	18
Ayadi	Najuoa	(*)	Ben Slima	Wided	61,125
Ayari	Wael	117, 138, 159,160	Ben Slima	Sirine	137,142,146
Azizi	Eya	134	Ben yagoub	Elhassan	100
Baccari	Hanen	54164	Ben Yahmed	Nesrine	74
Bahia	Wael	43,96,116,117,118	Ben Younes	Sonia	87,94,101
Bedoui	Arij	164	Ben Youssef	Rim	75
Bejaoui	Amani	8,134	Ben Youssef	Nabil	145,147
Bekara	Amina	103	Borgi	Mohamed Ali	94
Belguith	Hafedh	3,4	Bouallaghui	Zouhaier	87
Belguith	Karima	4	Belkahla	Sana	112
Belhadj Sghaier	Kaouther	42	Ben Abdallah	Syrine	149
Belhaj	Ines	72	Ben BRAEIK	Olfa	135

Ben Dhif	Yosr	103,108	Bousselmi	Hadir	12,42
Ben Farhat	Leila	135,158	Boutara	Meryem	75
Ben Hlel	Takoua	72	Bouzenna	Nozza	55
Ben Hmad	Ines	73	Brahmi	Jihen	43
Ben Hsouna	Anis	104,124,136	Brini	faical	104
Ben Jaafar	Sonia	154	Chaabani	Emna	62
Ben jemaa	Mariem	6,20,107,	Chabane	Fatima Zohra	120,121
Ben Jemia	Zeineb	155	Chafaa	Fouad	113
Ben Jouira	Hatem	73,78,80,81,83	Chaira	Nizar	138
Ben Mansour	Rim	74	Chamkha	Mohamed	11,76,77,88
Ben Mansour	Bouchra	21	Chaoui	Abdelilah	17,66,69,124
Ben Mhadheb	Manel	100	Chatti	Abdelwaheb	47,90
Ben Mohamed	Hatem	136	Cherif	Asma	55
Ben Rhouma	Khemais		Chihaoui	Saif-Allah	167
Ben Saad	Rania	124	Chouba	Ibtissem	56
Ben Saad	Rania	136	Chouikhi	Marwa	62
Ben Salah	Riadh	112	Chourou	Mohamed Nour	117,138,141,159,160
Ben Salah	Riadh	137,142,146	Chtourou	Khouloud	96
Ben Salah	Raouf	(*)	Chtourou Ghorbel	Nidhal	139
Ben Selma	Walid	18	Dahmen	Ines	76,88
Ben Slima	Wided	61,125	Dalhoumi	Wejden	63,129
Ben Slima	Sirine	137,142,146	Dallali	Sana	118
Ben yagoub	Elhassan	100	Daoud	Lobna	88
Ben Yahmed	Nesrine	74	Darghouthi	Malek	43
Ben Younes	Sonia	87,94,101	Dhaouadi	Aymen	50,139
Ben Youssef	Rim	75	Djebali	Wahbi	124,129
Ben Youssef	Nabil	145,147	Driss	Fatma	149
Borgi	Mohamed Ali	94	El Fessi	Rym	49
Bouallaghui	Zouhaier	87	El Haj Mabrouk	Faten	76
Bouanane Darenfed	Amel	104,132	Elabed	Selma	44
Bouassida	Mouna	73,88	Elbini	Ines	48,105,106,107,108
Bouatrous	Asma	61	Elbour	Monia	13
Bouazizi	Souhir	139	Ellafi	Ali	87,94,101
Bouazzi	Arij	125,126	Elouni	Sana	89,92
Boudiaf	Fella	54,56	Ennajah	Amel	63
Boukhari Benahmed Daidj	Nabila	120,121	Essid	Rym	77,160
Bourgou	Soumaya	164	Ezzine	Aymen	15,132
Bourguiba	Hedia	155	Fakhfakh	Hatem	117,138,141,159,160

Fakhfakh	Faiza	44,97,133,	Hjaij	Sarra	106
Falleh	Hanen	20,146 ,150	Hmissi	Soumaya	79
Faouzi	Ben Rebah	150	Hmissi	Manel	126
Farhat	Ameny	(*)	Horchani	Faouzi	126
Farhat	Nejia	(*)	Hosni	Taoufik	65
Fehri	Emna	97	Ibtissem	Ben Hassine	91
Feki	Firas	77	Ilahy	Riadh	62,127,128
Feki	Emna	90	Jabri	Mohamed Amine	53,120,121
Feriani	Anouar	53	Jammeli	Linda	89,92
Ferjani	Wafa	56,122	Jaouadi	Bassem	47,132,141,143,151
Ferjani	Dhaouadi	140	Jebara	Salwa	167
Flihi	Jihene	140	Jebara	Moez	40,60,167,
Gamraoui	Afef	90	Jelali	Nahida	73,80
Gatri	Emna	113	Jlassi	AROUA	48,107
Ghariani	Salma	156	Karim	Kadri	64,66
Ghorbel	Imen	105	Kasmi	Mariam	92
Ghrab	Jamila	45	Kenani	Abderraouf	41
Gorsane	Faten	117,141,159,160	Khadraoui	Nadine	158,160
Goussi	Rahma	75,78,80,81,83,84	Khaireddine	Leila	66
Grami	Dhekra	57	Khemakhem	Bassem	161
Guerbej	Hamadi	141,151	Khouni	Imen	89, 92
Habbachi	Essia	97,114	Kourdali	Sidali	94, 151
Hafsi	Chokri	61,125	Krouma	Abdelmajid	43, 114
Hajlaoui	Hafedh	60,64	Kroumi	Ranim	41,49
Hajri	Sarra	57,58	Laafif	Jaweher	143
Hallegue	Dorsaf	103,106,108	Larbi	Essia	115
Hamada	Walid	78	Lazreg	Marwa	143
Hamdi	Moktar	50,64,66,139	Lella	Mohamed Lemine	144
Hamdi	Chedya	(*)	Limam	Hajer	107,161
Harbaoui	Amel	79	Maaroufi	Karima	144,159
Harbeoui	Hela	45	Maaroufi	Abderrazek	159
Harigua	Emna	98,165	Mahmoudi	Hela	67,81
hassairi	ilem		Mahmoudi	Hela	81
Hassen	Amrou	71	Majoul	Thouraya	19
Henchiri	Selma	142	Makhlouf	Ines	80,115
Heni	Siwar	46	Makni	Mohamed	(*)
Herchi	Wahid	46	Makni	Hanem	(*)
Hiba	Selmi	91	Mallek	Sana	145

Manaa	Arafet	73,75,78,81	Saadi	Yusr	82
Manai Djebali	Hedia	145	Saddikioui	Leila	122
Mansouri	Sonia	67	Sadraoui	Raoudha	166
Marzouk Ep Refifa	Belsem	127	Sahar	Asmi	124
Marzouki	Leila	48,107	Sahbani	Nehed	58
Marzouki	Hanen	127,128	Sai	Afef	94
Marzouki	Nejib	(*)	Sai Kachout	Salma	69
Mecherghui	kaouther	(*)	Saidi	Issam	129
Mechergui	Rania	63,92	Sakka	Hela	117
Medimagh	Sana	64,68	Sakouhi	lamia	17
Mejri	Nourane	93	Sellami	Emna	44
Mejri	Nahla	146,150	Sellami	Douja	82
Mensi	Fethi	151	Sellami	Badreddine	152
Mesaadi	Erij	10	Setti Boubaker	Nouha	154,156
Mhadhbi	Haythem	8,65,134	Sila	Assaad	41,49,83
Mhamdi	Baya	68,101	Slama	Ines	80,81,83,84
Mhiri	Takwa	89	Smaali	Issam	15,72,74,79,143
Mhiri	Dalel	97	Smirani	Nadia	50,139
Midani	Mariem	47	Sonia	Aroui	41
Mohammadi	Hasna	48	Taboui	Marwa	102
Mokni	Abir	73,115	Takrouni	Oumayma	118
Naili	Rahma	103,108	Talbi	Ons	80,81,83,84
Naourez	Ktari	112,137,142,147,	Thebti	Siwar	65,130
Nawres	Aloui	69	Tlili	Imen	62,127,128
Neili	Nourelhouda	106,107,108	Torchi	Ayda	84
Nouairi	Issam	8, 65	Trabelsi	Imen	9,92,137,142,146
Nouha	Alimi	116	Trifi farah	Neila	96, 156
Nourhne	Dhawefi	165	Werheni	Rim	152
Othmani	Sirine	166	Yengui	Mariem	133,147
Oualha	Rafeh	40,98,165	Zarai	Nadia	85,143
Ouhibi	Aroua	147	Zarroug	Youkabed	85
Oumayma	Tej	116	Zehdi	Salwa	155
Ouni	Sonia	(*)	Zenati	Billal	94
Rtibi	Kais	58,62	Zerrouki	Khayra	109
Rzigui	Touhami	129	Zgaren	Nawres	69,122
Saada	Rihab	117	Zmantar	Tarek	162

(*) : Simple participation