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

32ND INTERNATIONAL CONGRESS OF BIOLOGICAL SCIENCES AND BIOTECHNOLOGY

Book of Abstracts

MARCH, 18-20, 2023
Sousse - TUNISIA

Themes

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

AVANT - PROPOS

Chers collègues, chers participants,

Nous sommes honorés d'organiser les 32ème congrès international des Sciences Biologiques et de Biotechnologie, et nous souhaitons la bienvenue à tous les chercheurs et doctorants tunisiens, algériens, marocains et européens qui ont manifesté leur intérêt pour participer à cette manifestation. Le comité d'organisation a reçu, comme d'habitude, des centaines de demandes de présentations orales et par affiche, reflétant 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.

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.

Nos remerciements s'adressent également aux sociétés BIOFASTER, ABS, Nanobioscience et RAN biolinks qui ont bien voulu nous accorder une aide symbolique en guise d'encouragements.

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

Le comité d'organisation

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Mr CHAOUI Abdelilah, Faculté des Sciences de Bizerte

Mr MESSAOUD Chokri, Institut National des Sciences Appliquées et de Technologie

Saturday, 18/03/2023

10h00 -14h00	**Registration & Lunch** *Lunch 12h – 13h*		
14h30 -15h00	**Opening Ceremony** ATSB activities, Tribute to former members Pr. Issam SMAALI, ATSB President *No registrations , they will resume after*		
15h00 -15h45	**Plenary Conference 1**		
	Moderators	Pr. Mohamed KHARRAT & Pr. Francisco Pérez Alfocea	
	Presented by	Pr. Demosthenis CHACHALIS	
	Title	Novel weed and parasitic plant management in Med cropping systems	
15h45 -16h15	**Coffee Break** *Free service at the bar (all-in)*		
16h30 - 19h30	**3 Sessions of Oral Communications**		
	Room 1:	**Room 2:**	**Room 3:**
	Biotechnology 1	**Plant Physiology & Biology 1**	**Microbiology & Virology**
	Moderators: Pr. Hafedh Belguith Pr. Bassem Jaouadi Pr. Sofiane Bezzine	**Moderators:** Pr Mohamed Kharrat Pr. Abdelilah Chaoui; Pr. Brini Fayçal	**Moderators:** Pr. Manel Ben M'hadheb Pr. Hatem Fakhfakh, Pr. Karima Belguith
	62-74	**36 – 39;** **47; 49; 50** **52-54**	**113-114** **116** **118-122**
19h30 - 20h30	**Dinner**		
20h30 - 22h00	**Poster Session A: 1 to 225**		
	Moderators: Raouf Ben Salah, Slah Ouerhani, Nizar Tlili, Aymen Ezzine, Badi Gaalich, Mohamed Ali Borgi, Nadia Khelifi, Mohamed Jomaa, Leila Rezuig, Nawzet Ktari		

Sunday, 19/03/2023

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<tr><td>Biochemistry 1</td><td>Plant Physiology & Biology 2</td><td>Animal Physiology & Biology</td></tr>
<tr><td>Moderators:
Pr. Abderraouf Knani
Pr. Aziz Amine</td><td>Moderators: Pr.
Pr. Wahbi Djebali,
Pr. Zouhaier Abbes</td><td>Moderators:
Pr. Khemais Ben Rhouma
Pr. Nabil Hamdi</td></tr>
<tr><td></td><td>1-6
8 & 10</td><td>43-44
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33-34</td></tr>
<tr><td>10h00-10h15</td><td colspan="3">Coffee Break
Free service at the bar (all-in)</td></tr>
<tr><td rowspan="4">10h15-11h00</td><td colspan="3">Plenary Conference 2</td></tr>
<tr><td>Moderators</td><td colspan="2">Pr. Hatem FAKHFAKH & Pr. Chokri Messoud</td></tr>
<tr><td>Presented by</td><td colspan="2">Pr. Abdelilah CHAOUI</td></tr>
<tr><td>Title</td><td colspan="2">Réponses des plantes au stress par les métaux lourds</td></tr>
<tr><td rowspan="2">11h00 - 14h30</td><td colspan="3">Poster Session B : 1-225 & Lunch
Lunch: 12h30 – 13h30</td></tr>
<tr><td colspan="3">Moderators: Pr. Riadh Ben Salah, Dr. Kamel Rouissi, , Dr. Azri Wassim, Dr. Nedra Asses, Pr. Wahbi Djebali, Pr. Sellam Bahri, Pr. Khemais Ben Rhouma, Dr.Touhami Rzigui, Pr. Raouf Kenani</td></tr>
<tr><td rowspan="4">14h30-16h30</td><td colspan="3">Sessions of Oral Communications (one day participation)</td></tr>
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<tr><td>Bioch./Anim. Biol./Env.</td><td>Plant /Microb. Vir.</td><td>Biotech./Gen./Pharm. Tox.</td></tr>
<tr><td>Moderators:
Pr. Nabil Hamdi,
Pr. Raouf Ben Salah,
Pr.Mohamed Chemkha
Bioch.: 7,9, 14-15
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Env: 87-88; 96</td><td>Moderators:
Pr. Faten Ghorsane
Pr. Salwa Zehdi
Pr.Borgi Med Ali
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Microb.: 115; 117</td><td>Moderators:
Pr. Rafik Gatri
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Free service at the bar (all-in)</td></tr>
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<tr><td>Moderator</td><td colspan="2">Pr. Issam SMAALI & Pr. Mohamed Makni</td></tr>
<tr><td>Presented by</td><td colspan="2">Pr. Aziz AMINE</td></tr>
<tr><td>Title</td><td colspan="2">Recent advances in biosensors based on enzyme inhibition</td></tr>
<tr><td rowspan="4">17h45 - 19h45</td><td colspan="3">Sessions of Oral Communications</td></tr>
<tr><td>Room 1:</td><td>Room 2:</td><td>Room 3:</td></tr>
<tr><td>Environment 1</td><td>Biotechnology 2</td><td>Biochemistry 2</td></tr>
<tr><td>Moderators:
Pr. Nizar Bellakhal
Pr. Hassib Bouallagui</td><td>Moderators:
Pr. Hanem Makni
Pr. Ali Gargouri</td><td>Moderators:
Pr. Nabil Attia &
Pr. Riadh Ben Salah</td></tr>
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<tr><td>Moderators:
Pr. Nedra Assess
Pr. Faycel Hellal</td><td>Moderators:
Pr. Raja Gargouri
Pr. Feiza Fakhfakh</td><td>Moderators:
Pr. Riadh Ksouri,
Pr. Chokri Messaoud</td></tr>
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<tr><td rowspan="4">10h15 11h00</td><td colspan="3">Plenary Conference 3</td></tr>
<tr><td>Moderators</td><td colspan="2">Pr. Riadh Ben Salah & Pr. Mohamed Nejib Marzouki</td></tr>
<tr><td>Presented by</td><td colspan="2">Pr. Farida BENDALI</td></tr>
<tr><td>Title</td><td colspan="2">Lactic Acid Bacteria : Starters, Bioconservatives and Probiotics</td></tr>
<tr><td>11h00 - 11h15</td><td colspan="3">Distribution of Best Posters Awards and Cloture</td></tr>
<tr><td>11h15 –11h45</td><td colspan="3">Rich Coffee Break & departure</td></tr>
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CONFÉRENCES

Conférence N°: 1.

NOVEL WEED AND PARASITIC PLANT MANAGEMENT IN MED CROPPING SYSTEMS

DEMOSTHENIS CHACHALIS

Laboratory of Weed Science, Benaki Phytopathological Institute, Athens 14561 Greece ; d.chachalis@bpi.grx

Abstract : Weeding is a critical agronomic practice aiming to balance sustainability and profitability in all cropping systems. In Europe, the new Green Deal framework and the farm to fork strategy aims to reduce the use and risk of pesticides by 50% within the 2030 by substantially enhancing the IPM strategies and the expansion of organic production. For the successful implementation of this new framework, it is essential to incorporate into agricultural practices a number of strategies/methods/technologies either within the transition period (up until 2030) or in the medium/long term (after 2030). An outline of the most important research development in the area of molecular, digital, robotic and cultural techniques, with reference to major European projects, will be done. In addition, special focus will be given in parasitic weeds (like broomrapes) that are noxious weeds creating significant problems in major Med crops (i.e. legumes, industrial tomato and vegetables). ZeroParasitic (www.zeroparasitic.eu) is a Prima innovation project (9 partners, 8 countries) aiming to deliver innovative sustainable solutions in faba beans and industrial tomato. Solutions are based on integrated pest management (IPM) context targeting several innovations such as prevention, biological/non-chemical approaches, and other IPM strategies. Genetic and molecular approaches are used at three critical levels to gain new insights on potential regulatory targets of the infection: the broomrapes *per se*, the host plants and their interaction (host-parasite). Surveillance tools utilizing remote and satellite images are employed for monitoring parasitism and for large-scale documentation. Innovation tools consisted of number of molecular approaches for screening and identification of tolerant/resistant hosts and hormone host-parasite interactions. Finally, lock-ins and drivers in the implementation of solutions will be discussed.

Keywords : Novel weeding, digital, agroecology weeding, broomrapes

Conférence N°: 2.

REPONSES DES PLANTES AU STRESS PAR LES METAUX LOURDS

CHAOUI ABDELILAH

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Résumé

La contamination des eaux, des sols et de la chaîne alimentaire par les métaux lourds (ML) suscite, depuis plusieurs décennies, un intérêt particulier tant sur le plan de recherche fondamentale qu'appliquée.

Sur le premier volet, des connaissances sont acquises concernant les sites d'accumulation, les transporteurs et les molécules et mécanismes enzymatiques de détoxication des ML. Depuis 1993, notre équipe de recherche s'est fixée comme objectif principal d'étudier les effets des ML chez des plantes cultivées en hydroponie et plusieurs publications ont émané des résultats obtenus sur les aspects physiologiques, biochimiques et moléculaires.

Sur le plan appliqué, l'usage de plantes accumulatrices (phytoremédiation) constitue un moyen très prometteur pour la dépollution et la réhabilitation des sols contaminés. Cependant, les scientifiques commencent à accepter l'approche utilisant des traitements (intrants) chimiques non nocifs pour "annihiler", ou diminuer, au moins, les effets néfastes des ML; exemples : chélateurs (EDTA, EGTA, acides organiques, ...), compétiteurs ioniques (Mg, Ca, Fe, Se, Si, ...), phytohormones, oestradiol, mélatonine, NO et H_2S et leurs dérivés, …

Sur le volet méthodologie, pour plusieurs raisons, physiologiques et techniques, la germination étant une étape cruciale du cycle de développement des plantes (première interface avec l'environnement pollué), est préférentiellement utilisée comme modèle expérimental. Le métabolisme germinatif est analysé au niveau de ses principales composantes (capacité d'hydratation, reprise de l'activité respiratoire, mobilisation des réserves et expression des gènes de transporteurs de nutriments) pour, finalement, modéliser la réponse escomptée. En effet, un screening optera pour la meilleure combinaison possible : a) choix de l'espèce végétale, variété ou cultivar, b) ML et c) effecteur chimique et d) régime de traitement adéquats.

Dans cette présentation, sont exposées (i) les données disponibles, (ii) les critiques adressées à ces connaissances et (iii) les questions en attente de réponses et, en conséquence, les recommandations et les perspectives de recherche.

Conférence N°: 3.

RECENT ADVANCES IN BIOSENSORS BASED ON ENZYME INHIBITION

A. AMINE

Faculty of Sciences and Techniques – Hassan II University of Casablanca, Morocco

A biosensor is an analytical tool, which combines a bioreceptor with a physical transducer to detect specific components of a sample.

Biosensors based on enzyme inhibition represent a cost-effective device for fast screening of inhibitors such as pesticides, aflatoxins, cyanide, sulfide, methylmercury, cadmium ions, nerve agents, antibiotics, and various other drugs and contaminants. They could be used as a complementary approaches to traditional methods which are based mainly on high performance liquid chromatography, gas chromatography, atomic absorption or emission specrometry and mass spectrometry.

In the present conference, we would like to underpin the recent advances in biosensing methods based on enzyme inhibition, focusing on:

-A new theoretical approach to diagnosis the type of inhibition and evaluate the kinetic parameters;

- A novel graphical method based on the plot of fifty percent of inhibition (I_{50}) against time at various concentrations of substrate;

-A combination with nanomaterials and their effects on signal amplification and sensitivity increase;

-A simple way to immobilize enzyme and to develop a paper sensor combined with a smartphone as detector.

The real sample applications of biosensors based on reversible and irreversible enzyme inhibition and theirs analytical performances in terms of time of analysis, detection limit, and matrix effect will be highlighted.

The advantages and limitations of "nanozymes", considered as nanoparticles with intrinsic enzyme-like activity, will also be discussed in this conference.

Conférence N°: 4.

LACTIC ACID BACTERIA : STARTERS, BIOCONSERVATIVES AND PROBIOTICS

FARIDA BENDALI, NACIM BARACHE, LIZA OUARABI, TASSADIT BENBARA, YASMINA AIT CHAIT, NESRINE BOUHROUR, ROSA OURTIRANE, FOUZIA IDIR

Equipe Interactions Microbiennes, Biofilms et Probiotiques (LMBP), Laboratoire de Microbiologie Appliquée, Faculté des Sciences de la Nature et de la Vie, université de Bejaia, Bejaia 06000, Algérie
Mots clés : Bactéries lactiques, ferments, bio-conservateurss, probioitques

Abstract : Lactic acid bacteria (LAB) have numerous biological activities, allowing their use both in food and medical applications. The main goal of this conference is an update of the recent knowledge on the fermentative, bio-preservative and probiotic properties of LAB, with reference to the results of the studies performed by our team. The manufacture of fermented food products constitute the oldest application of LAB. Indeed, lactic fermentation (LF) can be conducted and controled by the use of autochtonous or allochtonous starters. Autochtonous origin indicates the isolation and reuse of the strains on the same food matrix, independtly on the geographic origin. In contrary, the allochtonous starters indicate that they have been isolated from well defined matrices and used for the fermentation of diverse products. LF represents, on its self, a technique of bio-preservation witch implicates LAB strains (ex. lactobacilli) and/or their active metabolites. These bacteria produce a large gamme of antimicrobial substances (organic acids, CO_2 and bacteriocins [nisine]), that inhibit diverse food-borne microorganisms. Furthermore, many potentially functions have been attributed to LAB, witch allowed they use as probiotics ; the main ones are the renforcement of the barrier effect of the intestinal mucosa (anti-biofilm effect), improvement of the lactose digestion (presence of β-galactosidase) and the prevention of the urogenital and vaginal infections (antimicrobial activity). Other functions have also been evidenced such as hypocholesterolemia and cancer prevention.

Sommaire communications orales

Sommaire communications par affiche

COMMUNICATIONS ORALES

BIOCHIMIE
ET BIOLOGIE MOLECULAIRE

C. ORALE N°: 1.

PHYSICO-CHEMICAL PROPERTIES AND BIOACTIVE COMPOUNDS OF COLD PRESSED *ALLIUM CEPA* SEED OIL

RABEB AZAIEZ[1*], ISSAM SMIALI[2], MONDHER MEJRI [3], LEILA REZIG[4,5]

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2 University of Carthage, National Institute of Applied Sciences and Technology, LR11ES24, LIP-MB 'Laboratory of Protein Engineering and Bioactive Molecules', Tunis, Tunisia
University of Jendouba, High Institute of Biotechnology of Beja, B.P. 382, Jendouba 9000, Tunisia
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E-mail: rabebazaiez5@gmail.com *; Phone: +216 71 703829; Fax: +216 71 704329*

Abstract: This study investigates the physicochemical characterization of *Allium Cepa* seed and the lipid fraction of its seed oil using a cold-pressed extraction method. The research focuses on seeds grown in Tunisia and examines the physicochemical properties and nutrient profile of its cold-pressed seed oil. The results showed that the seed moisture content was 9.3 ± 0.1%, whereas protein contents, ash, fat and total carbohydrates were 20.93 ± 0.27 %, 5.3 ± 0.1%, 20.5 ± 1.60 % and 58.57 ± 4 %, respectively. Besides, the study has determined the mineral contents of calcium, magnesium, iron, copper, manganese, phosphorus, potassium, zinc, and sodium to be 0.64 %, 0.34 %, 123 ppm, 15 ppm, 27 ppm, 0.62 %, 1.20 %, 110 ppm and 0.02 %, respectively. The characterization of the lipid fraction of *Allium cepa* seeds oil by the cold-pressed extraction method was evaluated for an iodine value of 130.33 g I_2 /100g of oil (± 26.06), a saponification value of 195 ± 39 mg KOH/g of oil, an acid value of 10.5 ± 2.1mg KOH/g of oil and a peroxide value of 11 ± 0.16 meq O_2 /kg of oil. Gas chromatography analysis revealed that linoleic (55.84%) and oleic acids (32.30%) were the most abundant acids. The seed oil was also found to be rich in sterols (Beta- sitostroiol-Apparent: Beta –sitosterol + Delta 5-Avenasterol+Delta5-23-stigmastadienol+clerost) (61.3 ± 2.6 mg/100 g of oil). The total tocopherol content of *Allium cepa* seed oil was 1971 ± 295.65 ppm with a predominance of Alpha tocopherol (1624 ± 324.8 ppm). The determination of the physicochemical properties of *Allium cepa* seed oil would significantly contribute to the valorization of *Allium cepa* oil potential in cosmetic, pharmaceutical and food industries.

Keywords: *Allium cepa seeds, cold pressed extraction method, physico-chemical properties, bioactive Compounds.*

C. ORALE N°: 2.

COMPARATIVE PROTEOMIC ANALYSIS OF DROUGHT TOLERANCE IN THE TWO CONTRASTING GRAPEVINE WILD GENOTYPES AND CULTIVATED GENOTYPE

WASSIM AZRI[1], ARAFET MANAA[2], AHMED MLIKI[1]
[1]Laboratory of Plant Molecular Physiology, Centre of Biotechnology of Borj Cedria, B.P. 901, Hammam-Lif 2050, Tunisia
[2]Laboratory of Extremophile Plants, Centre of Biotechnology of Borj Cedria, B.P. 901, Hammam-Lif 2050, Tunisia

Abstract: Drought is one of the major environmental constraints threatening viticulture worldwide. Therefore, it is critical to reveal the molecular mechanisms underlying grapevine (*Vitis vinifera* L.) drought stress tolerance useful to select new species with higher tolerance/resilience potentials. Wild grapevine germplasm is a treasure trove of useful genes and offers rich sources of genetic variation for crop improvement. In this study, a proteome analysis was performed to identify the genetic resources and to understand the mechanisms of drought tolerance in plants that could result in high levels of tolerance to drought stress. A greenhouse pot experiment was performed to compare proteomic characteristics of two contrasting wild grapevine genotypes (drought-tolerant "Tebaba" and drought sensitive "Houamdia") and cultivated grapevine Razegui, in response to drought stress during 16 days. Drought-tolerance-associated proteins were identified using mass spectrometry and data bank analysis. These proteins were mainly involved in photosynthesis, stress defense, energy and carbohydrate metabolism, protein synthesis/turnover and amino acid metabolism. Our findings highlight the significance of specific proteins associated with drought tolerance, and verified the potential value of wild grapevine in improving drought tolerance of grapevine as well as other woody crops.

C. ORALE N° : 3.

NOUVELLE APPROCHE POUR L'OPTIMISATION DE L'ACTIVITÉ LIPASIQUE CHEZ PRUNUS AMYGDALUS.

CHERNI OUMAIMA ET BAHRI SELLEMA
Laboratoire de Biochimie, LR16ES05 : Département de Biologie. Faculté des Sciences de Tunis.

Abtract : Dans le but d'améliorer l'activité enzymatique de la lipase, extraite à partir des oléosomes des graines d'amandier (*Prunus amygdalus* Mill) variété *Tuono* en germination, nous avons adopté l'adsorption physique sur résines hydrophobes comme technique de purification et d'immobilisation. Nous avons testé cinq supports hydrophobes : **le butyl-sépharose**, **le phényl-sépharose, Purolite C18, l'Octylamine-agarose** activé au laboratoire et **un autre commercialisé**. L'activité enzymatique optimale (4 UI/mL) a été détectée sur Octylamine-agarose activé, suivie de celle détectée sur Butyl-sépharose (3,4UI/ml) ; la plus faible (1,2 UI/mL) a été révélée sur Octylamine-agarose commercialisé.

Pour désorber l'enzyme du support, nous avons utilisé un gradient de Triton X-100 **(0,1% ; 0,2% ; 0,5% ; 1%).** Pour une concentration de 1% en T–X100 la désorption s'est révélée la meilleure, pour les 3 supports testés (**Octylamine-agarose activé, Purolite C18, et Octylamine-agarose commercialisé).**

L'analyse par PAGE-SDS des fractions actives à différentes étapes de purification, nous a révélé le maintien d'une bande protéique dans une zone de masse moléculaire correspondant aux lipases connues.

C. ORALE N° : 4.

COMPARISON OF DNA EXTRACTION METHODS AND USE OF MITOCHONDRIAL DNA SEQUENCING FOR HUMAN IDENTIFICATION

DORRA BECHER[1,2,3], HAMZA DALLALI[2,3], SIHEM BEN FADHEL[4], SAFA ROMDHANE[4], ICHRAK AJLANI[1], CHAHIR GDAIM[1], RYM KEFI[2,4,5*]
1 Direction de la Police Technique et Scientifique, Sous-direction des Laboratoires Criminalistiques et Scientifiques, Tunis, Tunisia
2 Laboratory of Biomedical Genomics and Oncogenetics, Institut Pasteur de Tunis, BP 74, 13 Place Pasteur, Tunis 1002, Tunisia.
3 University of Carthage, National Institute of Applied Science and Technology, Tunis, Tunisia.
4 Genetic typing service, Institut Pasteur de Tunis, BP 74, 13 Place Pasteur, Tunis 1002, Tunisia.
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Abtract : Several factors, such as degradation of nuclear DNA and the presence of inhibitors, could be the main problems of forensic and scientific laboratories when analyzing samples.
The objective of this work is to compare the performance of four extraction techniques and to evaluate their efficiency throw nuclear STR genotyping and mitochondrial DNA sequencing.
The DNA extraction instruments used in this work are the AutoMate Express ™ system and the PrepFiler Express ™ kit, the AutoMate Express ™ System and Express BTA ™ Kit, the EZ1 Advanced XL and the QiaSymphony. The performance of these four instruments was compared on the basis of quantity of DNA recovered, STR profile and mitochondrial DNA sequencing profile.
All the four systems performed well; however extraction efficiency varied by sample type: human liver biopsy, blood stain from a fabric, bone marrow and hair.
In conclusion, our results showed that the PrepFiler Express BTA™ kit with the AutoMate Express™ gave the highest amount of DNA quantity and the best mitochondrial DNA sequencing profile. This combination of DNA extraction instrument and kit is highly recommended for the genetic forensic analyses.

Key words: *Forensic, mitochondrial DNA, nuclear DNA, DNA extraction, DNA amplification, STR genotyping, DNA sequencing.*

C. ORALE N° : 5.

CHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY OF THE LIPIDS FROM HALOTOLERANT AND HALOPHILIC MICROALGAE

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Abtract: Halophilic microalgae have gained increased attention as a source of various metabolite. Two halotolerant microalgae *Phormidium versicolor* and *Halamphora sp*. and the halophilic *Dunaliella salina* were isolated from solar saltern of Sfax, and cultured in batch facility under small scale laboratory conditions at 80 PSU. Total lipids and Fatty acids (FA) composition were characterized using GCFID, GC-MS and HPTLC. The in vitro antioxidant and antiradical potential of the microalgal lipids were evaluated by using 1,1-diphenyl- 2-picrylhydrazyl (DPPH) and 2,2-Azinobis (3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) assays. The principal FA of *Halamphora* sp., *P. versicolor* and *D. salina* lipids was respectively saturated fatty acids representing 47.83%, monounsaturtaed fatty acid (37.3%) and polyunsaturated fatty acid (43.23% of total fatty acid). C16:1, C18:1 and C18:3 was the major FA produced by *Halamphora*, *Phormidium* and *Dunaliella*, respectively. HPTLC analysis showed that the principal lipid which produced by the three species was triacylglycerol (TAG) diacylglycerol (DAG) and monoacylglycerol (MAG) were produced by *Dunaliella* and *Phormidium* respectively. In the ABTS assay, *Halamphora* and *Dunaliella* showed greater radical scavenging by ABTS activity (IC_{50} = 57 ± 0.001 mg/L) and (IC_{50} = 58 ± 0.001 mg/L) respectively, than *Phormidium* (IC_{50} = 72 ± 0.002 mg/L). However, for DPPH test system, *Dunaliella* showed the greatest activity (IC_{50} = 33 ± 0.001 mg/L) followed by *Halamphora* (IC_{50} = 46 ± 0.001 mg/L) then *Phormidium* (IC_{50}=67.5 ±0.005 mg/L).

Key words: *Microalgae, lipid, GCFID, HPTLC, antioxidant activity,*

C. ORALE N° :6.

ESSENTIAL OIL COMPOSITION AND ANTICHOLINESTERASE ACTIVITY OF *THYMUS NUMIDICUS* DEPENDING ON DIFFERENT PHENOLOGICAL STAGES

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Abstract : *Thymus numidicus* a Lamiaceae well known as medicinal plant because of their biological and pharmacological properties. Variation in the quantity and quality of their essential oils at different phenological stages including vegetative, floral budding, flowering and seed set are reported. The oils of air-dried samples were obtained by hydrodistillation and were analyzed by GC and GC/MS. Thymol was the major compound in all samples. The ranges of major constituents were as follow: thymol (52.17-89.69%), linalol (0-10.87%), thymol Methyl ether (0-16.16 %), carvacrol (4.61–6.52%) and *p*-cymene (0.73–5.43%). Anticholinesterase activity changed significantly depending on various phenological stages. The oil in seed set stage was the most effective extract on AChE and BChE inhibition, performing better than galanthamine.

Key words: *Thymus sp; Essential oils; phenological stage; GC/MS; anticholinesterase activity*

C. ORALE N° : 7.

EFFECT OF THE NON-STEROIDAL ANTI-INFLAMMATORY DRUG DICLOFENAC, ON ISCHEMIA-REPERFUSION INJURY IN RAT LIVER: A NITRIC OXIDE-DEPENDENT MECHANISM

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Abstract: Ischemia/reperfusion injury (IRI) is an inevitable complication of liver surgery and transplantation. The purpose of this study was to examine the beneficial effects of diclofenac on hepatic IRI and the mechanism behind it. Wistar rats' livers were subjected to warm ischemia for 60 min followed by 24 h of reperfusion. Diclofenac was administered intravenously 15 min before ischemia at 40 mg/Kg of body weight. To determine the mechanism of diclofenac protection, the NOS inhibitor L-Nitro-arginine methyl ester (L-NAME) was administered intravenously 10 min after diclofenac injection at 5 mg/Kg of body weight. Liver injury was evaluated by aminotransferases (ALT and AST) activities and histopathological analysis. Oxidative stress parameters (SOD and MDA) were also determined. Then, eNOS gene transcription, p-eNOS and iNOS protein expressions were evaluated. Transcription factor NF-κB in addition to the regulatory protein IκBα were also investigated. Finally, the gene expression levels of inflammatory (COX-2, IL-1β, IL-18, TNF-α) and apoptosis (Bcl-2 and Bax) markers were measured. Diclofenac decreased liver's IRI and maintained histological integrity. It also reduced oxidative stress, inflammation and apoptosis. Its mechanism of action essentially depended on eNOS activation rather than COX-2 inhibition, since pre-treatment with L-NAME abolished all the protective effects of diclofenac.

To our knowledge, this is the first study demonstrating that diclofenac protects rat liver against warm IRI through the induction of NO-dependent pathway. Diclofenac reduced oxidative balance, attenuated the activation of the subsequent pro-inflammatory response and decreased cellular and tissue damage. Therefore, diclofenac could be a promising molecule for the prevention of liver IRI.

C. ORALE N° : 8.

PROFILING OF FATTY ACID IN THREE DIFFERENT VARIETIES OF TUNISIAN APRICOT (*PRUNUS ARMENIACA* L.) AMONG MATURITY AND GEOGRAPHICAL REGIONS

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Summary : : Changes on oil yield and fatty acid profiles were studied during maturation of three varieties of apricot (*Prunus armeniaca* L.) during the ripening of three apricots cultivars (wild "*Bargoug*" or AprB, cultivar "*Chechi Bazza*"or AprC and cultivar "*Oud Rhayem*" or AprO) grown in two different geographical regions of Tunisia. The first results show that a rapid accumulation started at newly formed fruits and continued until their full maturity. During fruit maturation, fatty acid profiles varied significantly ($p<0.05$) among the growing regions and days after flowering (DAF). Nine fatty acids were identified in apricot oilseeds such as palmitic, palmitoleic, stearic, oleic, linoleic, linolenic, arachidic, gadoleic and margaric acids. Palmitic, oleic and linoleic acids were determined as major fatty acids in apricot oil varieties respectively with 14.37±0.75% in AprO at 34 DAF, 61.87±1.89% in AprB at 62 DAF and 51.89±2.27% in AprB at 34 DAF. Interestingly, linolenic acid reached its maximum significantly ($p<0.05$) with 11.67±0.59% in AprC at immature stage (20 DAF). PCA grouped each fatty acids components among each stage of maturation. Additionally, in the present study, PCA was found to be a powerful tool to identify the time-date to take advantage on these bioactive compounds. By the way, apricot oil represents potentially an important source of bioactive fatty acids which have numerous industrial applications.

In conclusion, the kernels of locally grown in *Testour* and *Gafsa* regions (Tunisia) rich in oil, oleic, and linoleic acids. the content of each fatty acid in the three varieties of apricot varied significantly ($p<0.05$) during seeds development and interestingly the bitter one *Bargoug* variety at time-date of 62 DAF (full maturity). The results of our present investigation revealed that apricot seed is a potential source of oil which can be used for both edible and oleo-chemical applications.

***Mots clés :** acides gras, abricots doux, semi- amères et amères ; au cours de la maturation.*

C. ORALE N°: 9.

EXTRACTION, PHYSICOCHEMICAL CHARACTERIZATION AND BIOLOGICAL ACTIVITIES OF CHONDROITIN SULFATE FROM *CENTROPHORUS GRANULOSUS*

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Abtract: chondroitin sulfates (CS) have attracted considerable interest in recently years due to their potential therapeutic applications and structural heterogeneities. Indeed, the CS from *Centrophorus granulosus* was isolated, characterized and essayed for antioxidant activity, anti-inflammatory activity and anti-nociceptive activity. Chondroitin sulfate was extracted by enzymatic digestion with papain followed by precipitation with cetylpyridinium chloride and ethanol and was subjected to electrophoresis on cellulose acetate, then the structure was characterized by FT-IR and physicochemical procedures, Molecular weight measurements were performed by SEC-MALLS. The antioxidant activity was studied by three tests (DPPH, ABTS and FRAP). Then, the *in vivo* anti-inflammatory activity was evaluated by the paw edema test in rats and finally test the anti-nociceptive activity in rats using the Von Frey test. The results showed that the chemical structure of this CS is also characterized by a remarkable negative charge density due to the abundance of sulfate groups and by a weight average molar mass (Mw). The results of the study of the biological activities of the CS show that this polysaccharide is endowed with a remarkable antioxidant, anti-inflammatory, anti-nociceptive activity. CS shows different anti-radical activities depending on their origin. Thus, it constitute an antioxidant molecule and can have valuable anti-inflammatory properties in the field of osteoarthritis pathology.

Keywords: *Chondroitin sulfate, Centrophorus granulosus, antioxidant activity, anti-inflammatory activity in vivo, anti-nociceptive activity.*

C. ORALE N°: 10.

PURIFICATION, STRUCTURAL CHARACTERIZATION AND ANTIOXIDANT ACTIVITIES OF A NOVEL POLYSACCHARIDES FROM *MALCOLMIA TRILOBA*

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Abstract: In this study, the polysaccharides isolated from *Malcolmia triloba* (PSMT) purified by DEAE-Sepharose chromatography. Tow fractions of polysaccharides, PSMT1 and PSMT2 were obtained. The PSMT1 and PSMT2 structures and physicochemical proprieties were investigated using chemical and instrumental analysis, including Fourier transform infrared (FT-IR) spectroscopy, spectrum visible UV, nuclear magnetic spectroscopy (^{1}H-NMR and ^{13}C-NMR), X-ray diffraction (XRD) and Scanning Electron Microscopy (SEM).The results of high-performance liquid chromatography (HPLC-MS) showed that the both purified polysaccharides PSMT1 and PSMT2 were mainly composed of rhamnose, arabinose, glucose and galactose in a molar percent in 39.69%, 29.59%, 8.81% and 21.89%, respectively for PSMT1 and 38.5%, 28.71%,15.1% and 17.676%respectively for PSMT2.The data of thermogravimetry analysis (TGA) and differential scanning calorimetry (DSC) indicated that PSMT1 and PSMT2 had relatively high thermal stability. The result of gel permeation chromatography (GPC) showed that PSMT1 and PSMT2 had a relative molecular weight of 9.779 kDa and 115.004 kDa respectively. Moreover, the in vitro antioxidant activities of PSMT were evaluated by DPPH free radical assay, ferrous iron–chelating, assay and total antioxidant activity. The experimental results showed that PSMT1 and PSMT2 exhibited an appreciable in vitro antioxidant potential.

Keywords: *Malcolmia triloba, polysaccharides, Purification, structural characterization, antioxidant activity*

C. ORALE N° : 11.

PHYSICOCHEMICAL AND BIOCHEMICAL PROPERTIES OF SEVEN DRIED FIG (*FICUS CARICA* L.) VARIETIES

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Abstract: The fig is a delicious and nutritious fruit, with several therapeutic properties. It has fleshy texture and sweet taste when ripen making it easily perishable requiring drying to extend its shelf life. The aim of this work is to evaluate the dried fig quality of seven local varieties according to their physicochemical and biochemical characters. It was conducted during 2022 at the Agricultural Experimentation Unit of INRA-Tunisia in Mornag. Fig samples were collected in august (at full maturity stage) and the fig drying processes was performed immediately in a glass greenhouse, whose transparent coating allows to concentrate the solar radiation and to heat the air inside. The day averages of temperature and relative humidity were, respectively, 39.2 °C and 51%. The results showed significant inter-varietal variation of the physicochemical characteristics and nutritional composition of dried figs. The moisture levels of all samples were below 26% which allows for better conservation. Soluble sugars were the major part of the fruit, with levels ranging from 41.71 to 78.67 g/100g DM. Protein contents were low for all studied varieties (1.23 to 1.79 g/100g DM). The contents of total phenolic compounds ranged between 164.88 and 340.55 mg GAE/100g DM. Flavonoids varied from 29.80 to 56.24 mg RE/100g DM. Dried figs were found also to be a good source of antioxidants known to have beneficial effect to the human health.

The present study confirmed that the ancestral drying technique constitutes a good practice for fig conservation as it preserves nutritional quality.

Keywords: *Ficus carica, varieties, sun-drying, physicochemical parameters, nutritional quality.*

C. ORALE N° : 12.

ACCUMULATION OF SUGARS AND GENE EXPRESSION IN RELATION TO CARBOHYDRATE METABOLISM IN FABA BEAN (*VICIA FABA* L.) CORRELATES WITH DROUGHT TOLERANCE

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Abtract: Drought is one of the major factors limiting global faba bean (*Vicia faba* L.) production. Exposure to long-term drought conditions inhibits growth and leads to yield losses. Soluble carbohydrates (sugars) are considered as important metabolites in plants involved in the responses to various abiotic stresses including drought. However, the role of sugars in faba bean growth and development under drought stress remains largely unknown. In this study, the two faba bean cultivars, Bachar and Badii, were grown in the hydrponic system and subjected to mild (-0.51 MPa), moderate (-1.03 MPa) and severe (-1.76 MPa) water stress induced by PEG-6000 solution, modeling drought. The data for relative leaf water content and photosynthesis-related parameters indicated that drought stress significantly repressed faba bean plants growth. Moreover, results showed that Bachar accumulated more proline and total soluble sugars and antioxidant enzymes activities (CAT, SOD, APX and GPX) in leaves but lower increments in MDA and H_2O_2 compared to Badii which suggested that Bachar exhibited a better drought tolerance than Badii. In the present work, carbohydrates from leaf samples were profiled using gas chromatography-mass spectrometry (GC-MS). Interestingly carbohydrate profiles of Bachar highlighted higher accumulation of α.-D-Mannopyranose, D-Glucopyranose, β-D-(-)-Ribopyranose, Rhamnose, α-L-Mannofuranose, D-Xylopyranose and Glucofuranose, compared with Badii following water deficit. However, D-Glucopyranose, β-D-galactopyranose, β-D-(-)-Ribopyranose, Rhamnose, α-L-Mannofuranose, β-D-(+)-Mannopyranose and Myo-Inositol content was decreased in Bachar compared to that of Badii. Furthermore, the analysis of the expression of genes involved in the synthesis (*VfSPP*, *VfPHS1*, *VfPHS2*, *VfSPS*, *VfHXK1*, *VfPGM1*, *VfFRK4* and *VfPGI*), degradation (*VfAN-INVH*, *VfcwINV1* and *VfSUS1*) and the transport (*VfpGlcT*, *VfSWEET2*, *VfpGPT*, *VfTMT2*, *VfSUT1*, *VfSUT4*, *VfHXT1*, *VfHXT4* and *VfHXT5*) of sugars by qRT-PCR revealed a differential expression of these genes under drought stress in Bachar and Badii. The analysis revealed an increase in most of the genes studied in Badii under mild stress, whereas this increase was observed in Bachar under moderate and severe stress. This may suggest a potential role of sugars as potential biomarkers associated with drought tolerance in faba bean.

C. ORALE N° :13.

GASTROINTESTINAL LYMPHOMAS IN TUNISIA: MICROBIOTA, MOLECULAR MARKERS AND RESISTANCE TO TREATMENT

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Abstract: Gastrointestinal lymphomas (GIL) are rare; however, they are the most common malignant extra nodal non-Hodgkin's lymphoma. However, the incidence of this malignant tumor is increasing and only an early diagnosis can be used ta improve the prognosis, Glls are very little studied and documented in Tunisia, hence the interest of our project ta carry out clinicopathological studies, molecular and cytogenetic. The clinicopathological and epidemiological data of patients with GIL diagnosed from January 2005 until now show a male predominance with a frequency of 74% against 26% for women. The average age of onset of gastric lymphoma is 59 years with extreme ages of 47 and 80 years. Glls include different anatomoclinical entities, the most common of which is the marginal MALT zone. H. pylori infection is considered the most important etiological factor of GIL. According ta our study, H. pylori was present in 100% of patients. The relationship between infection and age and sex was not significant due ta the small number concerned by this study, in particular because it is a rare pathology. The exact etiology of GIL remains unresolved. There is a growing interest in the raie of gut microbiota in the installation of GIL and the modulation of anticancer therapeutic response. Dysbiosis and gut-derived metabolome alteration of microbiota appear ta potentially promote carcinogenesis .A study on a national scale was necessary ta have more results that are significant and ta establish a true profile of our Tunisian patients bath on the clinicopathological and on molecular level. Furthermore, the study of the mutational profile of the MYD88 and Bello genes was carried out by the PCR technique followed by Sanger-type sequencing. We found the absence of the L265P mutation for the MYD88 gene. However, several other mutations have been identified at the level of the same exon and for the Bcl10 gene, the sequencing is in progress. On the other hand, we have studied the possible association between the C677T MTHFR gene variant and GIL.The identification of C677T polymorphism was carried by the PCR-RFLP technique , using the restriction enzyme Hinf I. This work is important ta introduce molecular screening for gastrointestinal lymphomas in Tunisia and ta improve the management of our Tunisian patients and the contribution of the 4Ps of medicine, Predictive, Preventive, Personalized and Participative.

***Keywords**: Gastro-intestinal lymphomas, Helicobacter Pylori, L265P MYD88, C677T MTHFR, Bcl10*

C. ORALE N° : 14.

RELATIONSHIP BETWEEN G2019S MUTATION AND OXIDATIVE STRESS IN IDIOPATHIC PARKINSON DISEASE : A CASE CONTROL STUDY

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Abstract : Idiopathic Parkinson's disease is a multifactorial neurodegenerative pathology. The etiology of the disease is still unclear, but is currently believed to be the result of oxidative stress and genetic factors. Oxidative stress and genetic factors contribute widly to the disease. Among LRRK2 gene, G2019S mutation is the most frequent in Tunisian population. Indeed this variation results from a substitution G>A at position 6055 of exon 41 of the gene previously cited. The objective of this study is to compare the occurrence of the G2019S mutation of the LRRK2 gene in the two groups of patients and controls and to determine whether there is an association between this mutation and oxidative stress parameters. In this study, we recruited 113 patients with idiopathic Parkinson's disease and 121 controls. The mean age of the patients was 61.49 ± 12.39 years while it was 55.50 ± 9.08 years in the control group. The genotypic distribution between the two groups showed that the frequency of the heterozygous GA genotype is more widespread than the frequency of the mutated genotype in the homozygous AA state, both in patients and in controls. The genotypic distribution shows the presence of association between the GA and AA genotypes and the development of MPI ($p < 10^{-4}$). The polymorphism G2019S is strongly associated with MPI, in fact it increases by 2.46 fold the risk of IPD. Biochemical analyses showed that Catalase, Vitamin B12 and total antioxidant status are significantly lower while homocysteine, protein carbonyls and Malondialdehyde are significantly higher in mutant patients compared to non-mutant one. we suggest that the G2019S mutation contribute widly to idiopathic Parkinson's disease by increasing oxidative stress.

Keywords : Idiopathic Parkinson's disease, Oxydative stress, G2019S mutation.

C. ORALE N° : 15.

OXIDATIVE STRESS MARKERS-DRIVEN PROGNOSTIC MODEL TO PREDICT POST- DISCHARGE MORTALITY IN HEART FAILURE WITH REDUCED EJECTION FRACTION

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Abstract

Background: Current predictive models based on biomarkers reflective of different pathways of heart failure with reduced ejection fraction (HFrEF) pathogenesis constituted a useful tool for predicting death risk among HFrEF patients. We aimed to develop a new predictive model for post-discharge mortality risk among HFrEF patients, based on a combination of clinical patients' characteristics, N-terminal pro-B-type natriuretic peptide (NT-proBNP) and oxidative stress markers as a potential valuable tool for routine clinical practice.

Methods: A prospective single-center study recruited 116 patients with stable HFrEF. Plasma levels of NT proBNP and six oxidative stress markers were measured in the stable predischarge condition. Generalized linear model (GLM), random forest and extreme gradient boosting models were developped to predict post-discharge mortality risk using clinical and laboratory data. Through comprehensive evaluation, the best performing model was selected.

Results : During a median follow-up of 525 days (7–930), 33 (28%) patients died. Among the three created models, the GLM presented the best performance for death prediction in HFrEF. The predictors included in the GLM model were age, female sex, beta blockers, NT-proBNP levels, LVEF, total antioxidant capacity levels, admission SBP, ACEI/ARBs and uric acid levels. Our model had a good discriminative power for the prediction of death risk with an AUC of 0.745. A simple calculator was created to allow calculation of estimated individual probability of dying.

Conclusion : In conclusion, we developed a new tool which could allow the accurate prediction of post-discharge mortality risk among patients with HFrEF in Tunisia and facilitate the treatment decision-making

Key words: *Heart failure, Oxidative stress, mortality, model, prediction.*

C. ORALE N° : 16.

POLYMORPHISMS IN NQOL AND MPO GENES AND RISK FOR BLADDER CANCER IN TUNISIAN POPULATION

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Abstract : Background: NAD (P) H: quinone oxidoreductase (1) (NQOl-HGNC: 2874) and myeloperoxidase (MPO-HGNC: 7218) are two enzymes involved in phase II of the xenobiotic metabolism pathway.
Methods: In this study, a case-control analysis was conducted to investigate the relationship between genetic variations in the NQOl (C609T, rs1800566; IVSl- 27 C >G, rs689452) and MPO (G463A, rs2333227) genes and the risk for bladder cancer among Tunisian population.
Results: We have found that the MPO 463GA genotype was associated with a decreased risk of developing bladder cancer (p = 0.049; OR = 0.696; 95% CI 0.484- 0.999). In contrast, we have found that the NQOl 609CT genotype could increase the risk ofbladder cancer patients (p = 0.0039; OR = 1.454; 95% CI = 1.017- 2.078). Moreover, patients with "NQO1 609 CT/IVSl-27 CG" genotype show a 2.180-fold increasing risk for developing bladder cancer in comparison to the control group with wild genotype. This OR is estimated at 5.6-fold in smokers patients with "NQO1 609 CT/IVSl-27 CG" genotype. Lastly, study findings suggest that the NQOl IVS-27 *CG genotype (rs689452) is associated with a risk of progression to muscle invasive bladder cancer.
Conclusion: Our study suggests that environmental risk factors in association to NQOl genotypes (NQOl 609 CT/IVSl-27 CG) play an important role in the development of bladder cancer in Tunisian population.

KEYWORD*: benzene, bladder cancer, NQOl and MPO polymorphism, RFLP, smoking*

C. ORALE N° : 17.

TETRAPLOIDIZATION INCREASES THE MOTILITY AND INVASIVENESS OF CANCER CELLS

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Polyploidy and metastasis are associated with low probability of disease-free survival in cancer patients. Polyploid cells are known to facilitate tumorigenesis. However, few data associate polyploidization to metastasis. Here, by generating and using diploid (2n) and tetraploid (4n) clones from undifferentiated pleomorphic sarcoma (UPS) and colon carcinoma cell lines we show the migration and invasion advantages of tetraploid cells *in vitro* and a preferential metastatic potential *in vivo*. Using published cytogenetic data, we find an accumulation of polyploid karyotypes in metastatic tumours compared to primary ones. This work reveals the clinical relevance of the polyploid subpopulation and the strategic need in preclinical studies to highlight polyploidy as a therapeutic target for metastasis.

C. ORALE N° : 18.

ANTI-MELANOGENESIS EFFECT OF FERROCIPHENOL: IN VITRO AND IN VIVO STUDIES

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Abtract : Cutaneous hyperpigmentation disorders are associated with abnormal accumulation of melanin pigments, which can be treated using depigmenting agents. In the present study, we investigated the effect of ferrociphenol (Fc-diOH), an organometallic intermediate used for the synthesis of hydroxy-ferrocifen derivatives, which has previously been shown as an inhibitor of Sepia tyrosinase activity, on the inhibition of melanogenesis in B16F10 mouse melanoma cells and zebrafish embryos. Cell viability, melanin quantification and tyrosinase activity assay demonstrated that 25 nM Fc-diOH treatment reduced the amount of intracellular melanin and tyrosinase activity by 32 and by 25%, respectively, in B16F10 melanoma cells without significant cellular toxicity. Additionally, we found that Fc-diOH inhibits the melanin production and the tyrosinase activity of zebrafish embryos treated with 0.5 and 2 µM respectively, without affecting viability or embryonic development. Development delay and lethality were observed only at concentrations equal or greater than 4 µM. Therefore, we suggest that Fc-diOH could be used as a depigmenting agent for the treatment of various hyper-pigmentation disorders.

C. ORALE N° : 19.

GENE CLONING, EXPRESSION, MOLECULAR MODELING, AND DOCKING STUDY OF THE PROTEASE SPSM FROM *STREPTOMYCES MUTABILIS* TN-X30

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Abstract: The literature indicates that the extremophiles are considered as an important source of enzymes with unconventional biochemical and molecular characteristics, and unique metabolic capabilities are the major points of attractions in biotechnological applications. Thus, as per earlier report, search for new robust biocatalysts producing microbes from extreme must be an endless task. The enzymes isolated from those microorganisms have been reported to be thermostable and active not only at high temperatures but also in the presence of organic solvents and detergents. Some of the enzymes from extremophiles have already been purified and their genes successfully cloned in mesophilic hosts. We have recently described the production of a detergent biocompatible protease from *Streptomyces mutabilis* TN-X30. Here, we cloned and over-expressed its corresponding gene (*spSM*). The *spSM* gene was heterologously expressed in *E. coli* BL21(DE3) pLysS and *E. coli* BL21-AI™ strains using pTrc99A (rSPSM) and Gateway™ pDEST™ 17 [$(His)_6$-tagged SPSM] vectors, respectively. The molecular docking simulation was rendered using MOE software by predicting the binding sites of the *N*-Suc-F-A-A-F-*p*NA substrate on the SPSM enzyme. The docking results indicated that *N*-Suc-F-A-A-F-*p*NA has a high affinity to bind SPSM with a predicted binding energy of -4.3174 kcal/mol. As revealed by a PROCHEK evaluation of the *N*-Suc-F-A-A-F-*p*NA complex, 98.4% of the residues were in the favored or allowed Ramachandran plot regions. According to the 2D diagram of the protein-ligand complex, at least 21 residues of the active site were interacting with the substrate using hydrophobic and van der Waals interactions, as well as hydrogen binding, suggesting a tight binding of the substrate to the enzyme. This is consistent with the results obtained by the Site Finder and COACH tools. The catalytic serine (S311) is in front of the carbonyl group of the Ala residue in position P1, indicating a good positioning of the *N*-Suc-F-A-A-F-*p*NA ligand in the active site and giving a representative image of the functioning of SPSM at the molecular level. It also shows the correct positioning of the residues of the catalytic triad towards the substrate molecule, which is in accord with the known mechanism of SPSM amino-acids in substrate binding.

KEYWORDS: *STREPTOMYCES, PROTEASE, EXPRESSION, DOCKING*

C. ORALE N° : 20.

CORRELATION BETWEEN KI-67 EXPRESSION AND OTHER PROGNOSTIC FEATURES IN BREAST CARCINOMA: A STUDY OF 100 PATIENTS

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Abtract: Breast cancer is an heterogeneous disease with many subtypes. Conventional clinical biomarkers seem to be insufficient as the only prognostic features. The current study investigates the prognostic value of Ki-67 expression in breast carcinoma and in triple negative subgroup The impact of Ki-67 and other clinical parameters on overall survival was also evaluated.
This study was performed on Formalin Fixed Paraffin Embedded (FFPE) tissues from 100 patients. Immunohistochemistry was used to evaluate expression levels of biomarkers. Bivariate and multivariate correlation was statistically explored.
The age of patients ranged from 29 to 87 years (54.45 ± 12.97). The mean size of tumor was 3.055 ± 2.019 cm (range from 0.8 to 13.5 cm). It was superior to 2 cm in 70% of cases. The expression status of Ki-67, HER2, ER and PR was 73%, 47%, 78% and 67% respectively. Bivariate analysis showed an inverse significant correlation between Ki-67 and hormonal receptors (ER *($p = 0.007$)*, PR ($p = 0.004$). Ki-67 expression was significantly associated with high SBR grade *($p \leq 0.001$)* and tumor size ($p = 0.009$). Multivariate analyses confirmed the positive correlation between Ki-67 and tumor size. In triple-negative cases (14%), high Ki-67 expression was found in 92.9% and it was associated with high SBR grade. Survival analysis showed that patients with low level Ki-67 had significantly better overall survival than those with high level *($p= 0.035$).* Cox proportional hazards regression analyses revealed that Ki-67, ER, tumor size and SBR grade were significantly associated with overall survival.
In conclusion, our results provide evidence that Ki-67 index could be considered as an important predictor for prognosis and survival of breast cancer patients.

Keywords: *Ki-67 index, Breast cancer, Overall survival, clinicopathological features, prognosis*

C. ORALE N° : 21.

BIOACTIVE COMPOUNDS AND BIOLOGICAL ACTIVITIES OF *LEPIDIUM SATIVUM* SEED OIL

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Abtract : The present study concerns the evaluation of the bioactive compounds of *Lepidium sativum* seed oil following a cold pressed extraction method. Gas chromatography revealed that the most significant acids were linolenic (35.59 %) and oleic acids (21.14 %) followed by linoleic acid (10.89 %), eicosenoic acid (10.3 %) and palmitic acid (9.45 %). The seed oil was also found to be rich in sterols (82.5 mg/100 g of oil). The sterol marker β-sitosterol accounted for 40.38 % of total sterols contained in the seed oil. The total tocopherol content of *Lepidium sativum* seed oil reached 136.83 ± 7.6 mg/100g with a predominance of γ-tocopherol (86.23 %). Total phenolic and flavonoids contents of *Lepidium sativum* seed oil were respectively 0.23 mg gallic acid equivalents (GAE) /g and 0.78 mg catechin equivalent (CE) /g. The seed oil exhibited an IC_{50} of 10.33 ± 0.05 mg/mL and a radical scavenging activity of 415.6 ± 40 Trolox Equivalent Antioxidant Capacity (TEAC) for the DPPH and the ABTS assays, respectively whereas the oil stability index was evaluated as 26.7 h. *Lepidium sativum* seed oil showed no noticeable bacterial or antifugal effects against eight bacteria and one fungal strain but held a remarkable anti-inflammatory activity.
Hence, the obtained results evidenced remarkable chemical, antioxidant and anti-inflammatory properties of *Lepidium sativum* seed oil, which might potentially be promising for enhancing human health and preventing age-related diseases. Thus appropriate use of *Lepidium sativum* seeds makes them a good example for valorization of such an unutilized and neglected crop processing product.

Keywords: *Lepidium sativum seeds; Cold extraction; Bioactive compounds; Antioxidant activity; Antimicrobial activit ; Anti-inflammatory activity*

C. ORALE N° : 22.

PHYSICO-CHEMICAL, SPECTRAL AND MICROBIOLOGICAL CHARACTERIZATION AND PHYTO-TOXICITY ASSESSMENT OF WASTEWATER FROM ROCK PHOSPHATE PROCESSING IN TUNISIA

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Abtract: Environmental applications and potential risks of wastewater have attracted increasing attention. Among these discharges, we can mention effluent from the phosphate laundries that has received great interest in recent years. In this work, we characterized CPG's wastewater from phosphate ore processing before and after treatment and investigated for the first time its phyto-toxicity. The mineralogical, spectral and physicochemical characterizations were made and show that these wastewaters are relatively alkaline, because of his high calcium and phosphorus content. This effluent had also a high salinity. The BOD_5/COD ratio is equal to 0.949, which allows us to estimate that this effluent is potentially biodegradable. The existence of numerous minerals, major elements as well as trace elements in low grade is observed.The microbiological characterization revealed the presence of revivable aerobic bacteria as; total coliforms, fecal coliforms, *Pseudomonas*, sulfite-reducing bacteria, and fungi. In contrast, a complete absence of *Salmonella*, *Vibrio cholerae*, and Helminth egg was noted. Concerning phyto-toxicity, the influence of varying concentrations of phosphate wastewater was studied on Radish, Lentil, wheat and Fenugreek plants. Taking the toxicology parameters (seed germination rate), plant irrigated with different effluent concentration weather treated or untreated exhibited a prominent reduction in growth traits at all four harvests. The results allow us to infer that, even after treatment, the effluent is still toxic, except at very low concentrations, it can act as a fertilizer.

Keywords: *Phosphate Processing Wastewater, mineral composition, microbiological composition, phyto-toxicity, germination tests*

C. ORALE N° : 23.

EXTRACTION, CHARACTERIZATION AND BIOLOGICAL ACTIVITIES OF EXOPOLYSACCHARIDES FROM *JUGLANS REGIA*

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Juglans regia was recognized by its richness in biomolecules with many biological activities. Polysaccharides, the most abundant macromolecules, have attracted much attention from researchers in the food and biomedical fields, due to their various biological and physiological activities such as biodegradability, non-toxicity and antimicrobial activities. The aim of this work is to extract, to characterize the *Juglans regia* water-soluble polysaccharides from the bark (JrWSPB) and to investigate some of its biological activities. The JrWSPB extraction yield was 3.86 % giving a yellow-brown colored powder. The spectral characterization showed the presence of a major peak between 200 and 225 nm could be attributed to the unsaturated carbonyl groups and carboxyl groups. In addition, a second peak at 245-255 nm indicated the presence of xylose, a third one between 260 and 270 nm, for sucrose and glucose presences and the last one at 675 nm could be attributed to chlorophylls. A low absorption at 280 nm testify the poorly protein presence. These results were confirmed by FTIR analysis. The JrWSPB extract exhibited a strong antioxidant activity towards DPPH (IC_{50}= 405µg/ml), ABTS (IC_{50}= 788µg/ml), reducing power capacity (IC_{50}= 338.36 mg/ml), and chelating power (IC_{50} = 0.299 mg/ml).The antibacterial activity shown that *Pseudomonas aeruginosa* was the most sensitive strain towards the JrWSPB extract with the lowest MIC equal to 2 mg/ml. In contrast, *Bacillus cereus* was the most resistant one with the highest MIC (9 mg/ml). In fact, the JrWSPB extract showed a very significant inhibition against all the tested bacteria biofilm formation (I%=70%). In addition, the JrWSPB dotted by an anticoagulant activity confirmed by FTIR analyzes showing the sulfoxide group presence.

C. ORALE N° : 24.

GENETIE AND BIOCHEMICAL STUDIES OF MARRUBIUM ALYSSON L., IN TUNISIA

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Marrubium alysson L. is an herbaceous perennial plant belonging of the family Lamiaceae. Traditionally, it was used to treat various diseases, including asthma, inflammation, and hypotension. These activities are related to the presence of phenylpropanoids and flavonoids. We proposed to evaluate the genetic variability of a collection of the medicinal plant Marrubium alysson L., collected in several regions of northem Tunisia using molecular markers. In addition, a biochemical study was carried out in order to quantify the contents of polyphenols by the colorimetric method based on the Folin-Ciocalteu reagent, flavonoids by the colorimetric method with Aluminum trichloride (AlC13), and the antioxidant activity by the method of reduction of the free radical (DPPH) of different organs (aerial parts, inflorescences, and leaves) with two different extraction solvents (water and ethanol). The results of the assays showed that the contents of polyphenols and flavonoids are affected by the type of sol vent, the organ, and the region of the harvests; in addition, the antioxidant activity is only affected by the type of sol vent and the place of harvest of the samples. This study provided insight into genetic variability and quantified polyphenol, flavonoid, and antioxidant activity levels between different samples of Marrubium alysson L.

***Keywords**: Marrubium Alysson L., Molecular markers, polyphenols, flavonoids, DPPH.*

C. ORALE N° : 25.

COMPARATIVE STUDY BETWEEN ACORN AND CORN STARCHES

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Abstract : The aim of the present study was to study the structural and technological properties of acorn and corn starches in order to determine their innovative potential application in food industry. The acorn starch yield was about 48.32%. The isolated starches showed low moisture, fat and proteins contents revealing high purity and quality. Also, the corn starch showed higher lightness (87.8) when compared to the acorn starch. In addition, acorn starch exhibited the highest swelling power, solubility and water absorption compared to corn starch. Results showed that extracted acorn starch was characterized by greater enthalpy and gelatinization temperatures. Also, similar observations were noted using FT-IR spectra analysis for both analyzed starches. Besides, observed granule starches using scanning electron microscopy were found to be spherical and ovoid. However, from the analysis by X-ray diffraction, crystalline pattern of C-type was found for acorn starches while corn starch presented an A- type pattern. As innovative food application, the underexploited acorn starch could be used to produce new formulated custard with good technological properties when compared to commercial custard.

***Key words**: Acorn, corn, starch, technological properties, custard.*

BIOLOGIE, PHYSIOLOGIE ET ECOLOGIE ANIMALE

C. ORALE N° : 26.

EVALUATION OF HYDROETHANOLIC EXTRACT OF *POLYGONUM MARITIMUM* ON ETHYLENE GLYCOL INDUCED CALCIUM OXALATE STONES IN WISTAR ALBINO RATS.

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Abstract : Urinary calculi are the third prevalent disorder of the urinary system. Approximately 80% of these calculi are composed of calcium oxalate. The current available therapy for management of urolithiasis includes thiazide diuretics and surgical invasive techniques have also been used. This study was mainly aimed to evaluate the more effective and safer antiurolithiatic treatment by using *Polygonum maritimum* extract (PME).The biomolecules of PME content was evaluated using LC/MS analysis. Administration of ethylene glycol (0.75% in water) caused hyperoxaluria, hypercalcemia and a decrease in urinary volume associated with an increase in pH. In addition, microscopic examination revealed large crystals and oxalic aggregates in comparison to the control group. PME hydroethanolic extract (37.5 and 50 mg/kg) was administered orally in a gastric tube in a preventive diet for 15 days and 28 days of treatment. The PME supplementation has considerably ($p<0.05$) restored urea, uric acid, creatinine concentration, as well as pH. In addition, PME pretreatment leads to a strong diuresis that helps to eliminate crystalline debris. This antilithiasis activity was higher than that observed after treatment with drug lithos (215 mg/kg) which is enhanced by the histological study. Treated groups showed significant antiurolithiatic activity which was comparable with the standard drug.

Key words: *Urolithiasis; Ethylene glycol; Polygonum maritimum,*

C. ORALE N° : 27.

IN SILICO STUDY FOR THE DESIGN OF NEW NATRIURETIC ANALOGUES IN THE PROTECTION AGAINST CARDIAC ISCHEMIA

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Abstract : Lebetin 2 (L2), a snake natriuretic peptide (NP), has been shown to exert potent cardioprotective actions in experimental myocardial infarction (MI), with stronger effects than B-type natriuretic peptide (BNP). Recently, we characterized the affinity and mode of interaction of L2 with natriuretic receptors, and found major discrepancies with BNP, which could explain the additional effects that L2 exerts during MI compared to BNP. This prompted us to design, through an *in silico* computational approach, L2 analogues with potentially higher activity and lower side effects. To do this, we used molecular modeling, molecular docking and molecular dynamics (MD) simulation to design analogues based on the structure of L2. This allowed us to predict the affinity and mechanism of interaction of L2 analogues for NP receptors and compared them to wild-type peptides (L2 and BNP). We also determined key residues involved in the interaction between L2 analogues and NP receptors, as well as those potentially involved in adverse effects. Finally, we generated forty-eight (48) analogues of which only four (4) showed better parameters of affinity and interaction with NP receptors compared to L2. Further studies are planned to test the effect of these *in silico* structure-based peptides on cardiac protection.

C. ORALE N° : 28.

LA FAUNE DE CULICOIDES (DIPTERA: CERATOPOGONIDAE) DANS LA REGION DES HAUTS PLATEAUX DE L'OUEST ALGÉRIEN

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Abtract : Bluetongue (BTV) is an almost vector-borne viral disease, including the virus (BTV), which mainly infects domestic and wild ruminants, thus representing a major threat to animal health and even the economy. Transmission occurs through the bites of female small hematophagous midges of the genus Culicoides (Diptera: Ceratopogonidae). The unexpected emergence of bluetongue in Algeria since the year 2000, and even observing outbreaks in neighboring countries requires a lot of vigilance.

The persistence of the disease in some regions of the country encouraged a study on *Culicoides* in the region of Tiaret in western Algeria. The objective of this study is to identify the species that could be incriminated or potential vectors in the transmission of BTV in the region. To do this, sampling took place on capture sites including breeding farms. Culicoides were collected by OVI-type light traps during a period from 2015 to 2018. Identification of specimens to species level was achieved by morphological and molecular approaches. In total, 36 species belonging to the 10 subgenera have been determined, of which 10 species are new to the fauna of Algeria, namely: *C. chiopterus*, *C. dewulfi*, *C. navaiae*, *C. grisescens*, *C. paradoxalis*, *C. shaklawensis*, *C. simulator*, *C. univittatus*, *C. achrayi* and *C. picturatus*. This study was able to update the list of *Culicoides* in Algeria by currently counting 59 valid species. This fauna includes species widely distributed in the Palearctic and Mediterranean region but also some species from the Afrotropical region. Among these species in particular which belong to the genus *Avaritia* and *Culicoides* are considered as confirmed or probable vectors for the transmission of important pathogenic arboviruses.

Keywords: *Culicoides, Blue tongue, Vector-borne diseases, new species, Algeria.*

C. ORALE N° : 29.

IMPACT OF ZINC AND CADMIUM ON THE LOCOMOTOR RHYTHM ACTIVITY OF *CHAETOPHILOSCIA ELONGATA* FROM GARAET ICHKEUL

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Abtract : This study deals with the impact of zinc and cadmium on the locomotor activity rhythm of the terrestrial isopod Chaetophiloscia elongata. Specimens were collected from the banks of Garaet Ichkeul in early morning hours. The locomotor rhythm of control and contaminated individuals were maintained under constant darkness during 10 days in environmental laboratory conditions.

Results showed that whatever the experimental conditions, C.elongata exhibited a nocturnal behavior and the locomotor patterns were in majority bimodal. Through periodogram analysis, ultradian and circadian components were obtained for treated and untreated individuals. These latter were characterized by the most important percentage of rhythmicity. Furthermore, contaminated individuals with cadmium were less active (αCd = 2h57±2h22) and their locomotor rhythm was less defined whatever for the ultradian or the circadian component (SNR12hCd = 0,041 ± 0,018; SNR24hCd = 0,068 ± 0,041).

With reference to environmental stability and variability, the differences of locomotor activity characteristics observed were explained as a need for plasticity to adapt to environmental changes.

Mots clés : *Chaetophiloscia elongata, lagoon, constant darkness, Zinc, Cadmium.*

C. ORALE N° : 30.

NATRIURETIC-LIKE PEPTIDE LEBETIN 2 MEDIATES M2 MACROPHAGE POLARIZATION IN LPS-ACTIVATED RAW264.7 CELLS IN AN IL-10 DEPENDENT MANNER

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Abstract: Snake natriuretic peptide (NP) Lebetin 2 (L2) has been shown to improve cardiac function and reduce fibrosis as well as inflammation by promoting M2-type macrophages in a reperfused myocardial infarction (MI) model. However, the inflammatory mechanism of L2 remains unclear. Therefore, we investigated the effect of L2 on macrophage polarization *in vitro* on lipopolysaccharide (LPS)-activated RAW264.7 cells and explored the associated underlying mechanisms. TNF-α, IL-6 and IL-10 levels were assessed using an ELISA assay, and M2 macrophage polarization was determined by flow cytometry. L2 was used at non-cytotoxic concentrations determined by a preliminary MTT cell viability assay, and compared to B-type natriuretic peptide (BNP). In LPS-activated cells, both peptides reduced TNF-α and IL-6 release compared with controls. However, only L2 increased IL-10 release in a sustained manner and promoted downstream M2 macrophage polarization. Pretreatment of LPS-activated RAW264.7 cells with the selective NP receptor (NPR) antagonist isatine abolished both IL-10 and M2-like macrophage increase provided by L2. In addition, pretreatment of cells with the IL-10 inhibitor suppressed M2 macrophage polarisation. We conclude that L2 exerts anti-inflammatory response to LPS by regulating the release of inflammatory cytokines via stimulation of NP receptors and that IL-10 is a major determinant of M2 macrophage polarization.

C. ORALE N° : 31.

EFFECT OF CAM-B-NGF ON MASS MOTILITY AND MEMBRANE INTEGRITY OF CAMEL SPERM (CAMELUS DROMEDARIUS) AFTER SHORT STORAGE AT 4°C

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Abtract : The aim of this work was to study the effect of Cam β-NGF on mass motility and membrane integrity of dromedary (Camelus dromedaries) semen after storage 24h at 4°C. Fatnassi et al. (2017) identified the cam-β-NGF in camel sperm. The NGF functions on spermatozoa was evaluated in animal model research indicating its role in promoting the formation and development of testis, the spermatozoon differentiation, maturation, viability, and motility.Ten ejaculates were collected from male dromedary (n = 6) using a bovine artificial vagina. After washing by HBSS buffer, Sperm was suspended in Tris-citrate-fructose-egg yolk diluent for a final concentration of 200 × 106 /ml and cooled at 4°C for 24 h. After refrigeration, the extended sperm samples were equilibrated for 5 min at 36°C and divided into the following subgroups: sperm samples without treatment (control) and sperm samples supplemented with Cam-β-NGF (10, 100, 500, and 1000 ng/ml). At 5, 30, and 60 min of incubation, the mass motility of sperm was evaluated under light microscopy and was scored using a 0 (immotile)–5 (highly motile) scale. The membrane integrity was evaluated with the swilling test. The Data were analyzed by one-way ANOVA followed by Tukey's Multiple Comparison Test ($P < 0.05$). The treatment of camel sperm with 500 and 1000 ng/ml of Cam-β-NGF increased significantly the sperm motility after 30 min of incubation ($p < 0.05$). However, after 60 min, only the dose of 1000 ng keeps the higher sperm motility (≥ 3). NGF supplementation with 1000 ng/ml, 500 ng/ml and 100 ng/ml in semen extender show the superior percentage of the swilled spermatozoa after 60 min of incubation. These results demonstrate that Cam-β-NGF could be implicated in dromedary sperm motility and membrane integrity after cooling.

Keywords : *Camelus dromedaries, Cam-β-NGF, sperm motility, membrane integrity*

C. ORALE N° : 32.

EFFECTS OF AN AQUEOUS SIDR LEAF EXTRACT ON THE HISTOPATHOLOGICAL LESIONS INFERRED BY SODIUM FLUORIDE IN THE REPRODUCTIVE ORGANS OF ADULT ALBINO RATS

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Abtract : In pioneering research, it was found that daily exposure to sodium fluoride (NaF) affects directly the reproductive organs, which can lead to infertility if taken abundantly in high doses over the long term. This is mainly associated with increased oxidative stress and changes in enzyme activity. In this paper, we investigated, for only one month, the effects of this toxic substance on some reproductive organ of adult albinos rats, as well as on the number and morphology of spermatozoa. The broad practical aim of this study is to probe the ways and solutions to treat the residues from NaF using medicinal herbs, including the aqueous plant extract of the leaves of the Sidr plant, and to determine its antioxidant activities. Twenty male rats were used and divided into four groups. The first group was used as an untreated (normal) control. The second group received NaF at a concentration of 150 ppm via mineral drinking water, and the third group received aqueous plant extract at a concentration of 150 ppm, while the fourth group received NaF at a concentration of 150 ppm with aqueous plant extract at a concentration of 150 ppm also for a period of thirty days. The animals weights and reproductive organs were calculated at the end of the experiment, and showed no significant difference in weight. The control group did not show any pathological changes in the histological structure of the reproductive system, in the second group, the results revealed atrophy and a stifled growth of the genital organs, also an almost total destruction of the connective tissue with deformation and reduction in the number of spermatozoa. The third group of Sidr plant compared to the control group showed that there was no significant difference between them in the natural composition of the tissues of the reproductive system, while the fourth group showed the effect of the aqueous vegetable extract of the leaves of the Sidr plant to correct the residues of sodium fluoride. The combined results indicate that the aqueous plant extract of Sidr leaves protects the normal tissue composition of the rat reproductive system from NaF-induced oxidative stress, possibly through its antioxidant properties, leading us to further investigate the molecular structure that addresses this damage.

Mots clés : *Sodium fluoride, oxidative stress, Antioxidant activity, Sperm, reproductive organs, the Sidr plant*

C. ORALE N° : 33.

TOXICITY AND SUB-LETHAL EFFECTS OF *CITRULLUS COLOCYNTHIS* EXTRACTS ON *DROSOPHILA MELANOGASTER*

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ABSTRACT:

Currently, biological control through the use of plants is of paramount importance to limit the nuisance of several insect pests. In this study we evaluated the different effects of *Citrullus colosynthis* aqueous extract on *Drosophila melanogaster;* we started with determining the toxicity of this fruit against the second instar of *D. melanogaster* larvae by using 3 different concentrations (50g/l, 100g/l, 150g/l). 50% mortality among the tested individuals was reported after 48 hours after treatment and reaches 93% on the 12th day. Thereafter we studied the delayed effects of sublethal concentrations on the sexual behavior in adults. We noticed a disturbance in some sequences of the courtship such as allied vibration, licking, mating, and a decrease in successful mating rate.

KEYWORDS: *Citrullus colosynthis, Drosophila melanogaster, sublethal concentration, sexual behavior.*

C. ORALE N° : 34.

EFFECTS OF PRICKLY PEAR SEEDS OIL ON MPO AND NADPH OXYDASE ACTIVITIES AND ON ROS PRODUCTION *IN VITRO* BY HUMAN NEUTROPHILS

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Introduction: Le figuier de Barbarie originaire d'Amérique centrale est une plante actuellement bien cultivée dans le bassin méditerranéen. Le fruit de cette plante est considéré comme un aliment de santé mais il est également utilisé comme aliment thérapeutique en raison de ses propriétés antioxydantes et de sa richesse en composés phénoliques. Ces antioxydants naturels protègent les cellules contre les effets néfastes des espèces réactives de l'oxygène (ERO).

Objectifs: La présente étude a pour but l'évaluation des effets de l'huile des graines du fruit de la figue de barbarie ou cactus (HGFC) sur la production de ROS par des neutrophiles humains in vitro ainsi que ses effets sur l'activité MPO et sur la phosphorylation P47phox-Ser-320 de ces neutrophiles.

Méthodes: Des cellules neutrophiles ont été isolés de donneurs sains et la génération d'espèces réactives de l'oxygène (ROS) a été mesurée par chimiluminescence amplifiée au luminol. La génération d'anions superoxyde a été détectée par le test de réduction du cytochrome C. Le peroxyde d'hydrogène (H_2O_2) a été détecté par le test de fluorescence DCFH. L'activité de la myéloperoxydase (MPO) a été mesurée par la méthode d'oxydation de la tétraméthylbenzidine. Une analyse par Western blotting a été utilisée pour déterminer la MPO et la lactoferrine ainsi que la phosphorylation de la P47phox-Ser-320.

Résultats: Les résultats obtenus montrent que l'huile fixe des graines du cactus (HGFC) inhibe la chimiluminescence amplifiée au luminol des neutrophiles humains au repos stimulés par la PMA. Cet extrait spécifique n'est pas capable d'éliminer l'anion superoxyde et le peroxyde d'hydrogène par contre il réduit légèrement l'activité et l'expression de l'enzyme MPO et plus important encore, le PPSO réduit la phosphorylation de l'enzyme ERK1/2 induite par la PMA et inhibe la phosphorylation de P47phox- Ser-320 dans les neutrophiles humains stimulés d'une manière dose-dépendante.

Conclusion: Notre étude montre que l'huile fixe des graines du cactus n'affecte pas la production *in vitro* des ROS par les neutrophiles humains, réduit légèrement l'activité de la myéloperoxydase et diminue nettement la phosphorylation de la p47phox sur Ser-320 d'une manière dépendante de la concentration dans les neutrophiles humains stimulés par la PMA.

Mots clés : *Cactus; Huile fixe; chemiluminescence; neutrophile; espèces réactives de l'oxygène; myeloperoxidase, phosphorylation.*

C. ORALE N° : 35.

DIVERSITÉ DU RÉGIME ALIMENTAIRE DE LA CHOUETTE CHEVECHE DANS LA RÉGION DE GABÈS

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Résumé: La Chouette chevêche (*Athene noctua*), est un rapace nocturne qui occupe le sommet des pyramides écologiques dans de nombreux écosystèmes terrestres. Bien que l'écologie alimentaire de cette espèce en Tunisie ait fait l'objet de plusieurs investigations antérieures, les données concernant les populations de Chouette chevêche dans le sud-est tunisien demeurent sommaires et incomplètes. C'est dans ce contexte que notre travail avait pour objectif d'explorer la variation du régime alimentaire de la Chouette chevêche en fonction de l'habitat dans la plaine côtière de la région de Gabès. Au total 156 pelotes de réjection ont été récoltées à partir de 31 territoires différents, puis minutieusement observées à la loupe pour l'identification et le comptage des restes des proies consommées. Ce travail a permis de recenser 918 proies réparties sur 5 catégories (Scorpions, micromammifères, oiseaux, cloportes avec une dominance des insectes qui représentent à eux seuls 80% des proies consommées).Ainsi notre étude montre une variation de la niche alimentaire de la Chouette chevêche en fonction de l'habitat. En effet, il est plus large et diversifiée dans les milieux ouverts que dans les zones urbaines.

Mots clés: *Chouette cheveche (Athene noctua), niche alimentaire, ecologie trophique, Gabès*

BIOLOGIE, PHYSIOLOGIE ET ECOLOGIE VEGETALE

C. ORALE N° : 36.

MORPHOLOGICAL, PHYSIOLOGICAL, BIOCHEMICAL PLANT RESPONSES TO WATER DEFICIT STRESS IN SOME BARLEY GENOTYPES

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Abstract: In the conditions of changing climate, plants are continuously subject to several biotic and abiotic stresses. Among these stresses, drought is one of the most severe abiotic stress which threats crops production and yield. This study describes some aspects of drought induced changes in morphological, physiological, biochemical changes in plants. Drought triggers a wide variety of plant responses, ranging from cellular metabolism to changes in growth development including roots, shoots and yield. Moreover, understanding the physiological and biochemical responses to drought is essential for perception of plant resistance mechanisms to water-limited conditions. Analysis of variance revealed significant differences among genotypes and landraces for all of the studied traits, and showed highly significant effects of water deficit stress on all the studied traits. Based on correlation analysis, all the characters included in the study except number of grain per spike showed significant positive correlation with grain yield under both conditions. In terms of physiological characters high significant correlation coefficient was found between relative water content and grain yield under stress condition; however, high significant correlation coefficient observed between fluorescence chlorophyll and grain yield under non-stress condition. 1000-grain weight had negative correlation with all characters under non-stress condition.

Mots clés : *Hordeum vulgare L, abiotique stresse. morphological physiologica, biochemical responses*

C. ORALE N° : 37.

PREVALENCE OF THE MAIN FUNGAL DISEASES IN OLIVE GROVES OF MARRAKECH - SAFI REGION IN MOROCCO

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ABSTRACT: Olive tree is the main fruit species cultivated in Morocco. Like any other crop, it is subject to damages from many fungal pathogens causing diseases that would have a direct or indirect impact on both its quantitative and qualitative production. This study aimed to build up a picture of the importance of different diseases associated with the cultivation of olive trees during its vegetative growth stage in the Marrakech-Safi region. Surveys were carried out on diseases occurrence and incidence for the 2020/21 crop year. The results showed the presence of diseases already known in the olive groves, mainly olive leaf spot (OLS) reported in 94.7% of surveyed groves, and verticillium wilt (VW) (34.2%). The OLS incidence ranged from 11.3 to 82.6% with an average of 48.89%, while the VW incidence ranged from 2 to 15%, with an average of 2.24 %. Furthermore, other fungal pathogens causing root and crown rot were also reported in 15% of visited groves with an incidence ranging from 5 to 20%. Infected olive trees showed general defoliation and black cankers on the base of their trunks. Generalised wilt and dieback of trees can be observed in the most severe cases. Considering the potential damage that this disease can cause, its control is necessary within an integrated disease management program.

Keywords: *Olive tree, Morocco, Marrakech Safi region, fungal pathogens, disease incidence.*

C. ORALE N° : 38.

COMBINING HYDRO- AND BIO-PRIMING TO BOOST SEED QUALITY IN CROP AND ORPHAN LEGUMES

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Abtract : Seed priming is used as pre-sowing technique to obtain high-vigor seeds able to provide increased yields, nutritional value, and stress resilience. With these treatments, the seed repair mechanisms (antioxidant response, DNA repair pathways) are boosted, contributing to seed quality. Hydropriming has been successfully tested in several climate-sensitive regions whereas beneficial microrganisms are also used as seed protectants to develop formulations for biopriming. Multiple priming agents can be combined to boost stress tolerance in seeds (hybrid priming). Combined hyro/bio priming has been used to *i)* enhance *Medicago* spp. seed germination and seedling establishment in soils from abandoned agricultural areas, *ii)* improve the performance of orphan legumes as climate-ready crops suitable for arid/semiarid regions of the Mediterranean Basin.

***Keywords** : seed priming, plant growth beneficial bacteria, Medicago truncatula, orphan legumes*

C. ORALE N° : 39.

STAPHYLOCOCCUS STRAIN 9 PREVENTS TETRACYCLIN INDUCED PLANT STRESS BY ANTIBOTROPHY

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Abstract: Antibiotic (ATB) contamination is one of the most serious threats to global health, food security and development today, due to the accelerating phenomenon of resistance through the misuse or excessive ATB's application. Once these pollutants accumulate in plant tissues, they cause deleterious changes that impair vital physiological processes, including seed germination, even at low concentrations.

We studied the impact of tetracycline (TET) on pea (*Pisum sativum*) growth applied alone or in combination with the bacterial strain *Staphylococcus* S9 isolated from soil irrigated with treated wastewater and showing resistance to TET (until 200 mg/L). Several plant growth parameters were evaluated after 27-day-old pea plants cultured in hydroponic controlled conditions.

Exposure of pea seeds to tetracycline (20 mg/L) significantly reduced elongation of roots (-49.14%) and leaves (-62.72 %), fresh biomass (-68.54 %), dry biomass (-66.66 %), and relative water content in roots (-72%) and leaves (-52.78 %) in comparison to control (without TET). However, the simultaneous application of TET (20 mg/L) and *Staphylococcus* strain S9 prevents antibiotic induced plant stress as all measured parameters like plant length (+102.80 %), plant fresh weight (+114.74 %), plant dry weight (+112.5%) and relative water content in roots (+73.08%) and leaves (+92.65 %) have been raised compared to control with TET added alone.

For a better understanding of the role of *Staphylococcus* strain S9 in plant responses to TET toxicity, the cellular content of some oxidative stress indicators in growing seedlings was determined. Under abiotic stress conditions, we showed that plant triggers overproduction and accumulation of ROS. In fact, we obtained -81.37%, -100.01 % and -181.75% for levels of superoxide anion ($O2^{\bullet-}$), hydroxyl radical ($HO^{\bullet}$), and hydrogen peroxide (H_2O_2) respectively in the roots of pea plants subjected to 10 mg/L of TET compared to control (without TET). Application of the selected bacteria to the plant culture medium decreased the production of $O2^{\bullet-}$, $HO^{\bullet}$, and H_2O in roots of TET-treated plants as +73.71 %, +47.36 % and +73.63% were obtained respectively, in comparison to roots plants cultured with TET alone.

The degradation kinetics of tetracycline followed by HPLC as a function of strain growth showed the antibiotrope character of strain *Staphylococcus* S9. Thus, the selected bacteria showed great potential as plant biostimulant in ATB stress condition.

***Keyword**: Staphylococcus Strain S9, tetracycline, pea, abiotic stress, antibotrophy.*

C. ORALE N° : 40.

IMPROVED GROWTH AND TUBER QUALITY OF TRANSGENIC POTATO PLANTS OVEREXPRESSING EITHER NHX ANTIPORTER, CLC CHLORIDE CHANNEL, OR.

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Abtract : The nutritional enhancement of potato plants (*Solanum tuberosum* L.,) is highly critical. As it is considered worldwide basic vegetarian nutrition to maintain health. S. tuberosum is one of the foremost staples and the world's fourth-largest food crop. In advance, its need is increasing because of its high-industrial value and population blast. To improve both potato growth and behavior under harsh environmental conditions, we produced transgenic potato plants overexpressing either VvNHX (a sodium proton antiporter from *Vitis vinifera*), VvCLC (a chloride channel from Vitis vinifera), or both. Control and transgenic plants were grown in greenhouse and field under non-stressed conditions for 85 days in order to characterize their phenotype and evaluate their agronomical performance. To this aim, the evaluation of plant growth parameters, tuber yields and characteristics (calibers, eye number and color), the chemical composition of tubers, was conducted and compared between the different lines. The obtained results showed that transgenic plants displayed an improved growth (flowering precocity, gain of vigor and better vegetative growth) along with enhanced tuber yields and quality (increased protein and starch contents). Our findings provide then insight into the role played by the VvNHX antiport and the VvCLC channel and a greater understanding of the effect of their overexpression in potato plants.

Mots clés : Potato, CLC, NHX, Tubers growth, Tubers quality

C. ORALE N° : 41.

FABA BEAN AS GREEN MANURE FOR INCREASED PEPPER GROWTH AND PRODUCTION THROUGH IMPROVED SOIL MICROBIAL AND CHEMICAL PROPERTIES WHEN GROWN UNDER CONVENTIONAL AND ORGANIC FARMING SYSTEMS

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Abstract: There is an increased need to find environmentally safe alternatives to agrochemicals. Faba bean (*Vicia faba minor* L.) used as green manure was tested for its effects on soil chemical and microbial properties, pepper (*Capsicum annum* L.) growth and production and fruit quality when grown under conventional and organic farming systems. At two-true-leaf growth, pepper seedlings cv. Baklouti were planted two months after incorporation of faba bean fresh material into the soil. Control plants were grown on soil without any green manure supply. Pepper production recorded under conventional farming system was around 94.62 g/plant compared to 73.62 g/plant recorded in control plants. The production of pepper grown under organic farming system following incorporation of green manure into soil was estimated at 100.37 g/plant compared to 6.18 g/plant noted in control. Ten plants were randomly sampled from each farming system to assess their growth. Green and red pepper fruits were characterized based on their total soluble solids, titrable acidity, vitamin C content and mineral status (calcium, phosphorus and sodium) under both farming systems. The green manure had significantly improved the soil bacterial population by 56.6 and 65.4% compared to control soil under conventional and organic farming systems, respectively. Faba bean incorporation into the soil had significantly reduced the fungal population by 90.3% under organic farming system. Tested green manure had enhanced by 24.4% the soil phosphatase alkaline activity in organic farming and the urease activity by 41.5 and 42.5% in conventional and organic farming systems compared to control soils, respectively. The available potassium and phosphorus levels, the soil organic matter and the soil carbon biomass content had increased following green manure in both farming systems. The present results indicate that faba bean explored as green manure would be an effective approach for improving the soil ecological environment for sustainable pepper cropping.

***Keywords**: Faba bean, fruit quality, green manure, pepper growth and production, soil microbial community and activity, soil fertility.*

C. ORALE N° : 42.

DIVERSITY, DISTRIBUTION AND BIOINDICATION OF BRYOPHYTES IN TUNISIAN NORTHEAST COASTAL FOREST (RIMEL) ACCORDING TO DISTANCE FROM INDUSTRIAL ZONE

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Abstract : Bryophyte proves to be a potential bio indicator of air pollution. Their habit diversity, structural simplicity, fast rate growth and high metal accumulation capacity make bryophytes ideal organisms for pollution studies. The decline or even absence of bryophytic population especially epiphytes species is a phenomenon primarily related to air pollution caused by gaseous and particulates pollutants.

In this regard, we investigated diversity, distribution and bioindication of bryophytes in the coastal Rimel forest in northeast of Tunisia along an increasing atmospheric pollution gradient. Five plots were selected along a transect according to distance from industrial zone.

In the studied site, results revealed low bryophytes diversity with 7 taxa (one liverwort and six moss) belonging to 6 genera and 5 families. The family *Potteacea* has the highest number of species. Also results showed a bryophyte diversity station-dependant. Epiphytic species as well as lichen-bryophyte association are found only in plots farthest from pollution sources traducing a high sensitivity of these species to atmospheric pollution and a poor air quality in the plots closet to pollution sources.

Our results confirm the bioindication character of bryophytes with regard to air pollution in the coastal Rimel forest.

Key words: *Tunisia, Rimel forest, Bryophytes, Bioindication.*

C. ORALE N°: 43.

SEASONAL EFFECT ON BIOACTIVE COMPOUNDS RECOVERY USING AQUEOUS EXTRACTION, ANTIOXIDANT ACTIVITIES, AND VOLATILE PROFILES OF DIFFERENT PARTS OF *S.MARITIMA* (*SCABIOSA .ATROPURPUREA SUB. MARITIMA L.*)

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Abtract : We investigated in this study the antioxidant activity and phenolics contents of the aqueous extracts obtained from the different parts of *Scabiosa.maritima* at four stages of development. Extraction was conducted by maceration, infusion, and decoction methods. Total phenolic content (TPC), total flavonoids content (TFC), condensed tannin content (CTC), flavonols content, ferric reducing power (RP), total antioxidant activity (TAC), and ABTS and DPPH scavenging activity were evaluated. Pigments (β-carotene, chlorophyll a, chlorophyll b,leukopene) contents of the different plant parts were also investigated as well as the chemical composition of essential oils obtained from leaves collected during April (pre-flowering stage) and inflorescence collecting during May (flowering stage). Mixed effect models were fitted to the different datasets, in order to elucidate the effect of the different intervening factors (organs, sampling date, and extraction method). The studied parameters have shown an organ-dependent variation, with leaves exhibiting in general the highest values. The analysis of random effect plots revealed an opposite behavior of leaves vs. stem and roots across time. Pigments, phenolics contents, and antioxidant activities were the highest in leaves during March, while they attained their peak during either April or June for stem and roots. The extraction method doesn't drastically affect the variation pattern of different variables across plant parts and sampling date, however, a significant effect on deviation magnitude was recorded. Infusion extraction assures in general the best recovery of phenolics from the different plant parts. Leaves and inflorescence essential oils exhibited a distinct chemical composition with only Hexahydrofarnesyl acetone as the common compounds. Leaves essential oil composition was dominated by apocarotenoids derivatives while pyridine derivatives were the group of the major compounds identified in inflorescence essential oil. Inflorescence essential oil was also characterized by a considerable amount of mescalin (5.66%). Repeated measure correlation (rmcorr) and multivariate analysis (MFA) highlighted respectively a moderate to strong correlation between extracts antioxidant activities and phenolics contents and confirm the opposite behavior displayed by roots and leaves regarding the different analyzed variables and a particular behavior of stem collected during June and roots collected during May.

Mots clés : *Scabiosa.maritima*, aqueous extract, essential oil, phytochemicals, antioxidant activity, mixed effect model, MFA, rmcorr

C. ORALE N° : 44.

HOW COULD HEAT SHOCK STRESS APPLIED AT THE ROOT LEVEL ALTER TOMATO LEAVES GROWTH UNDER CONTROLLED CONDITIONS?

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Background and aim: The predicted climate change associated with global warming presents a potential threat to agricultural production as well as to global food security. The present work aimed to investigate the acclimation process in adjusting plant responses to high root temperatures. Tomato (*Solanum lycopersicum* L., cv. Micro-Tom) during the flowering time was subjected to heat treatments (day/night temperatures at the root level of 40 or 45 °C for 4 d) while control plants were maintained at 25 °C, and the heat-stress treatment effects were analysed in the tomato leaves.

Methods: The effect of high growth medium temperature on tomato leaves was investigated through the analysis of biochemical markers such as tomato leaf MDA and H_2O_2 content, some key antioxidative enzyme activities and antioxidant compounds.

Results: The results showed an increase in the amount of malondialdehyde used as an indicator of lipid peroxidation that was greater at 45 °C. The leaf content of hydrogen peroxide was induced in tomato plants subjected to 45 °C whereas it was markedly decreased in plants maintained at 40 °C as compared to control plants. Antioxidant enzymes showed higher activity in tomatoes treated at 45 °C compared to those treated at 40 °C. Moreover, the highest amount of antioxidants such as carotenoids and ascorbate in tomato plants were found at a temperature of 45 °C.

Conclusion: Collectively, we provide evidence that physiological and biochemical components can be altered depending on the heat level, exposure time, and developmental stage. The interaction of root and shoot under high temperatures must be further characterized in terms of understanding the challenging climate changes.

Keywords: *antioxidant enzymes, heat stress, oxidative stress, reactive oxygen species, Solanum lycopersicumL.*

C. ORALE N° : 45.

FABA BEAN MINERAL ELEMENTS UNDER ORGANIC FARMING VERSUS CONVENTIONAL FARMING

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Abtract : Faba bean is one of the most important leguminous cultivated in the world. Its importance is due to its mineral elements composition, protein content and fibers. However, the green pods decortications results in an important amount of waste. This work aims to study the effect of two cultivation mode: organic farming (OF) versus conventional farming (CF) on mineral elements in green pods (Po) and grains (Gr) for two varieties (V) 'Mamdouh' and 'Chahbi'. The trial was conducted in a randomized complete block design at the experimental station Chott-mariem central eastern Tunisia during the campaign 2021-2022. Calcium (Ca), sodium (Na) and potassium (K) were analyzed using the flame photometer and phosphorus was determined using spectrophotometer. Statistical analysis was performed using SPSS 20.0.

Variety (V) had no significant effect on mineral elements in grains and pods. However, cultivation mode effect was statistically significant on Ca% in grains and Na% in pods and grains. In addition, some correlations were noted between mineral elements in grains and pods. These results present a first step for pods valorization and inform about the possibilities of their uses in food additives, pesticides and pharmaceutical products.

Mots clés : *Faba bean; cultivation mode; variety; mineral elements*

C. ORALE N° : 46.

ESTIMATION OF SHRUB BIOMASS AND CARBON STOCK FOR *QUERCUS SUBER* FOREST AT BELLIF NORTHWEST OF TUNISIA

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Abstract: Climate changes have a potential impact on forest ecosystems. They affect their growth, productivity and the carbon stocks. In Tunisia, *Quercus suber* forests represent a considerable part of carbon potential storage. The aim of this study focuses on estimation of shrub biomass and carbon pools of frequent species of Bellif forest in north-western Tunisia (*Pistacia lentiscus*, *Myrthus communis*, *Erica arborea*, and *Pteridium aquilinum)*, litter and soil in two different sites, one considered to be a young site (YS) and the other an aged site (AS). The prediction of total shrub biomass of each site was based on allometric equations between dependent variables of biomass (leaf, stems, roots, total aboveground and total shrub biomass) and dendrometric independent variables such as height, basal diameter, maximal crown diameter, minimal crown diameter. The total shrub biomass was 9.15 Mg ha^{-1} at YS and 33.53 Mg ha^{-1} at AS. Soil has the largest carbon pool in this ecosystem: with 302.49 Mg C ha^{-1} and 457.12 Mg C ha^{-1} in YS and AS Respectively. The total carbon stock of the ecosystem was 311.35 Mg C ha^{-1} in YS and 481.33 Mg C ha^{-1} in AS.

Results highlighted that carbon storage potential of shrub biomass in AS was greater than in YS and showed that forest soils were the major reservoir of carbon pool with 97.15 % and 94.97 % of the total organic carbon found in YS and AS respectively.

Keywords: *allometric equations, biomass, carbon, shrubs, soil organic carbon, stock.*

C. ORALE N° : 47.

ECOLOGICAL STRATEGIES TO REGAIN *OROBANCHE CRENA*TA INFESTED SOILS FOR FABA BEAN PRODUCTION

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Abtract : The Broomrape *Orobanche crenata* Forsk is a serious parasitic weeds causing considerable losses in many major crops including faba bean (Vicia faba L.). The aim of the project work was to develop an integrated package, suitable for faba bean fields infested with *O. crenata* via the reduction of number of germinated parasite seeds/emerged spikes, and reducing new seed deposition. Several strategies have been carried out to control the Broomrape. Of these: 1. using resistant and susceptible cultivars, 2.Intercropping by inhibitor crops, 3.Sowing date, 4.Chemical control and 5.Collecting information on the Biological control agent,(*Phytomyza orobanchia* fly). Both resistant (Misr 3 and Giza 843) and susceptible (Nubariia 1and Giza 716) cultivars were infected by the parasitic weed *O.crenata* with higher infestation rate among the susceptible cultivars compared with resistant ones. Intercropping fenugreek or flax with faba bean (*Vicia faba* L.) can reduce crenate broomrape infestation, but the effectiveness varied greatly when different ratios of seeds of inhibitor crop were used. Late sowing (3 weeks after normal sowing date) reduced significantly the number of emerged *O.crenata* shoots for both the resistant and the susceptible cultivars . Treatment by glyphosate decreased the number of parasitic weed and the infestation rate of parasitic weed among treated plots and increased the production of pod yield /plot. $CuSO_4$-application decreased the infestation rate and number of parasitic weed among plants of all plots, but had no effect on pod yield production of some plots. Gyphosate-applications were more effective in reducing number and infestation rates of parasitic weed among treated faba bean plants compared with $CuSO_4$-treatment. Field and lab data concerning *Phytomyza orobanchia* fly were collected.

Keywords : *Orobanche, Intercropping, Inhibitor crops, Sowing date, Gyphosate, CuSO4, Phytomyza orobanchia fly, faba bean*

C. ORALE N° : 48.

LES SOUS-PRODUITS DE BROCOLI (FEUILLES)-UNE SOURCE PROMETTEUSE D'INGREDIENTS BIOACTIFS

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Résumé : (Times New Roman ; 12 ; Justifié ; interligne simple ; 200 mots max une page ; Il ne doit pas comporter ni figures, ni tableaux ni références.)

L'apport alimentaire régulier de brocoli a été associé à une meilleure santé, mais l'utilisation industrielle des sous-produits du brocoli (restes de récolte) est négligeable. Ajouter de la valeur aux sous-produits du brocoli dans un pays comme la Tunisie en tant que non producteur de ce végétale pourrait encourager leur production en Tunisie pour un intérêt scientifique et économique.

Nous nous intéresserons aux glucosinolates (GLSs) et composés phénoliques (CPs) dans les feuilles de brocoli. Nous avons essayé de provoquer une augmentation des GLS et des PC dans des plantes de brocoli âgées de 35 jours grâce à la technique d'élicitation. Les traitements impliquaient le prétraitement des graines avec du KCl et l'exposition des plantes à des éliciteurs ; des solutions de K_2SO_4 et de NaCl et des pulvérisations foliaires par le méthyle jasmonate (MeJA), acide salicylique (SA) et la méthionine (Met).

L'élicitation avec K_2SO_4 ou MeJA a augmenté de façon marquée la teneur en GLSs tandis que le Met, SA et K_2SO_4 ont augmenté l'accumulation de CPs dans les feuilles de brocoli.

En conclusion, la stimulation des voies de biosynthèse phénoliques et GLSs par le K_2SO_4 souligne qu'il pourrait être prometteur en tant qu'éliciteur ayant un impact sur la qualité et les propriétés bénéfiques pour la santé des aliments d'origine végétale et pourrait constituer aussi un point de départ intéressant pour de nouvelles investigations impliquant l'utilisation des sous-produits de brocoli (feuilles).

Mots clés : *Sous produit de Brocoli ; Glucosinolates ; composés phénoliques ; Elicitation*

C. ORALE N° : 49.

IDENTIFICATION AND IN VITRO FUNCTIONAL STUDY OF A NOVAL DURUM WHEAT THIOREDOXIN TYPE H2

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Abtract : Thioredoxins (Trxs) are heat-stable multifunctional ubiquitous proteins characterized by a conserved redox-active CGPC site. In plants, Trxs are small antioxidant proteins encoded by a multigene family and regulate several processes during development and growththrough redox regulation.The aim of this work was therefore to study the role of TdTrxh2 under abiotic stress. We isolated the cDNA encoding for thioredoxin h2 from wheat (*Triticum durum*) (TdTrxh2). This cDNA fragment was sub-cloned into a pCAMBIA2300. The resultant construct, pCAMBIA2300-TdTrxh2, was then transferred into Agrobacterium tumefaciens. The homozygous T3 progeny,which derived from plants of the heterezegotes T2 generation ,was subjected to different stress conditions: salt stress (100 mM NaCl), osmotic stress (100 mM mannitol), heavy metals (100 µM cdcl2) and oxidative stress (3µM H2O2). Then, we cloned length cDNA of the *TdTrxh2* gene into the pYES vector, and was used to transform yeast (*S. cerevisiae* strain). Aliquots from the saturated and the diluted (10^{-1}, 10^{-2} and 10^{-3}) cultures were spotted on YNB-Uracile plates containing or not different stress conditions (500mM NaCl, 100Mm $LiCl_2$, 10mM H_2O_2 and cold -20°C). **In this** study, we demonstrated that TdTrxh2 of wheat is involved in response to salt, osmotic and oxidative stresses in both transgenic *Arabidopsis* plants and yeast. In fact, we showed that TdTrxh2 transgenic *Arabidopsis* plants exhibited tolerance to salt and oxidative stresses compared to those in NT plants under the control and the stressed conditions. this tolerance was manifested by high biomass production, roots length and secondary roots numbers of the transgenic plants compared to the NT plants. In the transformed yeast, we reported that under the stressed conditions, the yeast cells overexpressing the *TdTrxh2* gene exhibited enhanced growth and resistance compared to the control cells. We concluded that TdTrxh2 protein is involved in abiotic stress response such as salt, oxidative and cold stresses by regulating redox homeostasis.

Mots clés : *Abiotic stress, durum wheat, Arabidopsis, yeast, TdTrx2*

C. ORALE N° : 50.

PHENOTYPIC OROABNCHE RESISTANCE AND MARKER ASSISTED SELECTION FOR LOW VICINE CONVICINE ON TUNISIAN FABA BEAN (*VICIA FABA* L.) BREEDING PROGRAMME: CASE OF STUDY

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Abtract: Vicine and convicine (VC) are tow glycosides components of faba bean cotyledons. They are considered as the main anti-nutritional compounds that limit the valuing of faba bean seed flour especially for monogastric fodder production because they cause a disease called ''favism'' for G6PD enzyme genetically deficient humans and monogastric animals and can cause death. A spontaneous mutation on the VC-gene was discovered and five tightly linked markers to the VC- QTL were validated recently in the frame work of Beans4NAfrica Project. Forty crosses were done between Tunisian purified faba bean variety ''Najeh'', two British low vicine (VC-) and one Spanish broomrape resistant varieties were done following different breeding schemes and combinations. The genotyping of the F3:4 progenies and analysis of the flour of F4 generation seeds by HPLC quantification were done. Hundred lines were homozygote to low vicine (VC-) based on KASP-SNP markers. Among the preliminary identified lines, only twenty were selected as future candidate lines based on confirmation of their low VC genotypic profile by HPLC assays and their phyenotypic high resistance to broomrape (*Orobanche* spp.) based on low incidence and parisitism index in three years' field trials.

C. ORALE N° : 51.

IMPORTANCE OF A TUNISIAN LACTIFEROUS SPECIES, LOCALISTAION AND IDENTIFICATION OF LATICIFERS AND ANTIOXIDANT ACTIVITY OF THE EXCUDED LATEX

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Abtract : A tunisian lactiferous twinner belonging to the sub-family of Asclepiadoideae is very searched for its richness in enzymes, secondary metabolites, antifungal activity and milk-clotting activity. Its presents follicles generally assembled together as twins and secreting at the slightest touch a sticky white fluid called latex.

Latex is distributed throughout the plant in a special internal secretory system constituted by a series of elongated cells, called laticifers. By releasing their latex from laticifer cell combined to rubbers from parietal cytoplasm, latex-bearing plants construct a protective mechanism against herbivores and microorganisms as well as wound cicatrisation.

Morphological observation of the stem showed saturatation. Fulfilled laticifers were deposited in the pith and extremely in the cortex with a clear cylindrical arranging.

Anatomical study proved the presence of laticifers in the aerial parts of the plant. In stems, laticifers were located in the pith, in the collenchyma, and mainly in the cortical parenchyma. In leaves, they were scattered in the mesophyll (spongy and palisade) and localised also in the central cylinder. Petiole cross section showed two smaller and rounded lateral vascular bundles with a particularly laticifers in the phloem.

Scavenging free radicals of DPPH exhibited IC_{50} value of 12 µg/ml. Extracted latex can be considered as a promising source for several bioactive antioxidants compound. It can be implied in industry as a natural rubber and also, in medicine as a therapeutic agent.

Key words : *Tunisian Lactiferous, Latex, Laticifers, Anatomical study, Antioxidant power*

C. ORALE N° : 52.

SOLANUM BIODIVERSITY FOR PROVIDING BROOMRAPE RESISTANCE IN TOMATO AND THE UNDERLYING PLANT-PARASITE MOLECULAR COMMUNICATION

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Abstract : The broomrape species *Phelipanche ramosa* (L.) is a root holoparasitic plant that is widespread in Mediterranean countries and causes severe damage to crops of great economic importance such as the tomato (*Solanum lycopersicum* L.). Breeding for resistance is one of the most promising strategies to alleviate such issue but the success of this approach has been hampered by the scarce knowledge about the molecular and genetic basis involved in defense mechanisms against parasitism, and the limited availability of sources of tolerance identified in tomato so far. However, an advantage of the tomato, as some other horticultural species, is that the varieties of agronomic interest can be grafted onto rootstocks conferring tolerance to biotic and abiotic factors, which opens an interesting empirical perspective for a direct alleviation of this problem in the tomato crop and other graftable species. From a scientific perspective, grafting onto tolerant rootstocks also offers a specific root-targeted approach to gain insights about the physiological, molecular and genetic components of such resistance. With both empirical (to identify resistant rootstocks) and scientific (to identify underlying mechanisms), a wide collection of *Solanum* species and accessions is being prospected in the frame of Zeroparasitic project. The assessed germplasm collection includes: *S. galapagense*, *S. peruvianum*, *S. chilense*, *S. chmielewsk*ii, *S. pennellii*; introgression lines derived from *S. lycopersicum* cv M82 and *S. pennellii* acc. LA716, and their parental lines; mutants affected in the broomrape germination promoting hormone strigolactones (*CCD7*, *ST1*); and other relative species such as *S. melongena* and *S. aethiopicum*. Initial i*n vitro* screening experiments based in *P. ramosa* germination and infection capacities identified five genotypes as totally resistant, four with high-medium resistance and the rest as sensitive. Those results were further confirmed under greenhouse conditions. To test the initial hypothesis that those lines could transfer the resistance level to a tomato cultivar, all the resistant and some sensitive genotypes were used as rootstocks of the sensitive commercial variety cv Moneymaker. To better understand the mechanisms involved in the rootstock-conferred resistance, root and broomrape tissues in the broomrape-plant interface are being analyzed in order to identify particular hormonal patterns (strigolactones, cytokinins, auxins, abscisic acid, jasmonic acid, salicylic acid, gibberellins and ethylene precursor ACC) that could explain the observed tolerance or sensitivity traits.

Acknowledgements: This research is funded by the Prima Foundation (ZEROPARASITIC project).

C. ORALE N° : 53.

LE CARTHAME (*CARTHAMUS TINCTORIUS* L.) : UNE OLÉAGINEUSE À INTRODUIRE DANS LE SYSTÈME DE PRODUCTION AGRICOLE NATIONAL

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Abtract : Le carthame (*Carthamus tinctorius* L.) est une plante annuelle de la famille des Astéracées, originaire du croissant fertile. C'est une culture qui mérite l'attention en raison de sa polyvalence. Connu depuis l'antiquité en tant que plante oléagineuse, il est cultivé principalement pour ses graines riches en huile comestible et qui sont utilisées à des fins culinaires et médicinales. Les fleurs sont également utilisées pour leur couleur rouge vif, qui est utilisée comme colorant alimentaire. Le carthame a acquis la réputation d'être une huile comestible de qualité supérieure contenant des niveaux élevés d'acides gras insaturés associés à la réduction du taux de cholestérol dans le sang humain. L'étude présentée évalue le comportement, la teneur et la composition chimique de l'huile des graines mûres de cinq génotypes de carthame cultivés dans le sub-humide et le semi-aride tunisien.

Les graines des génotypes de carthame testés avaient une teneur totale en protéines de 11,5 à 16,0 %, tandis que la teneur totale en huile était de 22,8 à 28,5 % de la matière sèche, en moyenne. Les deux principaux acides gras insaturés des graines de carthame, les acides oléique et linoléique, représentent environ 90 % de la teneur totale en acides gras. La variété témoin Jawhara avait présenté une teneur en huile de 26% et elle est riche en acides gras, en particulier, en acide linoléique, acide oléique, acide palmitique et acide stéarique avec des pourcentages respectivement de 82.37 %, 7.9%, 7.2% et 2.33%. La hauteur moyenne était de 1.10 m avec un nombre de graines par capsule variant entre 35 et 40 et un poids de 1000 graines variant entre 45 et 50 g. Les graines étaient de taille moyenne et de couleur blanche.

L'introduction du carthame dans l'assolement, et son exploitation en tant que plante oléagineuse à fort rendement lipidique et riche en acides gras polyinsaturés est fortement recommandée dans le sub-humide et le semi-aride tunisien en culture pluviale.

Mots clés : Carthames, acides-gras, assolement, Tunisie

C. ORALE N° : 54.

TUNISIAN FARMERS' WEED MANAGEMENT BEHAVIOUR AND ATTITUDE TO FIGHT AGAINST OROBANCHE

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Abstract : Broomrapes (Orobanche sp.) is a parasitic plant that poses a major biotic threat to several legumes species, mainly faba beans, chickpeas, peas, and lentils. The fight against such a parasite requires an integrated weed management (IWM) program based on combination of preventive, cultural, mechanical and chemical practices. To evaluate farmers' perceptions towards the adoption of such practices, interviews were conducted with 74 farmers in June 2021. A farmer' typology based on agricultural land area, instruction level and have or not another professional activity is developed. The results reveals that there is not significant behaviour difference to protect against orobanche between farmers that undertake or not other professional activity. Furthermore, the farm size seem don't affect significantly farmers' attitudes towards integrated weed management measures to fight orobanche, In fact, more than 70% of farmers with less than 20 hectares have similar behaviors towards orobanche weed management. However, farmers with land areas exceeding 20 hectares are more likely to invest slightly more in control practices and seem to be less vulnerable to barriers to adopt new orobanche control practices. Finally, farmers with primary and secondary education levels do not appear to be involved in efforts to combat Orobanche.

Keywords : *Farmer attitude, farmer typology, broomrape, Intergrated Weed Management*

C. ORALE N° : 55.

BIOMASS AND CARBON STOCKS IN SHALLOW AND DEEP SOIL IN MEDITERRANEAN ALEPPO PINE FOREST IN NORTHEASTERN TUNISIA

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Abtract : Carbon stocks are key information criteria to understand the role of forests in global climate mitigation. The objectives of this study were to estimate biomass and carbon pools in shallow and deep soils of the Aleppo pine (Pinus halepensis) forest of Djbel Mansour in northeastern Tunisia. Allometric equations were developed between the dependent variables characterizing tree aboveground and belowground biomass (stem and branch woods, stem and branch barks, needles and roots) and dendrometric independent variables (diameter at breast height, height and live crown length).

The results showed that the tree biomass of Aleppo pine in the shallow site (S1, 62.10 ± 12.1 Mg ha^{-1}) was significantly lower than in the deep site (S2, 179 ± 11.21 Mg ha^{-1}). To estimate the total carbon stock in the ecosystem, the carbon contents in tree biomass, litter and soil were investigated. Carbon in trees was significantly higher in the deep soil than the shallow soil. Carbon litter showed similar trend with 6.9 ± 0.06 Mg C ha–1in the S2 and 4.25 ± 0.06 Mg C ha^{-1} in S1. Carbon sequestered in forest soils was 31.67 Mg C ha^{-1} in the shallow soil (0-40 cm soil depth) vs 115.67 Mg C ha^{-1} in the deep soil (0-70 cm soil depth).

In our study, the Aleppo pine forest with deep soil showed a higher ecosystem carbon storage (215.04 Mg C ha^{-1}) compared to that with shallow soil (64.96 Mg C ha^{-1}). These results highlighted the importance of the soil depth and fertility in the growth and the sustainability of the pine forest in Djbel Mansour. Forest soils were revealed to be important stores of carbon and fundamental agents in maintaining Aleppo pine tree growth.

Mots clés : *Pinus halepensis Mill, Mediterranean forest, carbon stock, biomass, litter, soil depth, allometric models*

C. ORALE N° : 56.

EFFECTS OF CADMIUM-SELENIUM INTERACTION ON GLYOXALASE SYSTEM AND CELLULAR REDOX STATE IN *PISUM SATIVUM* L.

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Abstract: Plant exposure to heavy metal stress, including cadmium (Cd), is of anthropogenic origin. In this regard, the alleviation of Cd stress by selenium (Se) addition to pea seeds germination medium was assessed. The Se (5 and 15 µM) was added individually or in combination with 300 µM $CdCl_2$. The addition of Se reversed the detrimental effect of Cd on seedling growth, and ameliorated the membrane integrity, as reflected by the reduced electrolyte leakage and lipoperoxidation byproduct contents. This beneficial effect can be attributed to the reduced Cd accumulation in plant tissues. The Se protective effects on the cell membrane were associated with proline overaccumulation in radicles and epicotyls. This effect could be connected to the Se-elicited proline biosynthesis *via* the upregulation of the Δ^1-pyrroline-5-carboxylate synthetase activity (up to 1.5-fold increase compared to Cd-treated radicles and epicotyls), concomitantly with the decrease of its oxidation by the proline dehydrogenase activity. Besides, when supplied in combination with Cd, Se abolished the Cd-triggered decrease of glyoxalase I and glyoxalase II activities, leading to the reduction of methylglyoxal levels, known as a signaling molecule in abiotic stress conditions. Likewise, the amelioration of the cellular redox state under the combination of Cd with Se was evidenced by the decreased hydrogen peroxide accumulation. Overall, the current findings suggest that Se application to germinating seeds can be a suitable option to ameliorate seedling tolerance to Cd stress.

Keywords: *Lipoxygenase, Methylglyoxal, Proline, Redox state*

C. ORALE N° : 57.

INTERCROPPING SALT SENSITIVE *LYCOPERSICON ESCULENTUM* AND SALT-TOLERANT *ARTHROCNAULON MACROSTACHYUM* IN SALT-AFFECTED AGRICULTURAL SOIL : PHYSIOLOGICAL AND AGRONOMIC RESPONSES

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Abtract : The use of intercropping in saline agricultural can be an economically viable option for farmers and allow them to meet the increasing quality standards of agricultural products and consumer expectations for sustainability and environmental protection. Saline irrigation water (3g/l) can lead to salt buildup and reduced crop yields. But halophytic plants are known by accumulation excess salts in tissues, removing them from the immediate environment. The aim of this study was to determine the effect of intercropping halophyte plants application on the course of physiological processes in tomatos plants. Field studies with an area around 600 m^2 we planted from April to August 2022 : monoculture tomatoes (T), halophyte monoculture (H), tomato/halophyte intercropping (T-H), irrigated with drip and randomized in block. The results of the crop monitoring clearly showed that the cultivation of salt-tolerant of halophyte plants in salinized condition, in association with tomatoes, reduced the level of soil salinity (by at least 50%). The preliminary results carried out on the physicochemical parameters of the agricultural soil highlight a spectacular variation in the resistivities between the periods; pre-culture of T-H (April 2022) and post-culture of T-H (Sept. 2022). Indeed, several months of drip irrigation have largely reduced the resistivities in the slice of soil surveyed up to 1.3 m deep. Finaly,the results of the physiological analysis of the plants showed that the reduction in salinity is also associated with a higher accumulation of salts in the aerial parts of halophytes than in tomatoes. In addition, tomatoes grown with halophytes accumulate less salt than those in monoculture. These results confirm the potential for soil desalination by halophytes even under field cultivation conditions. Other preliminary results showed that tomato and halophyte intercropping improved tomato yield by about 16% compared to tomato monoculture.

These findiings led us to continue with this research line conducting different biochemestry analysis of the Arthrocnemum and the tomatos in order to valorisate this biomass in different fields (pharmaceutic, agrofood and animal feed and veterinary.). *This work was supported by the European Partnership for Research and Innovation in the Mediterranean Area (PRIMA S2 2019) and the Tunisian Minstry of Higher Education and Scientific Research.*

Keywords: *Intercropping, saline agricultural, halophite, monoculture, arthrocnemum,Tomatos*

C. ORALE N° : 58.

VALORISATION DE LA FARINE DE POIS CHICHE : FORMULATION D'UNE BARRE DE CEREALE

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Le pois chiche (*Cicer arietinum L.*) est une légumineuse qui occupe une place importante dans l'alimentation humaine où elle présente des teneurs non négligeables en protéines et constitue des alternatives à la consommation des protéines d'origines animales. Ce travail a pour but de formuler des barres de céréales » en utilisant un mélange de farines de blé, riz et pois chiche.
Dans un premier axe, une caractérisation physico-chimique de 4 variétés tunisiennes de farines de pois chiche fournis par l'INRAT a été réalisée. Les résultats ont montré que la variété Beja1 est la plus performante de point de vue qualité nutritionnelle et valeur énergétique, et donc a été retenue pour la suite du travail. Dans un second axe, un plan de mélange constitué de 16 formules différentes avec des contraintes pour chaque composant (limites inférieures : 28,5 % farine de blé, 14,5 % farine de riz, 20% farine de pois chiche) ; (limites supérieures : 57 % farine de blé, 32 % farine de riz, 39,5 % farine de pois chiche) a été mis en place. Une caractérisation physico-chimique des barres de céréales issues des différents mélanges a été faite afin de modéliser chaque critère significatif et de choisir la formule optimale de la barre des céréales. Les résultats ont montré que parmi les six réponses étudiés (la dureté, le taux de cendre, la fracturabilité, la coloration, l'humidité et la matière grasses) seules (la dureté, le taux de cendre et les matières grasses) présentent des réponses significatives, où la farine de pois chiche présente un effet positif significatif sur la dureté de la barre. Cette formule optimale est composée de : 44 % farine de blé, 16% farine de riz et 40% farine de pois chiche.

C. ORALE N° : 59.

LA VARIATION DE LA PHOTOSYNTHÈSE EN FONCTION DE CO_2 (RELATION A/CI) ET LA DENSITÉ DE FLUX QUANTIQUE (RELATION A/DFQP): DES OUTILS DE DIAGNOSTIC DE L'APPAREIL PHOTOSYNTHÉTIQUE

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La relation A/Ci représente la variation de la photosynthèse du mésophylle (c'est à dire de la feuille sans l'épiderme) en fonction de la teneur en CO_2. Cette relation ne dépend plus en effet de l'ouverture stomatique. La relation entre A et la densité de flux quantique dans le visible (DFQP) incidente à une feuille (relation A/L) réalisée sur une plante en C3 permet d'estimer les indicateurs de la performance photosynthétique notamment le point de compensation pour la lumière et le rendement quantique maximum de la fixation du CO_2. Dans cette communication, nous résumons la modélisation de la photosynthèse et ses applications. Nous examinons également les implications des relations A/Ci etet A/DFEQ sur la quantification de la photosynthèse à une large gamme d'échelles spatiales et temporelles, et discutons le rôle de ces mesures dans la détermination des réponses photosynthétiques aux changements des conditions environnementales.

Mots clés : *photosynthèse, modélisation, stomates, lumière, mésophile*

C. ORALE N° : 60.

NITRIC OXIDE IS AN EFFICIENT MOLECULE TO PROMOTE THE PHOTOCHEMISTRY PATHWAY OF BEAN PLANTS WHEN SUBMITTED TO MANGANESE TOXICITY.

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Keywords: Chlorophyll fluorescence, manganese, nitric oxide, Phaseolus vulgaris L.

Abstract: Chlorophyll fluorescence is an instructive tool used to probe photosynthesis biophysics giving more information on the efficiency of photosystem II (PSII) and light energy use. Chlorophyll fluorescence kinetics (OJIP transient) is an integrative arrangement that estimates the transition of fluorescence yield from dark-adapted to maximum illumination. This investigation explored the involvement of nitric oxide (NO) applied exogenously on chlorophyll fluorescence and kinetics of bean (*Phaseolus vulgaris* L.) plants when subjected to manganese (Mn) stress. Chlorophyll fluorescence kinetics were analyzed and showed a decline under Mn stress, which affected negatively the induction-relaxation of the PSII. Interestingly, *Fv/Fm* and *Fv'/Fm'* did not change when plants were submitted to Mn excess. By contrast, the non-photochemical quenching (NPQ) was higher under Mn stress than in control plants. When plants were treated with Mn combined with NO, all OJIP transient levels were recovered concomitantly to hindering of the heat dissipation pathway for better use of light energy and promoting the electron transfer rate.

BIOTECHNOLOGIE

C. ORALE N° : 61.

PREPARATION, CARACTERISATION ET EVALUATION DES ACTIVITES BIOLOGIQUES ET FONCTIONNELLES D'UN ISOLAT DE PROTEINES DE COLZA LOCAL

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Résumé

Introduction: La culture du colza est actuellement en plein essor dans le monde et particulièrement en Tunisie, en raison de ses avantages multiples sur les plans agronomique et nutritionnel. Ce travail de recherche s'inscrit dans le cadre d'une valorisation d'un sous-produit agricole, le tourteau de colza, habituellement destiné à l'alimentation animale.

Matériel et méthodes: Dans la première partie du projet, un isolat protéique a été préparé par extraction et isolement des protéines à partir du tourteau de colza dégraissé. Cette étape a été suivie par une analyse de la composition protéique de l'isolat par chromatographie par filtration sur gel et SDS-PAGE ainsi qu'une analyse de la composition en acides aminés par chromatographie liquide haute performance en phase inverse (CLHP-FLD) après dérivation en présence d'o-phtahaldéhyde (OPA). Dans la deuxième partie du travail, une analyse des propriétés biologiques et fonctionnelles des protéines du tourteau de colza a été évaluée.

Résultats: L'isolat protéique de tourteau de colza local, obtenu après mise au point et optimisation du procédé, présente une pureté élevée, de l'ordre de 94.143% avec un rendement protéique global et un rendement massique de l'ordre de 24.81% et 11.5%, respectivement. Cet isolat protéique est principalement composé de globulines (environ 25%) et d'albumines (environ 75%). Il est également riche en acides glutamique et aspartique, ainsi qu'en arginine, méthionine et alanine, ce qui est caractéristique des protéines de réserve. L'évaluation des activités biologiques et fonctionnelles a montré que les protéines de tourteau de colza obtenues présentent un fort pouvoir de chélation du fer ferreux Fe^{2+} avec un pourcentage de chélation de l'ordre de 74% pour une concentration en protéines égale à 5 mg/mL, ainsi que de bonnes propriétés de rétention d'huile, de capacité moussante, de stabilité moussante et d'activité émulsifiante.

Conclusion: Le tourteau de colza local représente une source de protéines qui peuvent être destinées aux sportifs, aux végétariens ou aux personnes intolérantes au lactose ou incorporées dans les aliments en vue de modifier les propriétés fonctionnelles et de limiter l'oxydation des lipides insaturés.

Mots clés : *Colza, isolat de protéines, acides aminés, propriétés biologiques et fonctionnelles*

C. ORALE N° : 62.

GENOMIC ANALYSIS OF HEAVY METAL-RESISTANT *HALOBACTERIUM SALINARUM* ISOLATED FROM SFAX SOLAR SALTERN SEDIMENTS

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Abtract : Halophilic archaea, isolated from superficial sediments of Sfax solar saltern and affiliated to *Halobacterium salinarum*, were able to tolerate high concentrations of lead, cadmium, and nickel from 2.5 to 4.5 mM. The whole genome of five highly heavy metal resistant strains were sequenced and analyzed in order to reveal their adaptive strategies to live in hypersaline environments polluted with heavy metals. The genomes of strains named as AS1, AS2, AS8, AS11, and AS19 were found to contain 2,060,688; 2,467,461; 2,236,624; 2,432,692; and 2,428,727 bp respectively, with a G+C content of 65.5, 66.0, 67.0, and 66.2%. The majority of genes (43.69-55.65%) were annotated as hypothetical proteins. Growth under osmotic stress is possible by genes coding for potassium uptake (TrkA, TrkH and Kef-type K^+), sodium efflux (Na^+/H^+ antiporter), chloride channels, kinases, as well as stress proteins (universal stress proteins, cold and heat shock proteins), DNA repair systems and proteasomal components. The strains harbored many genes responsible for metal transport/resistance, such as: copper-translocating P-type ATPases, ABC transporter, and cobalt-zinc-cadmium resistance protein. In addition, detoxification enzymes, used to overcome oxidative stress (Superoxide dismutases, glutathione S-transferase, multicopper oxidase, and catalase-peroxidase KatG), were identified. Additionally, the genome sequences revealed the presence of arsenic resistance-associated genes used to transform arsenic to a volatile form. The studied strains were also able to deal with environmental variations and stress conditions by transcriptional regulation. Many genes coding for transcriptional regulators (AsnC, PadR, ArsR, and TrmB) and transcription factor (TATA-binding protein (TBP), transcription factor B (TFB), and transcription factor E and S) were revealed. The genomes analysis of the studied strains showed also that they can use yet another strategy to overcome the stressful conditions by secondary metabolites (carotenoids, siderophores and exopolysaccharide). The abundant metal-resistant genes in the AS1 genome suggested that it can tolerate in addition to (Cd, Pb, Zn, Cu and Ni) other heavy metals such as cobalt (Co), molybdenum (Mo), iron (Fe) and arsenic (As). AS1 strain may be then used in the bioremediation of multi-metal contaminated environments. This study highlights the presence of several commercially valuable bioproducts (carotenoids, retinal proteins, exopolysaccharide, stress proteins, squalene, and siderophores) and enzymes (Protease, sulfatase, phosphatase, phosphoesterase, and chitinase) that can be used in many industrial applications.

Keywords: *Solar saltern, archaea, genome sequence, heavy metal, osmotic stress*

C. ORALE N° : 63.

RECOMBINANT EXPRESSION OF A B-1, 3-ENDOGLUCANASE IN *E. COLI* AND INVESTIGATION OF ITS IN VITRO ANTIFUNGAL ACTIVITY

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The increase in the world population has produced a big need for the quantity and quality of the agricultural products, which has guided to a significant surge in the utilization of chemical pesticides to fight against the plant diseases caused by pathogenic fungi that are responsible for enormous crop losses. As a result, research focusing on alternative solutions has been imposed worldwide to introduce fundamentally new plant and crop protection antifungal strategies for sustainable agricultural production. Biofungicides represent attractive alternatives for the future.
In the present study, β-1, 3-endoglucanase GH64 was molecularly characterized from the fungus *Sclerotinia sclerotiorum* and the corresponding gene was cloned into pET15b vector to express recombinant GH64 by *Escherichia coli* BL21. The purified recombinant GH64 was visualized on SDS-PAGE with 39 kDa molecular weight and it's laminarinase activity was identified by zymogram.

In vitro antifungal susceptibility tests were performed against *Botrytis cinerea, Cladosporium herbarum, Aspergillus niger* and *Fusarium oxysporum* f.sp. *lycopersici*. β-1, 3-endoglucanase glucanase GH 64 inhibited the growth of *B. cinerea* and *C. herbarum*. The morphological changes that occurred in the presence of β-1, 3-endoglucanase GH64 on the *B. cinerea* germinating conidia were visualized and analyzed by light microscopy to characterize the antifungal effect of the enzyme. According to the above mentioned results, the β -1, 3-endoglucanase GH64 from *S. sclerotiorum* is a promising biofungicide molecule; however plant and crop protection assays are necessary to prove it.

Keywords: *β-1, 3-endoglucanase, Recombinant expression, Plant pathogenic fungi, Antifungal susceptibility test*

C. ORALE N° : 64.

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. The objective of this study was to isolate a novel extremotolerant bacterium (IS2), then characterize and evaluate its ability to improve barley seedlings growth under heavy metals stress. Results indicated that IS2 strain showed high tolerance to heat stress (40-60°C), pH (6-11), salt stress (0.2-2M), and heavy metals. Indeed, the minimum tolerance inhibitory concentrations to nickel was 4 mM, to zinc was 3 mM and to copper and chromium was superior to 8 mM and 40 mM, respectively. Based on morphological, biochemical and molecular properties, the bacterial strain was identified as *Bacillus glycinifermentans*. The Bacterial strain was then used *in vitro* for inoculating *Hordeum* vulgare L. under heavy metal stress conditions. It was observed that inoculation with IS2 stain considerably improved the growth parameters (seed germination, root and shoot length, and vigor index). These results confirm that IS2 strain has impressive potential for application as a PGPR under stressful conditions.

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

C. ORALE N° : 65.

COST EFFECTIVE PRODUCTION OF TWO GLYCOLIPOPROTEIN BIOSURFACTANTS PRODUCED BY A *LACTOBACILLUS PLANTARUM* AND THEIR USE IN A NEW SHAMPOO FORMULATION

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Abstract: Microbial surfactants, also known as biosurfactants, are amphiphilic molecules produced by bacteria, fungi, and plants that have high surface activities and emulsifying properties. Because of their structural diversity, low toxicity, and biodegradability, these molecules are potential substitutes for chemical surfactants; their interest has grown significantly over the last decade, particularly in the pharmaceutical and cosmetic industries because they are less irritating. The current research focuses on the production of two types of biosurfactants by previously isolated lactic acid bacteria using a low-cost growth medium, as well as their application in a new shampoo formulation. Using MALDI/TOF and ADNr16S amplification, the OL5 strain was isolated from green olive fermentation and identified as *Lactobacillus plantarum*. Emulsification activity and surface tension measurements were used to estimate biosurfactant production. For the preparation of the new medium, melon peel flour and whey were chosen because they provided the greatest decreases in surface tension and the best emulsifying activities, and fish meal was included as a nitrogen source. Surface tension reduction, critical micelle concentration determination, wetting ability, and antioxidant activities were all used to establish functional characterization. Furthermore, the two biosurfactants were incorporated into a new shampoo formulation to replace sodium lauryl sarcosinate. Both biosurfactants demonstrated good emulsification power in the presence of various oils during their characterization. Furthermore, both isolated biosurfactants showed significant antioxidant activity as well as good wetting ability. On the other hand, the addition of biosurfactants improved the shampoo's detergency and positively influenced the foam's stability; such results are encouraging the use of these biosurfactants as alternatives to chemical surfactants in cosmetics and a variety of industries.

C. ORALE N° : 66.

POTENTIEL MULTIFONCTIONNEL DES SOUCHES DES BACTÉRIES LACTIQUES ET LEURS EFFETS DE BIOPRESERVATION DANS DES ARILLES DE GRENADE PEU TRANSFORMÉS

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Abtract : Cette étude visait à évaluer l'activité antimicrobienne des cellules et des surnageants acellulaires (CFS) d'un panel de 7 souches sélectionnées de bactéries lactiques (LAB) appartenant à *Limosilactobacillus fermentum* (n. 4 souches), *Lacticaseibacillus paracasei* (n. 1), *Lacticaseibacillus rhamnosus* (souche n. 1) et *Enterococcus faecium* (souche n. 1), contre *Listeria monocytogenes*, *Escherichia coli*, *Salmonella Typhimurium*, *Pseudomonas aeruginosa* et *Staphylococcus aureus*, à la fois par la méthode de diffusion en puits de gélose et la méthodes de co-culture. De plus, des traits probiotiques et de sécurité ont également été détectés. On se basant sur les résultats in vitro, les CFS de deux souches sélectionnées de *L.fermentum* ont été appliquées, dans une solution mixte, comme bio-conservateur dans les arilles de grenade peu transformés, inoculé avec deux bactéries indicatrices de *L. monocytogenes* et *E. coli*. Des échantillons traités différemment, ont été analysés pendant le stockage à 4°C, jusqu'à 12 jours, pour la recherche des propriétés physico-chimique (comme la perte de poids, texture, couleur, pH, solides solubles totaux et teneur en acides organiques) et des caractères microbiologiques. Toutes les souches testées se sont révélées sensibles à la plupart des antibiotiques aussi les résultats n'ont montré aucune zone d'hémolyse de globules rouges « γ-hémolyse »

Les souches ont montré excellente survie dans des conditions acides et en présence de pepsine et de sels biliaires. En ce qui concerne les arilles de grenade peu transformés, les résultats ont révélé que le CFS était efficaces pour inhiber la croissance bactérienne des agents pathogènes jusqu'à 12 jours de stockage, soulignant le potentiel multifonctionnel des souches LAB.

Mots clés : *Bactéries lactiques, Biopréservation, effet antibactérien*

C. ORALE N° : 67.

ANTIOXIDANT ACTIVIES OF CAROTENOIDS EXTRACTED FROM HALOPHILC *ARCHAEA*

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Abstract: The carotenoids are yellow to red pigments, originating from a variety of plants, algae, bacteria and Archaea. They have received significant attention due to their beneficial human health effects and their industrial applications. In this study, the carotenoids were extracted from halophilic *Archaea* isolated from a Tunisian solar saltern. The carotenoids were identified using high performance liquid chromatography-tandem mass spectrometry. The C-50 carotenoids, bacterioruberin and its derivatives mono-anhydro-bacterioruberin, bis-anhydro-bacterioruberin and tris-anhydro-bacterioruberin were found to be the predominant carotenoids produced. The in *vitro* carotenoid extracts antioxidant activities were investigated at different concentrations, based on 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging capacity, reducing power, total antioxidant activity and β-carotene bleaching inhibition assay. The carotenoid presented an important DPPH radical activity with IC_{50} value of 86.67 µg/ml. This pigment exhibited a strong activity in all the assays in dose-dependent manner. These results suggested that carotenoid extracted from halophilic *archaea* could be a promising source of natural antioxidants and can be used as additive in food, cosmetic and pharmaceutical preparations.

Mots clés: *Carotenoids, antioxidant activities, Halophilic Archaea*

C. ORALE N° : 68.

BIOREMEDIATION OF COMPLEX AZO DYES BY FUNGAL-MEDIATED LACCASE

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Keys words: Azo dyes, Laccase Mediated System, Bioremediation, Coriolopsis gallica

Abstract: Dyes evacuated from the textile industry have been demonstrated to affect the environment and human health negatively. In this work, we studied the treatment of two recalcitrant azo dyes; Sirius Blue (Direct Blue 71) and Sirius Red (Direct Red 80). The decolorization was done using laccase from *Coriolopsis gallica* mediated by HBT in a Laccase-Mediator System (LMS). The optimized factors in this study were the pH, the laccase activity, and the dye concentration as well as the mediator concentration (1-Hydroxybenzotriazole (HBT)). The maximum decolorization yield as well as its rate were reached after 4 hours for both dyes (95.11 % and 0.396 %/min for the Sirius Blue and 93.75 % and 0.390 %/min for the Sirius Red). The optimum concentrations of HBT, dyes, and enzyme were respectively, for both colors, 0.62 mM, 50 mg/L, and 0.89 U/mL at pH 4.58. The quality of the model was analyzed using a coefficient of determination (R^2) and adjusted coefficient of determination (R^2_{adj}) which were respectively 96.05 %, 91.43 % for the Sirius Blue, and 84.43 % and 66.28% for the Sirius Red. A phytotoxicity test had proven that the by-products obtained after the degradation were more toxic than the dyes themselves.

C. ORALE N° : 69.

LACTIC ACID BACTERIA : STARTERS, BIOCONSERVATIVES AND PROBIOTICS

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Mots clés : Bactéries lactiques, ferments, bio-conservateurss, probioitques

Abstract : Lactic acid bacteria (LAB) have numerous biological activities, allowing their use both in food and medical applications. The main goal of this conference is an update of the recent knowledge on the fermentative, bio-preservative and probiotic properties of LAB, with reference to the results of the studies performed by our team. The manufacture of fermented food products constitute the oldest application of LAB. Indeed, lactic fermentation (LF) can be conducted and controled by the use of autochtonous or allochtonous starters. Autochtonous origin indicates the isolation and reuse of the strains on the same food matrix, independtly on the geographic origin. In contrary, the allochtonous starters indicate that they have been isolated from well defined matrices and used for the fermentation of diverse products. LF represents, on its self, a technique of bio-preservation witch implicates LAB strains (ex. lactobacilli) and/or their active metabolites. These bacteria produce a large gamme of antimicrobial substances (organic acids, CO_2 and bacteriocins [nisine]), that inhibit diverse food-borne microorganisms. Furthermore, many potentially functions have been attributed to LAB, witch allowed they use as probiotics ; the main ones are the renforcement of the barrier effect of the intestinal mucosa (anti-biofilm effect), improvement of the lactose digestion (presence of β-galactosidase) and the prevention of the urogenital and vaginal infections (antimicrobial activity). Other functions have also been evidenced such as hypocholesterolemia and cancer prevention.

C. ORALE N° : 70.

TITLE: COMPARISON OF DIFFERENT ETHANOLIC EXTRACTS OF MYRTUS COMMUNIS L.:EFFECTS ON BIOLOGICAL ACTIVITIES

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Abstract: This work focused on comparing different ethanolic extracts of Myrtus communis based on the phenolicThe ethanolic extracts of leaves were the subject of the dosage of the phenolic compounds, the evaluation of the stage.antioxidant activity, and anti-alpha-amylase activity.
The dry weight yields of ethanolic extracts of leaves obtained from the seven Myrtle plants of the Korbous region vary between them. The least significant yields are relative to the month of February for plant 4, while the month of April represents the most important yields for plant 6. The yield of ethanolic extracts was assessed by calculating the percentage and the most important yield was observed in April with a value of 13.39%.
The determination of phenolic compounds (total polyphenols, flavonoids, flavonols, and condensed tannins) and the evaluation of the anti-diabetic activity of the ethanolic extracts showed that the leaf extracts of the black fruit plants have the most significant contents during the vegetative stage compared to the leaf extracts of the yellow fruit plants. The most important contents of phenolic compounds and anti-alpha-amylase activity were observed in the ethanolic extract of the leaves of black fruit plants during the vegetative stage and more precisely in February with a value of 280.74 mg EQ gallic acid/ g DW.
As for the evaluation of the antioxidant activity via DPPH and ABTS tests, it was found that the leaf extracts of black fruit plants during the fruiting stage exhibited the highest antiradical powers. This variability in content could be explained by the change in chemical composition through the phenological cycle of the plant. The most significant antiradical activity was recorded in the extracts of the black fruit plant leaves during the fruiting stage with a value of 305 mg EQ Trolox/ g DW.
Mots clés : Myrtus communis, phenological stage, phenolic compounds, biological activities, morphotypes

C. ORALE N° : 71.

IMMOBILIZATION OF PROTEASE FROM *STREPTOMYCES MUTABILIS* TN-X30 AND ITS APPLICATION IN LAUNDRY DETERGENT FORMULATION

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Abstract: The protease's soluble form in detergent is still vulnerable and has certain constraints as the retention of both short-term and long-term stability. The immobilization of enzymes on various matrices is therefore one of the solutions not only to solve such problems but also to obtain a biocatalyst as a mild and environmentally friendly laundry detergent for cleaning fabrics. The SPSM has been immobilized on three carriers using encapsulation and adsorption-encapsulation approaches. Features of SPSM in soluble and immobilized forms have been studied by Fourier transforms infrared spectroscopy in attenuated total reflection mode, X-ray diffraction, zeta potential measurements, and field emission scanning electron microscope. We have recently described the production of a detergent biocompatible crude protease from *Streptomyces mutabilis* strain TN-X30. Here, we immobilized the SPSM using encapsulation and adsorption-encapsulation approaches. A variety of organic and hybrid complex matrices were utilized as strong carriers for SPSM. Optimized concentrations of 0.8% of kaolin and 1% of white clay were added to 2% sodium alginate. Accordingly, the immobilization yields reached 100% when sodium alginate was coupled with kaolin or white clay. However, when sodium alginate was coupled with white clay and kaolin, a marginal improvement in the recovery of activity was notice with yields reaching 42.8% and 71.1%, respectively. The values of ΔH_d, ΔG_d, and ΔS_d were 1.7-, 1.0-, and 0.72-times higher for the immobilized SPSM than that of the free one. At elevated temperature, the free and immobilized SPSM reached some important conformational variations leading to the reduction of enthalpy change which is greater for each immobilized SPSM compared to that of the free one. Features of SPSM in soluble and immobilized forms have been studied by Fourier transforms infrared spectroscopy in attenuated total reflection mode, X-ray diffraction, zeta potential measurements, and field emission scanning electron microscope. The alginate-kaolin SPSM beads were found to display the best activity and stability at alkaline pH and high temperature with the best compatibility with laundry detergent. Further investigations are required to explore the nano-SPSM immobilization on different Nano supports to improve its reutilization.

KEYWORDS: *PROTEASE, IMMOBILIZATION, DETRGENET, ORGANIC CARRIERS; HYBRID CARRIERS.*

C. ORALE N° : 72.

SYNTHESIS, BIOASSAY AND MOLECULAR DOCKING OF NOVEL PYRAZOLE AND PYRAZOLONE DERIVATIVES AS ACETYLCHOLINESTERASE INHIBITORS

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Abstract: Pyrazole and pyrazolone derivatives have attracted growing interest over the years because of their versatile applications in various fields. In this work, we describe the condensation of thiosemicarbazide and tosylhydrazine with ethyl acetoacetate using different catalysis. Docking study was performed for the reference compound rivastigmine and the prepared pyrazole and pyrazolones against human acetylcholinesterase (AChE). Based on the binding pose, compound (1) and (3) were occupying the site located in the deep cavity of AChE and rivastigmine was occupied the central active site cavity of AChE. While, the compound (4) was occupied the exterior active site cavity of the enzyme. The detailed interactions between the rivastigmine and the synthesized compounds and human acetylcholinesterase were determined and showed that the AChE- compound (1) complex was established several interactions with catalytic residues (His 447 and Ser 203) and the critical residue for the inhibition of the human enzyme (Tyr 337). Thus, this compound was predicted to be the most potent compound. The *in vitro* Acetylcholinesterase (AChE) inhibition studies showed that compound (1) has a good inhibitory activity against AChE and this activity is similar to that of rivastagmine with an IC50 value of 0.38 ± 0.019 mg/mL ($p < 0.05$) and 0.36 ± 0.018 mg/mL ($p < 0.05$), respectively. These findings confirmed the *in silico* results and suggest the possibility of using compound (1) as anti-Alzheimer drug.

Keywords: *Pyrazoles, Pyrazolones, Acetylcholinesterase (AChE) inhibitors, Molecular docking*

C. ORALE N° : 73.

SWORDFISH (IPHIAS GLADIUS) HEAD MUSCLE PROTEIN HYDROLYSATES: POTENTIAL BIOLOGICAL PROPERTIES AND NATURAL PRESERVATIVE EFFECT IN GROUND BEEF MEAT STORAGE.

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Hydrolysed proteins from many animal and plant sources exhibited favorable functional properties and biological activities, which had become a topic of great interest for health food and processing/preservation industries. Aquatic products and by-products have also proven to be good sources of proteins. In the current study, tow swordfish (Xiphias gladius) head muscle protein hydrolysates (XHMPHs) were produced by the separate action of alcalase® (HM-Al) and savinase® (HM-Sa) with different degrees ofhydrolysis (DH: 11.04% and 19.46%, respectively). The cytotoxic effect ofhydrolysates (against MCF-7 human breast cancer cell line), in vitro and in vivo wound healing and their potential effect on meat product quality, stored in ice for a period of up to 12 day, were investigated.
Results showed that the tow hydrolysates increased MCF- 7 cells proliferation and migration at a dose dependent manner. Moreover, Data showed that HM-Sa and HM-Al increased wound healing and the level of the inflammatory protein CRP is significantly lower in groups treated decreased compared to the positive control group (treated with Centasia Cream). Compared with HM-Al, HM-Sa was more effective.
Data revealed also that HM-Sa and HM-Al incorporated in meat products, at different percentage 0.1 and 0.5%, w/w), effectively inhibited myoglobin oxidation, thiobarbituric acid substances (TBARS) and conjugated dienes formation, and thereby, the degree of lipid oxidation. Since HM-Al was less, effective then HM-Sa as food preservatives of beef meat, both hydrolysates have been found to be more effective than BHA. Interestingly, successful inhibition of microbial proliferation was noticed by the decrease in the microbial counts.
In conclusion, our findings provided evidence that the generated hydrolysates could have a great interest for health food and processing/preservation industries.

Keywords: *Swordfish, protein hydrolysates, cytotoxic, wound healing, food preservatives*

C. ORALE N° : 74.

EXTRACTION AND PURIFICATION OF FUCOXANTHIN AND B-CAROTEN FROM THE BROWN MACROALGAE AND THEIR ANTIDIABETIC POTENTIAL

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Abtract : Algae are a diverse group of aquatic organisms that play a significant role in maintaining marine biodiversity. They are known to produce a wide range of metabolites with potential pharmaceutical applications, making them a promising source for drug development and therapeutic purposes. In this study, the brown macroalgae *Halopteris scoparia* was selected as a potential source of bioactive pigments, namely fucoxanthin and β-carotene, due to their reported health benefits.

The pigments were extracted from the algae using conventional organic solvent extraction, followed by their purification using a combination of chromatographic methods. The purified pigments were then evaluated for their effects on digestive enzymes, which play a crucial role in the breakdown and absorption of food. Specifically, the ability of the pigments to inhibit α-amylase and trypsin enzymes was investigated.

The obtained results showed that purified fucoxanthin and β-carotene exhibited interesting α-amylase inhibition activities, with IC_{50} values of 300 µg/mL and 500 µg/mL, respectively. Additionally, both pigments were found to inhibit trypsin enzyme activity. These findings suggest that the pigments from *H. scoparia* have potential therapeutic applications as an antidiabetic source due to their ability to inhibit α-amylase and trypsin.

Overall, this study highlights the potential of algae as a renewable source of bioactive compounds with various applications in medicine and healthcare. Further research is needed to explore the full range of bioactive metabolites produced by algae and their potential benefits for human health.

Mots clés : *Halopteris scoparia, Fucoxanthin, β-caroten, antidiabet*

C. ORALE N° : 75.

PARTIAL CHARACTERIZATION OF AN EXOPOLYSACCHARIDE EXTRACTED FROM *SPIRULINA MAXIMA* UNDER SALINITY STRESS

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Abstract: Exopolysaccharides (EPS) are secondary metabolites released from cyanobacteria in the surrounding environment, predominantly during the stationary growth phase of the microorganism, having the purpose of protection against tensions of extreme habitats and harmful conditions. The application of high salinity enhanced the production of EPS from *Spirulina maxima* stain. Precipitation of Exopolysaccharides was obtained by alcohol precipitation. A yield of 60mgEPS.L-1/12gMS.L-1 was obtained. Desalting using membrane dialysis followed by lyophilization provides the final EPS that were characterized by FTIR and by HPLC analysis to determine its molecular weight and to determine its monosaccharide composition. The EPS was submitted for RMN Characterization. Antibacterial activity was assessed and shows interesting capabilities, which allow EPS from *Spirulina maxima* to be used safely as food preservatives.

Key words: *Exopolysaccharides, cyanobacteria, salinity, spirulina maxima.*

C. ORALE N° : 76.

PHARMACOLOGICAL AND ANTIGENOTOXIC ACTIVITIES OF *OPUNTIA MICRODASYS* LEM.PFEIFF FLOWER EXTRACT

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Abstract : In recent years, the tendency was given to the study of natural products and healthy foods due to their potential as a source of biologically active and their eventual contribution in the prevention of some diseases. In this respect, tests evaluating the genotoxicity and antigenotoxicity of these natural products are extremely important in assessing the risk involved. In practice, pharmaco-toxicological evaluation generally includes studies of acute, subchronic, chronic, carcinogenic, genotoxic and reproductive effects. The aim of this study was to evaluate the analgesic and the antiinflammatory activity of *Opuntia microdasys* at post flowering stage, F3 (OMF3) in rat and, in other hand, its antigenotoxic effects by the *Allium cepa* test.
OMF3 extracts showed a higher analgesic and anti-inflammatory activity at 100 mg/kg (72.03% and 70.11%) as determined by the tests of acetic acid-induced writhing and carrageenan-induced oedema, respectively. Furthermore, the OMF3 aqueous extracts have a preventive antimutagenic potential, at lower concentration (EC_{50} ~ 60 µg/ml), against H2O2-mediated DNA damage in A. cepa root meristem cells with an efficient restoration of the mitotic index in comparison with controls. Based on this study, the flower of *O. microdasys* at post flowering stage may be use as an analgesic, anti-inflammatory and antimutagenic agents.

Keywords: *Opuntia microdasys Lem.Pfeiff flower, Pharmacological properties; Antigenotoxic effects.*

C. ORALE N° : 77.

CHEMICAL DIFFERENTIATION BETWEEN TUNISIAN POPULATIONS OF *PINUS HALEPENSIS* MILL., *PINUS BRUTIA* TEN. AND *PINUS PINASTER* AIT

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Pines are widely distributed in areas related to temperate and Mediterranean climates. Several of them have a variety of uses, particularly in the aromatic, medicinal and cosmetic fields, following to their richness in essential oils and vegetable oils. The work proposed the characterization of the seeds of 3 species of pine that can be found in Tunisia : Aleppo pine, maritime pine and brutia pine.
The comparison concerns the seeds by analyzing the fatty acid composition and the vitamin E composition. Important results were obtained to discriminate between the different species and populations. The lipid fractions of pine have a high content of vitamin E and varied considerably between species and populations. Aleppo pine has the highest content of vitamin E (256.34 mg / kg of seeds), maximum content of α-tocopherol and γ-tocopherol. Aleppo pine also showed the highest levels of γ-tocotrienol (~ 18%). Regarding the fatty acid composition, thirteen fatty acids were identified by GC-FID with significant variation between the different species and provenances studied. Linoleic acid was the major fatty acid (> 60%), followed by oleic acid (> 21%). In addition to the study of the lipid fraction, the analysis of the amino acid composition was studied. The samples analyzed are rich in free and total amino acids. For free amino acids, arginine and glutamic acid are the main amino acids present in all the samples. All the essential amino acids are present and Aleppo pine seeds have always the most important values.

Key words: *Aleppo pine, maritime pine, brutia pine, lipid fraction, fatty acids, vitamin E, proteins, amino acids.*

C. ORALE N° : 78.

ZEBRA BLENNY PROTEIN HYDROLYSATES AS A SOURCE OF BIOACTIVE PEPTIDES WITH PREVENTION EFFECT AGAINST OXIDATIVE DYSFUNCTIONS AND DNA DAMAGE IN BRAIN TISSUES OF RATS FED A CHOLESTEROL-RICH DIET

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• **Abtract :** Hypercholesterolemia is believed to cause oxidative stress by increasing the production of reactive oxygen species (ROS), and which play an important role in neuronal cell death, which is associated with many different neurodegenerative conditions, also is a key event in a variety of inflammatory processes. Our study aims to explore the potential ability of zebra blenny protein hydrolysates (ZBPHs), obtained through enzymatic hydrolysis of zebra blenny muscle proteins, to reduce hyperlipidemia in brain of rats fed with a hypercholesterolemic diet. ZBPHs strongly protected brain genomic DNA against oxidative damage and degradation induced by hydroxyl radical. High-cholesterol diet (HCD) causes oxidative stress with a rise in catalase (CAT), glutathione peroxidase (GPx), and superoxide dismutase (SOD) activities as well as thiobarbituric acid reactive substance (TBARS) levels in brain tissues. A fall in acetylcholinesterase (AChE) activity and a genomic DNA fragmentation was also shown in brain of hypercholesterolemic rats. Supplementing the HCD with ZBPHs significantly reversed these changes to near normal values and states. The histological and molecular findings confirmed that ZBPHs effectively protected brains against hypercholesterolemia-mediated oxidative damage. These observations suggested that ZBPHs are good source of bioactive peptides that possess hypocholesterolemic and antioxidant activities that help the cure and management of cognitive decline and neuronal degeneration induced by high-cholesterol levels. Overall, the findings of the current study indicate that ZBPHs significantly attenuated hyperlipidemia induced brain damage.

Mots clés : *Zebra blenny (S. basilisca), Protein hydrolysate, Hyperlipidemia, Brain damage, Oxidative stress.*

C. ORALE N° : 79.

BIOINFORMATIC ANALYSIS, CLONING, EXPRESSION AND CHARACTERIZATION OF A THERMOACTIVE AND ORGANIC SOLVENT TOLERANT LACCASE FROM THE *HALALKALIBACTERIUM HALODURANS*.

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Keywords: laccase, blue multicopper oxidase, green catalyst, thermo-active biocatalys, copper dependant laccase

Abstract: The search of biocatalysts with sustainable features is still of interest for applications in various fields as an alternative to chemical catalysis. A putative laccase from *Halalkalibacterium halodurans* was cloned and expressed as a recombinant protein with an overall activity of 0.625 U/mL. Compared to its original activity, the onset of thermo-activation of rLac-*HhC125* activity occurred at 25°C with an increase of 100 % and reached its maximum at the temperature of 50°C. The recombinant laccase was partially purified by size exclusion chromatography and ultrafiltration (10 kDa). The optimal pH and temperature were 8.0 and 60°C, respectively. Interestingly, the recombinant laccase showed resistance to organic compounds, chemical inhibitors and metal ions making it a powerful bio-catalyst with broad application in biotechnology. The recombinant laccase was able to oxidize typical substrates (i.e., syringaldazine, 2,4-dimethylphenol) and organic compounds used as potential precursors of dyes.

C. ORALE N° : 80.

SÉLECTION POUR L'APTITUDE À LA CULTURE D'ANTHÈRES DANS UNE PÉPINIÈRE DE CROISEMENT D'ORGE DE PRINTEMPS

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Résumé : L'orge (*Hordeum vulgare* L) est d'une importance majeure tant sur le plan économique que sur le plan alimentaire. Cette espèce constamment soumise aux changements climatiques irrégulières, exige une amélioration de ses capacités d'adaptation et ce par la création de nouvelles variétés beaucoup plus tolérantes. L'obtention de ces dernières nécessite souvent plusieurs cycles d'autofécondation afin d'atteindre un état pur et 100% homozygote.

Ce travail a pour objectif d'étudier l'aptitude à la culture d'anthère a été évaluée chez quinze lignées d'orge en génération F2 issues des croisements entre la variété tunisienne Rihane et des variétés introduites dans le but de créer de nouvelles variétés plus adaptées et tolérantes aux conditions défavorables. Au cours de la création variétale, l'haploïdisation permet la fixation rapide de lignées homozygotes.

Les anthères ont été soumises à un prétraitement au froid à 4°C pendant 28 et 40 jours avant leur mise en culture sur milieu d'induction. La capacité d'induction des cals et/ou des embryons, la capacité de régénération des plantules ainsi que l'effet du prétraitement ont été étudiés. Le taux d'induction le plus élevé 23,81% a été enregistré pour la lignée. 64,63% de plantules régénérées ont été Albina et uniquement 35,37% ont été chlorophylliennes. Les résultats obtenus ont permis de mettre en évidence que la régénération des plantes chez certains génotypes d'orge est dépendante du génotype et qu'une durée de prétraitement appropriée des épis au froid influence la capacité androgénique avec une meilleure réponse suite à une durée de 40 jours (66,67%).

Les faibles réponses des anthères à l'androgenèse in vitro observées dans notre étude peuvent être expliquées, en partie, par les conditions de culture de plantes mères en plein champ où les plantes sont exposées à des conditions de culture qui ne sont pas optimales.

Mots clés : *Hordeum vulgare L , culture d'anthère, prétraitement au froid, androgenèse in vitro.*

C. ORALE N° : 81.

DETERMINATION OF SOME HEAVY METALS IN DIFFERENT FOODS FROM ALGERIA

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Background and aim: The concentration of certain heavy metals in various foods (fruits, cereals, legumes and bee products) produced in industrial and urban cities is increasing each year following industrial development. This contamination of foods begins with the soil where some plants accumulate in their organs (wheat grains, fruits, etc.) what constitutes a risk to human health. In this work, we performed a dosage of some heavy metals in different varieties of foods (wheat, fruits and honey).
Methods: The determination of different concentrations of heavy metals (Cd, Pb, Fe, Ni, etc.) is carried out using an atomic absorption spectrophotometry (AAS). For the wheat grains, three fractions are analysed: whole grain, bran and flour. For the fruits, specially orange and lemon, two parts are analysed separately: peel and pulp. Then, they are fragmented and lyophilized before mineralization while honey has been caramelized and mineralized directly.
Results: The obtained results indicate that the dosage of four metals in wheat by AAS showed the complete absence of Cd in the three fractions (whole grain, bran and flour) and for each variety with the presence of some traces of lead (Pb) that does not exceed the standards. The two elements: Fe and Ni are present naturally in wheat, and their dosage showed values below the permissible limits. For the fruits, the search for seven heavy metals (copper, lead, cadmium, zinc, nickel, magnesium and iron) in 16 samples of fruits: apple, strawberry, lemon, orange, grape, plum, peach and melon, indicate the presence of a few traces of Cd below the permissible limit, while the values of Pb exceed the standard in three markets in the industrial and urban cities (Blida, Boumerdès and Eucalyptus). The trace elements Fe, Zn, Cu and Ni are present with variable contents depending on the type of matrix studied. However, their values do not exceed the authorized limits, which indicates contamination of the analyzed fruits by Pb. The analyse of metal content by determination of two toxic metals levels: lead (Pb) and cadmium (Cd) and other trace elements: magnesium (Mg), iron (Fe), zinc (Zn), copper (Cu) and nickel (Ni) in 23 different honey samples collected from North regions of Algeria were investigated. The metal contents were found within the ranges established by the international standards. All metals were found in non-significant values and are in safety baseline levels for human consumption except Mg which exceed the limits.
Conclusion: Regarding eco-toxicological aspects, the transfer of heavy metals to the aerial parts of plants is an undesirable property because they can pass into the food chain. For this, industrial areas must be separated from agricultural areas. Besides, these results suggested that honey could be used as an indicator to detect contaminating agents from the environment since bees are excellent sentinels for assessing environmental contamination because of their physiological and biological characteristics.

***Keywords**: heavy metals, wheat, fruits, Honey, industrial and urban cities, Algeria.*

C. ORALE N° : 82.

PRELIMINARY EVALUATION OF HAEMOSTATIC AND WOUND HEALING POTENTIAL OF HELIOTROPIUM EUROPAEUM

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Mots clés : healing, Heliotropium europaeum, biopsy, histology, regeneration, wound

Abtract : Heliotropium europaeum has been traditionally used to stop bleeding and accelerate scarring. To evaluate the haemostatic effect of Heliotropium europaeum, the time of bleeding of fresh wounds induced experimentally in rats was studied. Excision wounds were induced upon four groups; each one contains six rats to estimate the healing properties of wounds. Group-1 was assigned as control (not treated), group-2 was daily treated with Heliotropium europaeum leaf powder, group-3 was treated with Heliotropium europaeum every 6 days and group-4 was treated with a reference drug. All the parameters were significantly tested ($P < 0.05$) with comparison to a group control. The use of Heliotropium europaeum significantly shortened the bleeding time. The rats which were daily treated with Heliotropium europaeum healed in 12 days. This time period was significantly shorter than the control groups. The post healing biopsies were histologically assessed, revealed a better healing quality, and continue complete tissue regeneration. The experimental data revealed that Heliotropium europaeum displayed remarkable haemostatic and wound healing activities.

C. ORALE N° : 83.

GENETIC VARIABILITY OF CHICKPEA (*CICER ARIETINUM* L) COLLECTION

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An agro-morphological characterization of 60 chickpeas (*Cicer arietinum*) accessions was performed according to standard descriptors. Where, 45 are international accessions from different geographical origins and types (Kabuli and Desi), 13 local accessions collected and conserved in a German gene bank and 2 controls: Beja 1 and Amdoun.

This study was carried out at the Experimental Station of the Regional Research Center for field crops in Oued Beja (CRRGC). The statistical analysis shows that the majority of the morphological parameters studied are significantly different (number of pods / plants, number of pods empty, weight of 100 seeds ...).

The Desi type accessions "acc_35" from Indian and the Tunisian TN_5 were the most productive with respectively 56 and 52 pods per plant on average. However, acc_45, acc8, acc9, acc14, TN_13 are the least productive with a yield of less than 20 pods per plant on average.

This study made it possible to separate the genotypes into six different groups according to the chosen axes. The genotypes forming this group, approach each other by common morphological characters (the number of pods with 1 single seed, the yield of seeds per plant and the weight of one hundred seeds ...).

Keywords: *Cicer arietinum L., Chikpea, agro-morphological diversity;*
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C. ORALE N° : 84.

GENOTYPIC DIFFERENCES IN PHENOTYPIC, PHYSIOLOGICAL AND BIOCHEMICAL BEHAVIOR OF CULTIVATED BARLEY (*HORDEUM VULGARE*) AND SEA BARLEY (*HORDEUM MARINUM*) TOWARDS SALINE CONSTRAINT

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Abstract : The present study was conducted to investigate genotypic differences in response to salinity stress between *Hordeum marinum* genotypes (AR, salt sensitive; SH, salinity tolerant) and the salinity tolerant cultivar *Hordeum vulgare L*.cv. Rihane during three weeks, based on morphological, physiological and biochemical approaches. A significant differential effect of salt treatment on evaluated traits was observed by analysis of variance (ANOVA), confirming substantial genetic diversity among genotypes for salt tolerance. Salinity significantly decreased plant growth and leaf osmotic potential, with wild genotypes (AR and SH) showing more tolerance than Rihane. In contrast, salinity significantly increased proline content in root and shoot and activity of antioxidant enzymes (SOD, CAT and GPX) in both species. Peroxidation of lipid membranes and hydrogen peroxide showed no change in *H. marinum* under salt stress while it increased by two and three fold respectively in cultivated barley. These results suggest that high tolerance to salinity of SH and AR is closely related to lower osmotic potential, enhanced proline content, improved capacity of antioxidative performance to scavenge reactive oxygen species, and thus suppressed level of lipid peroxidation.

Keywords: *Growth performznce, salt stress, Hordeum marinum, Hordeum vulgare, Antioxidant enzymes.*

C. ORALE N° : 85.

VALORIZATION OF THIRD CATEGORY SHEEP MEAT IN THE FORM OF MINCED MEAT AND STUDY OF THE QUALITY OF THIS PRODUCT

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Abstract: The objective of this study was to evaluate the effect of preservation by smoking on the physicochemical and sensory qualities of meatballs made from ovine meat during 30 days of storage under vacuum at 4°C. Thus, 4 groups of meatballs were prepared: controls (F), cold smoked (FF), hot smoked (FC) and spicy meatballs (FE). The content of dry matter (DM), protein (MP), ash (MM) and lipids (MG), as well as the loss of water on cooking (PEC) were studied. A hedonic sensory analysis was conducted; similarly, the evolution of pH, lipid oxidation (TBARS), and color parameters (L, a*, b*) were studied. In addition, a survey assessing the perception of these products among 329 consumers was established. Our results showed that smoking allowed to delay the rancidity of meatballs by reducing the oxidation of FC meatballs with an average value of TBARS of 1 mg MDA/kg without exceeding the limit of acceptability. The FF group was less colored (a*=6.2; b*=10.7) than the FC group (a*=5.59; b*=12.1), but showed higher luminosity (L*= 60.16) than that of the FC group (55.66). The smoked groups presented the highest pH values (FC=6.25; FF=6.26). In addition, smoking affected sensory parameters, namely color, smoked smell, meat smell, hardness, and overall appreciation. The results of the survey indicated a great interest of consumers in the northeast region (46%) who have an income above 850 DT and a dominant age category between 25 and 40 years old, in purchasing this product. These respondents could be influenced by color, price, confidence in the application of good hygiene practices and the presence of reliable information on the product label.

Keywords: Sheep meat, hot smoking, cold smoking, sensory.

C. ORALE N° : 86.

BETALAINS NON-CONVENTIONAL EXTRACTION METHODS FROM FRESH AND DRIED *BETA VULGARIS* AND *OPUNTIA STRICTA* PLANT

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Keywords: Betalains, colorant, non-conventional extraction, Beta vulgaris, Opuntia stricta

Abstract: Natural pigment sources have recently been the focus of extensive food industry researches to replace synthetic sources. These latter appear to be associated with toxic and allergic issues. The most well-known source of natural food dye is red beetroot (Beta vulgaris L.), which is represented chemically by betalains. Other betalain sources from the Caryophyllales order have been identified in the last decade, including *Amaranthaceae, Nycaginaceae, Chenopodioideae*, and others. Among them is the *Cactaceae* family, which includes the *Opuntia stricta* variety. It spreads naturally from the North to the South of the country in Tunisia. The fruit has a distinct acidic flavor and an intense red purple color, which could be used to valorize this specie through natural dye extraction.
This study focuses on the extraction of betalains from *Beta vulgaris L.* and *Opuntia stricta* using non-conventional extraction methods. These methods are regarded as environmentally friendly and green technologies due to their ability to operate at low temperatures, under atmospheric pressure, and with minimal chemical input. This research investigates betalain extraction using microwave, ultrasound, and a combination of these two technologies. The effect of temperature (30-50-70°C) is assessed, in order to select the optimal temperature for the separation of betalains. The total polyphenol content and antioxidant activity are measured for the different fresh and dried *Beta vulgaris L.* and *Opuntia stricta* extracts.

The results showed that *Beta vulgaris L.* outperformed *Opuntia stricta* for betalains content when dried at 60°C using the combined microwave-ultrasound extraction method, with 1110.91±3.73 mg/100 g DW and 177.13±1.76 mg/100 g DW, respectively. Furthermore, dried *Opuntia stricta* and *Beta vulgaris L.* polyphenol content appeared to increase over five times when compared to fresh material. These findings suggest that dried material could be a promising stable natural colorant for the food industry.

ENVIRONNEMENT

C. ORALE N° : 87.

OLEA EUROPAEA L. AND SOIL MICROBIOLOGICAL RESPONSE TO OLIVE MILL WASTEWATERS APPLICATION IN AN ARID MEDITERRANEAN REGION

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Abtract : Oil mill wastewater (OMWW) is the primary waste from olive oil processing. Untreated OMWW is currently used for agronomic purposes in several countries, mainly because it is richness in valuable soil and plant nutrients. The increase in OMWW production each year and the severity of the pollution problem have made the direct application of this effluent to agricultural soils the best and the most effective alternative, despite its potential toxicity. Our study aims to evaluate the long-term effect of this co-product application, with a fixed dose authorized by the Tunisian low (50 m3 ha-1), on the soil microbial activity and the nutritional status of olive tree, aged over 80 years. The findings revealed an enhancement in microflora abundance. The number of aerobic soil bacteria and fungi generally decreased with the soil depth. Moreover, the cumulative respirometric activities, explained as C-CO2/TOC ratios were more intense in soils irrigated with OMWW and especially for the upper layer samples (0-30 cm). This organic amendment affects positively the plant morphological parameters (brunch diameter, leaves length and width). Also, it induces an increase in leaf chlorophyll pigments (chl a; chl b; chl (a+b); carotenoids). A slight and non-significative improvement in the essentials nutrients (Nitrogen, Phosphorus and Potassium) were noted.

Mots clés: *olive mill waste waters, soil microorganisms, olive tree, nutritional status*

C. ORALE N° : 88.

ADSORPTION OF POLYPHENOLS FROM OLIVE MILL WASTEWATER ONTO BIOCHAR WITHIN AN INTEGRATED WASTE TREATMENT SYSTEM

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In Mediterranean countries, the olive industry generates liquid and solid wastes with several phytotoxic and antimicrobial effects. Based on the principle of "industrial symbiosis", an integrated waste treatment system for the olive industry associated with the production of high value products has been developed.

Using pyrolysis process, olive mill solid wastes (OMSW) were treated to convert organic matter into energy carriers and biochar that can be used as polyphenols adsorbent. The present study aims to investigate the potential of application of biochar derived from OMSW as an adsorbent for olive mill wastewater (OMW) polyphenols. Batch adsorption experiments were carried out to evaluate the adsorption behavior of OMW polyphenols. Using RSM approach, the individual and combined effect of four parameters, i.e. pH, adsorbent dosage, pyrolysis temperature and polyphenols loading were studied. The study revealed that the kinetics of phenolic compounds adsorption followed better the second order model (R^2 = 0.9577). The study on the equilibrium adsorption revealed that nonlinear Freundlich isotherm model was found to better describe the experimental adsorption process (R^2 = 0.9911), while the maximum polyphenols adsorption was 140.47 mg/g. Finally, the results showed that hydroxytyrosol appeared to have a high adsorption affinity for the biochar.

Thus, adsorption treatments onto biochar would detoxify OMW by polyphenol elimination in view of their recovery as high-added products like hydroxytyrosol.

C. ORALE N° : 89.

MATERNAL EXPOSURE TO ACEPHATE CAUSED NEPHROTOXICITY IN ADULT OFFSPRING RATS

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Abstract : This study aimed to examine the impact of maternal exposure to acephate, an organophosphate-based insecticide, on renal development in rat offspring in adulthood. Virgin female Wistar rats were randomly allocated to three groups of which group 1 (Control) received sterile water as vehicle. Group 2 and 3 were exposed intragastrically to low (14 mg/kg) and high (28 mg/kg) doses of acephate after breeding from day 6 of pregnancy until delivery. The adult female rat offspring were euthanized on postnatal week 8. The animal's offspring with exposure to low and high doses of acephate exhibited elevated plasmatic creatinine and blood urea nitrogen levels, as compared to the controls. Additionally, immunofluorescence analysis revealed upregulation of autophagic marker genes (Beclin-1, LC-3) in acephate-treated rat offspring, suggesting the induction of an autophagic mechanism. Furthermore, reverse transcription polymerase chain reaction analysis revealed that the mRNA levels of the Na+/K+-ATPase, and the epithelial sodium channel (ENaC) genes were significantly higher in female offspring kidney than in controls, owing to acephate toxicity. Overall, our findings suggest that oxidative stress related to prenatal exposure to acephate causes nephrotoxicity and histopathological alterations in adult offspring, likely by actions on renal ENaC and Na+/K+-ATPase genes, along with the autophagic-related markers Beclin-1 and LC-3.

Key words: *Acephate; Nephrotoxicity; Autophagy; Oxidative stress; Immunofluorescence, Histopathology*

C. ORALE N° : 90.

PRENATAL EXPOSURE TO ALLETHRIN CAUSED HISTOPATHOLOGICAL DAMAGE, INDUCED BECLIN-1 AND LC-3 SIGNALING-MEDIATED RENAL AUTOPHAGY IN FEMALE RAT OFFSPRING

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Abstract : The present study was performed to investigate the developmental effects of the pyrethroid-based insecticide allethrin on kidney function in rat offspring in adulthood. Sixty-day-old Wistar albino female rats were randomly allocated to three groups: one group of control and two groups of treatment that were intragastrically administered with 34.2 or 68.5 mg/kg body weight allethrin after breeding from day 6 of pregnancy until delivery. The results revealed that the high dose of treatment (68.5mg/kg) considerably reduced the number of glomeruli. The glomeruli diameter of the kidneys in the animal group treated with 34.2 mg/kg was significantly decreased compared to the controls ($P<0.001$) whereas in 68.5 mg/kg treated group was significantly higher than the control group ($P<0.05$). Interestingly, the autophagic marker Beclin-1 and LC-3 have been increased compared to control indicating an induction to the autophagic mechanism. Furthermore, allethrin downregulated in a dose-dependent manner the expression of the epithelial sodium channel (ENaC) gene. The mRNA levels of Na+/K+- ATPase gene was significantly higher in the group treated with the low dose but significantly lower with the high dose of treatment, compared to control. However, there was no effect of allethrin on the gene expression of NHE3 in both treated groups. Taken together, the findings of this study suggest that exposure to the pyrethroid-based insecticide allethrin may contribute to nephrotoxicity by affecting the number and the diameter of glomeruli, causing histopathological alterations and inducing autophagic-related markers and affecting mRNA levels of ENaC and Na+/ K+ ATPase genes.

Key words: *Pyrethroid insecticide, allethrin, nephrotoxicity, autophagy, histopathology.*

C. ORALE N° : 91.

DECOLOURIZATION AND BIODEGRADATION OF TEXTILE AZO DYES VIA FUNGAL ENZYMATIC PEROXIDASE AND TOXICITY ASSESSMENT

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Background: Azo dyes have become a staple in various industries, as colours play an essential role in consumer choices. However, these dyes pose various health and environmental risks. Although different wastewater treatments are available, searching for more eco-friendly options persists. Bioremediation utilizing microorganisms has greatly interested researchers and industries, as the transition toward greener solutions has become more in demand through the years. This work tackles the health and environmental repercussions of azo dyes and their metabolites, available biological approaches to eliminate such dyes from the environment with a focus on the use of different microorganisms, enzymes that are involved in the degradation of azo dyes, and recent trends that could be applied for the treatment of azo dyes. The aim of the present work was to investigate the fungi potential for the detoxification, and the decolorization of several azo dyes.
Materials/Methods: Two fungal strains (*chaetomium moderasense* and *chaetomium jodhpurense*) isolated from different sites in northern and southern Tunisia were chosen as the most effective in the biodegradation of highly toxic azo dyes(indigo carmen and congo red) and incubated in 100 ml of dye solution. The effect of initial dye concentration, agitation, initial pH, inducer, temperature and glucose on the decolorization rate was studied. The enzymes involved into the decolorization process were identified and the degraded metabolites also the stability of the enzymes (pH, temperature, and salinity…) were characterized by using various analytical methods such as spectrophotometry UV-VIS and H-NMR spectroscopy. The study also aimed to assess the toxicity of the metabolites formed after the degradation of dyes by these microorganisms..
Results: *Chaetomium moderasense* and *Chaetomium jodhpurense* have shown an ability to effectively degrade this variety of toxic dyes. The obtained results showed that maximum decolorization was found to be 94 % for indigo Carmen and 90% for Congo red optimum conditions: pH 7, 30°C during 8 days. The decolorization is due to mycelia biosorption and enzyme degradation. The biodegradation mechanism was also been studied lignin peroxidase (Lip) and Manganese peroxidase (MnP) seems to be the main enzyme responsible for the bioconversion of dyes used in this work.
The toxicity test suggested the products were less toxic than the original dyes.
Conclusion: Overall findings showed that (*Chaetomium moderasense* and *Chaetomium jodhpurense)* had a good decolorization ability. It had well potential application prospects in the field of dye wastewater treatment. It had well potential application prospects in the field of dye wastewater treatment.

C. ORALE N° : 92.

STUDY OF THE BIODIVERSITY AND ABUNDANCE OF VIABLE BACTERIAL STRAINS IN AN AQUATIC ECOSYSTEM RECEIVING WASTEWATER EFFLUENT FROM THE OIL REFINERY IN THE WILAYA OF SKIKDA (ALGERIA)

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Abtract: The impact of petroleum refinery wastewater effluent on the bacterial load and the biodiversity and abundance of viable bacterial strains of a receiving aquatic ecosystem in Skikda Bay (Algeria) was studied during the four season of the year and at different sampling stations. The results show a large spatio-temporal variation of the isolated bacterial species, this difference between the stations and the seasons could be attributed to environmental factors, the pollution rate and the distance of the different sampling stations from the point of discharge of the refinery. The results of the statistical analyzes showed that the physico-chemical parameters such as pH, electrical conductivity (EC) and salinity have a very significant effect on the microbial load ($p<0.001$), while hydrocarbon pollution has a significant effect on the diversity of bacterial species ($p<0.05$). seventy five bacteria were isolated during the four sampling campaigns, with significant richness and variable diversity from one station to another, with a total number of identified strains equal to 42 strains belonging to the 18 bacterial genera were identified. Most of these genera belong to the class Proteobacteria. Pseudomonas was the most abundant genus in our region, represented by 10 strains, followed by the Acinetobacter and Pseudoalteromonas genera, represented by 4 strains each, then the Staphylococcus genus with 3 strains and finally the other 14 genera represented by one or two bacterial strains.

Key words : *Biodiversity, Skikda bay, Proteobacteria, bacterial abundance, estuary area*

C. ORALE N° : 93.

ETUDE DE L'ARTHROPODOFAUNE DU PARC NATIONAL DE JBIL

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Abstract: We will focus on the study of the Arthropodofauna of the National Park of Jbil, the latter being the gateway of the Grand Erg Oriental in Tunisia. The peculiarities of the park make of it an interesting spot for biodiversity studies. Noting the extent of the area which recovers over 1% of Tunisia national territory (163 000km^2), we can also note the presence of endemic specie recently reintroduced and that of relatively green patches attributable to the specific relief of the park with valleys which lock the water even if the rainfall is excessively low oscillating between 50 and 80 mm per year.

We aimed to study the population of arthropods of the park, its repartition, density and preferences. We divided the park in 40 study areas in order to make a systematic sampling. Each area forming a 100 meters square. The points have been pre-defined in advance with *Qgis* program. It was with this in mind that we used the Pitfall Trap method. This technique is especially useful for the study of walker insects. We did 160 pitfall traps representing 160 sites. Each pitfall trap is formed by (4) plastic cups berried in the ground; we have a total of 640 cups. We have optimized the probability of capture by having this quantity of traps covering the 40 study areas. On the ground, they are arranged according to a specific organization (North (1), Est (2), South (3), West (4)). We collect the 4 cups of study area exactly 24 hours after they were put down. This method is very useful both quantitatively and qualitatively. Indeed, we can estimate their density, repartition but also the preferences of the temporal niche (diurnal or nocturnal) and the direction that they came from. However, this method suffers from a major inconvenient related to the weather. In case of heavy sandstorm, the cups can be filed by sand within few minutes or hour depending on the intensity of the sandstorm. We collected **4190** animals over 640 cups averaging **6,55** individuals per cup with more than 36 different species belonging to 13 orders. Here is an exhaustive list of the found orders: the order of the Coleoptera, the order of Blattodea, the order of Orthoptera, the order of Hymenoptera, the order of Lepidoptera, the order of Heteroptera, the order of Diptera, the order of Solifugae, the order of Aranea, the order of Opiliones, the order of Scorpionea, the order of Isopoda and finally the order of Scolopendromorpha. We identified those orders and families by using a high-resolution stereo-microscope Leica M205® at the laboratory. On a total of **4190** individuals sampled, **3681** of these individuals belongs to the order of Coleoptera (almost 88%). This order is the most diversified, indeed Coleoptera order aggregate 2 sub order *Adephaga* and *Polyphaga* counting respectively 1 and 6 families while the other orders count one, two or maximum 3 families. The sub order of *Adephaga* is represented by the family of *Carabidae* (*Caraboidae* super family) while *Polyphaga* family is represented 6 families: *Scarabaeidae*, *Tenebrionidae*, *Curculionidae*, *Meloidae*, *Buprestidae* and *Elateridae*. Among the **3681** Beetles, **3658** belongs to the *Tenebrionidae* family. Much emphasis was led to this family, we used several identification keys such as Bedel,1895; Normand,1933,1936,1937; Dajoz 1982 and Baraud 1985. We also consulted the collection of Dr Normand at the National Agronomic Institute of Tunisia. Our observations led to the identification of a specie that occupies a predominant place in the *Tenebrionidae* family with **3161** individuals belonging to *Erodius nanus*. It is particularly important to note that 100% of the cups contain at least an *Erodius nanus* with the exception of the cups berried by sand in the very first hours after their installation.

This specie is the smallest specie of the order of *Erodius* measuring around 0.6cm. Prothorax is largely transverse, depressed inside the posterior angles. Antennas are spindly, body is matte dark, striations are protruding while elytra are scarcely protruding. *Erodius nanus* represent 75% of the individuals we found with 3161 specimens among 4190 captured arthropods.
After those observations and those findings, we can finally say that *Erodius nanus* is a keystone specie in the park. The present study shows that the diversity of the park is rich both quantitatively and qualitatively.

C. ORALE N° : 94.

ISOLEMENT ET IDENTIFICATION DES LÉGIONELLES DE L'ÉTABLISSEMENT THERMAL

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Résumé : Les établissements thermaux sont des lieux de relaxation et de cures. Beaucoup de personnes s'y rendent pour des soins thérapeutiques palliant ainsi bienfaits et détente. L'eau thermale, par ses propriétés chimiques offre une qualité de choix pour le traitement de plusieurs maladies. Néanmoins, un contrôle microbiologique strict doit être mis en place pour contrer les microorganismes pathogènes qu'elle peut véhiculer, en l'occurrence : les légionelles.
Les légionelles sont des bactéries de l'environnement, peuvent se retrouver libres, ou associées à des amibes. Elles infectent l'homme par inhalation de microgouttelettes d'eau chargées en légionnelles ou par aspiration lors de l'ingestion d'eau contaminée. Le diagnostic de la légionellose est souvent difficile et leur mise en évidence requiert plusieurs techniques. Le plus souvent un questionnaire est établi pour le malade sur les lieux où il a séjourné pour déterminer la cause et procéder à des prélèvements environnementaux.
Des méthodes culturales (directes et de co-culture), protéomique, sérologique et moléculaires (Amplification du gène *mip* et de l'ARNr 16S) pour la recherche et l'identification des légionelles ont été utilisés. Les points de prélèvements ciblés sont les douches et les piscines
Les résultats ont montré que *L. Pneumophila* est l'espèce prédominante avec 65% sur le total de nos échantillons. Le sérogroupe prédominant était celui de *L. pneumophila sg1* avec 49,24% sur le total des espèces identifiées. Le sérogroupe 4 a été retrouvé dans 21 échantillons (15,20%) et le sérogroupe 8-14 dans 17 échantillons (12,87%).

Mots Clés : *Etablissent thermaux, Légionelles, Méthodes de culture et d'identification*

C. ORALE N° : 95.

BIODEGRADATION OF HYDROCARBONS BY PICOCYSTIS SP. FROM PETROLEUM REFINERY WASTEWATER

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Abtract : Increasing global pollution, industrialization and rapid economic progress are considered to have serious consequences for the quality and availability of water around the world. Waste oils are considered hazardous waste and have some dangerous properties. The use of microalgae in wastewater treatments advantageous for removal or biotransformation of polluants and CO_2. This study focus on the bioremediation of highly toxic petroleum refinery wastewater by the Chlorophyta *Picocystis* sp. The effect of different concentrations of both wastewater CWO and BWO (25%, 50%, 75% and 100%) on the growth and lipid content of microalgae during 10 days was investigated. Various physicochemical parameters such as pH, COD, BOD, TOC, nitrate, phosphate and HPA content were estimated in crude and treated wastewaters. Results showed a reduction of COD, DBO, TOC and HPA of 25.5%, 50%, 94% and 50.8%, respectively in 50%CWO and 64.1%, 87.5%, 87 and 35%, respectively in 50% BWO. Germination trials were conducted to assess the potential phytotoxic effects of these treated wastewaters.

The results obtained in this study establish that *Picocystis* sp. could be used as a new ecologically sustainable bioremediation tool for waste water from the petroleum refining industry.

Mots clés : *Microalgues, wastewater, hydrocarbons, lipid, bioremediation*

C. ORALE N° : 96.

IMPACT OF HEAVY METALS IN THE MICROALGA TETRASELMIS SP. AND ASSESSMENT OF ITS POTENTIAL USE IN METALS BIOREMEDIATION AND BIODIESEL PRODUCTION

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Abtract : In aquatic environment, toxicity of heavy metals depends on external factors (environmental parameters, type of metals and exposure concentration). Phycoremediation of these polluants from contaminated waters by microalgae is a safe process and an emerging trend. In this study, toxicity of Ni, Cr and Co on the marine microalga *Tetraselmis* sp. was investigated at different concentration using the mixture design with a total metal concentration of 12 mg/L. In the current investigation, this strain removed 91% of total extracellular metals at the optimum binary mixture Ni (54.45 %) and Cr (45.45 %) combined to a highest cells growth of 9.22×10^5 cells/mL and lipid content of 31% Dry Weight. Results showed also a high bioconcentration factors within binary mixtures (Ni × Cr), (Cr × Co) and (Cr × Co) at 6 mg/L, respectively. Additionally, *Tetraselmis* sp. cells were characterized by Fourier transform infrared spectroscopy. FTIR analysis revealed that several functional groups as C=O, O-H, CH2, N-H, C-O-C and P-O may participate in the metal removal and biosorption process. In addition, the functional groups attributed to fatty acids and proteins showed a shifting of peaks assigned to optimized metal mixture condition and an increase of their area compared to that of the standard condition. This study showed that the marine microalgae *Tetraselmis* sp. is highly suitable for heavy metals bioremediation and biodiesel production.

Mots clés: *Tetraselmis sp., phycoremediation, heavy metals, lipids, biodiesel, metals removal*

C. ORALE N° : 97.

EVALUATION DE LA CONSOMMATION ALIMENTAIRE DE MATIÈRES GRASSES CHEZ LES ENFANTS TUNISIENS AGES DE 3 A 9 ANS

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Abtract : L'organisation Mondiale de la Santé (OMS) recommande la limitation de l'apport énergétique journalier des acides gras saturés (AGS) à un maximum de 10 % et l'apport en acides gras trans (AGT) à 1 % de l'apport énergétique total pour éviter le surpoids et l'obésité. L'objectif global de ce travail étant d'évaluer la consommation des matières grasses chez les enfants de 3-9 ans, habitants le Grand Tunis.
Dans ce cadre, une enquête transversale à passage unique a été réalisée sur un échantillon de 1200 enfants Tunisiens dans les gouvernorats de Tunis, de l'Ariana, de Manouba et de Ben Arous. Les sujets ont été sélectionnés sur la base d'un plan d'échantillonnage réalisé par l'Institut National de la Statistique. L'apport alimentaire des enfants a été évalué d'une part par l'histoire alimentaire sur une semaine habituelle et d'autre part par le rappel de 24 heures. Selon la méthode du rappel de 24 heures, les parents sont questionnés par les diététiciens, sur la consommation alimentaire de leurs enfants au cours des dernières vingt-quatre heures. L'analyse des aliments transformés les plus consommés par les enfants a été réalisée par Chromatographie Gazeuse couplée à un Détecteur à Ionisation de Flamme (GC-FID) après extraction par l'éther éthylique et l'éther de pétrole suivie d'une hydrolyse acide et d'une méthylation à chaud de la matière grasse.
Les résultats de cette étude ont montré des pourcentages énergétiques de graisses totales, d'AGS et les d'AGT chez les enfants tunisiens de 29,6 %, 11,4 % et 0,15 %, respectivement. La consommation des matières grasses selon le genre était similaire entre les garçons et les filles. D'autre part, les recommandations de l'OMS pour les graisses totales, les AGS et les AGT ont été adoptées par 58 %, 39 % et 89 % de la population étudiée, respectivement. Les principaux groupes alimentaires de matières grasses et d'acides gras consommés par les enfants étaient les aliments ultra-transformés, les céréales du petit-déjeuner et les produits laitiers. La mise en œuvre d'une stratégie pertinente de réduction des matières grasses, notamment issues des aliments ultra-transformés, considérés comme produits pauvres en nutriments, est nécessaire pour promouvoir la santé des enfants et prévenir les maladies chroniques.

Mots clés : *Hypr-HDLémie, femmes tunisiennes, facteurs physiologiques, socio-économiques et environnementaux.*

C. ORALE N° : 98.

EVALUATION DE LA CONSOMMATION ALIMENTAIRE DE MATIÈRES GRASSES CHEZ LES ENFANTS TUNISIENS AGES DE 3 A 9 ANS

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Abtract : L'organisation Mondiale de la Santé (OMS) recommande la limitation de l'apport énergétique journalier des acides gras saturés (AGS) à un maximum de 10 % et l'apport en acides gras trans (AGT) à 1 % de l'apport énergétique total pour éviter le surpoids et l'obésité. L'objectif global de ce travail étant d'évaluer la consommation des matières grasses chez les enfants de 3-9 ans, habitants le Grand Tunis.
Dans ce cadre, une enquête transversale à passage unique a été réalisée sur un échantillon de 1200 enfants Tunisiens dans les gouvernorats de Tunis, de l'Ariana, de Manouba et de Ben Arous. Les sujets ont été sélectionnés sur la base d'un plan d'échantillonnage réalisé par l'Institut National de la Statistique. L'apport alimentaire des enfants a été évalué d'une part par l'histoire alimentaire sur une semaine habituelle et d'autre part par le rappel de 24 heures. Selon la méthode du rappel de 24 heures, les parents sont questionnés par les diététiciens, sur la consommation alimentaire de leurs enfants au cours des dernières vingt-quatre heures. L'analyse des aliments transformés les plus consommés par les enfants a été réalisée par Chromatographie Gazeuse couplée à un Détecteur à Ionisation de Flamme (GC-FID) après extraction par l'éther éthylique et l'éther de pétrole suivie d'une hydrolyse acide et d'une méthylation à chaud de la matière grasse.
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Mots clés : *Hypr-HDLémie, femmes tunisiennes, facteurs physiologiques, socio-économiques et environnementaux.*

C. ORALE N° : 99.

POTENTIAL FOR HEAVY METAL REMOVAL USING A NEWLY ISOLATED GREEN MICROALGA

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Abstract: Heavy metals utilization is increasing all over the world. They present several hazards of aquatic sources contamination leading to environment deteriorating and thus human health threatening. Hence, the development of remedial solutions offers numerous advantages in terms of cost-effectiveness, sustainability, and efficiency. The main objective of the present work is to evaluate the effects of cadmium, chromium and lead exposures on cellular and metabolic responses of a newly isolated microalgal strain as well as its capacity to biosorb these metallic species.
The microalga strain was used to remove Cd, Cr and Pb from synthetic wastewater in batch assays. The removal mechanisms were investigated using AAS analysis while the identification of the functional groups involved were analyzed via FTIR.

The effects of heavy metal exposition on microalgal growth and cellular metabolism were analyzed biochemically.

The microalga proved a tolerance for Cd, Cr and good resistance against Pb. Cd and Cr exposure elicited a decrease of chlorophyll, lipid and polysaccharide contents. However, not noticeable damages under Pb treatment were observed. Besides, the metals exhibited no significant changes for protein content.

The molecular mechanism findings showed that Pb and Cr exposures up-regulated many stress- defense-related genes.

The uptaking efficiencies of Cr and Pb in this microalga were 89% and 95%, respectively. Both intracellular accumulation and extracellular adsorption mechanisms are involved for Cr biosorption while the majority of Pb was removed by adsorption which was due to the contribution of several functional groups showed by FTIR analysis.

Key words: *Microalgae strain, Heavy metals, Bioaccumulation, Bioremediation, Wastewater*

C. ORALE N° : 100.

EFFECTS OF ORGANIC CONTAMINANTS ON MIGRATORY BEHAVIOUR OF MEIOBENTHIC NEMATODES.

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Abstract: An open experimental setup was established in order to explore toxic effects of the antidepressant paroxetine on meiobenthic nematodes. Three types of microcosms made with polyvinyl chloride tubes, comprising each two sedimentary compartments (upper and lower), were used in a bioassay for 15 days. The experimental setup targeted the migratory behaviour of the nematofauna from the above compartments which were exposed to amitriptyline and to the mixture of amitriptyline and paroxetine (0.4 µg.l^{-1} and 40 µg.l^{-1}), at below compartments. The univariate indices significantly decrease in the contaminated compartments compared to controls. Multivariate analyses revealed also significant taxonomic dissimilarities between contaminated and uncontaminated compartments. Furthermore, SIMPER functional outcomes highlighted a significant decrease in 2A feeding groups, 'co' tail shape, 1-2 mm interval length, 'cr' amphid shape, and c-p2 life history in contaminated compartments. Computational approach showed that paroxetine bound GLD-3 and SDP with high affinities, which together with molecular interactions and toxicokinetics satisfactorily explain the experimental results.

Keywords: *Open microcosms, free-living marine nematodes, computational analyses, migratory behavior, Paroxetine, taxonomic diversity.*

C. ORALE N° : 101.

EFFECTIVE REMOVAL OF CONTAMINANTS FROM SOYBEAN OIL REFINERY WASTEWATER USING PHYSICO-CHEMICAL TREATMENT: A BOX-BEHNKEN DESIGN-BASED OPTIMIZATION

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Abtract : The growth in industrial production and urbanization, which had its onset in the 18th century with the industrial revolution and increased considerably in the last decades, brought about great improvements in manufacturing processes and in the living conditions of populations. However, as a result of overexploitation and inadequate waste management, it has also led to the emergence of many environmental impacts. Among these, contamination of water resources has been one of the most afflicting. Among the many classes of industries, vegetable oil refineries, which discharge large volumes of highly polluted wastewater (VORW). These effluents are heavily loaded with suspended and dissolved matter, mainly organic oils and fats. Thus, many treatment techniques have been used in order to eliminate the pollutants contained in this wastewater such as adsorption, membrane filtration, electro-coagulation and flotation. Coagulation/flocculation (CF) technique is one of the physicochemical methods of treating wastewater and it has stood out among others because of its simplicity and cost effective in usage. Coagulant such as aluminum sulphate is the most widely used. This is because of its effectiveness, cheap, easy to handle and availability. However, to be most effective with the minimum loss of chemical used, CF must be efficiently optimized.

Indeed, the optimization of water treatment processes has a great importance because it improves efficiency and reduces the cost of treatment. One of the more modern methodologies for process optimization is Response Surface Methodology (RSM).It is generating considerable interest in terms of reduction of number of experiments and studying all factors at the same time; also, it highlights the possible interactions and their effects between studied factors. In particular, RSM based on Box–Behnken design (BBD) is the mostly used due to its attractive advantages such as the low number of experiments carried out.

The current study takes into consideration the different variables known to be likely to affect the process of VORWs CF, the RSM based on BBD was used to optimize the purification performance of this treatment and to evaluate the impact of the seven factors at three equally spaced coded levels designated as −1 (low), 0 (middle), and +1 (high): Coagulant concentration (X1 : Aluminium sulphate), Flocculant dosage (X2 : Chimfloc), Initial pH (X3), coagulation speed (X4), flocculation speed (X5), coagulation duration (X6) and flocculation duration (X7) with a sedimentation time equal to 30 minutes and their effects on turbidity (Y1) and COD (Y2) removals (59 experiments were investigated).

The results showed that CF was very effective for the VORWs treatment. The RSM made it possible to obtain maximum depollution under the following optimal conditions: 3.19 g/L of coagulant concentration, 63.16 mg/L of flocculant dosage, initial pH of 9, with a coagulation duration of 4.58 minutes under 171.22 rpm stirring speed and 31 minutes flocculation under 22.4 rpm stirring speed.

These optimal conditions make it possible to obtain 100% and 96% of turbidity and COD removals, respectively. The quality of fit of the models developed by the statistical study using the NemrodW version 9901 software was checked by the coefficient of determination (R^2). High R^2 values were obtained for both turbidity (0.982) and COD (0.887) removals, indicating that the models developed are considered highly significant.

These results confirm that RSM is very useful for optimizing variables/factors in a more practical way compared to classical optimization by varying a single parameter while keeping the others fixed. This method offers better reproducibility of results and optimization of the CF process with fine perspective for the development of predictive models. It also makes it possible to optimize treatment efficiency by minimizing the number of experiments and by taking into consideration all the possible interactions between the different factors.

Keywords: *Vegetable Oil refinery Wastewater, Coagulation/Flocculation treatment, Optimization, Box Behnken design, Response Surface Methodology.*

C. ORALE N° : 102.

INTENSIFICATION OF THE PHYSICO-CHEMICAL TREATMENT EFFICIENCY OF UNSAPONIFIABLE OILS CONTAMINATED SOAP INDUSTRY WASTEWATER THROUGH PROCESS CONDITIONS OPTIMIZATION USING RESPONSE SURFACE METHODOLOGY

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Abtract: Saponification is the chemical reaction that occurs between the fatty acids and an alkali, typically sodium hydroxide or potassium hydroxide. This reaction produces soap molecules, which are made up of soap (carboxylate ions), and glycerol, also known as glycerin. However, during the soap making process, some of compounds known as ``unsaponified matters`` may not be fully saponified. These matters can be released into the water as well as some other chemicals, organic matter, alkalis, and industry-specific additives used in the soap production process. Some of these pollutants can be toxic and harmful to the environment and human health if not properly managed and treated. Various methods have been applied to treat soap industry wastewater, including adsorption (Ad), coagulation/flocculation (CF), anaerobic treatment (AT), membrane filtration (MF) etc. Among these treatment processes, CF has been found to be the most effective solution for treating this type of heavily polluted effluent.

However, in this process, many factors can influence its efficiency, such as the type and dosage of coagulant/flocculant, pH, temperature, mixing speed and duration of each step, settling time, etc. Thus, the optimization of the various factors acting on the CF wastewater treatment process can improve its purification performance. Conventional multifactorial experiments that vary a single factor while keeping the others constant may not achieve the true optimum due to ignorance of the possible interactions that may exist between the different variables and may be of a large number and can be time-consuming. To fully optimize the physico-chemical treatment by CF of heavily polluted effluents from the soap manufacturing industry, it is important to consider the interaction between all relevant variables. In the present study, the response surface methodology (RSM) was proposed in order to identify the optimal conditions resulting in high pollution removal. Indeed, RSM is a statistical technique that enables experimental design, data evaluation and analysis, and process modeling with a limited number of planned experiments.

Within this framework, the CF process was investigated for the treatment of wastewater generated by the soap manufacturing industry. CF experiments were performed using the international jar-test protocol. A preliminary study was carried out in the laboratory and allowed us to select the most efficient coagulant and flocculant. Next, an optimization study of CF treatment of soap industry wastewater was carried out by adopting a full range of Response Surface Methodology (RSM) using Box Behnken Design (BBD).

Three variables were involved: coagulant concentration (X1), flocculant dosage (X2), and initial pH (X3). The manipulated variables were varied on three levels (+1, 0 and -1) and two responses were taken into account to find the best treatment conditions: turbidity (Y1) and COD (Y2) removals. Analysis of variance using NemrodW version 9901 software was used for graphical analyses of the data to obtain the interaction between the process variables and the responses.

The evaluation of Student's t-test statistics associated with the coded variables (X1, X2 and X3)and their interactions (coagulant-flocculant (X1X2), coagulant-pH (X1X3) and flocculant-pH (X2X3)) indicates that all three factors coagulant concentration, flocculant dosage and initial pH have a significant impact on the performance of CF treatment in terms of turbidity and COD removals. The results of the current study indicated that the optimum conditions were coagulant concentration of 2 g/L, flocculant dosage of 49.97 mg/L and initial effluent pH of 9.48.Under these optimal conditions, maximum turbidity and COD removals efficiency reached97% and 44%, respectively. Analysis of variance (ANOVA) showed a high variance coefficient (R^2) value of 0.953 and 0.986 for turbidity and COD removals, respectively, thus ensuring a satisfactory adjustment of the second-order regression model with the experimental data.

This study showed that statistical design methodology was an efficient and feasible approach in determining the optimum conditions for high turbidity and COD removals from soap industry effluent treated using CF process. Although the CF treatment of soap wastewater was able to achieve a significant removal rates of organic and suspended matters, the treated wastewater still exhibits a high level of pollution expressed in terms of COD (4700 mgO_2/L) that remained above the allowable limits for the discharge into the receiving environment (NT 106.002) as well as for reuse in agriculture (NT 106.003). Therefore, secondary treatment of these effluents through other processes (applied alone or in combination) is necessary to obtain water quality that complies with the standards for discharge, reuse, and/or recycling.

***Keywords**: Soap manufactory Wastewater; Coagulation/Flocculation; optimization, Response surface methodology, Box Behnken design*

C. ORALE N° : 103.

DETERMINATION OF SOME HEAVY METALS IN DIFFERENT FOODS FROM ALGERIA

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Background and aim: The concentration of certain heavy metals in various foods (fruits, cereals, legumes and bee products) produced in industrial and urban cities is increasing each year following industrial development. This contamination of foods begins with the soil where some plants accumulate in their organs (wheat grains, fruits, etc.) what constitutes a risk to human health. In this work, we performed a dosage of some heavy metals in different varieties of foods (wheat, fruits and honey).
Methods: The determination of different concentrations of heavy metals (Cd, Pb, Fe, Ni, etc.) is carried out using an atomic absorption spectrophotometry (AAS). For the wheat grains, three fractions are analysed: whole grain, bran and flour. For the fruits, specially orange and lemon, two parts are analysed separately: peel and pulp. Then, they are fragmented and lyophilized before mineralization while honey has been caramelized and mineralized directly.
Results: The obtained results indicate that the dosage of four metals in wheat by AAS showed the complete absence of Cd in the three fractions (whole grain, bran and flour) and for each variety with the presence of some traces of lead (Pb) that does not exceed the standards. The two elements: Fe and Ni are present naturally in wheat, and their dosage showed values below the permissible limits. For the fruits, the search for seven heavy metals (copper, lead, cadmium, zinc, nickel, magnesium and iron) in 16 samples of fruits: apple, strawberry, lemon, orange, grape, plum, peach and melon, indicate the presence of a few traces of Cd below the permissible limit, while the values of Pb exceed the standard in three markets in the industrial and urban cities (Blida, Boumerdès and Eucalyptus). The trace elements Fe, Zn, Cu and Ni are present with variable contents depending on the type of matrix studied. However, their values do not exceed the authorized limits, which indicates contamination of the analyzed fruits by Pb. The analyse of metal content by determination of two toxic metals levels: lead (Pb) and cadmium (Cd) and other trace elements: magnesium (Mg), iron (Fe), zinc (Zn), copper (Cu) and nickel (Ni) in 23 different honey samples collected from North regions of Algeria were investigated. The metal contents were found within the ranges established by the international standards. All metals were found in non-significant values and are in safety baseline levels for human consumption except Mg which exceed the limits.
Conclusion: Regarding eco-toxicological aspects, the transfer of heavy metals to the aerial parts of plants is an undesirable property because they can pass into the food chain. For this, industrial areas must be separated from agricultural areas. Besides, these results suggested that honey could be used as an indicator to detect contaminating agents from the environment since bees are excellent sentinels for assessing environmental contamination because of their physiological and biological characteristics.
Keywords*: heavy metals, wheat, fruits, Honey, industrial and urban cities, Algeria.*
Source: Publication of honey results:
https://www.researchgate.net/publication/327745785_Physicochemical_characterization_and_determination_of_chloramphenicol_residues_and_heavy_metals_in_Algerian_honeys

C. ORALE N° : 104.

PHYSICO-CHEMICAL, SPECTRAL AND MICROBIOLOGICAL CHARACTERIZATION AND PHYTO-TOXICITY ASSESSMENT OF WASTEWATER FROM ROCK PHOSPHATE PROCESSING IN TUNISIA

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Abtract : Environmental applications and potential risks of wastewater have attracted increasing attention. Among these discharges, we can mention effluent from the phosphate laundries that has received great interest in recent years. In this work, we characterized CPG's wastewater from phosphate ore processing before and after treatment and investigated for the first time its phyto-toxicity. The mineralogical, spectral and physicochemical characterizations were made and show that these wastewaters are relatively alkaline, because of his high calcium and phosphorus content. This effluent had also a high salinity. The BOD_5/COD ratio is equal to 0.949, which allows us to estimate that this effluent is potentially biodegradable. The existence of numerous minerals, major elements as well as trace elements in low grade is observed.The microbiological characterization revealed the presence of revivable aerobic bacteria as; total coliforms, fecal coliforms, *Pseudomonas*, sulfite-reducing bacteria, and fungi. In contrast, a complete absence of *Salmonella*, *Vibrio cholerae*, and Helminth egg was noted. Concerning phyto-toxicity, the influence of varying concentrations of phosphate wastewater was studied on Radish, Lentil, wheat and Fenugreek plants. Taking the toxicology parameters (seed germination rate), plant irrigated with different effluent concentration weather treated or untreated exhibited a prominent reduction in growth traits at all four harvests. The results allow us to infer that, even after treatment, the effluent is still toxic, except at very low concentrations, it can act as a fertilizer.

***Keywords**: Phosphate Processing Wastewater, mineral composition, microbiological composition, phyto-toxicity, germination tests*

C. ORALE N° : 105.

THE ENVIRONMENTAL REMEDIATION CAPACITY OF *ULVA LACTUCA*: THE POTENTIAL OF MACROALGAE TO REDUCE THE THREATS CAUSED BY TITANIUM IN MARINE INVERTEBRATE SPECIES.

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Abtract : As a result of the wide use of Titanium (Ti) compounds in various products, Ti and Ti nanoparticles (nTi) are released into aquatic environments, inducing varying degrees of toxicity on aquatic fauna. *Ulva lactuca*, a green macroalgae commonly found in coastal areas, has been extensively studied due to its worldwide distribution and capacity to accumulate trace elements under toxic conditions, which makes it a good universal sorbent. The present study aimed establish the preventive and remediation properties of *U. lactuca* by evaluating the toxicity of Ti and nTi in bivalves, in the presence and absence of algae. Using the bivalve species *Mytilus galloprovincialis*, Ti toxicity was evaluated by assessing changes on mussel's metabolic capacity and oxidative status. Results evidenced cellular damage in *M. galloprovincialis* exposed to Ti and nTi. This was a result of the inactivation of antioxidant defences. The inclusion of *U. lactuca* prevented cellular damage, however, this was not a result of previously demonstrated bioremediation capacity, as no accumulation of Ti was verified in algal tissues. As a metabolism decrease was verified for mussels exposed to Ti/nTi in the presence of algae, we hypothesise that *U. lactuca* may have been responsible for changes to the water quality which induced this metabolic depression and, by consequence, exposure to the contaminants.

***Mot clès:** Bivalves, Algae, Remediation, Titanium, Nanoparticles, Oxidative stress*

C. ORALE N° : 106.

CULTIVATION OF *CHLORELLA* SP. FOR DOMESTIC WASTEWATER TREATMENT AND CO_2 SEQUESTRATION

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Abstract : Nowadays, anthropic activities generate serious water pollution and deplete fresh water, causing serious global issues. Microalgae such as *Chlorella* sp. are suitable for wastewater decontamination that can be applied for tertiary wastewater treatment processes and CO_2 sequestration due to its resistance to environmental changes and the numerous industrial uses of its products. In the present study, secondary effluent and exhaust gas from diesel engine were supplied in batch and semi continuous mode in 2 L photobioreactors for the cultivation of *Chlorella* sp. CO_2 at 5%, pure CO_2 and air (Control) were also tested. The maximum productivity reached 0.13 g/l/d on the 3rd day in batch culture. In semi-continuous mode, maximum productivity was maintained at a specific dilution rate of 30 % per culture day in the presence of exhaust gas. The environmental indicators such as Inorganic carbon (IC), nitrogen (TN) and phosphorus (TP) were decreased over 80%. Lipids and protein contents reached 7% and 12,1%, respectively. In conclusion, *Chlorella* sp. was very effective in the treatment of domestic wastewater using flue gas from diesel engine as carbon source. The harvested biomass could be a sustainable green energy source.

Mots clés : *Chlorella sp., Bioremediation, CO2 sequestration.*

GENETIQUE ET IMMUNOLOGIE

C. ORALE N° : 107.

DECODING THE GENETIC RELATIONSHIP BETWEEN ALZHEIMER'S DISEASE AND TYPE 2 DIABETES: POTENTIAL RISK VARIANTS AND FUTURE DIRECTION FOR NORTH AFRICA

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Abtract :

Alzheimer's disease (AD) and type 2 diabetes (T2D) share several biological processes. The co-emergence of these diseases may create strain on the health system, and societies. The identification of shared genes and variants between T2D and AD represents a new hope for understanding and developing early diagnostic tools for T2D-induced AD. Despite the great consortium on the genetic screening of AD and T2D worldwide, we noticed an under representation of North African populations in these studies. In the present work, we aimed to study the genetic landscape of the most common genes and variants shared between AD and T2D in North African populations in comparison with other populations. First, we conducted a comprehensive review of the common genes and variants shared between these diseases using PubMed. Next, we analyzed their distributions in worldwide populations using PLINK2, R, and STRUCTURE software. Finally, we performed an interethnic comparison based on the minor allele frequency (MAF) of T2D and AD common variants. A total of 33 eligible papers were included in our study. We identified 218 variants and 232 genes that were shared between T2D and AD. Multidimensional screening based on shared genes showed that North African populations are clustered together and are divergent from other populations. Interestingly, our results showed that five variants located in BORCS7, SORCS1, PITPNM2, and MPP9 showed significant differences in MAF between North Africa and 16 other populations. Our findings highlight the complexity and unique molecular architecture of North African populations regarding the shared genes between T2D and AD. The significant difference in the five MAF variants might be a contributing factor to the higher prevalence of T2D and AD in North African populations. Taken together, we emphasize the importance of T2D-AD shared genes and ethnicity-specific investigation studies for developing accurate diagnoses using personalized genetic biomarkers.

Mots clés : *Pathogenic variants, pathways, ethnicity, BROCS1, SORCS1, PITPNM2, and MPP9*

C. ORALE N° : 108.

WHOLE EXOME SEQUENCING IN PATIENTS WITH MITOCHONDRIAL DISEASES REVELS NOVEL VARIATIONS: IMPACT FOR DIAGNOSIS AND EXPANDING THE GENETIC SPECTRUM OF MITOCHONDRIAL DISEASES IN TUNISIA

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Abstract: Mitochondrial diseases are a clinically complex and heterogeneous group of neurometabolic disorders recognized as the most common cause of inherited metabolic diseases. They are characterized by a defect in the oxidative phosphorylation system due to an alteration of mitochondrial and/or nuclear DNA. We recruited four patients belonging to four different Tunisian families with clinical features suggestive of mitochondrial diseases. Whole Exome Sequencing (WES) was performed in order to investigate causal variations followed by Sanger sequencing to confirm the presence and the segregation of the detected variants. Bioinformatic analysis of raw data generated by WES revealed the presence of four homozygous variants: three missense variants and one frameshift deletion. We identified two novel variants in *NDUFAF5* and *FASTKD2* gene in which structural analysis and in-silico prediction tools supported their pathogenicity. In addition, we detected two undescribed variants in the North African population in *FOXRED1* and *GFM2*. Our study highlights the usefulness of genomic investigation to improve the diagnosis of mitochondrial diseases and it expands the genetic spectrum of these diseases.

Mots clés: *Mitochondrial diseases, WES, Complex I, Leigh syndrome, Tunisia.*

C. ORALE N° : 109.

GENOME-SCALE INVESTIGATION OF BZIP FAMILY GENES IDENTIFIES STRUCTURAL DIVERSITY, EVOLUTIONARY PATTERNS AND EXPRESSION IN RESPONSE TO SALT STRESS IN SUGAR BEET

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Abtract : Sugar beet (*Beta vulgaris* subsp. *vulgaris*) is a significant crop with high biotechnological potential. In many plant species, basic leucine zipper (bZIP) genes function as key transcription factors in reaction to salt stress, and their investigation in sugar beet will assist in improving productivity in saline environments. Using bioinformatics software, the entire catalogue of sugar beet bZIP (BvbZIP) regular genes (45) and proteins (50) was critically examined, revealing a wide range of physicochemical properties suggesting functional versatility. Eleven phylogenetic groups were detected, based on relationships with *Arabidopsis thaliana*. BvbZIP genes and proteins with comparable exon counts and motif configurations were typically assigned to the same phylogenetic class. Among the BvbZIP genes, ~94% (42) were assigned to their chromosomal locations and shown to have expanded primarily through segmental duplication. *In silico* gene expression analysis revealed a wide implication of BvbZIPs in the response to salinization, with seven candidate BvbZIPs that were strongly up- or down-regulated when a salt-sensitive/tolerant cultivar responded to salt, while maintaining a constant expression level in the other cultivar, implying that they play a role in sugar beet salt-responsive signaling network. We showed that these candidate genes exhibited considerable conservation with their sea beet (*B. vulgaris* subsp. *maritima*), counterparts, suggesting that they could be beneficial in enhancing sugar beet salinity tolerance. Our findings establish the framework for a deeper functional validation of selected candidate genes by offering the first comprehensive genome-scale view of the sugar beet bZIP transcription factor family.

***Keywords** : Sugar beet, bZIP transcription factor family, Comparative phylogeny, Expression profiling, In silico analysis, Salt stress, Candidate genes*

C. ORALE N° : 110.

ETUDE DE L'IMPLICATION DES POLYMORPHISMES DU GÈNE CODANT LE RÉCEPTEUR DE LA VITAMINE D DANS LA SURVENUE DU CANCER PULMONAIRE EN TUNISIE.

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Abtract : Numerous studies have reported that vitamin D receptor (VDR) gene polymorphisms could influence the risk of cancer occurrence due to their antiproliferative, antiangiogenic and apoptotic properties. The aim of this project was to study the genetic associations between polymorphisms of the VDR gene and the risk of lung cancer in the Tunisian population.

Our study population includes 240 patients with lung cancer and 280 healthy controls. The genotypic study of the four polymorphisms in the VDR gene, FokI (rs2228570), BsmI (rs1544410), ApaI (rs7975232) and TaqI (rs731236) was carried out by the PCR-RFLP technique.

Our analyzes showed that the distribution of genotype frequency of FokI and ApaI polymorphisms differed significantly between patients and healthy controls (*FokI* P_{adj} = 0.002; *ApaI* P_{adj} = 0.013). However, we did not find an association between BsmI and TaqI polymorphisms and the risk of developing lung cancer (P > 0.05). We have also shown that subjects homozygous for the A allele of the ApaI polymorphism have a high risk of developing lung adenocarcinoma and subjects carrying at least a single copy of the A allele have a significant risk of being affected with an advanced stage (III-IV) of the tumor. The haplotype analyzes revealed an association between haplotypes G-A-C and A-C-T and lung cancer risk (Pcorr = 0.0128, Pcorr = 0.008). The study of gene-environment interactions indicated that 58% of the risk of developing lung cancer in smokers carrying at least a single copy of the risk A allele of the ApaI polymorphism is linked to the existence of an additive-type interaction with tobacco.

This is the first study in Tunisia, which suggested that the VDR polymorphisms FokI and ApaI could be a risk factor for the development of lung cancer.

C. ORALE N° : 111.

GENOME-WIDE CHARACTERIZATION OF THE WRKY FAMILY TRANSCRIPTION FACTORS AND THEIR ROLES IN COMMON FIG (*FICUS CARICA* L.) FRUIT DEVELOPMENT AND COLOR ACQUISITION

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Abtract : WRKY transcription factors (TFs) play significant roles in plant development. However, no investigations on the WRKY gene family have been reported in the common fig (*Ficus carica* L.), one of the most significant fruit species in Mediterranean countries. In the current work, 49 WRKY proteins were identified in *F. carica* (FcWRKYs) genome. Their coding genes' structures, protein domains and motifs, physicochemical properties, phylogenetic relationships, and selection pressure were thoroughly analyzed computationally. The FcWRKY genes were grouped into three main groups based on the structural properties of their encoded proteins, with the second group further subdivided into five subgroups. Subgroup IId FcWRKY proteins were identified as containing the Plant zinc cluster (Plant–zn–clust) domain and $Ca2^{+}$-dependent Calmodulin (CaM)-binding domain (CaMBD). Ten conserved motifs in total were found, of which seven may be linked to WRKY functional specificities to a single group or a small number of groups. Overall, phylogenetically related members shared similar exon-intron structure, but the average number of exons was clearly higher (~5) in (sub)groups I, IIa, IIb than IIc, IId, IIe and III (~3). Comparative phylogeny using the mulberry WRKY gene complement (MnWRKYs) revealed 38 pairs of orthologous WRKY genes shared by both species, evolving under purifying selection since the divergence of fig and mulberry, though the selection constraint was weaker on group III genes. RNA-seq results revealed that genes that were marked by an extremely high expression levels across all fruit peel developmental stages belonged to group I and subgroups IIb, IIc, IId and IIe, suggesting the role played by these members in fruit peel development. RT-qPCR validated this profile and further showed that three genes: *FcWRKY25* (IIc), *FcWRKY31* (IIb), and *FcWRKY39* (IIc), were clearly more overexpressed during color acquisition in the Tunisian dark cultivar 'Zidi', in comparison with the light purple cultivar 'Soltani', presenting these three genes as potential contributors to the changes in biochemical compounds in the fig peel during fruit maturation. Our study offers a strong knowledge framework that will greatly aid in future functional exploitation of *F. carica* candidate genes potentially associated with fruit quality.

***Keywords** : Transcription factor, Gene family, Ficus carica, Fruit ripening, Comparative genomics, Expression analysis.*

C. ORALE N° : 112.

ETUDE CYTOGENETIQUE DUNE ESPECE EN DECLIN : LA PERDRIX GAMBRA ALECTORIS BARBARA

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Abtract : The development of avian cytogenetics is significantly behind that of mammals. In fact, since the advent of cytogenetic techniques, less than 1500 karyotypes have been stablished. The Barbary partridge *Alectoris barbara* is a bird of economic interest but its genome has not been studied so far. This species is endemic to North Africa and globally declining. The Chukar partridge *Alectoris chukar* is an introduced species which shares the same habitat area as the Barbary partridge and so there could be introgressive hybridisation. A cytogenetic study has been initiated in order to contribute to the Barbary partridge and the Chukar partridge genome
analyses. The GTG, RBG and RHG-banded karyotypes of these species have been described. Primary fibroblast cell lines obtained from embryos were harvested after simple and double thymidine synchronisation. The first eight autosomal pairs and Z sex chromosome have been described at high resolution and compared to that of the domestic fowl *Gallus domesticus*. The diploid number was established as 2n=78 for both partridges, as well as for most species belonging to the Galliformes order, underlying the stability of chromosome number in avian karyotypes. Wide homologies were observed for macrochromosomes and gonosome except for chromosome 4, 7, 8 and Z which present differences in morphology and/or banding pattern. Neocentromere occurrence was suggested for partridge chromosome 4 with an assumed paracentric inversion in the Chukar partridge chromosome 4. Terminal inversion in the long arm of the Barbary partridge chromosome Z was also found. These rearrangements confirm that the avian karyotypes structure is conserved interchromosomally, but not at the intrachromosomal scale.

***Mots clés :** Perdrix gambra, caryotype, chromosomes à haute résolution, cytogénétique classique*

MICROBIOLOGIE ET VIROLOGIE

C. ORALE N° : 113.

OCCURENCE OF *COXIELLA BURNETTI* CONTAMINATION IN RAW MILK AND ARTISANAL UNPASTEURIZED DAIRY PRODUCTS TRATED IN RETAIL MARKET POINTS

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Abstract : Q Fever is one of the major bacterial zoonotic diseases, caused by *Coxiella burnetti*. It's a highly infectious bacterium, causing abortions in ruminants, and still excreted by infected females for long period in their milk. Ruminants are the main source of transmission to humans, through direct contact with livestock or ingestion of raw or unpasteurized milk products. In Tunisia fever Q is considered as an endemic disease, which can result in important economic losses and serious health threat. In this study we aimed to investigate the occurrence of contamination by *C.burnetti* in several types of artisanal unpasteurized dairy products. Thus, we have collected a total of 200 dairy product samples, from 75 stores distributed in 4 governorates (Tunis, Zaghouan, Bizerte and Beja). The samples were analyzed for the presence of *C. burnetii* DNA, by PCR targeting the highly specific DNA fragment the *IS1111a*. The obtained results showed an overall contamination rate of 6% (12/200) such as 10% of cheese, 1,5% of ricotta and 0% of milk samples were positive. The distribution of positive samples between regions was of 18% (9/50) and 6% (3/50) respectively in Tunis and Zaghouan governorates. All samples collected from the regions of Bizerte and Beja were negative. These results showed that PCR is an appropriate method for detecting *C.burnetti* in dairy products, and could be used as a rapid and sensitive test in food control. Nevertheless, bacterial DNA detection doesn't allow to differentiate between live, damaged or dead bacteria, but allow a risk assessment of the presence of the bacteria in dairy products, which represent a real challenge for food security and consumer health.

Mots clés : *Coxiella burnetti, contamination, PCR, raw milk, unpasteurized dairy products*

C. ORALE N° : 114.

RELATIONSHIPS BETWEEN VIRULENCE GENES AND ANTIBIOTIC RESISTANCE PHENOTYPES/GENOTYPES IN *CAMPYLOBACTER* SPP. ISOLATED FROM LAYER HENS AND EGGS IN THE NORTH OF TUNISIA: STATISTICAL AND COMPUTATIONAL INSIGHTS

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Abstract: *Campylobacter* is a significant contributor of gastroenteritis. Efficient pathogens are qualified by their virulence power, resistance to antibiotics and epidemic spread. However, the correlation between antimicrobial resistance (AR) and the pathogenicity power of pathogens is complex and poorly understood. In this study, we aimed to investigate genes encoding virulence and AR mechanisms in 177 *Campylobacter* isolates collected from layer hens and eggs in Tunisia and to assess associations between AR and virulence characteristics. Virulotyping was determined by searching 13 virulence genes and AR encoding genes were investigated by PCR and MAMA-PCR. The following genes were detected in *C. jejuni* and *C. coli* isolates: *tet*(O) (100% / 100%), $bla_{\text{OXA-61}}$ (18.82% / 6.25%), and *cmeB* (100% / 100%). All quinolones-resistant isolates harbored the Thr-86-Ile substitution in GyrA. Both A2074C and A2075G mutations in 23S rRNA were found in all erythromycin resistant isolates; however, *erm(B)* gene was detected in 48.38 % and 64.15% of *C. jejuni* and *C. coli* isolates, respectively. The machine-learning algorithm Random Forest was used to determine the association of virulence genes with AR phenotypes. This analysis showed that *C. jejuni* virulotypes with gene clusters encompassing *racR*, *ceuE*, *virB11* and *pldA* genes were strongly associated with the majority of phenotypic resistance. Our findings showed high rates of AR and virulence genes among poultry *Campylobacter*, which is a cause of concern to human health. In addition, correlations of specific virulence genes with AR phenotypes were established by statistical analysis.

Keywords: *Campylobacter; antibiotic resistance; Virulotyping; Virulence-AR association; data analysis.*

C. ORALE N° : 115.

IMPACT OF GENETIC POLYMORPHISMS IN CYTOMEGALOVIRUS GLYCOPROTEIN ON INCREASED VIRAL LOAD AND CLINICAL OUTCOME IN PATIENTS WITH HEMATOLOGIC MALIGNANCIES RECEIVING CHEMOTHERAPY

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Abtract : Clinical significance of the cytomegalovirus (CMV) genotypes has been evaluated mostly in patients undergoing allogeneic hematopoietic stem cell transplant (HSCT).This study determined the distribution of CMV glycoprotein B, N, and O genotypes (gB, gN, and gO) and their potential impact on viral load and clinical outcome in a cohort of Tunisian non-HSCT patients receiving chemotherapy. CMV viral load was assessed by real-time quantitative PCR. The gB, gN and gO genotypes of CMV strains were analyzed by multiplex nested PCR and sequencing. This study included 60 CMV clinical isolates. Mixed CMV glycoprotein genotypes gB, gN, and gO were the predominant glycoprotein genotypes in 31%, 41.4%, and 46.4% of patients, respectively. Mixed gB genotypes had a higher initial CMV load (p=0.001), increased fever rate (0.025), and co-infection with other herpesviruses (HHV) (p=0.024) than single gB genotypes. Mixed gN genotype was more strongly associated with severe lymphopenia (ALC < 500/µL) (p=0.01) and increased mortality risk (p=0.042) than the single gN genotype. Single gO2b genotype was also less favorable than the other single gO genotypes (p=0.009). Mixed gO genotypes were associated with female gender (p=0.015), acute leukemia disease (p=0.036), initial high CMV viral load (at least 1000 copies/mL) (p=0.029), more common rash (p =0.01) than single gO genotypes. gO1a/gN3b linkage was associated with increased initial viral load (p=0.012). Mixed CMV genotype infections were common and multiple gB, gN, and gO genotypes were associated with clinical presentation and higher viral load.

Mots clés : *Cytomegalovirus; Glycoprotein; Polymorphisms; Viral load.*

C. ORALE N° : 116.

PREVALENCE AND ANTIMICROBIAL RESISTANCE OF BACTERIAL FOODBORNE PATHOGENS ISOLATED FROM OYSTERS AND MUSSELS SAMPLES COLLECTED FROM THE LAGOON AREA OF BIZERTE, TUNISIA

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Abstract: The consumption of bivalve mollusks is still of serious concern for their health benefits. As they are filter-feeding animals, they concentrate on a high number of pathogenic bacteria carrying resistance to some antimicrobial agents and presenting some human health problems, especially after the consumption of undercooked shellfish. In the present study, we isolated and identified some pathogenic bacteria by using the main biochemical, molecular, and antimicrobial susceptibility characteristics. Thus, a wide collection of 79 strains was isolated from raw oysters and mussels sampled from the shellfish farming area of northern Tunisia. This collection of isolates showed à large diversity of potentially pathogenic strains with mainly *Psychrobacter* (32.8%), *Vibrio* (20.9%), *Pseudoalteromonas* (14.9%), and *Acinetobacter* (10.4%) as Gram-negative bacteria followed by *Staphylococcus* (44.4%), *Bacillus* (33.3%) and *Cytobacillus* (22.2%) as Gram-positive bacteria. Besides, high levels of resistance to cephalosporins and penicillin, followed by carbapenems, were found with 86% of these resistant isolates from oysters and 87% from mussels. Also, several exo-enzyme activities are registered by most isolates especially alpha-hemolytic activity (38%), amylase (45.1%), DNase (32.5%), lecithinase (43.7%), cellulase (27.1%), lipase (45.5%), gelatinase (39.3%), and chitinase (19.3%). According to these findings, mussels and oysters analyzed should be carefully consumed as a raw material since they could cause food poisoning with the dissemination of antimicrobial resistance.

Keywords: *Bacterial Foodborne Pathogens; Antimicrobial resistance; Food safety; Shellfish; Bivalve Mollusks; Oysters; Mussels.*

C. ORALE N° : 117.

VERTICILLIUM WILT CONTROL AND EGGPLANT GROWTH PROMOTION ACHIEVED USING *SARGASSUM VULGARE* (C. AGARDH, 1820) METHANOLIC EXTRACTS

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Abtract : In Tunisia, Verticillium wilt caused by the phytopathogenic fungus, *Verticillium dahliae*, is considered as one of the most devastating fungal diseases of eggplant (*Solanum melongena*), which control is still difficult. Actually, the use of seaweeds is a promising alternative for the control of such soilborne fungal diseases. The objective of the present study is to evaluate the effects of *Sargassum vulgare* methanolic extract, collected from Monastir region, against *in vitro* growth of the two pathogen physiological races, on disease severity parameters (the index of foliar damage (IFD) and the relative vascular discoloration extent) as well as on eggplant growth. Applied at 0.7 and 1 g/l, tested *S. vulgare* extract had completely inhibited *V. dahliae* mycelial growth after 12 days of incubation at 25°C, compared to 49 and 76% inhibition rates noted using this extract at 0.3 and 0.5 g/l, respectively, relative to the untreated control. For *in vivo* assay, two doses were tested (0.5 and 1 g/l) and treatments were performed on eggplant cv. Bonica plants, twice in the nursery stage (5 ml/plant/treatment/week) followed by three applications (100 ml /dose/plant/week) carried out after plant inoculation with *V. dahliae*. These two treatments had completely suppressed foliar damage and vascular discoloration extent noted on *V. dahliae* race 1-inoculated plants, compared to reductions of 63 and 40% (dose 0.5 g/l) and of 93 and 100% (dose 1 g/l), noted respectively on race 2-inoculated plants, relative to the untreated control. *S. vulgare* based treatments had also improved the majority of tested growth parameters (plant height, root and aerial part fresh weights, root length and stem diameter). Based on these results, we can conclude that seaweeds could be explored as a potential source for the extraction and isolation of bioactive antifungal compounds for the management of Verticillium wilt disease and the promotion of eggplant growth.

Mots clés : *Activité antifongique, algue brune, croissance mycélienne, effet promoteur, inhibition, sévérité de la verticilliose*

C. ORALE N° : 118.

IN VITRO PROBIOTIC AND SAFETY ATTRIBUTES OF BACILLUS SPP. ISOLATED FROM SARDINE

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Abtract: Aquaculture industry is the world's fastest growing animal protein producer. However, frequent bacterial diseases occurring during fish farming can limit the worldwide growth of this sector and pose serious threats to public health. Vibriosis is one of the major diseases leading to massive fish mortality. To avoid or minimize the loss in aquaculture due to disease; use of the chemotherapeutics, antibiotics, and vaccines has become a customary practice. However, the indiscriminate use of these substances is plagued with negative consequences. As an answer to this very concern, the probiotics have established their significance as an effective and sustainable biocontrol strategy in global aquaculture. The aims of this study were to (i) isolate and purify marine Bacillus strains, (ii) screen for bacteria with potential probiotic properties, (iii) carry out their *in vitro* safety assessment.
Selection was assayed *in vitro* by subtractive screening with several criteria including, their antimicrobial activity against fish pathogens, tolerant to low pH and bile salts, their secretion of enzymes, auto-aggregation, co-aggregation, anti-biofilm and finally their in anti-quorum sensing activities and their cytotoxicity.
Among 62 marine Bacillus strains, two strains exhibited a strong antibacterial activity against Vibriosis such as *Vibrio harveyi* and *Vibrio anguillarum.* These selected strains were unaffected by high-temperature and gastrointestinal conditions; produced amylase, protease, and lipase activities; and showed high percentages of auto-aggregation and co-aggregation with pathogens, as well as a strong adhesion to fish mucus. The selected strains suppressed biofilm formation of fish pathogens and interfered with pathogens communication. The tested strains showed a great heterogeneity respect to their safety and antibiotic susceptibility and were taxonomically identified by partial 16S rDNA gene sequencing.
Given their antimicrobial activity against fish pathogens and their safety, some of the tested strains may be considered as potential fish probiotics, and their effectiveness will be further tested *in vivo*.

Keywords: *Aquaculture, Vibriosis, probiotics, spore formers, biofilm, adhesion*

C. ORALE N° : 119.

GENOMIC CHARACTERISATION OF MONOPHASIC AND NONMOTILE VARIANTS OF *SALMONELLA ENTERICA* SEROVAR TYPHIMURIUM

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Abstract : Variant strains of *Salmonella enterica* serovar Typhimurium, lacking one or both flagellar phases have been widely reported. Here, we sequence and characterize three monophasic and four nonmotile variants of *Salmonella* Typhimurium genomes isolated from clinical samples in the laboratory of Microbiology CHU Habib Bourguiba Sfax.
Whole genome sequencing (WGS) was performed using illumina nextseq500. Paired-end reads for each isolate were *de novo* assembled using the SPAdes run assembler software (V.3.6.0). Using the available online tool Centre for Genomic Epidemiology, all the assembled sequences were uploaded to ResFinder 4.1, MLST 2.0; cgMLST Finder 1.0, and plasmid Finder 1.3.
Genome assemblies consisted of several contigs with a total length of about 4.9 Mbp, and an average GC content of ~52%. MLST analysis based on the seven housekeeping genes demonstrates that six strains were sequence type ST19 and one isolate was ST328, differed only by one locus (aroC10/116). Based on 3002 loci, these isolates were assigned to five-core genome multilocus typing patterns, suggesting a diversity genetic between isolates. All isolates, except two, were susceptible to all antimicrobial agents tested. WGS analysis revealed that these two resistant isolates carried $bla_{\text{TEM-1B}}$, $bla_{\text{CARB-2}}$, $bla_{\text{OXA-1}}$ genes associated with resistance to ampicillin. The phenotypically resistant variants of *Salmonella* Typhimurium isolates against aminoglycoside, phenicol, sulfonamide, tetracycline, trimethoprim were harbouring (*str*A, *str*B, *aad*A1 and *aad*A2), (*flor* and *cat*B), (*sul*1 and *sul*2), (*tet*G) and (*dfr*A1) genes, respectively. Furthermore, all isolates, except one, harbored plasmid ; four isolates carried the replicon *inc*FIB and *inc*FII, commonly found in *Salmonella* Typhimurium and may encode virulence factors and antimicrobial genes resistance (ARGs) in Enterobacteriaceae species, one isolate carried replicon *inc*FIB(S),*inc*FII(S),*inc*Q1, *inc*I1, and the sixth isolate with ST328 was associated to replicon *inc*FII(p96A), ColRNAI. Replicon ColRNAI is recognized for harboring ARGs against ampicillin, streptomycin, sulfamethoxazole, and tetracycline, but is present at a low frequency in *Salmonella enterica*.
Whole genome sequencing provide useful data on the genomic features with core genome and antimicrobial resistance for the monophasic and nonmotile variants of *Salmonella* Typhimurium. Although the number of *Salmonella* Typhimurium variants is low, the multidrug resistant *Salmonella* pose an important global health threat. it necessary to conduct a more exhaustive investigation to survey *Salmonella enterica* in Tunisia using WGS.

Keywords: *monophasic and nonmotile Salmonella Typhimurium, WGS, cg-MLST, antimicrobial resistance genes*

C. ORALE N° : 120.

USE OF EUGENOL, CARVACROL, THYMOL, *P*-CYMENE AND ɣ-TERPINENE ON INHIBITION OF DRUG RESISTANCE AND BIOFILM FORMATION OF ORAL BACTERIA

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Abtract: Dental caries remains the most prevalent oral infectious disease worldwide. Oral flora on dental surfaces is the primary etiological agents of periodontal disease and dental caries. In this study, the antibacterial and the antibiofilm activities of five essential oils (EO's): eugenol (EUG), carvacrol (CAR), thymol(TYH), p-cymene (CYM) and ɣ-terpinene (TER) were tested (alone or in combinaison with tetracycline) against oral bacteria. In addition, their potential roles to enhance the accumulation of ethidium bromide (EtBr) in bacterial cells were tested. Our results indicated that EO's induced a selective antimicrobial activity. A synergistic effect of EO's and tetracycline(TET) was noticed with a reduction rate ranged from 2 to 8-fold. In addition, the efflux of EtBr was inhibited with a decrease in loss of EtBr from the bacteria to confirm the ability of EO's to inhibit pump efflux. On the other hand a significant anti-biofilm activities of EO's (alone or combined with antibiotics) was noticed on both polystyrene and tooth surface. In conclusion the tested EO's may be considered as a potential natural source with a resistance modifying activity and may be useful as an alternative and valuable approach to improve the clinical efficacy of antibiotic and simultaneously reduce the selection of resistant pathogens and eradicate bacterial biofilm.

C. ORALE N° : 121.

DEVELOPMENT AND EVALUATION OF REAL-TIME PCR (RT-PCR) FOR THE DETECTION OF RESISTANCE GENES IN ENTEROBACTERIACEAE DIRECTLY FROM CLINICAL URINE.

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Abtract :
Objectives: Develop newly improved, rapid and reliable strategies to detect by real-time PCR the most frequent beta-lactamase genes recorded in Enterobacteriaceae Clinic particularly in Tunisia (*bla*$_{SHV-12}$, *bla*$_{TEM}$, *bla*$_{CTX-M-15}$, *bla*$_{CTX-M-9}$, *bla*$_{CMY-2}$, *bla*$_{OXA-48}$,*bla*$_{NDM-1}$and *bla*$_{IMP}$).
Methods: Following the design of the primers for a specific gene pool and their validation, a series of real-time PCR reactions was carried out to detect these genes in 78 urine samples showing after the cytobacteriological examination of the urine (ECBU) the presence of the Enterobacteriaceae strains resistant to Broad spectrum cephalosporins and / or cephamycins and / or carbapenems. Assays were applied to DNA extracted from cultured bacteria and collected urine. Real-time PCR results were compared for phenotypic sensitivity.
Results: Real-time PCR results were similar regardless of whether cultures or urine were collected, with 100% sensitivity and specificity. Out of 78 multiresistant uropathogenic strains of Enterobacteriaceae, 44 of *E. coli* and 34 of *K. pneumoniae* strains show the presence of the genes of the bla group with 36.4%, 52.3%, 70.5%, 68.2%, 18.2%, and 4.5% of *E. coli* having *bla*$_{SHV-12}$, *bla*$_{TEM}$, *bla*$_{CTX-M-15}$, *bla*$_{CTX-M-9}$, *bla*$_{CMY-2}$ and *bla*$_{OXA-48}$, respectively, while 52.9%, 67.6%, 76.5%, 35.5%, 61.8, 14.7 and 1.28% of *K. pneumoniae* had *bla*$_{SHV-12}$, *bla*$_{TEM}$, *bla*$_{CTX-M-15}$, *bla*$_{CTX-M-9}$, *bla*$_{CMY-2}$, *bla*$_{OXA-48}$ and *bla*$_{NDM-1}$, respectively. The time required to have a result was 3 hours by real-time PCR and 2 to 3 days by the conventional method.
Conclusions: Resistance genes of Gram-negative bacteria in urine, as well as cultured bacteria, were rapidly detected using real-time PCR techniques. Therefore, this test could be a good candidate to create real-time PCR kits for the detection of resistance genes directly from urine in clinical or epidemiological settings.

C. ORALE N° : 122.

ANTIBACTERIAL AND EFFLUX PUMP INHIBITORS OF SEVERAL NATURAL COMPOUNDS AGAINST VIBRIO SPP. STRAINS ISOLATED FROM AQUACULTURE

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Abtract : Vibriosis remains the most prevalent fish infectious disease in aquaculture. In this study, the antibacterial of five essential oils (EO's): cuminaldehyde, linalool, p-cymene, g-terpinene and T-T farnesol were tested (alone or in combinaison with oxytetracycline and flumequine) against bacteria. In addition, their potential roles to enhance the accumulation of DAPI in bacterial cells were tested. Our results indicated that natural's compounds (NC) induced a selective antimicrobial activity. A synergistic effect of NC and tested antibiotics was noticed with a reduction rate ranged from 2 to 512-fold. In addition, the efflux of DAPI was inhibited with a decrease in loss of DAPI from the bacteria. On the other hand a significant diminution of expression of tet gene was noticed by Real time PCR. In conclusion the tested NC may be considered as a potential natural source of efflux pump inhibitors with a resistance modifying activity.

PHARMACOLOGIE ET TOXICOLOGIE

C. ORALE N° : 123.

FENPYROXIMATE INDUCES MITOCHONDRIAL APOPTOSIS ON CULTURED HUMAN COLON CANCER HCT 116 CELLS VIA OXIDATIVE STRESS PROCESS

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Abtract : Fenpyroximate (FEN) is a METI acaricide, that inhibits mitochondrial electron transport at the NADH-coenzyme Q oxidoreductase (complex I). It is widely used in horticulture and agriculture to fight against Kanzawa-spider mites, two spotted spider mites and leaf hoppers.

The present study was designed to investigate the molecular mechanisms underling FEN toxicity on cultured human colon carcinoma cells (HCT116). Our data showed that FEN was cytotoxic to HCT116 by inducing cell mortality in a concentration dependent manner. FEN was also able to arrest cell cycle in G0/G1 phase and to increase DNA damage as assessed by comet assay. Induction of apoptosis was confirmed in HCT116 cells exposed to FEN by AO-EB staining and Annexin V-FITC/PI double staining assay. Moreover, FEN was found to induce a loss in mitochondrial membrane potential (MMP), increased p53 and Bax mRNA expression and decreased bcl2 mRNA level. An increase in caspase 9 and caspase 3 activities was also detected. All toghether, theses data suggest that FEN induce apoptosis in HCT116 cells via mitochondrial pathway. To check the implication of oxidative stress in FEN-induced cell toxicity, we examined the oxidative stress statue in HCT116 cells exposed to FEN and we tested the effect of a powerful antioxidant, N-acetylcystein (NAC), on FEN-caused toxicity. It was observed that FEN enhanced ROS generation and MDA levels and disturbed SOD and CAT activities. Besides, cell treatment with NAC significantly protected cells from mortality, DNA damage, loss of MMP, and caspase 3 activity induced by FEN. To the best of our knowledge, this is the first study showing that FEN induced mitochondrial apoptosis via ROS generation and oxidative stress.

C. ORALE N° : 124.

ASSESSMENT OF THE EFFECT OF LOOFAH LEAVES INFUSION ON THE BIOCHEMICAL PARAMETERS AND HISTOLOGICAL STRUCTURES OF THE LIVERS AND KIDNEYS OF MICE SUBJECTED TO INDUCED TOXICITY.

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Keywords: Loofa leaves, induced toxicity, mice model, hepatoprotective, nephroprotective

Luffa cylindrica is a medicinal plant used for several therapeutic purposes. The leaves in particular are edible and its herbal tea is used as a cancer treatment in folk medicine. The aim of this study was to evaluate the *in vivo* protective effects of *Luffa cylindrica leaves* infusion (LL) on liver and kidney injuries induced by cisplatin and CCL4 respectively. Thus, the freeze-dried infusion was orally administered to the pretreated group of mice. The serum liver and kidney biomarkers as well as the histological structures were investigated in pretreated and control groups. Results revealed that LL exhibited a remarkable effect in reducing the effects caused by cisplatin intoxication on serum kidney biomarkers and by CCL4 on serum renal biomarkers. Besides, the treatment significantly decreased the lipid peroxidation level (MDA) in both organs while enhancing the antioxidant biomarkers (SOD and CAT). The protective results of LL were confirmed by the histological examination showing that the normal organs structures were restored in the pretreated mice. The findings reveal that *Luffa cylindrica* leaves infusion demonstrated hepato- and nephroprotective activities in vivo and thus the consumption of its herbal tea could help alleviating the liver and kidney injuries in humans.

C. ORALE N° : 125.

STRESS OXYDANT ET DOMMAGE TISSULAIRE HEPATIQUE INDUIT PAR UN REGIME ALIMENTAIRE CONTAMINE AVEC UN REGULATER DE CROISSANCE VEGETALE « 1-METHYLCYCLOPROPENE » CHEZ DES RATS WISTAR (ETUDE DE 90 JOURS).

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Abtract : Le 1-méthylcyclopropène (1-MCP) est un régulateur de croissance végétale utilisé depuis les années 2000 dans plus de 50 pays, dans le but de contrôler le développement et la maturation des fruits et légumes climactériques en bloquant la perception et production de l'hormone 'Ethylène'. Ceci a pour conséquence de retardé leur pourrissage, diminué les pertes post-récolte, et prolongé leur durée de conservation ce qui explique la valeur économique et le rôle important que joue le 1-MCP dans le développement du commerce intercontinentale. Ce dernier est une poudre qui, en contact de l'eau se transforme en une vapeur qui enveloppe les végétaux de ce fait les consommateurs peuvent ingérer des résidus du 1-MCP suite à la consommation quotidienne d'aliments traités. Malgré son usage émergeant et polychrone ; aucune étude in vivo n'a été réalisé sur l'effet de l'exposition au 1-MCP. De plus, plusieurs études ont démontrés que l'exposition au régulateurs d'hormone végétales qu'ils soient synthétiques ou naturelles ont un effet toxique sur plusieurs organes mammaliens, par ailleurs le 1-MCP se métabolise en deux molécules extrêmement toxiques et qui ont déjà été prouvé comme étant carcinogènes. Toutes ces informations controversées ont éveillés notre conscience sur la consommation des aliments traités avec le 1-MCP. L'objectif de la présente étude est de réalisé une investigation sur le potentiel effet hépatotoxique d'un régime alimentaire contaminé avec des doses infimes du 1-MCP sur des rats wistar. Le but étant de mimer l'exposition quotidienne du consommateur via l'ingestion de résidus sur les aliments traités. Pour ce faire ; On a préparé un régime alimentaire à base de pommes bio contaminés avec deux doses respectives de 1-MCP à savoir 5 mg/kg/jr et 6,5 mg/kg/jr pendant une période de 90 jours consécutive. Le lot témoin a reçu un régime alimentaire non contaminé. A la fin du traitement on a mesuré les taux sériques de ASAT et ALAT, le taux du produit final de la peroxydation lipidique l'MDA et on a évalué le système antioxydant non enzymatique à savoir les taux de GSH et enzymatiques à savoir l'activité du GST, GPx, CAT, et SOD. On a également recherché les dommages tissulaires en réalisant des colorations histologiques à l'hématoxyline et éosine. Nos résultats montrent une augmentation significative des taux d'ASAT accompagné par une chute des taux de GSH hépatique ainsi qu'une diminution au niveau de l'activité de GPx et CAT. Ces perturbations au niveau du système antioxydant révèle un effet inhibiteur du 1-MCP sur l'expression génétique des enzymes, de plus le taux élevée d'MDA indique un déclenchement d'une réaction d'oxydation lipidique ce qui a augmenter la perméabilité des hépatocytes et a permet la fuite de l'ASAT vers la circulation sanguine. Ceci est prouvé par les photo-micrographes qui ont révéler une modification de l'architecture des lobules et des hépatocytes ainsi que la présence d'une infiltration lymphocytaire et une congestion. Cette étude est une des première à élucider l'effet de la consommation d'aliments traités avec le 1-MCP ce qui a clairement été en faveur d'une induction de stress oxydant et de l'échec du le système antioxydant neutralisé les ROS générés par le 1-MCP ; une découverte qui doit être pris en considération pour la préservation de la santé du consommateur.

Mots clés : *1-methylcyclopropène, régulateur d'hormone végétale, hépato-toxicité, stress oxydant, régime alimentaire contaminé*

C. ORALE N° : 126.

EFFET CYTOPROTECTEUR DE LA MÉLATONINE SUR LA TOXICITÉ HÉPATIQUE INDUITE PAR UN HERBICIDE LOCALE LE LINURON CHEZ LE RAT WISTAR.

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Résumé :
Cette étude a été réalisée pour évaluer l'efficacité de la supplémentation d'un antioxydant la mélatonine sur le statut oxydatif (le système de défense antioxydant) chez un modèle animal présentant des lésions pathologiques induites par un herbicide local : le linuron.
En effet, l'administration du linuron a provoqué des physiopathologies qui ont été révélé d'une part, par la formation de cellules pré-tumorales situées au niveau des hépatocytes et d'autre part par la diminution de glutathion -S - transférase (GST), et une diminution considérable des taux de glutathion réduit (GSH), qui sont des biomarqueurs de stress oxydatif.
Le traitement préventif des rats par la mélatonine en présence du linuron a diminué significativement l'incidence de lésions pré-tumorales, avec une amélioration de l'activité du statut de défense antioxydant GSH, GST.
Ceci suggère que la mélatonine peut agir en tant qu'agent chemo-préventif efficace contre le cancer du foie via la diminution des attaques radicalaires au niveau des lobes hépatiques.

Mots clés : *foie ; la mélatonine ; le linuron ; stress oxydatif.*

C. ORALE N° : 127.

EFFECTS OF *THYMELAEA HIRSUTA* EXTRACT ON TESTOSTERONE-INDUCED BENIGN PROSTATIC HYPERPLASIA

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Abtract: Benign prostatic hyperplasia (BPH) is a disease that commonly strikes the majority of aged men. Developing new therapies to manage BPH with improved efficacy and safety is strongly needed. *Thymelaea hirsuta* extract (THE) present a natural bioactive molecule that have an antioxidant and an anti-inflammatory properties. Therefore, this study was performed to explore the potential protective effect of *Thymelaea hirsuta* extract in testosterone-induced BPH rats and investigate the exact regulatory mechanism involved.
The experiment was carried out in male Wistar 7 week old rats that were divided into three groups: Group 1, control; Group 2, BPH-induced rats and Group 3, BPH-induced rats administrated with *Thymelaea hirsuta* extract (1ml /kg).
The results revealed that *Thymelaea hirsuta* extract could significantly reduce the prostate weight and index in BPH rats and improve the tissue morphology of the prostate. THE mainly played roles in regulating the sex hormone level, improving the antioxidant levels of prostate tissue, reducing the expression levels of inflammatory factors and enhancing apoptosis in prostatic epithelial cells. HPLC-ESI-MS^n analysis showed that chlorogenic acid and vicenin-2 were the main components of THE.
These findings elucidate the effectiveness of THE in preventing testosterone-induced BPH in rats. This could be attributed, at least partly, to its anti-oxidative, anti-inflammatory and pro-apoptotic properties.

Mots clés: *Thymelaea hirsuta, benign prostatic hyperplasia, testosterone-induced rat model, antioxidant, anti-inflammation*

C. ORALE N° : 128.

ETUDE DES EFFETS TOXIQUES DU COLORANT E171 SUR LA STRUCTURE HISTOLOGIQUE DES TESTICULES ET DES ÉPIDIDYMES CHEZ LE RAT WISTAR.

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Ces vingt dernières années, les nanotechnologies ont ainsi conquis de nombreux domaines d'utilisation (électronique, cosmétiques, textile…). Si l'homme est exposé à un nombre croissant de sources, l'impact sur la santé et, en particulier, sur la fonction de reproduction reste mal évalué. En effet, les industriels peinent à tracer l'utilisation des nanoparticules, et la nano toxicologie ne semble pas obéir aux règles de la toxicologie classique.

Au cours des dernières années, les nanoparticules de dioxyde de Titane (NPs de TiO_2) sont de plus en plus utilisées dans plusieurs domaines dont la peinture, les cosmétiques, les additifs alimentaires, les papiers, les matériaux antibactériens (Shi *et al.*, 2013).

De ce fait et en raison de leur utilisation dans la vie quotidienne, il est important de développer les connaissances de leur toxicité sur la reproduction. C'est dans ce contexte que s'inscrit notre travail dans lequel nous nous sommes intéressés à l'étude des effets toxiques du colorant alimentaire E171 sous forme de nanoparticules (NPs) de TiO_2 sur l'appareil reproducteur des rats males de souche « wistar » en réalisant une étude histologique des testicules et des épididymes des rats.

Les résultats montrent une atrophie des tubes séminifères, des anomalies structurales de la lame basale ainsi qu'une hypospermatogenèse, associée à une diminution du nombre des cellules germinatives et interstitielles, un détachement des cellules de Sertoli et une perte intense des spermatozoïdes, une déformation au niveau des épididymes ont été notés sur les coupes histologiques des testicules et des épididymes des rats exposés aux NPs de TiO_2.

En conclusion, nos résultats prouvent qu'une intoxication, même par une dose faible du colorant alimentaire E171, peut induire des effets nocifs sur l'appareil reproducteur male. Par conséquent, il faut Contrôler la présence des nanomatériaux des NPs de TiO_2 dans les produits alimentaires.

C. ORALE N° : 129.

GENETIC DIVERSITY OF VARIANTS INVOLVED IN DRUG RESPONSE AMONG TUNISIAN AND ITALIAN POPULATIONS: IMPLICATION FOR PERSONALIZED MEDICINE

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Abtract : Adverse drug reactions are a cause of significant morbidity and mortality to patients and a source of financial burden to the healthcare system. Several studies highlighted that ethnicity is one of the main factors influencing individual genetic patterns in drug response. The aim of the study is to characterize the genetic variability of some pharmacogenes invoved in drug biotransformation and adverse drug reactions in Tunisian, Italian population and to compare our results to the worldwide populations.

A set of 135 healthy Tunisians and 690 Italians were genotyped using array chip. Variants located in 25 Very Important Pharmacogenes (VIP) involved in drug response variability and adverse drug reactions were extracted from the genotyping data. Analysis of variant distribution in Tunisian and Italian populations compared to 24 worldwide populations publicly available was performed using plink and R software. Common variants between Tunisians, Italian and the 24 investigated populations were extracted from genotyping data. Results of fixation index (Fst), Principle Component Analysis and ADMIXTURE analyses showed that there is high similarity among Mediterranean populations which are genetically divergent from South African populations. Moreover, the Fst comparaive analysis highlighted 27 variants with high level of differentiation between the Tunisian, Italian and other studied populations. Among these variants, there are four SNPs rs622342, rs3846662, rs7294, rs5215 located respectively in S*LC22A1*, *HMGCR, VKORC1, KCNJ11*, involved in in adverse drug reactions showed genotypic frequency differences. In conclusion, our study showed that Tunisian and Italian population are genetically homogenous regarding the studied pharmacogenes. The Correlation of the genotype and allelic frequencies of risk variants with their associated adverse drug reactions would enhance the drug outcomes and have an important impact in the implementation of personalized medicine in worldwide populations. Similar studies need to be reproduced to identify populations that require attention when taking a particular drug.

Key words: *Pharmacogene, adverse drug reactions, Mediterranean population, admixture, ethnicity.*

C. ORALE N° : 130.

ANTINOCICEPTIVE AND ANTI-INFLAMMATORY, AND ACUTE TOXICITY EFFECTS OF CANNABIS SATIVA (L.) ESSENTIEL OIL IN ANIMAL MODELS

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Abtract : Cannabis sativa L., commonly known as "Elkif", is widely used in Moroccan folk medicine to treat pain. This study aimed to investigate the antinociceptive and anti-inflammatory effects of cannabis sativa using rodent models. The antinociceptive activity of C. sativa essential oil was performed using acute nociception models (acetic acid-induced abdominal contortions, formalin-induced paw licking and hot plate test). The possible mechanisms of the essential oil were tested by antagonists, namely atropine and naloxone, The results showed that EOCS administered intraperitoneally has a potent and dose-dependent antinociceptive effect. In addition, the antinociceptive activity of EOCs was significantly inhibited when antagonists were used.

Anti-inflammatory activity was assessed by the xylene and carrageenan test. The results showed that in the xylene-induced ear edema test, cannabis sativa oil reduced acute inflammation in a dose-dependent manner. In the carrageenan test, a significant inhibition of the formation of odema was observed.

The results show that the essential oil of C. sativa has antinociceptive and anti-inflammatory properties in rodents. The study provides pharmacological support for the traditional use of the plant in the management of pain and inflammatory conditions.

C. ORALE N° : 131.

BROMUCONAZOLE FUNGICIDE INDUCES CELL CYCLE ARREST AND APOPTOTIC CELL DEATH IN CULTURED HUMAN COLON CARCINOMA CELLS

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Abtract : Bromuconazole, a fungicide belonging to the triazole family, is a plant protection product used to control, repel or destroy fungi, which may develop on crops. Although the massive and repeated use of bromuconazole is associated with various toxic effects, its exact mechanism of toxicity remains unclear. For this in this present work, we inspected the genotoxic and pro-apoptotic effects of bromuconazole in cultured human colon carcinoma cells (HCT116). The MTT assay, showed that bromuconazole caused a concentration-dependent increase of cell mortality. In other side bromuconazole caused cell cycle arrest in the G0/G1 phase and DNA synthesis inhibition. DNA damage analysis showed that bromuconazole exposition caused DNA fragmentation in a concentration dependent manner. Bromuconazole-induced apoptotic cell death was observed by, both Annexin-V/FITC-PI and BET/AO positive staining, by mitochondrial membrane depolarization, and by increased caspase-3 activity. We concluded that bromuconazole causes DNA damage and mitochondrial dysfunction, leading to cell cycle arrest and apoptotic death of HCT116 cells.

COMMUNICATIONS PAR AFFICHE

BIOCHIMIE
ET BIOLOGIE MOLECULAIRE

C. AFFICHE N° : 1.

THE METACHROMATIC LEUCODYSTROPHY: EXPERIENCE OF CLINICAL BIOCHEMISTRY LABORATORY IN FARHAT HACHED HOSPITAL,SOUSSE, TUNISIA

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Abstract: Metachromatic leukodystrophy is a lysosomal storage disease caused by a deficiency in arylsulfatase A. Clinically, three phenotypes were distinguished: Late infantile, juvenile and adult form. These phenotypes vary according to the absence or presence of neurological manifestations and their progression degree.
Our purpose was to demonstrate the frequency of requests for the determination of arylsulfatase A activity in our laboratory.
We conducted a retrospective study for 6 years (2013-2018) including all requests for the arylsulfatase A assay sent to our laboratory. The measurement of arylsulfatase A enzyme activity was performed in leucocytes by a colorimetric method using a synthetic substrat : paranitrocathechol-sulfate.
During our study, 139 requests were sent to our laboratory: 8 requests in 2013, 15 requests in 2015, 43 requests in 2015, 31 requests in 2016, 10 requests in 2017 and 32 requests in 2018. We detected 11 patients with a deficit of arylsulfatase A activity (7.9%) in our study population during these 6 years: four cases in 2018, two cases in 2017, four cases in 2016 and one case in 2014.
The average of enzymatic activity level of the arylsulfatase A at 37 ° C was 3.68 µkat / kg of protein with extremes from 1.25 µkat / kg to 10 µkat / kg of protein (NV: 12-35 µkat / kg of protein). At 0 ° C, the average of enzymatic activity level was 0.33 µkat / kg protein with extremes from 0 µkat / kg to 1.8 µkat / kg protein (NV: 3-9 µkat / kg protein).
Metachromatic leukodystrophy is a very disabling hereditary disease.

Keywords: *Metachromatic leukodystrophy, arylsulfatase A, hereditary disease, prenatal diagnosis, genetic counseling.*

C. AFFICHE N° : 2.

PREDICTION OF THE DAMAGE-ASSOCIATED NON- SYNONYMOUS SINGLE NUCLEOTIDE POLYMORPHISMS IN THE HUMAN *SLC22A1* GENE

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Abtrsact : Non-synonymous single nucleotide polymorphisms (nsSNPs) in hOCT1 (encoded by *SLC22A1* gene) are expected to affect Imatinib uptake in chronic myeloid leukemia (CML).
In this study, we aimed to prioritize the deleterious nsSNPs reported in the SLC22A1 gene and to investigate the relationship between SLC22A1variants and loss of response to imatinib therapy.
Using eight different algorithms, sequence homology-based genetic analysis of a set of 270 coding SNPs were conducted to identify putatively damaging/deleterious. Subsequently, based on conservation of amino acid residues, stability analysis, posttranscriptional modifications, and solvent accessibility analysis, the possible structural-functional relationship was established for high-confidence nsSNPs.
Out of 18 predicted high-risk pathogenic nsSNPs, 12 were novel sites involved in the hOCT1-mediated imatinib uptake. Three highly deleterious mutations consisting of P283L, G401S and R402G in *SLC22A1* gene that may alter the protein structure, function and stability were identified. Furthermore, based on the modeling results, some dissimilarities of mutant type amino acids from wild-type amino acids such as size, charge, interaction and hydrophobicity were revealed. These results provide a filtered data to explore the effect of uncharacterized nsSNP and find their association with Imatinib resistance in CML.

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

C. AFFICHE N° : 3.

IN SILICO STUDY OF BACTERIAL AMYLASES : COMPARATIVE STUDY AND SEQUENCE INSPECTION PROTEIN

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Mots clés : Bacterial amylases, Bioinformatics, Inspection, 3D structure

Abtract : Bioinformatics is the automatic processing of biological information. Here, it was used in the *in silico* study of 2 amylases from 2 bacterial strains of the genus *Bacillus* (AmyB201 and AmyS1). The protein sequence of AmyB201 was determined by the « ORF Finder » program.
On the other hand, that of amyS1 was retrieved from the « NCBI » database based on the affiliation of the S1 strain, source of AmyS1. The alignment of these 2 sequences shows that they are 91.96% similar and that they have 4 conserved regions and an identical catalytic triad characteristic of the GH13 family of glycosyl-hydrolases. Subsequently, the analysis of two sequences by the « SignalP» server confirmed their extracellular nature. Furthermore, we used the « Protparam » program to analyze the different physicochemical parameters of the 2 mature amylases. Moreover, the analysis of 2 sequences by « Psipred » and « Espript3 » show that the 2 secondary structures are almost superimposable except for a few differences which mark the specificity of each enzyme and which could explain the difference in thermostability. The modeling of the 3D structures of the 2 amylases was carried out by the « Swiss-model» and « Phyre2 » programs. The visualization and manipulation of these models were carried out using the «ViewerLite» program, which shows the presence of three typical domains of amylases, namely the domains: A, B, C. Thus, thanks to these structures, we were able to explain certain differences in the properties of each of these amylases.

C. AFFICHE N° : 4.

CONCENTRATION DE L'HOMOCYSTEINE (*HCYS*) DANS LE CAS DES COMPLICATIONS CARDIOVASCULAIRES CHEZ LE DIABETIQUE DE TYPE 2 DANS UNE POPULATION DE L'EST ALGERIEN

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Abtract : Rationnel ***et objectif*** : le diabète de type 2 et ses complications associées continuent à poser un problème majeur de santé publique. Le traitement du diabète ne restaure que rarement un équilibre glycémique parfait. Les complications cardiovasculaires liées aux diabètes sont pour l'essentiel consécutives au déséquilibre glycémique persistant. L'homocystéine est reconnue comme un facteur de risque cardiovasculaire ; elle est plus élevée chez les diabétiques non insulinodépendants non compliqués que dans la population générale.
L'objectif principal de notre étude est de déterminer la relation entre le taux plasmatique de l'Hcys, et la survenue des complications cardiovasculaires chez le diabétique de type 2 dans une population de l'Est, Algérien.
Patients et méthodes : Il s'agit d'une étude cas – témoins, qui s'est déroulée en 2015 et qui a concerné 50 patients présentant un diabète de type2 compliqué, suivi au CHU de Constantine, service d'endocrinologie, et 60 témoins présumés sains recrutés au niveau du service de médecine du travail. Le dosage de l'homocysteine a été réalisé au Laboratoire central de Biochimie du CHU de Constantine.
Résultats : la moyenne de l'Hys chez les diabétiques du sexe masculin était de 17,74 ± 5,99, et elle était de 19,44 ± 10,47 chez les femmes. Nos résultats montrent que nos patients diabétiques présentaient une hyperhomocystéinémie légère (16 - 30 µmol / l), mais pas d'Hyperhomocystéinémie sévère (>100 µmol / l). Cependant la moyenne de l'Hcys chez les témoins du sexe masculin était de 12,11 ± 6,97, et de 12,77 ± 7,36 chez les femmes, ce que correspond aux valeurs normales
[5-15 µmol / l].
Conclusion : nos résultats sont significatifs, et montrent que l'hyperhomocystéinemie est liée aux complications cardiovasculaires chez le diabétique de type2, à l'instar de plusieurs études publiées jusqu'à ce jour. Cependant, une étude multicentrique avec un échantillon plus grand est nécessaire pour conforter ces résultats.

C. AFFICHE N° : 5.

SUSTAINABLE MICROALGAE BIOREFINERY : FROM THE CELL TOWARD THE PROCESS

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Considering the worldwide tendency to Sustainable Development Goals, bioenergy is receiving an increased interest as an alternative to petroleum derived products. Microalgae are photosynthetic microorganisms sources of a myriad of biomolecules valued in several domains including nutraceuticals, cosmetics, pharmaceuticals, animal feed and biofuels. However, microalgae processing is facing many challenges linked to operations cost and energy consumption. In this project, we aim to study the feasibility of a sustainable multi-product biorefinery producing carotenoids as high value molecules, biodiesel/biomethane and pellets from the cultivated microalgae cells. In a successful approach, a new specie designated LT1 isolated from the Tunis lagoon identified *Tetradesmus sp*. was cultivated in a bubbling photobioreactor at stress conditions. HPLC-DAD applied on to extracted carotenoids from the obtained biomass shows mainly the presence of : lutein ~50%, canthaxanthin ~18%, astaxanthin ~12% and violaxanthin ~7%. The residual coproduct was used to carry out an anaerobic digestion to determine an overall biomethane potential of 282.3ml CH_4/g of biomass. This work demonstrates the concept proof of the implementation of this sustainable biorefinery.

Keywords*: microalgae, sustainability, biorefinery, carotenoids, biofuels*

C. AFFICHE N° : 6.

PHYTOCHEMICAL STUDY, AND EVALUATIONOF THE ANTIOXIDANT ACTIVITY OF AQUEOUS AND METHANOLIC EXTRACTS OF *MORINGA OLEIFERA* PLANT: FROM SOUTHERN ALGERIA (TAMANRASSET)

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Purpose: due to its richness in active compounds, *Moringa Oleifera* lam a medicinal plant widely used for therapeutic reasons in traditional medicine, the aim of our research is to evaluate the antioxidant activity in vitro and analysis of polyphenols and flavonoids, phytochemical screening of aqueous and methanolic extracts of *Moringa Oleifera*.
Methods: The aerial parts (leaves and seeds) of *Moringa Oleifera* were dried and ground for the preparation of aqueous extracts by infusion, decoction and methanolic extracts by maceration, The estimation of the antioxidant potential was determined by DPPH radical assay method. Analysis of flavonoid content using aluminium trichloride and Folin-Ciocalteu reagent for the estimation of phenolic compounds.
Results: Phytochemical screening showed that the six extracts contain different secondary metabolites with different qualities, such as flavonoids, tannins, alkaloids, and terpenoids. This is confirmed by a quantitative analysis where the highest values for the MEF, MEG methanolic extracts: for phenolic compounds (16.49±0.02 and 10.23±0.04 mgEAG/g extract) respectively and for flavonoids (0.27±0.09 and 0.2±0.03mgEQ/g extract) followed by the aqueous extracts of leaves A1F, A2F. While the A1G, A2G aqueous extracts of the seeds show a low quantity. DPPH inhibition rates ranged from 6.03±0.80% to 76.64±1.49%. The 80% methanolic extract and the aqueous (decocted) extract of the leaves of exhibited the highest antioxidant activity.
Conclusion: From the results obtained, the leaves and seeds of *Moringa Oleifera* constitute a source of antioxidant activity due to their richness in phenolic compounds.

Key words: *Moringa Oleifera, antioxidant activity, analysis of polyphenols, flavonoids, DPPH.*

C. AFFICHE N° : 7.

CONGENITAL METHEMOGLOBINEMIA TYPE I IN A TUNISIAN PATIENT

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Abstract : Recessive congenital methemoglobinemia (RCM) is a very rare disorder caused by NADH-cytochrome b5 reductase (NADH-CYB5R3) deficiency (EC 1.6.2.2.). Two distinct clinical forms, types I and II, caused by NADH- CYB5R3 deficiency have been recognized. In type I, the enzyme deficiency is restricted only to erythrocytes with cyanosis being the only major symptom. In contrast, in type II, the enzyme deficiency is generalized to all tissues and associated with neurological impairment, mental and growth retardation and reduced life expectancy, in addition to cyanosis. These two types are caused by mutations in the *CYB5R3* gene, encoding for NADH-CYB5R3.
We investigated a 33-year-old female with cyanosis. Methemoglobin level and NADH-CYB5R3 activity were measured by standard methods, and molecular analysis was performed by PCR followed by DNA sequencing.
Sequencing the *CYB5R3* gene identified a homozygous G→A transition at base c.535, which changed codon 179 from alanine to threonine (Ala179Thr) in NADH-CYB5R3 protein. This mutation was already reported in other populations, especially in India According to our knowledge, this is the first time that this mutation has been reported in Tunisian population.
This variant is situated at the C-terminal end of strand *β8* of the NADH domain and quite close to the adenosine fragment of the NADH coenzyme. The introduction of a bigger and more polar residue at position 179 may influence NADH binding, resulting in a decrease in the catalytic activity of the enzyme, even though it is not directly involved in coenzyme recognition.

Keywords : *RCM, cyanosis, NADH-CYB5R3 deficiency type I, CYB5R3 gene.*

C. AFFICHE N° : 8.

SYNTHESIS AND CHARACTERIZATION OF NEW PEPTIDES OBTAINED BY OPENING REACTIONS OF SULFAHYDANTOINS

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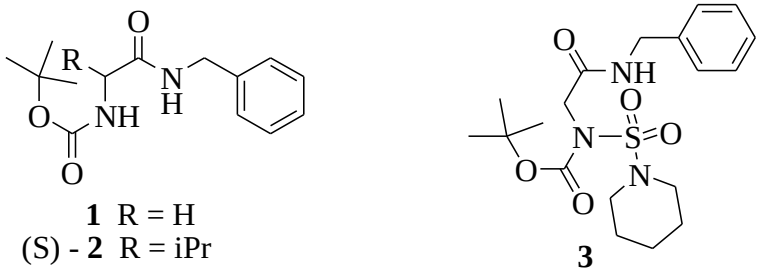
Abstract: Sulfhydantoin from glycine or *L*-valine is used as a precursor via heterocyclic opening reactions. The operating conditions used during electrophilicity tests influence the reactivity of heterocycles, the best control of the electrophilicity of our molecules and consider as well as their use as enzyme inhibitors. The regioselectivity of the reactions carried out in various nucleophilic media leads to three new linear products derived from acetamide and butanamide and which are analogous to the peptide structures Fig1.

The synthetic methodology adopted and the realization of a process for opening sulfhydantoins which are derived from glycine and *L*-valine, which are used as generators for new derivatives which have mimetic structures at peptides under different nucleophilic conditions, these heterocycles have also been investigated in peptide chemistry. The objective of these syntheses was to use them as generators of functionalized peptide analogues for potential enzyme inhibition. The structures of the synthesized products **1**-**3** have been elucidated and confirmed by the usual spectroscopic methods.



1 R = H
(S) - **2** R = iPr

3

Fig.1.

Mots Clés : *Sulfahydantoïne, Nucléophiles, Réaction d'ouverture, Peptide*

C. AFFICHE N° : 9.

GENETIC SUSCEPTIBILITY TO CERVICAL CANCER IN A TUNISIAN POPULATION

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Background: HuR (ELAVL1) gene has been implicated in the oncogenesis of certain cancers. However, the correlation between the ELAVL1gene and the risk of cervical cancer remains unclear. In this study we investigated the effect of ELAVL1gene polymorphisms (SNPs) in cervical cancer development in Tunisian women.
Method: ELAVL1 gene SNPs: ELAVL1 rs12983784 T>C, ELAVL1 rs14394 T>C, ELAVL1rs74369359G>T, ELAVL1rs35986520G>A, ELAVL1rs10402477C>T, ELAVL1 rs12985234 A>G and ELAVL1 rs2042920 T>G, were genotyped by High resolution melting (HRM). SNPStats software was used to perform statistical study.
Results: Comparing patients with healthy control, the rs12983784 (P=0.032), rs74369359 (p=<10-3) and rs10402477 (P=0.001) were associated with an increased cervical cancer risk. Contrary to the rs14394, rs7469359, rs35986520, rs12985234 and rs2042920 (p>0.05). The haplotype analysis of the seven SNPs of ELAVL1gene showed that there is no association between the different haplotypes and a possible risk of cervical cancer disease.

C. AFFICHE N° : 10.

PHYTOCHEMICAL ANALYSIS AND EVALUATION OF BIOLOGICAL ACTIVITIES IN ACHILLEA LIGUSTICA.ALL.

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The present study is interested in valorizing the species Achillea ligustica all. located in the two zones of Ain Drahem and Feyja through the vegetable extracts and essential oils.
Indeed, this research work consists in evaluating the various parts of the plants: inflorescences, aerial parts and roots by the dosages of the various phenolic compounds (total polyphenols, flavonoids and flavonols) and the antiradical power of the extracts measured by the two tests DPPH and ABTS. Then, all the tested extracts underwent a study of their enzymatic activity by measuring their inhibitory power of a amylase, one of the main targets of treatments against type II diabetes disease. For the essential oils of the inflorescences and aerial parts of both species, the chemical compositions were studied by GC-MS and the cited biological activities.
The contents of phenolic compounds and flavonoids indicate that the inflorescences of Ain Drahem are richer than those of Feyja with contents respectively 150.578 ug EAG/mg E and 144.8 ug ER/mg E. For the aerial parts and the roots of Feyja are richer than those of Ain Drahem. Concerning the contents of flavonols the extracts of Feyja site are higher than those of Ain Drahem.
The results of the antioxidant activity show that the extracts of inflorescences and roots of Feyja site are higher than those of Ain Drahem (131.644 ug eq trolox/mg E and 25.733 ug eq trolox/mg respectively) for the DPPH test and (777.355 ug eq trolox / mg E and 609.81ug eq trolox /mgE respectively) for the ABTS test. For the aerial parts it is those of the site Ain Drahem which have more important activities. Concerning the results of the inhibitory activity of a amylase, the inhibition of the extracts of inflorescences of Feyja is stronger than those of Ain Drahem, on the other hand the aerial parts and the roots of the site Ain Drahem generate activities more important than those of the site Feyja.
Key words: Achillea ligustica.all, essential oils, polyphenols, flavonoids, flavonols, antioxidant activity.

C. AFFICHE N° : 11.

DEGLYCOSYLATED BLEOMYCIN EXHIBIT LESS TOXIC SIDE EFFECTS IN A SERIES OF LUNG CANCER CELL LINES.

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Purpose: Pulmonary fibrosis is a collection of heterogeneous diseases associated with a very poor prognosis. The current therapeutic agents show little or no effect against this disease. Reactive oxygen species and their reactions with epithelial cells are involved in the pathophysiology of pulmonary fibrosis. Bleomycin, antitumor agent, has demonstrated potent activity in treating malignant lymphomas but its therapeutic efficacy is hampered by induction of lung fibrosis. This side effect is related to the ability of the drug to generate reactive oxygen species leads to excessive apoptotic cell death in lung. The bleomycin-derivative molecules that exert lower oxidant abilities may have a therapeutic usefulness to reduce or prevent the toxicity of bleomycin. We have previously observed that deglycosylated form of bleomycin induced apoptosis in leukemia and oral cancer cell lines; this apoptosis was independent of Reactive oxygen species formation.
Methods: We evaluated by Hoechst and Flow cytometry the effects of deglycosylated bleomycin on apoptosis in five human lung cancer cell lines (A549, H-358, H1703, H292 and H1650).
Results: Deglycosylated bleomycin at 100µM was found to induce lower apoptotic death in all the five lung cancer cell lines tested with a level ranging from 5% to 30%. However, with the same concentration bleomycin was more efficient to trigger apoptosis in these cells. The apoptosis induction was associated with reactive oxygen species formation only with bleomycin.
Conclusion: These data suggest that deglycosylated bleomycin exhibit less toxic side effects in lung cancer cell lines and could warrant its use in clinic.

Keywords: *Deglycosylated bleomycin, bleomycin, cancer lung cell line, apoptosis, ROS*

C. AFFICHE N° : 12.

LOW-DOSE BISPHENOL S EXPOSURE INDUCES HYPOSPERMATOGENESIS AND MITOCHONDRIAL DYSFUNCTION IN RATS: A POSSIBLE IMPLICATION OF STAR PROTEIN

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Abstract: BPA is an environmental chemical/xenobiotic used in the manufacturing of various plastics. It has been used in several products, including foodstuffs. Many researchers proved the impact of BPA on male reproductive dysfunctions and infertility. Recently, bisphenol S (BPS) replaces BPA, under the BPA-free label. However, several studies have raised inquietude about the potential adverse effects of BPS. The present study was conducted to evaluate sperm parameters, biochemical parameters, mitochondrial function, and histopathological patterns after post-lactation BPS exposure at a low dose. After 10 weeks of getting dirnking water contaminated with BPS at 50 µg/L ,male rate aged 21 days old. Results showed no significant alteration in the gonadosomatic index (GSI) and relative reproductive organs weight. While epididymal sperms parameters (number, viability, and mobility) have undergone a significant reduction with morphological abnormalities were observed in the BPS group compared to control. An increase of malondialdehyde (MDA) level accompanied by antioxidant defense alteration particularly, in glutathione peroxidase activity, as well as a defective mitochondrial function were observed in testicular tissues of BPS treated rats. More importantly, in histopathological diagnosis, BPS treatment induces hypospermatogenesis and alteration in Sertoli cells. In silico docking studies illustrated BPS binds with steroidogenic acute regulatory (StAR) protein thereby affecting the transport of cholesterol into mitochondria resulting in decreased steroidogenesis. These results reflect a reprotoxic effect of BPS could potentially lead to fertility reduction, in sexually maturity age. We highlighted that post-lactation exposure to BPS, equivalent in humans to the period covering childhood and adolescent stages, disrupt male reproduction function.

Keywords: *Bisphenol S; Mitochondria; Spermatogenesis; StAR; Steroidogenesis.*

C. AFFICHE N° : 13.

VARIATION DE LA COMPOSITION EN ACIDES GRAS CHEZ LES MÂLES ET LES FEMELLES DE *SPICARA MANEA* DE LA CÔTE NORD-EST TUNISIENNE

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Résumé : Cette étude a été menée dans le but de déterminer la variation de la composition du profil lipidique dans le muscle des mâles et des femelles de ***Spicara manea*** capturés à partir de la côte Nord-Est Tunisienne : la région de Bizerte.

L'extraction des lipides totaux a été effectuée par la méthode de Soxhlet. La préparation des esters méthyliques a été effectuée par une transesterification directe selon la méthode de Mosers., (1991). Les protéines totaux ont été déterminés par la méthode de Kjeldhal. Les résultats obtenus montrent la présence de trois catégories d'acides gras à savoir : les AGS, les AGMI, et les AGPI. Il a été noté une dominance de l'Acide palmitique (C16:0) dans la catégorie des AGS, et dont les proportions les plus élevées sont observées chez les femelles avec 26.3%. Celles des AGMI est fortement représentée par l'acide oléique (C18:1*n-9*) dont la proportion la plus élevée est de 15% chez les mâles. Dans la catégorie des AGPI, les proportions les plus élevées sont celles de l'acide arachidonique le C20:4 *n-6 et de* l'acide eicosapentaénoïque C20:5 *n-3 avec respectivement 2% chez les mâles et 8*% chez les femelles. Pour l'acide docosahexaénoïque le C22:6 *n-3* la proportion la plus élevée est obtenue chez les femelles avec 33%.

En conclusion on déduit que *Spicara manea* est une source importante de DHA et que sa teneur en lipides et en acides gras *varie en fonction du sexe*.

***Mots clés**: Spicara manea, lipides totaux, protéines, acides gras, AGPI n-3.*

C. AFFICHE N° : 14.

CALCULS ET MODÉLISATION DES INTERACTIONS ENTRE DEUX FLAVONOIDES EXISTANTS DANS UNE PLANTE ET UNE ENZYME KINASE 2HCK À L'AIDE DE TECHNIQUES DE « DOCKING » MOLÉCULAIRE

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Abtract : Avec le développement des outils informatiques, la modélisation moléculaire, plus précisément le docking moléculaire s'est très vite introduit dans le domaine de la recherche en biologie permettant ainsi le traitement du flot des données produites et l'optimisation de ses avancées. L'étude des interactions des pesticides au sein d'un mélange avec différentes cibles aux niveaux cellulaire et moléculaire est une problématique très complexe. Il est difficile de prévoir les interactions des substances chimiques dans les mélanges et de connaitre leurs modes d'action possibles, notamment leurs effets à long terme.

L'objectif principal de notre travail est de modéliser les interactions entre deux molécules de flavonoïdes L1 (padmatin) et L2 (3-O-methylquercetin) qui existent dans la plante *Inula Viscosa*, et la kinase *2HCK* afin de justifier l'activité antioxydante de cette dernière.

Les résultats du criblage virtuel par le logiciel **MOE** nous a permis de sélectionner les **5** meilleurs poses qui peuvent être proposés comme meilleur inhibiteur de notre cible thérapeutique **2HCK** et pour lesquels nous avons fait une analyse détaillée des diverses interactions. L'étude du Docking moléculaire a confirmé que le composé flavonoïde (L1 : padmatin) se lie aux résidus catalytiques de la kinase par six interactions de liaison hydrogène.

***Mots clés :** Docking moléculaire, 2HCK, MOE, Inula Viscosa*

C. AFFICHE N° : 15.

VARIABILITY OF PHENOLIC CONTENT IN THREE *CUCURBITA MAXIMA* PEELS EXTRACT FRACTIONS

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Abstract. The aim of the present study was to examine the peels of three Tunisian squash (NGBTUN751, NGBTUN746 , NGBTUN748) fractions for their phenolic contents. Mature fruits were cut and peels were separated then lyophilized and their preliminary extraction were conducted with aqueous ethanol. To find a gradient elution solvent system capable of separating compounds with a wide polarity range, various solvents were tested. In detail, the following solvents were used for liquid-liquid extraction (n-hexane, ethyl acetate, Dichloromethane, n-butanol, methanol and water). According to the obtained results**,** important variability can be observed when comparing the different solvents extracts as well as the three varieties. Considering the solvent extractabilities, the ethyl Acetate and the methanolic fraction seems to be richest ones in phenolic compounds with a total polyphenol content reaching 7.5 and 6.3 mg GAE/gDR for Batati peels. The aqueous fraction contained also important TPC estimated at 5.5 mg GAE/gDR and was closely followed by hexane, dichloromethane and butanol fractions that the highest TPC assessed was around 4 mg GAE/gDR. When comparing the three varieties it seems that Batati peels contains the highest total phenolic contents that ranged from 7.4 to 4 mg GAE/gDR. For karkoubi, TPC ranged from 5.6 to 1.1 mg GAE/gDR while it was limited to 4.5 mg GAE/gDR in bejaoui samples.

C. AFFICHE N° : 16.

MIRNAS: NEW ACTORS TO IMPROVE TOMATO TOLERANCE TO ABIOTIC STRESS

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Abstract : To overcome changes in their environment, plants undergo a transcriptional reprogramming to activate stress-response pathways. Conserved DNA-derived Polymorphism (CDDP) approach and visual phenotypic assortment permits to select two contrasting heat-tolerant and heat- sensitive tomato cultivars. Based on discriminating CDDP-markers, a protein functional network was built allowing prediction of candidate genes and their regulating miRNA. Expression patterns analysis revealed that miRNA-targets modules expression seems to be modulated through a complex heat-stress regulatory network. Integrating biological and genetic resources data is required to select valuable a tomato genotype that can be considered in marker assisted breeding programs to improve heat tolerance.

***Key words**: miRNA-targets, CDDPs, Heat stress*

C. AFFICHE N° : 17.

GAUCHER DISEASE IN A TUNISIAN FAMILY

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Abstract: Gaucher disease is an inborn, autosomal recessive error of the metabolism which belongs to the group of lysosomal storage disorders.
This work reports on the diagnosis of Gaucher disease in several members of the same family from Tunisia. This was descriptive case study about the biochemical and molecular diagnosis of Gaucher disease.
The diagnosis of these patients was performed by measuring the levels of glucocerebrosidase and confirmed by genotyping. All patients suffering from Gaucher disease had low glucocerebrosidase activity (0, 1 to 0, 5 µkat/gr proteins (reference value: 3 - 9 µkat/gr proteins). Hepatosplenomegaly was the most common clinical manifestation (100%) and osteopenia was seen in 80% of the cases. Regarding hematological manifestations, anemia and leukopenia were found in 40% of patients at diagnosis. Our results showed that two members (Father and uncle) of this family were homozygote for the N370S (*(c.1226 A>G)* mutation, two members (children) were heterozygotes for this mutation. the mutation is absent in the mother.
The prevalence of the N370S mutation in Tunisian GD patients is one of the highest in Arab populations. In such populations, the number of mutations giving rise to GD is small, which facilitates a rapid genetic diagnosis.
Gaucher's disease is not exceptional in Tunisia. Type 1 is the most common type. In these cases, the treatment as the family with Gaucher disease showed possible and necessary.

***Key words**: Gaucher disease, biochemical and molecular diagnosis, N370S mutation, genetic diagnosis, glucocerebrosidase.*

C. AFFICHE N° : 18.

BIOCHEMICAL AND MOLECULAR CHARACTERIZATION OF CTNS MUTATIONS IN TUNISIAN PATIENTS WITH CYSTINOSIS

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Abstract : Nephropathic cystinosis (NC) is an autosomal recessive disorder characterized by defective cystine transport across the lysosomal membrane, resulting in renal, ophthalmic, and other organ abnormalities. Mutations in the CTNS gene cause a deficiency of the transport protein cystinosin. This study investigated mutations of the CTNS gene in three Tunisian families with NC.
Polymerase chain reaction (PCR), ARMS multiplex PCR, and direct sequencing were performed for molecular characterization of the CTNS gene in 3 unrelated Tunisian patients and their parents. Based on family history, prenatal diagnosis (PND) was performed in fetal DNA isolated from chorionic villi obtained at 10–12
weeks of gestation.
None of the patients showed the most common 57-kb deletion in heterozygous or homozygous status. One patient was homozygous for the previously reported mutation c.1515G > A (p.G308R). One patient presented the novel gross deletion of 20,327 bp. One was homozygote for the previously reported mutation c.771_793del (p.Gly258Serfs*30). In addition, eight polymorphisms were identified in the three patients and their parents. The prenatal diagnosis in one family showed that the fetus's DNA was heterozygous for the c.771_793del (p.Gly258Serfs*30) mutation.
This study expands the mutational and population spectrum of NC, representing the first molecular diagnosis of NC in the Tunisian population. Also, the CTNS gene mutation screening was utilized for prenatal diagnosis to avoid and/or minimize this inheritable disease in our nation, where the families are extensive, and the risk of consanguinity is high.

***Keywords:** Nephropathic cystinosis, CTNS, Mutations, Polymorphisms, Tunisian families, Prenatal diagnosis*

C. AFFICHE N° : 19.

REDUCED FORCED VITAL CAPACITY IS INDEPENDENTLY ASSOCIATED WITH, AGING, HEIGHT AND A POOR SOCIOECONOMIC STATUS: A REPORT FROM THE TUNISIAN POPULATION-BASED BOLD STUDY

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Abstract :

Background: Reduced forced vital capacity (FVC) is a risk factor of all-cause mortality; however, the prevalence and determinants of reduced FVC are not available for the Tunisian population. This study investigated the association of reduced FVC with risk factors and health variables in an urban population of subjects aged ≥40 years and living in the city of Sousse in Tunisia.

Methods: A cross-sectional survey was performed using data from the Tunisian Burden of Obstructive Lung Disease (BOLD) study. We defined reduced FVC as a post-bronchodilator FVC below the lower limit of normal using National Health and Nutrition Examination Survey (NHANES) values and Global Lung Function Initiative 2012 equations (GLI 2012) and determined the relation between this finding and the potential risk factors (demographic and socioeconomic factors and the presence of chronic diseases), using multivariable regression analysis.

Results: The prevalence of reduced FVC was 26.6% (176/661) when using NHANES values for white Americans and 14.2% (94/661) using the GLI 2012 equations. Compared to people with normal FVC, those with a reduced FVC were significantly older, taller, had a lower body mass index (BMI), more respiratory symptoms and a higher prevalence of heart disease and hypertension. Multivariable analysis showed that reduced FVC was essentially driven by exposure to biomass smoke for heating, a number of schooling years lower than or equal to 6 years, a childhood history of hunger for a lack of money, aging and height.

Conclusions: The prevalence of reduced FVC is associated with a poor socioeconomic status aging and height.

Keywords: *Reduced forced vital capacity, Lung function, Spirometry, Risk factors, Prevalence*

C. AFFICHE N° : 20.

HORTICULTURAL PERFORMANCES AND FUNCTIONAL QUALITY TRAITS OF SOME TUNISIAN POTATO GENOTYPES AS AFFECTED BY GROWING LOCATIONS

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This study focused on some horticultural performances (average tuber weight, soluble solids and dry matter) and the functional quality traits (total carotenoids, total phenols, flavonoids and total vitamin C) as well as radical scavenging activities (HRSA and LRSA) of potato genotypes consisting of six new clones (SLN, ELD, SYN, BDA, NMA, UNV) and the cultivar Spunta grown under a coastal location for the Late Cropping Season (LCS) and an inland or highland location for the New Cropping Season (NCS) commonly known as the fifth cropping season in Tunisia. Under (NCS), SLN and SYN clones, showed dry matter content 21%-45% higher compared to (LCS). Under (NCS), carotenoids were only detected in BDA and NMA at levels higher compared to (LCS). However, the flavonoids content in SLN, ELD, SYN and BDA clones was 54-163% higher in (LCS) compared to (NCS). HAA and LAA values were almost similar in both growing seasons except for Spunta and UNV which presented higher HAA values in (LCS) and SLN which exhibited higher LAA values in (NCS). Therefore, the tubers issued from (NCS) revealed satisfying agronomic traits and functional quality similar to (LCS) and suggest that (NCS) production will contribute to the balance of the demand/price of this agricultural produce.

Keywords: *Highlands, potato, carotenoids, flavonoids, hydrophilic and lipophilic antioxidant activity, dry matter*

C. AFFICHE N° : 21.

POTENTIAL FUNCTIONS OF HSA-MIR-155-5P AND CORE GENES IN CHRONIC MYELOID LEUKEMIA AND EMERGING ROLE IN HUMAN CANCER: A JOINT BIOINFORMATICS ANALYSIS

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Abtract :
Considering the critical roles of hsa-miR-155-5p participated in hematopoietic system, this study aims to clarify the possible pathogenesis of chronic myeloid leukemia (CML) induced by hsa-miR-155-5p.
Three different strategies were employed, namely a network-based pipeline, a survival analysis and genetic screening method, and a simulation modeling approach, to assess the oncogenic role of hsa-miR-155-5p in CML.
We identified new potential roles of hsa-miR-155-5p in CML, involving the BCR/ABL-mediated leukemogenesis through MAPK signaling. Several promising targets including E2F2, KRAS and FLI1 were screened as candidate diagnostic marker genes. The survival analysis revealed that mRNA expression of E2F2, KRAS and FLI1 was negatively correlated with hsa-miR-155-5p and these targets were significantly associated with poor overall survival. Furthermore, an overlap between CML-related genes and hsa-miR-155-5p target genes was revealed using competing endogenous RNA (ceRNA) networks analysis.
Taken together, our results reveal the dynamic regulatory aspect of hsa-miR-155-5p as potential player in CML pathogenesis.

C. AFFICHE N° : 22.

THE METABOLIC SYNDROME: EXPERIMENTAL AND BIOINFORMATICS ANALYSIS

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Abstract : The Metabolic syndrome (MetS) is one of the major risk factors for emerging cardiovascular diseases (CVD) and type 2 diabetes (T2D). The common gene signature and the associated signaling pathways of MetS, T2D and CVD have not been widely studied. Bioinformatics is growing as we continue to generate and integrate large quantities of biological data. MetS, T2D and CVD, may share common genetic and epigenetic modifiers. The sample was divided into two groups: Group I, including 209 patients 209 patients representing at least 3 of the criteria defining an MetS according to NECP-ATPIII and Group II, comprising 193 control subjects. In our study, the prevalence of MetS was 52% according to NECP-ATPIII. Among these patients 51.67% are diabetic and 48.38% are non-diabetic. The frequency of the MetS was significantly higher in postmenopausal women than in premenopausal ones (67.1 vs. 27.2%, $p < 0.001$). PPI network and module analysis were also conducted to evaluate the associations of common genes associated with MetS, T2D, CVD and menopausal status, 10 hub genes were revealed, including TGFB1, SPP1, MMP2, MMP9, CCL2, IGF1, EGFR, ICAM1, TNF and IL6. This study focuses on the development of new bioinformatics solutions, integrating Big Data and approaches guided by the knowledge and contribution of clinical biochemistry to improve the study of MS, T2D and CVD. Our finding of a common gene signature association between these different diseases and menopausal status could be a useful tool for early diagnosis of T2D and CVD and maintaining a healthy life during the menopause.

Keywords : *Metabolic syndrome, type 2 diabetes, cardiovascular diseases, bioinformatics.*

C. AFFICHE N° : 23.

CHEMICAL COMPOSITION, PHYTOTOXIC AND ANTIBIOFILM ACTIVITY OF EUCALYPTUS SPECIES FROM TUNISIA

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Abtract : This study was carried out to characterize the chemical composition of the essential oils from seven Eucalyptus species , as well as their phytotoxic and antibacterial activities. The essential oils were analyzed by GC/MS and the potential in vitro phytotoxicity was evaluated against germination and radical elongation of *Raphanus sativus*, *Lolium multiflorum*, and *Sinapis arvensis* seeds. The antibiofilm activity was studied against both Gram-negative (*Pseudomonas aeruginosa*, *Escherichia coli* and *Acinetobacter baumannii*) and Gram-positive (*Staphylococcus aureus* and *Listeria monocytogenes*) bacteria. The inhibition of biofilm formation and its metabolism was determined at different times. Eucalyptol was the most abundant component in all essential oils studied (ranging from 40.8% for *E. lesouefii* EO to 73.6% for *E. wandoo*) except for that of *E. pyriformis* where it was present but at 15.1%. E. pyriformis was the most active against both germination and radical elongation of *S. arvensis*. The action of all essential oils proved to be highly effective in inhibiting the bacterial adhesion process of the five strains considered. In light of these results, these essential oils could have potential applications both in the agricultural and health fields.

C. AFFICHE N° : 24.

ROLE OF THE POLYMORPHISM OF ABCA1 (I883M) IN THE ALTERATION OF THE LIPID PROFILE IN CORONARY ARTERY DISEASE ASSOCIATED OR NOT WITH TYPE 2 DIABETES

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Background and objective : In Tunisia, as in the rest of the world, cardiovascular diseases in particular acute coronary syndromes (ACS) are the leading cause of death and the rate of hospitalizations is becoming very alarming. For this reason, estimating cardiovascular risk is an important step in the primary prevention of these diseases. In this study, we examined the influence of I883M variant of the ATP Binding Cassette A1 (ABCA1) gene, which plays a key role in the reverse transport of cholesterol.

Patients and methods: The study included in silico analysis of one variant in ABCA1 gene I883M (rs2066714; A/G).The study population consisted of 375 subjects (95 witnesses, 58 diabetics, 62 patients with coronary syndrome, 163 diabetic patients with coronary syndrome), they were genotyped by PCR_RFLP with EcorV. In addition, biochemical parameters [glycemia, total cholesterol, triglycerides, high density lipoprotein cholesterol HDL-C and low Density lipoprotein cholesterol LDL-C] was evaluated.

Results: The results obtained showed that there are significant differences in clinical and biochemical characteristics between the groups. Thus, according to the genotype-phenotype, genotypic distribution of polymorphism I883M and lipid profile indicate that GG mutated homozygous genotype carriers are more sensitive to the development of heart disease since this genetic pattern increases LDL-C in coronary patients independently of diabetes. In addition, HDL-C concentrations in this variant decreased significantly in all study subjects without consideration of heart disease and type 2 diabetes (T2D). In addition, HDL-C concentrations in this variant decreased significantly in all study subjects without consideration of heart disease and type 2 diabetes (T2D). Also, we found new results in talking about triglyceride levels, in fact, the heterozygous genotype AG can influence the variety of triglycerides in diabetic patients (T2D).

Conclusions The study results suggest that I883M SNP of the ABCA1 gene may play a role in the development of heart disease in our Tunisia population. independently to diabetes. Larger epidemiological studies are needed for validation of the results.

C. AFFICHE N° : 25.

LONG-TERM STORAGE EFFECTS ON MINERAL CONTENT, PROTEIN PROFILES, AND ANTIOXIDANT CAPACITY OF *ARGYROLOBIUM UNIFLORUM* SEEDS

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Abtract : *Argyrolobium uniflorum* is a wild plant species with potential applications in food, medicine, and industry. However, the effects of long-term storage on its nutritional and phytochemical properties are not well understood. In this study, we investigated the changes in mineral content, protein profiles, phenolic composition, and antioxidant capacity of *A. uniflorum* seeds stored for over two decades. Our findings provide insights into the stability of *A. uniflorum* seeds during long-term storage and can help guide the development of strategies to optimize the storage and utilization of this valuable plant resource. The study investigated the effect of long-term storage on the mineral content, protein fraction, phytochemical composition, and antioxidant capacity of *A. uniflorum* seeds. Measurements were taken in 1990, 2004, and 2011. The results showed that the mineral content of Na, K, Ca, and Mg decreased over time, while the Fe content remained relatively constant. The protein fraction showed some variability over time, but overall, the albumin content increased, while the globulin and glutelin contents decreased. The phytochemical content of polyphenols, flavonoids, and condensed tannins were found to decrease over time. The antioxidant capacity, as measured by total antioxidant capacity (CAT), DPPH radical scavenging activity, and reducing power assay, also showed a decrease over time. In summary, the study suggests that long-term storage can have a negative impact on the nutritional and antioxidant properties of *Argyrolobium uniflorum* seeds. These findings may be useful in guiding the storage and processing of the seeds to preserve their nutritional quality.

***Keywords**: Argyrolobium uniflorum seeds, Proteins, Antioxidant, Phytochemical contents*

C. AFFICHE N° : 26.

EFFET DU PRETRAITEMENT ALCALIN AU PEROXYDE D'HYDROGENE SUR L'HYDROLYSE ENZYMATIQUE DU GRIGNON D'OLIVE

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La valorisation des déchets et des coproduits issus des agro-ressources et des industries agro-alimentaires prend de l'essor ces dernières années. Le grignon d'olive est le coproduit majeur de l'industrie oléicole, depuis longtemps il a été utilisé dans la nutrition animale mais sa structure hautement lignocellulosique constitue un obstacle majeur pour sa dégradation et sa digestibilité. Dans ce travail, Le traitement alcalin au peroxyde d'hydrogène de grignon d'olive a été effectué pour la fragilisation de la paroi cellulaire et pour la diminution des teneurs en polyphénols à potentielle anti-nutritionnelle. On a optimisé Le traitement alcalin au peroxyde d'oxygène de grignon d'olive épuisé en utilisant un plan d'expérience composite centré. Dans les conditions optimale, le contenu phénolique atteint 1,51 ±0,03 mg/100g MS pour le grignon d'olive traité, et environ un taux de 25 % d'élimination de la lignine a été atteint. L'hydrolyse enzymatique par la celluclaste a révélé un rendement en glucose de 50% pour le grignon d'olive traité et 33% pour le grignons d'olive non traité après 48h d'hydrolyse. Ce pretraitement donne une matrice riche en fibres qui trouver des applications dans différents secteurs, notamment dans l'alimentation animale.

***Mots clés :** Grignon d'olive, prétraitement, hydrolyse enzymatique plan d'expériences*

C. AFFICHE N° : 27.

EVALUATION OF LIPID PEROXIDATION AND FATTY ACIDS IN TUNISIAN OBESE WITH ACUTE MYOCARDIAL INFARCTION

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ABSTRACT

Background: Imbalance with fatty acid alteration and increased lipid peroxidation causing oxidative stress, would be exacerbated by the accumulation of fat characterizing the state of obesity. The aim of our study is to evaluate lipid peroxidation in Tunisian obese with myocardial infarction (MI) by assaying malondialdehyde (MDA), fatty acid profiles and compare them to non-obese MI.

Methods: A case-control study that involved subjects with MI was conducted. Participants were divided according to BMI into two groups: group 1 (BMI <25, patients with MI in normal nutritional status) and group 2 (BMI ≥ 30, MI obese patients). Lipid peroxidation biomarker (MDA) was analyzed using spectrophotometric methods and fatty acids were established, using gas chromatography (GC) on plasma from 200 patients with MI obese and 350 patients with MI in normal nutritional status.

Results: Our study showed a significant increase in MDA in patients obese compared to non-obese patients. A positive correlation between MDA and BMI was noted. An accumulation of several FA including linoleic, ɤ-linoleic (GLA), dihomo-γ-linolenic (DGLA), and arachidonic acids (AA) were observed in the plasma of obese MI patients.

Conclusions: The increase in plasma MDA and its relationship to BMI indicates more pronounced lipid peroxidation in obese MI patients. Our data suggest the existence of relationships between FA, lipid peroxidation, and the risk of myocardial infarction.

C. AFFICHE N° : 28.

LINKS BETWEEN SNPS IN ADIPONECTIN GENE AND MISCARRIAGE ACCORDING TO OBESITY STATUS

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Abstract : This study addresses whether the association of adiponectin gene (*ADIPOQ*) variants with idiopathic recurrent pregnancy loss (RPL) is influenced by obesity.

Retrospective case–control study performed in outpatient obstetrics/gynecology clinics. Study subjects comprised 308 women with RPL, defined as ≥ 3 consecutive miscarriages of unknown etiology, and 310 control women. *ADIPOQ* genotyping was done by allele exclusion method on real-time PCR.

Of the 14 *ADIPOQ* variants tested, the minor allele frequency (MAF) of rs4632532, rs17300539, rs266729, rs182052, rs16861209, and rs7649121 were significantly higher, while rs2241767, and rs1063539 MAF were lower in RPL cases, hence assigning RPL-susceptibility and protection to these variants, respectively. Higher frequencies of heterozygous rs17300539 and rs16861209, and homozygous rs4632532, rs266729, and rs182052 genotypes, and reduced frequencies of heterozygous rs1063539 and rs2241767, homozygous rs2241766 genotypes were seen in RPL cases. *ADIPOQ* rs4632532, and rs2241766 were associated with RPL in obese, while rs1063539 and rs16861209 were associated with RPL in non-obese women; rs182052 and rs7649121 associated with RPL independently of BMI changes. Based on LD pattern, two haplotype blocks were identified. Within Block 1 containing rs4632532, rs16861194, rs17300539, rs266729, rs182052, rs16861209, rs822396, and rs7649121, increased frequency of CAGGACAT and TAACGAAA, and reduced frequency of TAGCGCAA haplotypes were seen in RPL cases when compared to controls, thereby assigning RPL susceptibility and protection, respectively.

This is the first study to document contribution of *ADIPOQ* variants and haplotypes with RPL, and also to underscore the contribution of obesity to genetic association studies.

***Keywords**: Adiponectin, Haplotypes, Idiopathic recurrent miscarriage, Real-time PCR*

C. AFFICHE N° : 29.

BLACK RATS IN PALM GROVES STORAGE AND THEIR ASSOCIATED PARASITES

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Abstract : Black rats are considered a carrier of microorganisms that are vectors of diseases to animals and humans. No studies have ever been reported on the external or internal parasites of this rodent in Algeria. Where *Rattus rattus* was introduced recently in the south-eastern oasis and has taken refuge in palm groves. 128 individuals of black rats, from date stock, allowed us to collect 1527 arthropods from four species of lice, five mites, one tick, and flea's larvae. The results showed that lice especially *Polyplax spinulosa* and *P. serrata* were the most trapped ectoparasites followed by *Ornithonyssus bacoti*. Otherwise, *Atricholaelaps* sp. was the least population. On the other hand, seven species of parasitic fungi namely *Penicillium* sp., *Aspergillus niger*, *Alternaria* sp., *Cladosporium* sp., *Microsporum* sp., *Trichophyton* sp. and *Chrysosporium* sp. were identified. In addition, coliforms, fecal streptococci, and *Clostridium* sulphito-reducer were identified in intestines of these animals. Also, pinworms (*S. muris, S. obvelata,* and *A. tetraptera*) were more presented than the others species. All inventoried species were significantly greater ($P < 0.0000$) in summer than winter.

Keywords: *Palm grove, Rattus rattus, arthropod, dermatophyte, bacteria, pinworm.*

C. AFFICHE N° : 30.

DIABETE GESTATIONNEL ET SYSTEME ABO

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Abstract Objective: The aim of this study is to define the influence of the blood groups on the onset of pregnancy diabetes Material and methods: We carried out a retrorespective and comparative study (witness case) involving 60 pregnant women this study was carried out according to patient files collected in the period from April to October from Boukerrou clinic situated at Zouaghi Slimane with the collaboration if maternity service in didouche Mourad hospital Results: Among 60 pregnant women 40 aming whom are diabetic and 20 are not diabetic the results show the following distributions according to blood groups: O 58%;A 23; B 10% and AB 10% .The frequency of O is significantly higher in diabetic patients while the frequency of B and A is significantly lower in diabetic patient. While applying T test on patients any significative statistic association was found between the blood group and pregnancy diabetes .really the frequencies of RH + where higher comparing with the other groups but there is no official statistics proving Conclusion: This According to this study we can deduce that women of O+ group are more exposed to develop a pregnancy diabetes comparing with the others which the blood group is different ex A B AB but a large and a deep study is necessary to discover the real association between blood group and Pregnancy Diabetes

Keywords*: ABO system; Gestational Diabetes; blood group; rhesus.*

C. AFFICHE N° : 31.

SIMVASTATIN REDUCES INFLAMMATION AND DERMONECROSIS INDUCED BY *CERASTES CERASTES* VIPER VENOM

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Abtract : Dermonecrosis is a prominent local tissue damage resulting from viper snakebite, often leading to permanent tissue sequelae. Besides to cholesterol-lowering properties, statins are characterized by anti-inflammatory effects. This study aimed to evaluate the effect of simvastatin (SMV) on inflammation and dermonecrosis induced by the venom of *Cerastes cerastes*. Animals were divided into three groups. Venom group received an i.d. injection of 1 LD50 of venom (48 µg/ 20 g of mice body mass), SMV treated group received 1 LD50 of venom followed by a daily supplementation with SMV (20 mg /kg/day, *per os*) and control group received an i.d. injection of NaCl (0.15 M). Animals were anesthetized and sacrificed at 4, 24 and 72 h. Histopathological analysis of skin biopsies, revealed extended necrotic lesions accompanied by hemorrhage, edema, acanthosis and neutrophil infiltration. However, dermonecrosis was significantly reduced by SMV treatment at 72 h. In addition, the use of SMV reduced myeloperoxydase (MPO) activity a biomarker of neutrophil infiltration and inflammation, mostly at 24 h (1.018 ± 0.048 UDO/Min/100 mg of tissue) compared to envenomed group (1.563 ± 0.118 UDO/Min/100 mg of tissue). Moreover, nitric oxide (NO) (28.85 ± 1.57 µM/mg of proteins) levels were significantly decreased within 24 h of SMV treatment, compared to envenomed group (43.53 ± 0.92 µM/mg of proteins). These data highlighted the beneficial effect of *simvastatin* on dermonecrosis, probably due to its immunomodulary potency, which could be attributed to its anti-inflammatory properties.

Mots clés : *Cerastes cerastes, Venom, Dermonecrosis, Inflammation MPO, NO, Simvastatin.*

C. AFFICHE N° : 32.

PROGNOSTIC IMPLICATION OF *TP53 GENE* CODON 72 POLYMORPHISM IN CLL

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Abstract : Chronic lymphocytic leukemia (CLL) is the most common B-cell lymphocytic malignancy of the elderly. Despite therapeutic advances, its evolution differs between patients in correlation with their genetic status. *TP53* gene abnormalities represent the gold standard of prognostic criteria and must be sought at diagnosis because they predict a poor response to chemoimmunotherapy. These mutations result in the loss or expression of a non-functional protein. Variant 72 (rs1042522) of the *TP53* gene, substituting G for C, has an impact on carcinogenesis. It encodes either arginine (Arg) or proline (Pro).

Our objective is to determine the correlation between this variant and the severity of the disease.

160 patient samples including 104 males and 56 females were collected between 2019 and 2021 in the IPT Hematology laboratory. Clinical data were collected. Molecular study of *TP53* gene polymorphism 72 was performed by PCR-RFLP technique.

Genetic variability in the distribution of this polymorphism was shown, the predominant phenotype was arginine with a frequency of Arg/Arg (42%), Arg/Pro (49%) and Pro/Pro (9%). A significant association was found between the proline variant and the hemoglobin level (p= 0.003), the platelet count (p=0.016) and consequently the prognostic classification of Binet stage C (p= 0.001).

The Proline variant seems to be associated with a poor prognosis, and need to be correlated with other molecular abnormalities of the *TP53* gene.

Keywords*: Chronic lymphocytic leukemia, TP53 gene, Polymorphism 72, PCR-RFLP.*

C. AFFICHE N° : 33.

PHYTOCHEMICAL STUDY AND EVALUATION OF THE INHIBITORY ACTIVITY OF *SATUREJA BARCELOI L.* EXTRACTS AGAINST ALPHA- AMYLASE AND ACETYLCHOLINESTERASE

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Abtract: *Satureja barceloi L.* (Lamiaceae), herbaceous with medicinal and aromatic properties, is well represented in the wild in the western Mediterranean region. This work aims to study the phytochemical composition of methanolic and aqueous extracts of roots, leaves and flowers in *S. barceloi*, and the inhibitory effect in vitro of these extracts on the activity of enzymes involved in human diseases: α- amylase and acetylcholinesterase. In order to explain the relationship between the phenolic composition of extracts of different plant organs and the inhibitory activity of enzymes, the Pearson correlation coefficients were determined.

The results obtained showed a variation in the phenolic composition according to the organs of the plant and according to the polarity of the extraction solvent. Thus, the aqueous extracts of the roots, leaves and flowers are richer in phenolic compounds than the methanolic extracts, particularly the aqueous extracts of the roots (53.795 mg EAG/ g Ex in total polyphenols, 24.139 mg RE/ g Ex in flavonoids, 12.205 mg EQ/ g Ex in flavonols). In addition, all extracts were able to inhibit the activity of α- amylase and acetylcholinesterase enzymes, and showed considerable and variable inhibitory capacity. Furthermore, the inhibitory potential of α- amylase and acetylcholinesterase is strongly linked to the contents of phenolic compounds identified in the extracts. Therefore, the purification of compounds from extracts of *S. barceloi* offers the possibility of discovering new structures which have the potential to exhibit the characteristics of a drug for the treatment of type 2 diabetes, and which can be associate to the treatment of Alzheimer's disease.

Keyword*: Satureja barceloi L., phenolic compounds, antioxidant activity, anti-α-amylase activity, acethylcholinesterase inhibitory.*

C. AFFICHE N° : 34.

CHEMICAL COMPOSITION AND OIL PROPERTIES OF *LEPIDIUM SATIVUM* SEED OIL

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Abtract : *Lepidium sativum* is cultivated mainly for the edible oil from its seeds, and considered as an unutilized and neglected crop despite its important properties. Its oil fraction is used to produce soap and stabilize linseed oil when it is mixed with wild mustard seed oil. Once converted into fatty acid methyl esters, it represents a good substitute for imported petroleum diesel after alkaline transesterification reaction. In the current study, *Lepidium sativum* seeds cultivated in Tunisia and the physicochemical properties and nutrient profile of its cold pressed seed oil were investigated. Seed moisture was expressed as 2.63%, whereas protein contents, fibre, ash, fat, and total carbohydrates were determined as 24.55%, 8.5%, 5.37%, 23.2%, and 35.75% respectively. The physico-chemical properties of the cold extracted oil were evaluated for an iodine value of 165 g I_2/100 g of oil; a saponification value of 179 mg KOH/ g of oil; an acid value of 0.56 mg KOH/ g of oil, and a peroxide value of 2.4 meq/kg of oil. The general result is that *Lepidium sativum* may be considered as a valuable source of novel multi-purpose product concepts mainly in pharmaceuticals and personal care products.

Keywords*: Lepidium sativum seeds; chemical composition; cold extraction; oil properties.*

C. AFFICHE N° : 35.

ASSOCIATION STUDY OF GENETIC VARIANTS (RS3765945, RS6203) OF THE *HSD3B1* GENE WITH RECURRENT PREGNANCY LOSS

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Abstract : Recurrent pregnancy loss (RPL) is defined as two or more consecutive recurrent losses of pregnancy at an early stage. Currently, 50% of cases remain unexplained.
The 3b-hydroxysteroid dehydrogenase/isomerase (3b-HSD) enzyme plays a crucial role in the biosynthesis of all steroid hormones classes. 3b-HSD is encoded by two different genes *HSD3B1* and *HSD3B2*. An alteration in these genes could disrupt the hormonal balance that is a key factor in maintaining a full-term pregnancy.
Our cohort study consisted mainly in evaluating the association between the risk of RPL and certain polymorphisms affecting the *HSD3B1* gene of the Tunisian population (103 patients and 100 controls). We studied the allelic and genotypic frequencies of the rs3765945 and rs6203 of the *HSD3B1* gene; determined by a candidate gene approach as a predisposition gene for RPL. Genotyping was done by real-time PCR (TaqMan® allelic discrimination test) and statistical analyses were performed using a few bio-statistical software such as SPSS 24.0, Haploview 4.2 and SNPstats.
The allelic distribution of the two polymorphisms in the HSD3B1 gene showed a statistically significant association of the C allele of the rs3765945 T/C (P=0.0002; OR (95% CI) = 0.44 (0.28 - 0.68) and rs6203 T/C (P=0.0003; OR (95% CI) = 2.10 (1.39 - 3.19) variants with risk of RPL. The results also showed a positive association of rs3765945 (P<0.001) and rs6203 (P<0.001) variant genotypes with the pregnancy complication at issue.
Our results showed the contribution of risk alleles of the rs3765945 and rs6203 variants of the *HSD3B1* gene in RPL susceptibility.

Keywords*: RPL, HSD3B1, Genetic polymorphism, allele, RT-PCR*

C. AFFICHE N° : 36.

ACETYLCHOLINESTERASE INHIBITION BY MOLECULAR MODELING METHODS

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Abstract: Acetylcholinesterase, is the primary cholinesterase in the body. It is an enzyme which catalyzes the breakdown of acetylcholine and some of other choline esters functioning as neurotransmitters. AChE is found in the mainly neuromuscular junctions and in chemical synapses of the cholinergic type, where its activity serves to terminate synaptic transmission. And hence, inhibition of AChE has emerged as one of the most promising strategies for the treatment of AD. Different synthetic and natural inhibitors are used for Acetylcholinesterase inhibition. A series of quinoline derivative has been synthesized with a very high heterocyclic class in a wide range of biological activities. These derivatives have been shown to be selective inhibitors of Acetylcholinesterase (AChE) with IC50 values.

Molecular docking studies were performed with MDV Molegro , to derive the affinity and mode of binding of the inhibitors to the active site of the AChE. This work is to study the inhibition of AChE which is an enzyme involved in the Alzheimer's disease by methods of molecular modeling. These results will probably help in the development of an effective therapeutic tool in the fight against the development of Alzheimer's disease.

Keywords: *Acetylcholinesterase (AChE) enzyme; Alzheimer's disease (AD) ; Quinoline derivatives; molecular modeling .*

C. AFFICHE N° : 37.

POTENTIAL APPLICATION OF ESSENTIAL OIL OF LAVANDULA STOECHAS IN POULTRY MEAT DURING REFRIGERATED STORAGE

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Abtract : The inhibitory effects of essential oil on bacteria development give them an important role in the fields of the food industry as an additive in food packaging. This study was aimed to identify the effect of *Lavandula stoechas* essential oil at different concentrations on chicken fillets quality during refrigerated storage.
Antimicrobial and antioxidant activities showed that essential oil extracted has an important antibacterial activity and antiradical potential. In chicken fillets, the lavender essential oil (100 and 200 ppm) reduced their oxidation and microbial proliferation during refrigerated storage and with no cytotoxicity effect towards murine macrophage cells. During the storage period, the values of pH, dry matter, acidity and cooking loss of treated fillets were lower than that of the control. The statistical analyses proved greatly significant variations of color between the control and the treated by lavender essential oil, during storage. The sensory analysis selected an improvement effect in the organoleptic quality of the chicken meat when it was supplemented by 100 ppm of lavender essential oil. The statistical analysis of the microbiological characteristics clearly discriminated the control and those treated with lavender essential oil ($p<0.05$). The effectiveness of lavender essential oil was proved by its incorporation as a natural food preservative and the improvement of the shelf life of poultry meat products by about 3 days.

C. AFFICHE N° : 38.

GROWTH KINETICS, PROTEIN AND PIGMENT PRODUCTION FROM *CHLORELLA VULGARIS:* EFFECT OF DIFFERENT CELL DISRUPTION METHODS ON PROTEIN EXTRACTION

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Abtract : Microalgae are a valuable source of biomolecules that can be utilized as functional, nutritional and therapeutic commodities. While process optimization and integration are still required to extend commercial applications, diverse approaches have been taken to process and characterize microalgae-derived food products, such as protein and pigment content. This study presents the growth curves kinetics in terms of cell density and optical density to observe the growth rates and division per day. *Chlorella Vulgaris* isolated specie was mass cultured in BG11 culture medium. Different samples were taken from Chlorella cultures every 48 hours for 35 days to obtain the production kinetics of protein and pigment and to determine the optimal production phase of these biomolecules. In the second part, the microalgal structure has been investigated to evaluate the release of proteins in aqueous media from Chlorella after conducting different cell disruption techniques: manual grinding, freezing/thawing, sonication, and alkaline treatment. After conducting cell disruption, the protein concentration in water was determined for all the microalgae and the results are discussed within the context of their cell wall structure. It was found that the alkaline treatment and the freezing/thawing followed by sonication step improve the protein extraction from aqueous media. Understanding the mechanisms of production of biomolecules by microalgae can contribute to the development of applications of microalgae in food and nutraceutical fields.

Keywords: *microalgae, growth, kinetics, protein and pigment, protein extraction.*

C. AFFICHE N° : 39.

N370S (C.1226 A>G) MUTATION AMONG TUNISIAN PATIENTS WITH GAUCHER DISEASE

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Abstract: Gaucher Disease (GD) is a most common type among lysosomal storage disorders. It is an autosomal recessive, caused by deficiency of an enzyme ß-glucocerebrosidase (GBA).
The GBA activity was performed in leucocytes using the fluorescent substrate, 4–methylumbelliferone ß-glucoside. The amount of 4- methyl – Umbeliferone (4 –UM) was quantified using fluoremetric method (excitation length: 340 nm, emission: 495 nm). All patients were screened for four mutations in the GBA gene (N370S, 84dupG, IVS 2 (+1) G>A and L444P). All mutations were analyzed by Polymerase Chain Reaction (PCR) and Restriction Fragment Length Polymorphism (RFLP).
256 patients enrolled in our clinical laboratory of Biochemistry in Tunisia, were diagnosed for the GD. Only 15 presented GD (decreased activity of GBA, splenomegaly was found in 12 (80 %), hepatomegaly in 8 patients (53 %) and thrombocytopenia in 4 (26 %). Skeletal manifestations were detected in 4 cases (30%). Of the 15 individuals screened, 9 were found to be homozygotes for the N370S (*(c.1226 A>G)* mutation and two were found to be heterozygous for it. Then, two patients with the acute neuronopathic type who presented with hydrops fetalis harbored the L444P mutation.
The N370S mutation results in a catalytically deficient enzyme with normal or near normal levels.
According of several studies, Tunisian patients show a profile characteristic of the Arab and the south Mediterranean populations, with the N370S mutation being the most prevalent, succeed by the L444P, the D409H and the RecNCi I mutations.
The prevalence of the N370S mutation in Tunisian GD patients is one of the highest in Arab populations.
Keywords*: Gaucher Disease, ß-glucocerebrosidase, N370S, Genetic polymorphism, allele, PCR-RFLP*

C. AFFICHE N° : 40.

EXTRACTION, STRUCTURAL CHARACTERIZATION AND BIOLOGICAL ACTIVITIES OF WATER SOLUBLE POLYSACCHARIDE FROM *ERODIUM ARBORESCENS* LEAVES

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Abstract: A polysaccharide was isolated from *Erodium arborescens* leaves (EAPS) via ultrasound-assisted system in distilled water for 60 min with liquid/solid ratio of 5g /100 mL at 25°C. The structural characterization, functional properties, antioxidant activity and antimicrobial activity of EAPS were investigated. Chemical composition analysis revealed that EAPS was a pectin-like polysaccharide with uronic acid content (6.76%±0.17) and neutral monosaccharides (38.98± 0.71%) constituted mainly of galactose. Structural characterization was carried out using UV-vis analysis, Fourier transform infrared spectroscopy (FT-IR), and HPLC method. The results showed that EAPS essentially contains four functional groups: C=O, C-H, O-H, and C-H. Moreover, the monosaccharide composition revealed a biopolymer composed of galactose (6%), fructose (1.68%), xylose (0.4%), and galacturonic acid (91.8%). The biological activity evaluation showed a power inhibition against bacterial strains: *Klebsiella pneumoniae* ATCC 4352, *Staphylococcus aureus, Listeria, and Salmonella Hum 517 and also fungic strains: A. Niger, A. Alternata, F. graminearum, and F. culmorum*. In antioxidant assays, DPPH radical scavenging and ABTS activities at different concentrations revealed high antioxidant power comparable to synthetic antioxidants, encouraging their replacement in pharmaceuticals, cosmetics and food additives. Besides, IC50 values of EAPS were 0.04 µg/mL and 0.09 µg/mL using DPPH and ABTS tests, respectively. Furthermore, EAPS showed interesting functional properties (water and oil holding capacity, emulsion properties and surface tension capacity). Thus, the present study will involve the diversity and bioactivity of EAPS which could be a challenge in drug discovery and a promising natural source of food additives.
Keywords: *Antioxidant and antimicrobials activities, characterization, Erodium arborescens leaves, functional properties, polysaccharide.*

C. AFFICHE N° : 41.

POTENTIAL RISK FACTORS FOR CORONAVIRUS DISEASE 2019 (COVID-19) : A RETROSPECTIVE STUDY IN ALGERIA

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COVID-19 is viral pneumonia caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), it was first reported in the city of Wuhan, in the Chinese province of Hubei, and then it spread worldwide.

Our work consists of realizing an epidemiological study on the Covid-19 disease in the area of Tebessa, as well as to evaluate and establish a link between the sociodemographic, clinical and epidemiological characteristics in order to understand the risk factors associated with elevated risk of COVID-19 infection and severity of the infection. This is a descriptive retrospective study conducted on a sample of 1,500 cases of COVID-19 in the area of Tebessa, reported to the Epidemiology and Preventive Medicine Department.

The median age was 46 years, The most infected cases are 60 years old with over 339 (26.6%) cases. 435 (29%) cases made contact with a confirmed case. Diabetes, hypertension, asthma are the most common pre-existing illnesses. Fever, asthenia and cough are the most reported symptoms (72.1%), (57.4%) and (50.5%) respectively. 1112 (74.1%) cases are confirmed positive by PCR, 118 (12.5%) cases confirmed positive by CT, 118 (12.5%) are positive by both tests, 4 (0.3%) cases positive by PCR and negative by CT, 8 (0.5%) are negative by PCR and positive by CT. 106 cases are vaccinated.

The majority of 650 cases (43.3%) went to see a doctor within a day of showing signs of illness.

As a conclusion, advanced age, male gender and presence of comorbidity were potential risk factors associated with covid-19 infection.

***Keywords**: COVID-19, SARS-CoV-2, pandemic, epidemiology and risk factors.*

BIOLOGIE, PHYSIOLOGIE ET ECOLOGIE ANIMALE

C. AFFICHE N° : 42.

IMPACT OF THE CLIMATE CHANGE ON THE DISTRIBUTION OF THE ATLAS PIED FLYCATCHER FICEDULA SPECULIGERA

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Abtract : At the northern Africa, endemic avifauna, including the Atlas Pied Flycatcher Ficedula speculigera, are strongly influenced by global climate change. In this context, the integration of climate forecasts, greenhouse gas release scenarios and the spatial occurrence of the flycatcher show that the species is currently in balance with climatic conditions. However, by 2050, it will probably show a loss of its suitable niches, located on the side of the coastal forests, with a displacement of the breeding populations towards the interior of the national territories. This modeling provides essential information for the implementation of conservation and management plans for the Atlas Pied Flycatcher as well as all forest birds.

Mots clés : *climate change, cavity-nesting species, distribution, ecological niche modeling.*

C. AFFICHE N° : 43.

EVIDENCE OF MIGRATORY PROTANDRY OF GOLDEN ORIOLES (*ORIOLUS ORIOLUS*) IN A SPRING STOPOVER SITE IN SOUTHERN TUNISIA

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Abstract : In migratory birds, males often arrive at breeding grounds earlier than females. This migratory protandry could also be expected to occur in migratory stopover sites, but empirical evidence are lacking. In this work we investigated this hypothesis by using data on the stopover of the Golden oriole (*Oriolus oriolus*), a common trans-Saharan palearctic passerine, in a southern Tunisian oasis during spring migration. Birds were captured daily by mist nets throughout the migratory passage period (April-May 2020) and their morphometric measurements were recorded. In total, we captured 76 birds including 37 females and 39 males. There was a significant difference in the capture date between sexes, as males were earlier than females. When comparing the morphometric traits between the two sexes, we found that males were characterized by larger wings compared to similar-sized females. This morphometric difference may explain the observed migratory protandry, as larger wings may allow males to cross the Sahara and reach stopover sites faster than females.

Key words: *oasis, Oriolus oriolus, migration, phenology, protandry*

C. AFFICHE N° : 44.

LA FAUNE DE CULICOIDES (DIPTERA: CERATOPOGONIDAE) DANS LA REGION DES HAUTS PLATEAUX DE L'OUEST ALGÉRIEN

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Abtract : Bluetongue (BTV) is an almost vector-borne viral disease, including the virus (BTV), which mainly infects domestic and wild ruminants, thus representing a major threat to animal health and even the economy. Transmission occurs through the bites of female small hematophagous midges of the genus Culicoides (Diptera: Ceratopogonidae). The unexpected emergence of bluetongue in Algeria since the year 2000, and even observing outbreaks in neighboring countries requires a lot of vigilance.
The persistence of the disease in some regions of the country encouraged a study on *Culicoides* in the region of Tiaret in western Algeria. The objective of this study is to identify the species that could be incriminated or potential vectors in the transmission of BTV in the region. To do this, sampling took place on capture sites including breeding farms. Culicoides were collected by OVI-type light traps during a period from 2015 to 2018. Identification of specimens to species level was achieved by morphological and molecular approaches. In total, 36 species belonging to the 10 subgenera have been determined, of which 10 species are new to the fauna of Algeria, namely: *C. chiopterus*, *C. dewulfi*, *C. navaiae*, *C. grisescens*, *C. paradoxalis*, *C. shaklawensis*, *C. simulator*, *C. univittatus*, *C. achrayi* and *C. picturatus*. This study was able to update the list of *Culicoides* in Algeria by currently counting 59 valid species. This fauna includes species widely distributed in the Palearctic and Mediterranean region but also some species from the Afrotropical region. Among these species in particular which belong to the genus *Avaritia* and *Culicoides* are considered as confirmed or probable vectors for the transmission of important pathogenic arboviruses.

Keywords: Culicoides, Blue tongue, Vector-borne diseases, new species, Algeria.

C. AFFICHE N° : 45.

LA FRAGMENTATION DE L'ADN ET LA DECONDENSATION DE LA CHROMATINE DANS LE CAS *DES OLIGO-ASTHENO-TERATOZOOSPERMIES*

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L'infertilité, représente un réel problème de santé publique et, est considérée comme une pathologie à part entière. L'infertilité comme définie par l'OMS (Organisation Mondiale de la Santé) est l'incapacité d'un couple à procréer ou à mener une grossesse à terme après un an ou plus de rapports sexuels réguliers et non protégés. Dans un tiers des cas la cause est due à un facteur féminin, dans un tiers des cas à un facteur masculin et dans le tiers restant il s'agit de la combinaison de facteurs féminin et masculin. Près de la moitié des cas d'infertilité seraient donc due à une infertilité masculine (*World Health Organisation*, WHO 2021). L'incidence de l'infertilité masculine aurait augmenté parallèlement à la dégradation de la qualité du sperme. Les causes sont multiples et le stress oxydant est considéré comme un agent important dans la dégradation de la fertilité masculine. Contrairement aux cellules somatiques, les spermatozoïdes sont particulièrement sensibles au stress oxydant (faible volume cellulaire, antioxydants limités, membrane riche en acides gras polyinsaturés...) qui peut conduire à des cassures de la molécule d'ADN des spermatozoïdes.

La capacité des spermatozoïdes à féconder et à produire un embryon de bonne qualité avec un fort potentiel d'implantation et de développement dépend donc de la qualité et de l'intégrité de son ADN. L'absence de fragmentation et/ou de la décondensation de la chromatine reste un critère de qualité du spermatozoïde.

Au cours de ce travail nous avons étudié la fragmentation de l'ADN (structure primaire et secondaire) et la décondensation de la chromatine (structure tertiaire) du sperme dans le cas des oligo-asthéno-tératozoospermies.

Les spermogrammes ont été réalisés et analysés conformément aux directives de l'OMS (Manuel de la 6ème édition, 2021). Le comptage se fait par une méthode semi-automatisée à l'aide du logiciel *Sperm-Class-Analyzer* (CASA-*Computer-Assisted Sperm-Analysis* (Microptic®)). La normozoospermie a été déterminée lorsque la motilité progressive des spermatozoïdes est ≥ 32%, la concentration des spermatozoïdes ≥ $15x10^6$/mL et la morphologie des spermatozoïdes≥ 4 %. La fragmentation de l'ADN a été détectée en utilisant le kit *Gold Cyto Sperm®* (*Goldcyto Biotech corp*.).

L'indice de fragmentation de l'ADN était significativement plus élevé chez les groupes de patients présentant une oligospermie, une asthénospermie et une tératospermie par rapport au groupe de patients normospermiques (27.21 ± 11.57; 24.11 ± 9.47; 19.14 ± 9.16 vs 12.15 ± 8.77 respectivement). Les mêmes observations sont obtenues pour le groupe de patients avec une oligo-asthéno-tératozoospermie (21.13 ± 10.15 vs 12.15 ± 8.77 respectivement).

Chez les patients présentant un spermocytogramme pathologique, l'indice de fragmentation de l'ADN est négativement corrélé à la mobilité progressive, à la mobilité totale et à la concentration totale des spermatozoïdes. Des résultats similaires sont obtenus avec la décondensation de la chromatine des spermatozoïdes chez les différents groupes de patients.

Ces résultats sont en accord avec ceux de la littérature qui montrent que le sperme avec une concentration et une mobilité réduite et une morphologie anormale ont des niveaux plus élevés de fragmentation de l'ADN. De plus, récemment l'étude de Jakubik-Uljaszstudy et al. (2020) pourrait confirmer nos résultats lorsqu'ils ont conclu que des défauts structurels détaillés des spermatozoïdes coexistent avec une dispersion anormale de l'ADN nucléaire des spermatozoïdes et que les hommes atteints de tératozoospermie peuvent avoir un risque plus élevé de dommages de l'ADN des spermatozoïdes.

Nos résultats devraient intéresser les chercheurs des Sciences de la Reproduction qui souhaitent améliorer les investigations sur l'origine de l'infertilité, en particulier lorsqu'elle vient du côté masculin.

Références:

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C. AFFICHE N° : 46.

SURVIE DES NIDS ET TAUX D'ÉCLOSION CHEZ LE GRAVELOT À COLLIER INTERROMPU (CHARADRIUS ALEXANDRINUS) DANS LE GOLFE DE GABÈS

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Résumé : La reproduction est généralement considérée comme une fonction très coûteuse en termes d'énergie. En effet, l'investissement et le succès reproducteur varient en fonction de l'individu et la qualité de l'environnement. Dans ce contexte, l'objectif de ce travail était d'étudier la survie et le succès d'éclosion des nids du Gravelot à collier interrompu (Charadrius alexandrinus) nichant dans le golfe de Gabès. Pour ce faire, 56 nids ont été marqués et suivis durant le printemps et l'été 2022. Nos résultats montrent que la probabilité de survie journalière des nids était plus élevée chez les nids précoces que les nids tardifs. En effet, 72% des nids qui ont été pondus au début de la saison de reproduction ont abouti à l'éclosion, alors que seulement 28% des nids tardifs ont abouti à l'éclosion. De même, le succès d'éclosion des nids était plus élevé au cours de deux dernières semaines d'incubation qu'au début. En outre, la probabilité de survie journalière, ainsi que le taux d'éclosion variaient également en fonction de la taille de ponte, dans la mesure où les nids à 3oeufs avaient plus de chance d'arriver à l'éclosion que les nids ayant moins de 3 oeufs. En conclusion, nos résultants montrent que le succès reproducteur est fonction de l'investissement parental.

Mots clés : *Gravelot à collier interrompu, Charadrius alexandrinus, Golfe de Gabès, Nidification.*

C. AFFICHE N° : 47.

EFFECT OF NITROGEN SOURCE ON METABOLIC ACTIVITY OF THE MAIN BACTERIAL GROUPS OF THE BOVINE RUMEN

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Abtract : Our work has focused on the study of the effect of different sources of organic and inorganic nitrogen on the metabolic activity of the main functional groups of bacteria from bovine rumen. We performed several *in vitro* fermentations using rumen fluid taken from cattle, as inoculum, using various energy sources in the presence of different nitrogen sources. The first step is to exhaust residual nitrogen and energy in the inoculum. Anaerobic incubation lasted from**5** to **6** hours following gas production. The second step of the fermentations was carried out using different energy sources each with different nitrogen sources. Monitoring the fermentation is effected by the volumetric measurement of gas production. Results shown that rumen bacterial group witch rapidly degrade plant polymers such as pectin **(lag 0,01h)**, starch **(lag 0,01h)** and hemicellulose **(lag 0,04h)** are able to use the four nitrogen source while the bacterial groups that degrade cellulose and protein, getting slower energy **(lag 16,06 h)** and are less stimulated by these nitrogen sources. Organic nitrogen sources stimulate more metabolic activity of ruminal microorganisms than inorganic sources. Yeast extract stimulates more pectinolytic group **(606.6 ml)**, than sodium glutamate **(452,1ml),** ammonium bicarbonate **(350,8 ml)** and potassium nitrate **(497,4 ml).** KNO3 has shown some inhibition of metabolic activity especially in cellulolytic groups (24.6 ml) and proteolytic **(99 ml)**. pH varied between **5.25** and **7,11** and decreased to **5,25** when yeast extract was used by amylolytic group as nitrogen source and increased to **7,11**, when adding ammonium bicarbonate to xylanolytic bacterial group. In conclusion, organic and inorganic alternative nitrogen sources may be used with rations for ruminants composed of fibrous feed for the first sources and for less fibrous for the second nitrogen sources.

Mots clés : *in vitro fermentations, Yeast extract, sodium glutamate, plant polymers.*

C. AFFICHE N° : 48.

FIELD OBSERVATIONS ON THE LIFE OF GORDIID (PHYLUM NEMATOMORPHA), A TERRESTRIAL NEMATOMORPH IN THE NATIONAL PARC OF THENIET EL HAD.

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Abtract : the Nematomorpha, known as hair worms, is a relatively understudied metazoan phylum. Although nematomorphs specializing solely on a parasitic life style. Little attention has been focused on this enigmatic group scientifically. To date, all free-living adult hairworms have been reported from aquatic habitats. However, recently a gordiid, namely Gordius terre-stris, has been documents from terrestrial habitats. We found that an unidentified species of gordiid exists also in the soil of Theniet El Had National Park. The recoverd *Gordiid* were then studied using the direct manual sorting method (TSBF) with seasonal sampling. During our study we found that the density of Gordiid 28.6 ind/m^2 find on average in the National Park of Thaniet El Had, the seasonal dynamics of Gordiid is marked by the movement of this group between strata of soil (10 to 30) cm to the litter in spring, this may be for reproduction, the larval stage of this group requires an insect host in the Orthoptera or Coleoptera, are infected when consuming cysts of Gordiodae. From our results we assume that the soil moisture in spring facilitates the movement of Gordiid and the abundance of insects during this season are favorable conditions for females to produce eggs, and more chance for cysts to be incubated in insect hosts.

C. AFFICHE N° : 49.

COMPARISON BETWEEN THE INSECTICIDAL EFFECT OF THE AQUEOUS SOLUTION AND THE ESSENTIAL OIL, BOTH EXTRACTED FROM THE CYPRESS PLANT *CUPRESSUS SEMPERVIRENS,* AGAINST THE PINE PROCESSIONARY CATERPILLAR.

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Summary: The pine processionary caterpillar *Thaumetopoea pityocampa* is the most important pest of pine and cedar forests in Algeria and over the world. The destructive impact of the insect is mostly observed during the larval stage that usually extends from September to April in five different instars. The caterpillars feed on pine or cedar needles during this period of the year, which can weaken the photosynthetic process of the trees, and leads after many years to their death.

Several control methods are used to reduce the harmful effect of the processionary caterpillar on our forests. Among these methods, biological control, using bio-pesticides seems to be more respectful of the environment.

In this context, we evaluated the effect of two bioactive molecules extracted from the cypress plant *Cupressus sempervirens* on the processionary caterpillar's mortality. The first one is the aqueous solution, extracted from the plant needles, by a Soxhlet-Rotavapor technique, and the second one is the essential oil of the same plant obtained from pharmaceutical laboratory. Doses of 04, 02 and 1 g/l are prepared for each molecule, and tested on the 4th instar of *Thaumetopoea pityocampa*.

The results obtained showed that the two molecules recorded a good larvicidal effect, with greater efficiency for the essential oil. In fact, the toxicological tests using the essential oil resulted in 100% mortality of the population after only six day of the treatment. Lethal concentrations (LC 50% and CL 90%) and regression equations are also estimated for each molecule after four and seven days of the treatment.

Keywords*: Cupressus sempervirens, Thaumetopoea pityocampa, caterpillars, larvicidal effect, instar, bio-pesticides.*

C. AFFICHE N° : 50.

STUDY OF THE OLFACTORY AND GUSTATORY SENSILLA OF DOCIOSTAURUS MAROCCANUS (THUNB., 1815) (ORTHOPTERA, ACRIDIDAE)

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Summary : The gustatory perception is an essential sense for all insects, allowing them to detect both food substances (sugar, salt, lipids, amino acids) and potentially toxic substances dissolved in aqueous solution or adsorbed on surfaces (leaf, cuticle).
The study of the organs involved in chemoreception: olfactory and gustatory sensilla at the level of wrasses and antennae, in *Dociostaurus maroccanus* Thunb, 1815 (Orthoptera, Acrididae), was undertaken in the laboratory on a gregarious population from the region of Marhoum harvested (Wilaya of Sidi Bel Abbes). She demonstrated that the most important sensilla are the sensilla forms 3 and 4 and the number of sensilla of males is higher than that of females. Thus, the sensilla of forms 1 and 5 are more numerous in males and the numbers of sensilla of the other forms 2, 3 and 4 are similar in both males and females. It can be seen that there are two predominant categories of sensilla (zone A1 and zone A2) and two other categories of antennal sensilla (zone A3 and Zone A10) which are less represented. We can also note a certain similarity in the numbers of sensilla of each category in males and females.
We can hypothesize that there is a relationship between the variation in the number of taste senses and the diet of locusts.

Keywords: *Sensilla, Dociostaurus maroccanus, locust-plant, olfactory, gustatory*

C. AFFICHE N° : 51.

EFFET DES ECTOPARASITES SUR LA CONDITION CORPORELLE DU LÉZARD TACHETÉ (*ACANTHODACTYLUS MACULATUS*)

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Résumé : Comme tous les vertébrés, les lézards jouent le rôle d'hôtes définitifs ou intermédiaires pour de nombreux parasites et en subissent des conséquences plus ou moins néfastes, en termes d'état de santé et de condition corporelle. Dans ce contexte, l'objectif de ce travail était d'étudier l'effet de l'infestation par des ectoparasites *Trombicula spp* sur la condition corporelle du lézard tacheté (*Acanthodactylus maculatus*) vivant dans la région de Gabès. Pour ce faire, 99 lézards ont été échantillonnés durant le printemps et l'été 2020. Chaque lézard a été minutieusement inspecté à la recherche d'ectoparasites, puis ses mensurations ont été relevées et un échantillon sanguin lui a été prélevé pour la détermination de la formule leucocytaire. Un indice morphométrique de condition corporelle (BCI) a été calculé comme étant le résidu de la régression linéaire du poids en fonction de la longueur museau-cloaque (données transformées en log). Nos résultats montrent d'abord une prévalence parasitaire de 37%. Ils montrent également que l'infestation parasitaire s'accompagne d'une réduction significative du BCI et d'une prolifération des leucocytes éosinophiles. Ces deux effets sont des manifestations remarquables de l'activation de la réponse immunitaire antiparasitaire. En conclusion, notre travail met en évidence un lien entre l'infestation par des ectoparasites du genre *Trombicula* et l'altération de l'état de santé des lézards.

C. AFFICHE N° : 52.

EFFECT OF OILY AND AQUEOUS NATURALS EXTRACTS ON THE GROWTH AND REGROWTH OF RATS HAIR

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Abtract : The present study aimed to study the effects of three natural extracts on the growth and regrowth of hair in shaved rats on their backs for two months. The first oily extract (EV) is a mixture of several extra virgin oils and essential oils such as castor, jojoba, arugula, mustard, rosemary, clove,…, the second extract (EM) is a maceration with oil of olive from several medicinal plants such as nettle, rosemary, amla, brahmi, cedar, sage,. The third extract (CA) is a mixture of several hydrosols of medicinal plants and essential oils (rosemary, lavender, peppermint, etc.) enriched with cosmetic active ingredients and vitamins (provitamin vit B5, caffeine, etc.) which have an effect on hair growth and the prevention of hair loss. Methods: I took six groups of rats each of them contains 3 rats, the first group is considered as a control, the second group is treated with CA daily without rinsing, the third group is treated with EV, the fourth group is treated with EM, the fifth group is treated with CA+EV and the sixth group is treated with CA+EM. For the groups treated with oily extracts (EM, EV), the application is made on the part of the back that is shaved twice a week for two hours then rinsed with a natural shampoo without sulfates, parabens or silicones. Results: Our results showed that the first group of rats that were treated with CA grew their hair better compared to the control group. the third group their hairs grow less than that of the second group while the fourth group presents a better growth of their hairs. the fifth group their hairs grow less than that of the sixth group. It should be noted that the CA aqueous extract and the EM oily extract promote hair growth and growth better than the EV oily extract during a two month treatment.

Key words : *hair loss, hair growth, hair regrowth, oily extract, aqueos extract*

C. AFFICHE N° : 53.

OLFACTORY SYSTEM AND BEHAVIORAL AND IMMUNE DISTURBANCE UNDER NASAL OBTURATION IN THE WISTAR RAT

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Abstract : The living world is dominated by visual and auditory sensations. In some species, such as rodents, the sense of smell is an extremely developed and vital sense, it is a considerable source of information about the world around them. This ability to detect odors will allow rats to find food, communicate with each other, or even detect predators. In order to know if the absence of olfaction was likely to influence the exploratory activity of investigation and orientation, could cause stress that would disturb the development of the individual, a bilateral nasal obturation (ON) was induced in young rats of the Wistar strain on the 8th postnatal day. Its consequences were examined 24 hours after the treatment (D9), at the end of the period of obstruction (D15) and six days after the reopening of the nostrils (D21). Behavioral and biological studies were carried out. Our results show that nasal obturation affects exploratory behavior at different levels and these changes could have more or less long-term behavioral repercussions. Nasal plugging involves social stressors that have immune impacts that last for at least 21 days. Nasal obturation has various deleterious effects that may be increased during the developmental period. For the rat, this procedure therefore constitutes a multifactorial stressful situation.

Keywords*: Nasal Obturation, Anxiety, Exploratory Behaviour, Immune System, Lymphocytes, Wistar Rat.*

C. AFFICHE N° : 54.

ETUDE COMPARATIVE DES PEUPLEMENTS DE SCARABÉIDÉS COPROPHAGES DANS DEUX MILIEUX DIFFÉRENT (OUVERT/FERMÉ) DANS LA RÉGION D'AMIRA ARRES- MILA.

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Résumé : Une étude comparative des communautés de Scarabéidés coprophages a été réalisée, dans la région d'étude Amira Arres au nord de la wilaya de Mila, sur une période de 10 mois entre le mois juillet 2018 et le mois Avril 2019. deux sites déférent ont été choisis (site ouvert et site fermé), L'échantillonnage a était réalisé en utilisant des pièges de type CSR, l'effort d'échantillonnage nous a permis de capture de 9813 spécimens appartenant à 30 espèces, La richesse spécifique et L'abondance de chaque guilde (rouleurs, fouisseurs et résidents) varie peu d'un site à l'autre (entre 26 espèces dans le site ouvert et 21 espèces dans le site fermé), cette variation peut être due a des conditions climatique spécifique dans chaque milieu notamment, la nature du sol, la structure de végétation, la disponibilité et l'abondance des ressources trophiques et la structure du milieu (l'ouverture ou la fermeture).

Mots clés : *Amira Arres « mila », Scarabéidés coprophages, guildes, fouisseurs, rouleurs, résidents, site ouvert, site fermé.*

C. AFFICHE N° : 55.

IMPACT OF NEEDLE SIZE ON THE ONSET AND THE PROGRESSION OF DISC DEGENERATION IN RATS

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Abtract :

Background: Numerous animal models of intervertebral disc (IVD) degeneration have been proposed in the literature. The rat caudal disc has been used in disc degeneration studies because of its low cost and simplicity. However, no consensus on the size of the needle to be used during this process has been reached, yet.

Objectives: This study aims to select an optimal needle size to establish a reproducible IVD degeneration model.

Study Design: This is a randomized, experimental trial.

Setting: Cell therapy and experimental surgery of musculoskeletal system LR18SP1 Lab, The Faculty of Medicine of Sfax, Tunisia.

Methods: The validity was verified by magnetic resonance imaging (MRI), histological, and immunohistochemical examinations.

Results: The MRI, histological, and immunohistochemical examinations showed that a disc that is perforated with a 21G needle degenerated acutely one week after the surgery, while a 29G needle puncture failed to develop disc degeneration. A 25G needle induced progressive degeneration in the IVD.

Limitations: This study was not very long (6 weeks).

Conclusions: We conclude that the size of the needle affects the onset and the progression of disc degeneration;, a larger needle size leads to a more extended histological and radiographic degeneration within the IVD and in a relatively short time. Therefore, a 21G needle is an optimal choice to induce rapid degeneration in rats' caudal discs. However, the use of a 29G needle failed to establish a degenerative IVD model, which makes it ideal for IVD injection of drugs, plasmids, and growth factors. A 25G needle may be used to induce gradual degeneration.

Mots clés : *Degenerative intervertebral disc, different needle sizes, caudal spine, animal model, optimal choic.*

C. AFFICHE N° : 56.

DAIRY CATTLE MANAGEMENT IN ALGERIAN SEMI-ARID CONDITIONS.

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Abstract: For several years, Souk Ahras region has occupied a very advanced rank in dairy production; it constitutes one of the principal dairy basins in the east of the country. However, it still knows a significant imbalance of supply in relation to demand, particularly in the south where the climate is semi-arid. So in order to describe the breeding management and techniques, we carried out a study using a participative survey in 61 of semi-arid region dairy farms. Results revealed an average herd size of 11.5 ±5 heads with 7 ±3.5 cows including crossbred, purebred and autochthones cattle. Feeding is based on fodder complemented with 6-12kg/c/d of concentrate, with controlled watering frequency of +1 time/day.
Concerning reproduction conduct, farmers prefer inseminate their heifers at an age >15 months, via natural mating which is the most common mode of reproduction. 57.4% of the dairy farms had a calving-first insemination interval (C-AI1) >60days, as a result, the inter-calving interval (ICI) average was 400 ±34.3 days. Regarding the fertility statue; 88% of cows need 1-2 inseminations to conceive. In the majority of farms, pregnancy diagnosis is based on the absence of heat within 45 days post insemination.
Under mediocre conditions, the milking is mechanical in almost all farms, and a part of produced milk whose main destination is dairies (marketing), is always reserved for calves until late weaning (>3 months). It is worth noting that dry period is about 45 to 60 days in 65.6% of farms.
According to these results, it seems that conduct strategies and breeding management need improvement to better exploit the dairy potential available.

Keywords: *Cattle breeding, Semi-arid zone*.

C. AFFICHE N° : 57.

ADJUSTMENT OF VON BERTALANFFY GROWTH MODEL USING BAYESIAN APPROACH, CASE OF *POMATOMUS SALTATRIX* (LINNAEUS, 1766) ALONG THE EASTERN COAST OF TUNISIA

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Abstract : Many functions are used for growth modeling, but the mainly used model in stock assessment is the Von Bertalanffy growth function (VBGF). For this reason, a VBGF adjustment was settled for *Pomatomus saltatrix* (Linnaeus, 1766) to improve the growth parameter estimation.
A total of 288 individuals (158 females, 103 males and 27 unsexed individuals) was collected over a period of 12 months from July 2020 to June 2021, along the eastern coast of Tunisia (Mediterranean Sea). The individual ageing data was carried out from the whole otolith under binocular with transmitted light. For each sex, length-weight relationship (LWR, W: total weight±1g; L: total length±0.1 cm) is showing $W = 0.011*L^{2.974}$ ($R^2 = 0.952$, $p < 0.05$) for female, $W = 0.014*L^{2.897}$ ($R^2 = 0.926$, $p < 0.05$) for male and $W = 0.093*L^{2.205}$ ($R^2 = 0.819$, $p < 0.05$) for all individuals. LWR presented an isometric growth by sex. The use of Markov Chain Monte Carlo chains and the back calculation optimized the accuracy of model fitting the observed data. This approach was applied to the Von Bertalanffy growth model for *Pomatomus saltatrix*. The estimated Von Bertalanffy growth parameters were $L\infty = 31.63 \pm 1.32$ cm, $K = 0.46 \pm 0.04$ year^{-1} for female and $L\infty = 30.33 \pm 1.31$ cm, $K = 0.49 \pm 0.05$ year^{-1}for male. The new parameters will be useful in the stock assessment methods and subsequently in fishery management decision making.

Key words*: Pomatomus saltatrix; Whole otolith; Ageing data; Von Bertalanffy; model adjustment; Bayesian approach, Mediterranean Sea.*

C. AFFICHE N° : 58.

IMPACT D'UN RÉGIME HYPERGRAS SUR L'HISTOPATHOLOGIE CARDIAQUE CHEZ UN MODÈLE DE DIABÈTE DE TYPE 2, LE *PSAMMOMYS OBESUS*

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Résumé

De nos jours, les pathologies associées à l'accumulation des lipides dans l'organisme humain, telles que l'obésité ou l'athérosclérose, favorisent le développement des atteintes cardiaques affectant la structure et le fonctionnement du cœur.

Le but de ce travail est d'étudier l'impact d'un régime hypergras (RHG), riche en huile de palme, pendant 3 mois sur l'histopathologie du cœur d'une part, et d'autre part sur la production *in situ* des espèces réactives d'oxygène (EROs) chez le rat des sables *Psammomys obesus* (*P.obesus*).

12 *P. obesus* ont été séparés en deux groupes : un groupe control nourri avec un régime naturel (RN) et un groupe nourri avec un régime supplémenté en huile de palme (RHG). Après 12 semaines, le profil lipidique a été évalué. Les échantillons de cœur prélevés ont été soumis aux techniques histologiques classiques suivies d'une étude morphométrique afin d'évaluer les résultats qualitatifs obtenus. L'évaluation de la production *in situ* des EROs a été réalisée à l'aide du dihydroethidine.

Nos résultats ont montré que le RHG a induit le développement d'une dyslipidémie marquée par l'augmentation de la cholestérolémie et la triglycéridémie. L'étude structurale du myocarde, chez les *P.obesus* soumis au RHG comparés à ceux soumis au RN a montré plusieurs remaniements histologiques marqués par une densification de la trame réticulinique interstitielle, une inflammation chronique à prédominance lymphocytaire au niveau du myocarde, une hyperplasie des cellules musculaires lisses de la paroi vasculaire et parfois une atrophie des cellules musculaires cardiaques. En outre, une augmentation de la production des EROs a été observé au niveau du myocarde des rats soumis au RHG.

Ce travail indique l'effet délétère d'un régime hypergras sur l'histopathologie cardiaque ce qui nous amène à chercher le mécanisme moléculaire mis en jeu.

C. AFFICHE N° : 59.

DELAYED EFFECTS OF SPINOSAD ON SEXUAL BEHAVIOUR AND OVIPOSITION OF DROSOPHILA MELANOGASTER (DIPTERA; DROSOSPHILIDAE).

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Drosophila is a diptera that offers many advantages for research, its small size, its ease of breeding, its short reproductive cycle (10 days at 25 ° C) and the power of the genetic tools available make it a privileged model of study in biology. Despite all its advantages it also has harmful effects for humans.

In order to improve biological control and limit the risks caused by this fly we proceeded to the study of sexual behavior and oviposition.

At the end of the series of tests that we carried out in our laboratory, it resulted in treatments with the sublethal dose of bioinsecticide Spinosad during the larval stage of Drosophila melanogaster cause changes and disturbances on sexual behavior and inability to mate and for oviposition the fly prefers to lay its eggs in the artificial culture medium used for mass breeding when the second choice of the laying place contains the culture medium added the Spinosad, their choice is random they act on the number of eggs laid.

Keywords *:D rosophila melanogaster, Sexual behavior, oviposition, sublethal dose Spinosad*

C. AFFICHE N° : 60.

PRICKLY PEAR SEEDS AQUEOUS EXTRACT INHIBITS HUMAN NEUTROPHILS *IN VITRO* ROS SCAVENGING ACTIVITY

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Abstract : Oxidative stress and the inflammatory reaction are potential actors in many pathologies, in particular gastrointestinal diseases such as ulcerative colitis. The prickly pear (*Opuntia ficus indica L.)* fruit considered a health food but it also used as a therapeutic food because of its antioxidant properties and its richness in phenolic compounds. These bioactive molecules are known for their antioxidant and anti-inflammatory properties and may play an interesting role in preventing intestinal inflammation.
The present study was to evaluate effects of prickly pear seeds aqueous extract (PSAE), on ROS production by human neutrophils as well as its effects on glacial acetic acid-induced colon inflammation in mice in vivo.
We analyzed the effect of PSAE on ROS production in vitro by resting and PMA-stimulated human neutrophils using luminol-enhanced chemiluminescence and on superoxide anion generation detected by cytochrome c reduction assay. H_2O_2 was detected by DCFH fluorescence assay. The effect of PSAE was tested in vivo on acetic acid-induced mice colon inflammation. However, PSAE (1, 10, and 1000 mg/kg body weight) was given by oral administration for 7 days before treatment with acetic acid. Colitis was induced on the 8th day by the infusion of acetic acid (3% v/v, 10 mL/kg b.w.) by using a polyethylene tube, inserted in rectum up to a distance of 3 cm. Animals were sacrificed one days after acetic acid injection . The colon, liver and kidney were carefully removed. Colons were washed in 0.9% NaCl and theirs lengths and weights were measured. Portions of Colons were homogenized with sodium phosphate buffer, centrifuged, then, the supernatant was used for oxidative stress markers measurement and for histological evaluation. Liver and kidney were rapidly homogenized in phosphate buffer saline and after centrifugation, supernatant was used for biochemical parameters. Blood was likewise collected in heparinized tubes and after centrifugation, plasma was also stored at -80 °C.
Ours results show that prickly pear seeds aqueous extract (PSAE) inhibits luminol-amplified chemiluminescence of resting human neutrophils stimulated by PMA and that it is able to scavenge superoxide anion and hydrogen peroxide. PSAE reduces slightly MPO activity and expression. More importantly, this extract reduced the phosphorylation of $ERK_{1/2}$ induced by PMA and of Ser-320 in neutrophils stimulated. PSAE also inhibited lipocalin release by human neutrophils in a concentration-dependent manner. However, treatment of mice *in vivo* with increasing doses of PSAE recovered colon weight gain in a dose-dependent manner, prevented colonic shortening, and reduced the severity of colonic lesions and biochemical alterations.....
Our study suggest that cactus fruit seed aqueous extractdoes not affect *in vitro* ROS production by human neutrophils, slightly reduces MPO activity and inhibits p47phox phosphorylation on Ser-320 in a concentration-dependent manner in PMA-stimulated neutrophils.

C. AFFICHE N° : 61.

RENAL HISTOPATHOLOGICAL CHANGES IN STREPTOZOTOCIN DIABETIC GERBIL

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Abstract : Diabetic nephropathy is a leading cause of end-stagerenal disease in diabetic patients. The present work is aimed at studying the effects of high dose of streptozotocoin (STZ) on kidney architecture of a nocturnal desert rodent, gerbil *Gerbillus gerbillus*. Gerbils were divided into 2 groups:
Control group (n=6) received IP injection of sodium citrate buffer.
Experimental group (n=6) received IP injection of a single dose of STZ at 130 mg/kg body weight dissolved in freshly prepared sodium citrate buffer.
We observed that STZ administration caused a significant increase in plasmatic glucose, plasmatic lipid profil and creatinineamia. Furthermore, histopathological study showed renal changes with tubular and glomerular damages.
These results indicate that STZ induced biochemical and structural changes in kidney that characterize diabetes. *Gerbillus gerbillus* could be considered as an interesting model for the study of diabetic complications

Mots clés : *Gerbille, STZ, diabete, rein, histologie*

C. AFFICHE N° : 62.

LES HELMINTHES PARASITES DU ROUGET DE ROCHE *MULLUS SURMULETUS* (LINÉE, 1758) DANS LE LITTORAL EST ALGÉRIEN (GOLF D'ANNABA)

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Mots clés : Mullus surmuletus, helminthes, indices parasitaires, baie d'Annaba, Algérie

Abtract : The objective of this study is to qualitatively and quantitatively determine the helminth communities identified by the study of parasitic diversity in the host species *Mullus surmuletus* and to describe the epidemiological parameters by calculating parasitic indices.
The composition of the parasitic fauna was determined from the examination of 37 red mullet fish *M. surmuletus* during the period from March to April 2022, in Annaba Bay in eastern Algeria.
147 parasites were collected belonging to the various systematic groups: Three species of nematodes *Hysterothylacium sp*, *Hysterothylacium fabri* and *Ascarophis valentina*, one species of acanthocephalus *Euzethacanthus simplex*, three species of digeneans *Opecoeloides furcatus*, *Poracanthium furcatum, Derogene varicus*.
The values of the parasitic indices and the use of statistical tests allowed us to highligt the influence of size and sex on the intensity of infestation of this fish.

C. AFFICHE N° : 63.

PLASMA, LIVER BIOCHEMISTRY AND MARKERS OF OXIDATIVE STRESS IN DESERT RODENT FED HIGH CARBOHYDRATE DIET

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Abstract: Non-alcoholic fatty liver disease (NAFLD) is a common cause of chronic liver disease and a major indicator of metabolic syndrome that is becoming increasingly prevalent. Oxidative stress is one of the key mechanisms responsible for liver damage and disease progression in non-alcoholic steatohepatitis (NASH). Antioxidants try to combat the oxidative stress and minimise the oxidative stress. The present study aimed to evaluated markers of oxidative stress in the liver of *Gerbillus gerbillus* submitted to nutritional stress. Twelve gerbils were randomly assigned to receive a natural diet (controls) or a high carbohydrate diet (HCD: 75% dry dates and 25% barley). 24-week later, body weight, plasma biochemical parameters (including lipid and transaminase levels) were evaluated. Liver samples were collected for oxidative stress evaluation. Compared to natural diet, HCD leads to several metabolic disorders including adiposity, dyslipidemia, ectopic fat deposition in the liver which were associated by an enhanced oxidative stress (MDA increased, GSH depleted). Additionally, antioxidant enzymes such as catalase, SOD and GST were decreased significantly ($p < 0.05$) in experimental group, compared to that of control group. In conclusion, these results demonstrate that HCD consumption in gerbils induces perturbations of some biochemical parameters, lipid peroxidation and alterations in the antioxidant enzymes in liver homogenates which are key contributors to NASH development.

C. AFFICHE N° : 64.

STUDY OF THE ACUTE TOXICITY OF *TAXUS BACCATA* ON A SOIL QUALITY BIOINDICATOR: CASE OF *MESSOR BARBAROUS*

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Summary :

The Taxus genus is at the origin of the discovery of two anti-cancer molecules forming the pharmaceutical class of Taxanes: Paclitaxel and 10-deacetylbaccatin III, which are stabilizers of the mitotic spindle of cancer cells. Due to the sensitivity of this species, spraying aqueous extracts at different doses made from the needles, twigs and trunks of adult trees of *Taxus baccata* in three different ecosystems (Chréa National Park at 1130 m altitude, the Djurdjra National Park at more than 200m altitude, and the Experimental Botanical Gardin of Hamma in Algiers at 20 m altitude harvested in both winter and spring season, in order to determinate their toxicity and insecticidal effects on one of the most known and important biological indicators soil *Messor barbarus*

The results obtained show that *T. baccata* has a high Taxane content with an extremely high biocidal effect with 100% and 75% mortality for a Lethal Time not exceeding 3 hours for all parts of the plant with the samples extracted. at the level of Chréa National Park and Djurdjra National Park, compared to the control which does not exceed 60% mortality even after 08 days of treatment, when the samples extracted at the level of the Experimental Botanical Gardin of Hamma show no effect after 24 hours of spraying, the extracts of the needles of *T. baccata* during the two seasons is characterized by an acute toxicity for 100% of the ants during the winter season even with the low concentrations 25% and 12.25%, compared to the branches and trunk for the three inspected biotopes. *Taxus baccata* is more toxic at the Djurdjra National Park than at the other two stations. The mortality rate varies according to the part of the plant, region and sampling period as well as the adult individuals themselves.

Keywords: *Taxus baccata, Messor barbarus toxicity, northern Algerians.*

C. AFFICHE N° : 65.

SEASONAL VARIATION IN THE PREVALENCE OF PARASITIC SPECIES OF *RAJA CLAVATA* LINNAEUS, 1758 FROM THE TUNISIAN COASTS

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Abstract

Raja clavata Linnaeus, 1758 is one of the most widespread chondrichthyan fish species along the Tunisian coast. However, few studies have focused on the diversity and variation in the prevalence of the parasitic species that infest it.

Thus, it seemed interesting to us to study the composition of parasitic communities and the variation in the prevalence of harvested species in order to better understand the impact of the external environment on these communities.

During a period from 2018 to 2020, we were able to sample 480 specimens of this host fish from the main Tunisian gulfs. Examination of these specimens enabled us to identify two species of parasitic copepods (Caligus sp. and *Lernaeopoda galei* Krøyer, 1837) and four species of isopods (*Ceratothoa oestroides* (Risso, 1827), *Ceratothoa parallela* (Otto, 1828), *Mothocya nana* (Schioedte & Meinert, 1884) and *Nerocila orbignyi* (Guerin-Meneville, 1832)). The study of the parasite frequencies of the harvested species revealed that the prevalence varies according to the seasons and that it presents a peak during the hot seasons. In addition, the comparison of these variations by the non-parametric Wilcoxon test reveals a significant difference for most of the harvested species.

Key words: *Raja clavata, copepods, isopods, prevalences, seasonal variation, Tunisian coast*

BIOLOGIE, PHYSIOLOGIE ET ECOLOGIE VEGETALE

C. AFFICHE N° : 66.

REGULATION OF ROS AND SIGNALING MOLECULES METABOLISM BY EXOGENOUS MELATONIN IN WHEAT (*TRITICUM TURGIDUM* L.) UNDER CD CONTAMINATION

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Abtract : Melatonin (MEL) is a signalling molecules with biotechnological applications in the agronomical field. MEL a derivative of tryptophan plays an important role in the response of plants under abiotic constraints. In current study, using 6-day-old durum wheat (*Triticum turgidum* L.) seedlings exposed to 100 µM Cd, the potential mitigating effects of exogenous MEL (1, 10 and 100 µM) were investigated in embryonic axes. Cadmium treatment leads to biomass and elongation loss by causing the imbalance of ROS generation. However, the Cd-elicited superoxide anion ($O_2^{\bullet -}$) and hydrogen peroxide (H_2O_2) production was suppressed by exogenous MEL. As a new critical approach to cope with Cd toxicity, our experiment was conducted to determine the interaction between MEL and endogenous signaling molecules, involved on the plant responses to Cd stress including nitric oxide (NO) and hydrogen sulphide (H_2S). Therefore, our results depicted that MEL further stimulated NO biosynthesis by up-regulating both key activities on NO metabolism: nitrate reductase (NR) and nitrite reductase (NiR). However, H_2S metabolism was down-regulated which was corroborated by a significant decrease on L-cysteine desulphhydrase (LCD) and D-cysteine desulphhydrase (DCD) activities. This clearly shows a cooperative function of both signal molecules in enhancing tolerance to Cd-toxicity in wheat seedlings, particularly a synergic effect between NO and MEL. This will provide an interesting direction for further research on the regulation of the complex interactions between MEL, NO and H_2S in plants.

Keywords: *Cadmium, Hydrogen Sulphide, Oxidative Stress, Nitric Oxide, Melatonin, Wheat.*

C. AFFICHE N° : 67.

SCREENING OF PLANT GROWTH-PROMOTING POTENTIAL OF RHIZOBACTERIA NATURALLY ASSOCIATED TO FABA BEAN NODULES ON NON-HOST TOMATO PLANTS

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Abstract : One hundred seven bacterial strains naturally associated to faba bean (*Vicia faba minor* L.) nodules were screened for their plant growth-promoting potential onto non-host tomato plants. Six strains namely R93, R98, R104, R107, B96 and B99 were found to be the most efficient in improving tomato plant height (14.2 to 22.6%), the aerial part fresh weight (31.4 to 47.8%), the root length (1.5 to 22.7%) and the root fresh weight (29.7 to 52.2%) compared to the untreated control. The nodulation test on faba bean plants grown onto sterilized sand confirmed that four strains (R93, R98, R104 and R107) belonged to *Rhizobium* spp. which were able to form nodules on their roots while B96 and B99 are non-nodulating strains and considered as plant growth-promoting rhizobacteria (PGPR). Furthermore, significant increments in plant height (14.2 to 38.3%), aerial part fresh weight (10.3 to 61.6%), root length (1.1 to 37.8%) and root fresh weight (17.3 to 35.9%) were noted in faba bean plants treated with the six bacterial strains compared to the untreated controls. The six strains will be characterized and identified in further study. The metabolites produced by the four *Rhizobium* spp. and the two PGPRs strains and involved in the recorded plant growth-promoting potential will be elucidated.

***Mots clés** : Faba bean, plant growth-promoting rhizobacteria, Rhizobium spp., tomato.*

C. AFFICHE N° : 68.

THE PHYSIOLOGICAL TRAITS UNDERLYING DURUM WHEAT (*TRITICUM DURUM* DESF.) TOLERANCE TO BORON DEFICIENCYS

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Abstract : Boron (B) is a unique micronutrient that belongs to group 13 (IIIa) of the periodic table and possesses both metallic and nonmetallic properties. It is an essential element required for the plant's growth and development. It is involved in plant physiological, biochemical, and metabolic processes. In the plant, B is involved in respiration, sugar transport, lignification, the structural stability of the cell wall, and the metabolism of carbohydrates, phenolics, auxin, and RNA.
In the soil, boron concentration usually ranges between 20 and 200 ppm, and its availability varies depending on soil characteristics. The soil factors that affect boron uptake are pH, temperature, moisture, texture, soil calcium carbonate content, and soil organic matter. With an increase in soil pH, B gets adsorbed on soil particles and becomes less mobile. Although B exists in several forms in the soil solution, the dominant, suitable for plant growth, form in the pH range (5.5–7.5) is undissociated boric acid (H_3BO_3). The uncharged boric acid is prone to leaching in light-textured soil in high-rainfall regions, leading to boron deficiency. In heavy-textured soil with less rainfall, boron may accumulate in the soil, leading to B toxicity. Boron deficiency is severe during the dry summer season due to high temperatures and low moisture levels.In calcareous soils, calcium carbonate ***directly*** acts as a sink for boron by adsorbing it on the surface and ***indirectly*** by increasing soil pH, thus restricting boron mobility. Soil organic matter also adsorbs boron on its particles and affects its availability in soil.
Different strategies were adopted to overcome B deficiency in crop plants, among them chemical fertilization. However, the exploration of the genotypic differences in response to B deficiency allows the identification of tolerant genotypes and the associated traits of tolerance, thus representing an efficient, sustainable, and ecofriendly approach. According to this strategy, a greenhouse experiment was conducted on two durum wheat genotypes (khiar and razek). Plants were subjected to either B deficiency (Hoagland nutrient solution deficient in B) or adequate B supply (standard Hoagland solution). Plant growth, chlorophyll fluorescence, chlorophyll biosynthesis, and B uptake were analyzed.
Plants grown in B-free solutions developed specific B-deficiency symptoms (earlier in khiar than in razeg; control plants showed no symptoms).Otherwise, there was a significant decrease in spad index (-19% and -29%, respectively, in razeg and khiar), plant growth (- 15% and -18%, respectively, in razeg and khiar), and B concentration in the two genotypes subjected to B deficiency. The chlorophyll fluorescence measurements also demonstrated the deleterious effect of B deficiency on the quantum yield of PSII (Y-PSII). The established correlations showed a close relationship between plant growth and shoot B concentration, between chlorophyll concentration and shoot B concentration, and between Y-PSII and shoot B concentration.
Taken together, our results demonstrated that B significantly influences the key metabolic functions of the plant and determines its growth and yield.

***Keywords** : Boron, Chlorophyll, photosynthetic, Growth, Wheat.*

C. AFFICHE N° : 69.

CHEMICAL COMPOSITION AND ANTIMICROBIAL ACTIVITY OF ESSENTIAL OIL OF NEPETA SP

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Abstract : The essential oil of *Nepeta sp* obtained by hydrodistillation at flowering stage was characterized by GC-MS as well as by ^{1}H and ^{13}C NMR. 24 constituents were identified representing 96% of the oil.. 4aα,7α,7αβ–Nepetalactone (72.37%), . 4aα,7α,7αα–Nepetalactone (16.25%), thymol (2.28 %) and carvacrol (0.35%), were found to be the major components among the identified constituents at flowering stage.
The antimicrobial activity of the essential oil was examined against seven human pathogenic microorganisms including *Escherichia coli, Pseudomonas aeruginosa, Enterococcus faecalis, Klebsiella pneumonia*, *Staphylococcus aureus, Bacillus cereus, and Candida albicans* by both the agar diffusion method and the minimum inhibitory concentration (MIC) assay. (MIC range was 0.156 -1,25µl / ml). The agar diffusion method indicated that *candida albicans* were the most sensitive to the essential oil, followed by Staphylococcus *aureus* and *Pseudomonas aeruginosa* .

***Key words**: Nepeta sp , Lamiaceae , essential oil composition, nepetalactone , antimicrobial activity*

C. AFFICHE N° : 70.

LE SULFURE D'HYDROGÈNE CORRIGE LA TOXICITÉ FERRIQUE CHEZ LE BLÉ DUR PAR LA MODULATION DU METABOLISME DE LA PROLINE

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Abstract : Malgré ses effets bénéfiques pour la croissance et le développement des plantes, le fer (Fe) en excès peut être nocif en stimulant la production des radicaux libres. Dans ce travail, est étudié l'effet de la toxicité de FeCl3 sur la germination du blé dur (*Triticum durum* L. var. Karim) en présence et en absence d'un effecteur exogène ; le sulfure d'hydrogène (H_2S) via son donneur artificiel (NaSH). L'exposition à Fe augmente significativement la peroxydation lipidique attestée par l'augmentation de teneur en malondialdéhyde (MDA). Cette augmentation corrobore l'installation d'un stress oxydant confirmé par une augmentation des activités superoxyde dismutase (SOD) et peroxydases (POD). Toutefois l'ajout de NaHS a réduit l'accumulation de MDA et a augmenté davantage les activités antioxydantes SOD et POD. Aussi, une altération des membranes cellulaires chez les plantes soumises à la toxicité ferrique a été évaluée par la méthode de fuite des électrolytes, mais corrigée en présence de NaHS. Ainsi, comme molécule de signalisation, H_2S serait impliqué dans la régulation de métabolisme de la proline en inhibant l'activité Δ 1-pyrrolin-5-carboxylate synthétase (P5CS) et en stimulant celle proline déshydrogénase (PDH).

Mots-clés : *Blé, correction, fer, sulfure d'hydrogène, proline.*

C. AFFICHE N° : 71.

ROLE OF NITRIC OXIDE IN MODULATING ZINC OXIDE NANOPARTICLE TOLERANCE IN WHEAT (*TRITICUM AESTIVUM* L.)

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ABSTRACT : This study aimed to analyze the potential interaction of nitric oxide (NO) in regulating zinc oxide (ZnO NPs) nanoparticle tolerance in wheat (*Triticum aestivum* L.). After 10 days, treatment with 100 mg/L ZnO NPs caused a significant reduction in growth concomitant with a strong increase in the contents of reactive oxygen species (ROS), antioxidant enzymes activities such as catalase (CAT), ascorbate peroxidase (APX), guaiacol peroxidase (GPOX) and glutathione peroxidase (GPX). An increase in the lipid peroxidation marker malondialdehyde (MDA) indicated oxidative stress. The addition of 500 µM of the nitric oxide (NO) donor, sodium nitroprusside (SNP), to the growth medium alleviated ZnO NPs toxicity by enhancing antioxidant capacity. The current results show that NO addition can alleviate ZnO NPs toxicity by affecting the antioxidant defense system suggesting that NO treatment protects proteins against oxidation by regulating the cellular redox homeostasis.

C. AFFICHE N°: 72.

EVOLUTION OF PHYSICO-CHEMICAL PARAMETERS OF A FERMENTED WHEAT TYPE *HAMMOUM* AFTER STORAGE IN A TRADITIONAL GRANARY " MATMORA"

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Abstract: Traditional fermented wheat type Hamoum (FWH) is a food with medicinal virtues appreciated in the prevention and treatment of many intestinal pathologies. Compared to the normal wheat, this wheat undergoes during its fermentation physico-chemical modifications due mainly to the nature of the soil and the endogenous bacterial flora that it contains. The objective of this work is to evaluate the physicochemical parameters of FWH compared to unfermented durum wheat (NFW). Our samples were taken from a granary type Matmora (West Algeria). The FWH was taken at the level of the peripheral zone and the NFW at the level of the central zone of the Matmora under aseptic conditions. After grinding in powder form, we carried out the determination of water content, pH, fatty acidity, mitadinage rate, and ash content as well as the measurement of total protein, gluten and starch. Our results show that FWH has a mitadinous, non-vitreous appearance, brown color and strong odor, with very low gluten and starch content. FWH has an acidic pH with high fat acidity and high mineral and moisture contents compared to NFW. The differential values of these physicochemical parameters are probably due to the emergence of lactic acid bacterial flora in FWH during storage, which probably exerts effects on the biochemical parameters of the wheat seed. The evaluation of the physicochemical parameters of the fermented wheat Hamoum constitutes a good indicator that can orientate us on the quality of the bacterial strains for nutritional purposes, or even biotechnological in view of its application in the food industry.

C. AFFICHE N° : 73.

LEAF WATER RELATIONS IN THREE TUNISIAN DURUM WHEAT VARIETY (*TRITICUM TURGIDUM* L.SUBSP.DURUM. DESF) GROWN UNDER DROUGHT CONDITIONS

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Abstract: Drought is threatening crop production worldwide (Marín-de la Rosa *et al.*, 2019), crop species with high drought tolerance are needed to maintain yields in dry regions. Therefore, the selection of wheat genotypes that are resistant to water scarcity becomes crucial under real dry conditions. In this study, we compared the evolution of leaf water relations of three Tunisian wheat cultivars (*Triticum turgidum* L.subsp.durum.Desf) Karim, Maali and Razzak, grown under drought conditions. An experiment under semi-controlled conditions was carried out on plants subjected to a water deficit by suspending irrigation for 10 days.
Waters relations were studied using the pressure-volume (P-V) technique curves. The results showed that the water deficit leads to decrease of the potential at full turgor (Ψ_π^{100}), osmotic potential at zero turgor (Ψ_π^{0}), and the increase of relative water content at the point of loss of turgor (RWC_0) reflecting a greater adaptive capacity of Karim variety. The increase of apoplast water content (AWC), the elasticity module (ε_{max}) especialy in Karim variety indicates an adjustment of the elasticity of the cell walls in the condition of water deficit. The greater increase of osmotic adjustment in Karim variety is related to higher accumulation of proline and soluble sugars contents in plant tissues. Difference in responses to water deficit of the three wheat variety showed that Karim variety is the most tolerant to drought followed by Maali then Razzak. Thus, Karim variety could be proposed for genetic improvement program and selection of new productive and tolerant lines to water deficit.

Key words: *Durum wheat, osmotic adjustment, pressure-volume curve, water deficit, water relations*

C. AFFICHE N° : 74.

ANTIBACTERIAL ACTIVITY OF ETHANOL AND AQUEOUS EXTRACT OF *PLANTAGO MAJOR* L. AGAINST ORAL PATHOGENIC BACTERIA

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Abstract: The specie *P. major* L. of the *Plantago* genus belonging to the *Plantaginaceae* family is cosmopolitan plant used in traditional and modern medicine. Indeed, they are endowed with several virtues, this is due to their richness in various secondary metabolites (polyphenols, terpenes, heterosides ...), among these qualities we can cite the antiviral activity, wound healing, anti-inflammatory properties, anti-hypertensive, anti-leukemia, anti-tumor, and reduction of immunosuppressive effects of anti-cancer drugs and antioxidant. Indeed, in this work we are interested in studying the antibacterial activity of different extracts of leaves and roots of *Plantago major* L. collected in the region of Beja in the north-west of Tunisia, on three Gram + bacteria: *Bacillus subtilis*, *Staphylococcus aureus* and *Streptococcus mutans*; three Gram - bacteria: *Escherichia coli*, *Pseudomonas aeruginosa* and *Klebsiella pneumonia*; and a yeast: *Candida albicans*. We found that the aqueous extracts showed no antibacterial activity against all species. However, ethanolic extracts of leaves and roots of this species have an inhibitory and anti-biofilm effect against *Escherichia coli* (*E.coli*) and *Klebsiella pneumonia* and at low concentration (CMIB = 2µg/mL).

***Key words**: P. major L.; antibacterial activity.*

C. AFFICHE N° : 75.

SUPPLEMENTAL RHIZOSPHERE- APPLIED CALCIUM REVERTED ADEQUATE MAGNESIUM NUTRITION IN COMMON BEAN (*PHASEOLUS VULGARIS* L.)

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Abstract: Magnesium is considered an essential nutrient for humans, where about 60% of Mg plays an important role in skeletal development. However, its deficiency can trigger several health pathologies (namely, asthma, Alzheimer's disease, hypertension, and diabetes). Mg is also essential in plants, particularly for structural and regulatory functions. In fact, Mg has diverse functions and is especially important, being involved in protein synthesis, correlated with chlorophyll pigments, a key element in photosynthesis, and deeply involved in the phloem loading of sucrose. Magnesium is considered a phloem mobile element and is rapidly translocated within the plant to the growing parts, which is why the first symptoms start to appear on older leaves. Its deficiency can compromise plant growth, photosynthesis, and crop productivity, and can also lead to shorter roots and necrotic zones in leaves. Additionally, Mg deficiency in fields can be due to its ionic antagonism with competing cations (H^+, Al^{3+}, Ca^{2+}, K^+, and Na^+) that strongly inhibit Mg^{2+} root uptake. Most of the magnesium in the soil is bound in the crystal lattice structure of minerals, and 90–98% of it cannot be absorbed directly by plants. The only form that plants can absorb is Mg^{2+}, but this form is highly prone to leaching in acidic soils because it is weakly bound to root cell walls and negatively charged soil particles due to its large size.

Basal and foliar Mg applications effectively alleviate Mg deficiency. However, the effectiveness of root application is influenced by various environmental factors, such as dry soil, low transpiration rates, soil characteristics, and the presence of antagonistic ions. In this context, calcareous soils are known for their high Ca concentration and alkaline pH. Mg deficiency is known to be installed in such soils but the origin of this induced- Mg deficiency remain unclear (Mg precipitation due to alkaline pH or high Ca that inhibit Mg uptake). In order to decipher this problem, a greenhouse experiment was conducted hydroponically on the common bean genotype, coco nain, subjected to direct Mg deficiency (0 Mg), suitably supplied with Mg (Hoagland solution), or suitably supplied with Mg (Hoagland solution) but supplemented with excessive Ca concentration (2 Hoagland Ca).

Obtained results demonstrated that direct magnesium deficiency induced characteristic symptoms of Mg deficiency and decreased plant growth, chlorophyll biosynthesis, and photosynthetic activity in common bean plants. When plants were supplemented with excessive Ca concentration, symptoms of Mg deficiency appeared on mature leaves, and the same behavior of the above metabolic functions was observed, although with a clearly lesser effect. The analyzed minerals (Ca, Mg) in plant organs showed a clear overload of plants with Ca when this nutrient exists in high concentration in the rhizosphere at the expense of Mg. This result confirms the antagonistic effects of Ca and Mg and suggests that Mg deficiency, commonly observed in calcareous soils, can be explained by the competitiveness of these two ions on the root membrane surface.

***Keywords**: Calcium, Competitivity, Magnesium, Phaseolus vulgaris L,. photosynthesis*

C. AFFICHE N° : 76.

MORPHOMETRIC CHARACTERISTICS AND GERMINAL BEHAVIOUR OF WESTERN ALGERIAN ZIZIPHUS LOTUS L. SEEDS

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Abtract : *Zizyphus lotus* L., or the wild jujube, is a plant species that forms natural populations in degraded areas threatened by desertification due to climatic and human pressure. The fruit of this species, the jujube, is still a wild food source for both people and animals. The objective of this work is to present the morphometric characteristics and germination behavior of *Z. lotus* seeds from the Sidi Bel Abbès region in western Algeria. Before germination, morphometric and weight measurements were performed on the seeds. Seed viability was determined by a germination test under two different light conditions, the first being a light/dark cycle and the second in continuous darkness, at a temperature of 20 °C. The determination of the thermal optimum was carried out by germination trials of different seed lots placed at increasing temperatures ranging from 10 to 45 °C with a 5 °C progression for each trial. The progress of this phase was represented by germination curves and expressed by calculating the average time and germination capacity. The results revealed that the average germination capacity obtained was significantly higher under a light/dark cycle than under continuous darkness, being 32% under the light/dark cycle and 24% in darkness. The thermal optimum was between 25 and 35 °C with a high average germination time of 14 days under the light/dark cycle compared to continuous darkness. The use of this species in the restructuring of degraded arid areas is an interesting option, hence the importance of studying both its morphometric and germinative characteristics.

Keywords*: Germinating behaviour; morphometric characteristics; seeds; thermal optimum; viability; Ziziphus lotus L.*

C. AFFICHE N° : 77.

ASSESSING THE MAIN HORTICULTURAL AND QUALITY TRAITS EVALUATION FOR DIFFERENT TRADITIONAL AND HYBRID PROCESSING PEPPER CULTIVARS GROWN IN TUNISIA.

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Abstract : Worldwide pepper (*Capsicum annum* L.) is considered as one of the most important vegetable crops grown and consumed. In Tunisia the area dedicated to pepper cultivation reached 20000 ha. Previously, Peppers pods synthesize and store a wide array of bioactive phytochemicals beneficial for human health such as vitamins A, C and E, as well as phenolic, flavonoids, carotenoids and capsaicinoids with well-known antioxidant properties. It has been reported that the levels of these compounds vary depending on various factors such as genotypic differences, pre-harvest and postharvest agricultural practices. Besides, although, processing industries integrates in their product mostly hybrid cultivars, recently, the interest of consumers has been shifted towards local/traditional cultivars of peppers for their low input/water demand associated to their recognized high nutritional value. Therefore, in this study, a total of 8 pepper genotypes consisting of 4 commercial hybrids and 4 traditional cultivars were compared for their horticultural performances and functional quality attributes. The result revealed significant differences affecting most of the tested attributes. The highest SPAD index was recorded for the hybrid cultivar Sahraoui (59.96) and the lowest for the local variety Kairouan (47.64). Added to this, the highest chlorophyll fluorescence was recorded for the hybrid cultivar Starter (0.768) while Baklouti showed the lowest (0.733). Necessario and Nabeul showed the highest dry matter content (15%) while Starter and Sifi varieties showed the lowest content (11%). Average fruit weight varied from 33.44 g in hybrid cultivar Sifi to 17.52 g in Nabeul variety. It is also worthy to underline that in this experiment, hybrid cultivars were more succeptible to blossom end rot with respect to traditional cultivars. Reagrding the functional quality, cultivar Beldi exhibited the highest vitamin C content (0.81 mg/100 ml) and the lowest was recorded for Nabeul and Sifi (0.36 mg/100 ml).

Keywords *: Pepper, traditional cultivars, hybrids, processing, horticultural performances, functional quality.*

C. AFFICHE N° : 78.

BIOCHEMICAL RESPONSE OF MATURE RADISH PLANTS (RAPHANUS SATIVUS L.) FERTILIZED BY SEWAGE SLUDGE OF SEDRATA REGION (SOUK-AHRAS CITY, NORTHEAST ALGERIA)

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Abtract: Sewage sludge is very rich in organic matter and fertilizing elements, so it can be an alternative to chemical fertilizers for crop fertilization (improving soil quality and increasing crop yields) and is of real economic interest.
In addition, sewage sludge also contains a multitude of pollutants and pathogens that can accumulate and contaminate crops affecting plant performance and growth, which makes the use of sewage sludge involves risks for the environment.
In order to study the effect of fertilization by sewage sludge from Sedrata region (Souk-Ahras city, northeast Algeria), on mature radish plants (*raphanus sativus l.*), a culture test was installed on a planting medium: agricultural soil. Biochemical parameters were quantified to characterize the adaptive strategy of the species with respect to the abiotic constraint present in the environment.
The preliminary results of the MDA assay indicate that the sewage sludge induces oxidative stress in the species studied. However, the effect differs from one species to another, the radish seems resistant to this type of stress. On the other hand, stress induces an increase in ascorbate peroxidase activity in cells. In addition, stimulation of catalase and glutathione peroxidase activities in the species studied under the effect of this stress was noted.

Key words: *Raphanus sativus l., Fertilization, Sewage sludge, Abiotic stress.*

C. AFFICHE N° : 79.

VALORIZATION OF ETHNOBOTANICAL PRACTICE IN VETERINARY MEDICINE IN NORTH-EAST ALGERIA

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Abstract : In the context of valorization of the use of medicinal plants in the North East Algerian, a survey was carried out among private veterinarians in the region with the aim of determine the status and benefits of animal health herbal medicine traditional. The results obtained show that there are several plant species for veterinary use is the source of similarity for this practice, the formulas used by the plant-based veterinarians generally applied in the treatment of certain diseases indocil dermatological and internal parasitic in the case of treatment before marketing to avoid drug persistence.
Most veterinarians interviewed stated that the interests of herbal medicine are the control of antibiotic resistance and drug residues and any related complexity at ordinary salaries
The ethnobotanical practice of veterinary medicine remains an area of research that was not well developed and the international demand for bioproducts requires the valorization of this thematic.

Keywords*: Antibiotic resistance; Ethnobotany; Herbal medicine; drug residues; Valuation; Veterinarians*

C. AFFICHE N° : 80.

PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES IN HALOTOLERANT *PHORMIDIUM VERSICOLOR* NCC466 EXPOSED TO HIGH SALINITY AND IRRADIATION

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Phormidium versicolor (Cyanophyceae), was isolated from the solar saltern of Sfax (Tunisia). Growth, pigment contents, and photosynthetic and antioxidant enzyme activities were measured under controlled conditions of three light levels (300, 500, and 1000 µmol photons m^{-2} s^{-1}) and three NaCl concentrations (40, 80, and 140 g L^{-1}). The highest growth of *P. versicolor* was recorded with NaCl 80 g L^{-1} under E300 and the lowest with NaCl 140 g L^{-1} under E1000. Chl *a* content in *P. versicolor* showed a significant decrease with NaCl 140g L^{-1} under each light level tested. High irradiance (E500 and E1000) stimulated carotenoids synthesis in the presence of NaCl 80 g L^{-1}. The addition of NaCl 140 g L^{-1} in the culture medium led to a significant decrease ($p<0.001$) of the net oxygen evolution (PN) of *P. versicolor* under the three light levels. According to the effective quantum yield efficiency of PSII (ΦPSII) values, the photosynthetic apparatus of *P. versicolor* was stimulated by increasing salinity. The non photochemical quenching (NPQ) of *P. versicolor* changed significantly ($p < 0.01$) with the increase of salinity when this cyanobacterium was grown under E500. E1000 irradiance significantly increased the NPQ of *Phormidium* with NaCl 40 and 80 g L^{-1}. The maximum quantum efficiency of PSII (Fv/Fm) was low with an average value of 0.4. Activities of CAT, and SOD were only detected and measured when cells were grown under E1000. However, APX activity was not detected in *P. versicolor*.
Under these stress-controlled conditions, *P. versicolor* could provide promising sources of extremolyte for several purposes.

***Keywords** : light-salt stress, microalgae, Phormidium versicolor, PSII, photosynthetic activity, antioxidative enzyme activity*

C. AFFICHE N° : 81.

PHYSIOLOGICAL RESPONSES OF CONTRASTING TUNISIAN DURUM WHEAT GENOTYPES TO DROUGHT STRESS

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Abtract : The greatest fear of global climate change is drought. High frequency and severity of droughts have been predicted throughout the world leading agriculture to face multiple challenges. Tunisia is considered highly vulnerable to climate change. The increased aridity and rainfall dependency will severely threaten agriculture in Tunisia, especially wheat yields and eventually food security. Therefore, screening wheat genotypes that produce high and stable yield with less water becomes crucial under actual dry conditions. In this study, we aim to compare the dynamics of elastic and osmotic properties of leaf tissues of four Tunisian wheat cultivars. We observed that in drought-susceptible genotype, drought stress (DS) induces reduction of apoplasmic water content, lower osmotic adjustment with high level of lipid peroxidation, leading to great yield loss. On the contrary, in drought-tolerant genotypes, physiological activities were maintained through improved fraction of apoplasmic water content (AWC) which induces osmotic adjustment due to the accumulation of osmotically active compounds (soluble sugars and proline). The redistribution of water outside the cell walls allows plant to increase the concentration of solutes, resulting in greater tolerance to water deficit. Moreover, DS remarkably alter the cell-wall elasticity by increasing the modulus of elasticity (Ɛmax). The osmotic and elastic adjustment allow greater membrane stability in tolerant genotypes with lower level of lipid peroxidation compared to susceptible ones. These results will help future studies dealing with drought adaptive mechanism to predict wheat tolerance in dryland ecosystems. Based on those features, the genotypes D117 and SYN can be used as a breeding material to develop drought resistant wheat genotypes.

C. AFFICHE N° : 82.

DÉVELOPPEMENT ET RÉPARTITION SPATIO-TEMPORELLE DU PSYLLE DE L'OLIVIER *EUPHYLLURA OLIVINA (HEMIPTERA : PSYLLIDAE COSTA, 1839)* DANS UNE OLIVERAIE DE LA VARIÉTÉ CHEMLAL, DANS LE SUD OUEST DU HODNA – ALGÉRIE.

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Abtract : L'étude menée, sur le développement du psylle de l'olivier *Euphyllura olivina*, sur la variété Chemlal dans la Daira de Sidi Aissa, située au Sud Ouest de la wilaya de Msila, durant les mois de Novembre 2018 au mois de Mai 2019, a révélée que les pontes ont lieu au mois de Novembre 2018, avec un pic maximal à la fin du mois d'avril 2019 avec 96 œufs ; toutes les directions cardinales de l'arbre sont infestés par le ravageurs, les directions Nord et Ouest sont les plus attaqués pour la variété étudiée, par les larves d'*E. olivina* ; l'apparition des adultes est enregistrée, au début du mois d'e Novembre 2018.

La mortalité des larves, est enregistré sur la variété étudiée, vue les conditions climatiques défavorables (Basses températures), ainsi qu'au printemps vue l'apparition de la faune auxiliaire qui limite les pullulations de l'insecte étudié.

Mots clés : *Psylle, M'sila, ravageur, variété, Chemlal.*

C. AFFICHE N° : 83.

EFFET DES FACTEURS ABIOTIQUES SUR LE COMPORTEMENT DE QUELQUES VARIÉTÉS DE POMMIER *MALUS PUMILA* MILL, EN CONDITIONS STEPPIQUES DANS LE SUD DU HODNA – ALGÉRIE.

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Abtract : Notre étude sur un suivi du comportement variétal sur pommier vis-à-vis des conditions climatiques, prenant compte des paramètres phénologiques et productives des variétés étudiées, l'objectif est de voir le comportement des variétés étudiées envers les conditions de la région d'études et l'effet du froid sur la production.

Pour notre essai, nous avons choisi 5 lignes en fonction de la pente de terrain afin d'obtenir une représentation totale de la parcelle.

Le suivi des différents stades phénologiques des variétés, est basé sur 23 arbres âgés de 15 ans, dans chaque station à raison de 4 rameaux par arbre, au total 92 rameaux. Nous remarquons que, le débourrement été précoce, pour la variété *Golden Délicious* durant 15 jours et pour la variété *Anna* le 06/01/2017 durant 13 jours. Le taux de débourrement enregistré pour cette campagne est de 43.93**%** pour la variété *Anna* et 63,08% pour la variété *Golden Délicious*. La floraison est enregistré le 08/03/2017 pour la variété *Anna* et le 11/03/2017 pour la variété *Golden Délicious.*

Pour les besoins thermiques, on a enregistré, des degrés de jours de 167,28 pour la variété *Golden Délicious* et 119,69 pour la variété *Anna* ; Concernant l'unité de froid avoisinant 11,42°C pour les deux variétés **;** L'effet des paramètres climatiques, sur les différents stades phénologiques, des variétés *étudiées* nous a fait ressortir que le débourrement est précoce et même pour la floraison, alors que la production est très faible.

Mots clés: *Pommier, abiotiques, comportement, Hodna, Anna*

C. AFFICHE N° : 84.

SALINITY EFFECTS ON BIOACTIVE COMPOUNDS AND ANTIOXIDANT ACTIVITIES OF SARCOCORNIA ALPINI NEWLY IDENTIFIED FROM THE SOUTHERN COASTAL OF TUNISIA

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Abtract: *Sarcocornia alpini* is a euhalophytic herb recently cited to be present in the coastal regions of Southern Tunisian. In this study, the effect of salinity stress on bioactive compounds and antioxidant activities of this species was evaluated. Six months-old *Sarcocornia alpini* plants were irrigated for four months with different concentrations of NaCl (0, 0.2, 0.4, 0.8, 1, and 1.2 M) in a growth chamber with controlled temperature (25 °C), light (16/8 h, light/dark), and humidity (65%). At harvest, seedlings were collected and the total phenols, total flavonoids, and non-enzymatic (total antioxidant capacity (TAC), DPPH radical scavenging activity and ferric reducing power (FRAP)) and enzymatic antioxidant activities (catalase (CAT), ascorbate peroxidase (APX) activity and guaiacol peroxidase (GPX) activity) of shoots were studied. Hydrogen peroxide (H_2O_2) and Malondialdehyde (MDA) levels were also evaluated. The results revealed that the application of salt stress induced an increase in H_2O_2 and MDA contents in comparison with the control treatment (0 M). Regarding bioactive compounds, results showed that total phenols decreased at low salinity (0.2 M NaCl) and increased at moderate (0.4-0.8 M) and high (1-1.2 M NaCl) salinities whereas flavonoids decreased significantly with salinity (from 362.5 µg EQ/g DM to 169.4 µg EQ/g DM at 0.2 and 1.2 M, respectively). Our results also revealed that salt treatment increased the non-enzymatic antioxidant activities, especially, FRAP (from 520.8 µg to 1739.28 µg ET/g DM at 0 and 1.2 M, respectively). However, CAT activity decreased with increasing salinity. At low (0-0.2 M NaCl) and high (1-1.2 M NaCl) salt concentrations, both GPX and APX activities were enhanced then decreased significantly at moderate stress (0.4-0.8 M NaCl). These results suggest that moderate stress could be considered as the optimal threshold for *Sarcocornia alpini*.

Keywords*: Euhalophyte, Enzymatic antioxidant activities, Non-enzymatic antioxydant activities, Salt stress, Sarcocornia alpini, Total phenols*

C. AFFICHE N° : 85.

CLUE OF ZINC OXIDE AND COPPER OXIDE NANOPARTICLES IN THE REMEDIATION OF CADMIUM TOXICITY IN PHASEOLUS VULGARIS L. VIA THE MODULATION OF ANTIOXIDANT AND REDOX SYSTEMS

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Abstract

This study is new evidence for the successful use of metal oxide nanoparticles for heavy metal remediation. The effect of zinc oxide nanoparticles (ZnO NPs) and copper oxide nanoparticles (CuO NPs) on reducing cadmium (Cd) toxicity in bean seedlings and plants was evaluated. Monitoring of physiological and metabolic parameters enables elucidation of the mechanisms and processes of cadmium leading to its phytotoxic effects in legumes. The response of *P. vulgaris* seedlings was dependent on the NP dose (10 mg/L, 50 mg/L, 100 mg/L and 200 mg/L). Similarly, the applied concentrations elicited different responses in growing plants in terms of length and biomass. Our physiological data allowed us to choose 100 mg/L as the most suitable application concentration to avoid any risk of phytotoxicity. The regulatory mechanism of ZnO NP and CuO NP action was compared for the first time in bean seedling hypocotyls under Cd stress. Both NPs were able to reduce the overproduction of hydrogen peroxide (H_2O_2). They also act by increasing the enzymatic ability to scavenge ROS and the activity of antioxidant enzymes CAT, APX, GPOX, GPX, and GR, and by inhibiting the activity of ROS-producing enzymes such as GOX and NOX. Another mechanistic role of NP is to regulate the oxidoreductases Trx, NTR, Fd, and FNR, which evolve in cellular homeostasis and maintain a reduced state in the cell. In conclusion, ZnO NPs elicited more pronounced metabolic regulation, thereby attenuating Cd-induced oxidative damage.

Keywords: *Antioxidant enzymes; Cadmium; Copper oxide nanoparticles; Phaseolus vulgaris L.; Redox enzymes; Zinc oxide nanoparticles.*

C. AFFICHE N° : 86.

IMPROVEMENT OF DURUM WHEAT TOLERANCE TO SALINITY STRESS VIA INDOLE ACETIC ACID (AIA) APPLICATION

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Abtract : Soil salinity, whether natural or anthropogenic, affects more than 20% of cultivable land in the world and exceeds 30% in Tunisia. These soils, considered marginal, continue to increase and occupy new areas due to the scarcity of conventional water, the use of more saline ones, unsustainable irrigation, the introduction of saline soils into agricultural cropping systems, the increased aridity, and climate change. Thus, salinity will represent in the near future a real handicap for the world's agriculture. Tunisia is no longer immune to this threat, especially since it is, for the most part, in an arid and semi-arid climate. Some authors have reported that 50% of arable land will be lost by 2050. Several solutions have been put forward to mitigate the risks to agronomic production. However, such solutions are costly and difficult to implement. Alternatively, the adverse effects of salinity on crop yields can be minimized by screening species, genotypes, and cultivars that are better suited to salinity conditions or implying useful approaches to increase the tolerance of crops, such as seed priming or plant pulverization with phytohormones that have demonstrated their effectiveness (AIA, GA3, …). To this end, a field experiment was conducted on the durum wheat genotype, karim, cultivated in three different plots, the first one irrigated with tap water (control), the second one subjected to salinity stress (5 g. L^{-1} NaCl), and the third plot subjected to salinity stress (5 g. L^{-1} NaCl) and pulverized with Indole acetic acid (AIA) solution. The physiological behavior (plant growth, photosynthesis, ionic compartmentation, …) and plant yield were evaluated.
Obtained results demonstrated that salinity stress significantly decreased chlorophyll biosynthesis, photosynthetic activity, and plant growth. The K/ Na compartmentation demonstrated an excessive accumulation of sodium, particularly in shoots, at the expense of potassium. However, even if salinity continues to hamper these metabolic reactions, the AIA application significantly attenuates its inhibitory effect through improved K uptake and translocation to shoots. The quantified yield demonstrated that durum wheat can complete its life cycle on 5 g of L-1 NaCl and provide yield (despite being 25% lower than control plants). As for the physiological functions, wheat yield was clearly improved under salinity stress after AIA application.
Taken together, our results demonstrated that AIA application to durum wheat crops cultivated on saline soil or irrigated with saline water represents a useful approach to overcome, to some extent, the deleterious effects of this abiotic stress and improve yield.

Keywords: *Indole acetic acid, durum wheat, ionic compartmentation, yield*

C. AFFICHE N° : 87.

EVALUATION OF TOTAL PHENOLIC CONTENT AND ANTIOXIDANT CAPACITY OF AERIAL PARTS OF *ATRIPLEX HALIMUS*

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Abtract: Medicinal plants are a rich source of phytonutrients and bioactive substances such as phenolic compounds. In fact, these later provide health benefits and enhance nutritional values.

This work investigates the antioxidant properties of the methanolic and ethanolic extracts of the arial parts of *Atriplex halimus* (leaves and stems).

For that, the analysis of total phenols in leaves and stems extracts was determined using ‘‘Folin-Ciocalteu’’reagent assay. Then antioxidant capacity of the extracts was carried out by the Phosphomolybdate assay (total antioxidant capacity) using ascorbic acid as standard.

Results revealed a proportional relationship between total phenolic content, and antioxidant capacities in leaves extracts unlike stems. Then, a significant variation was found between the solvents; whereas ethanolic extracts of leaves and stems are richer in total phenols then the methanolic extracts.

To sum-up, antioxidant capacity is intimately linked to the amount of the polyphenolic content extracted from each plant's parts as well as to the nature of solvent used for extraction.

Key words: *Medicinal plants, Atriplex halimus, phytochemical Study, antioxidant activity*

C. AFFICHE N° : 88.

L'IMPACT DE SYSTÈME INTENSIF ET SEMIS INTENSIF SUR L'OLÉICULTURE DANS LES ZONES ARIDES CAS DE BISKRA

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Abtract : L'agriculture saharienne reste un mot clé qui regroupe deux principale significations ; la recherche d'une production de qualité et de quantité dans toutes les branches et les systèmes utiles au niveau de ces zones arides et la durabilité de ses branches, en particulier les branches qui sont nouvelles dans le Sahara algérien comme l'oléiculture.

Dans notre simple étude ; nous avons réalisé une enquête profonde au niveau de la zone de Biskra concernant la branche oléicole et nous avons trouvé des résultats très significatifs car à l'époque tout le monde pensé que cette branche a une place seulement dans le nord algérien.

Concernant les résultats nous avons trouvé que ;

- L'oléiculture occupe une place très importante dans la zone de Biskra.
- La production est basculée entre deux systèmes : traditionnel (extensif) et moderne (intensif et semi intensif).
- La destination des produits récoltés en grande part aux olives de table : reste sous la culture de la société et les conditions climatiques.
- La mise en place des vergers sons aucune étude avec l'utilisation des plans hors les normes (faux greffage, variétés inconnues, densité au hasard ex).
- La durabilité des vergers ; dans le système intensif (10 ans) avec une très haute production ce qui équivalait à dix fois ou plus par rapport au système extensif.
- La présence des taux de mortalité des plans au niveau des plusieurs vergers du à les fréquences d'irrigations et la nature des sols et autres.

Mots clés : *oléiculture, olivier Agriculture saharienne, Biskra, système intensif et semi intensif*

C. AFFICHE N°: 89.

INVESTIGATION ON CHEMICAL COMPOSITION, ANTIOXIDANT, ANTIFUNGAL AND HERBICIDAL ACTIVITIES OF VOLATILE CONSTITUENTS FROM TUNISIAN *DEVERRA TORTUOSA* STEMS AND INFLORESCENCES

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Abtract : Tunisia is a repository source of medicinal and aromatic plants. *Deverra tortuosa* is one of a common wild medicinal plant belonging to the Apiaceae family. In Tunisia, Few are the investigations on the volatile constituents and biological activities of this species. The aims of this study were then, to determine the chemical composition of the essential oil obtained from stems and inflorescences *Deverra tortuosa* as well the assessment of their biological activity. EOs were extracted by hydrodistillation and analyzed by gas chromatography coupled to mass spectrometry (GC/MS). The antioxidant properties were determined by DPPH and ABTS assays. The phytotoxic potential was assessed against dicots weeds (*Sinapis arvensis* and *Trifolium campestre*), monocots weeds (*Lolium rigidum*) and cultivated species (*Lepidium sativum*). The antifungal activity was investigated against four target phytopathogenic fungal strains. High diversity of compounds were detected in D. tortuosa oils varying among plant part, and consisting mainly of α-pinene (24.47-28.56%), sabinene (16.2-18.6%), α –phellandrene (6.3-11.7%) and Cis-Ocimene (5.28-7.85%). D. tortuosus oils exhibited remarkable antioxidant activity. For the antifungal activity, tested oils showed interesting variable activities depending on the dose and fungi strain. The herbicidal activity of essential oilsshowed significant efficacy on the inhibition of germination seedling growth of all tested herbs. These results suggest that the essential oil of *Deverra tortuosa* represents a valuable source of antioxidant, antifungal and phytotoxic metabolites and could be a potential candidate for pest management and sustainable agriculture.

Mots clés : *Deverra tortuosa, Essential oils, antioxidant, phytotoxicity, antifungal activity.*

C. AFFICHE N° : 90.

HYDROGEN SULFIDE DONOR EFFECTIVELY DETOXIFIES CHROMIUM TOXICITY IN BEAN (PHASEOLUS VULGARIS L.) BY MODULATING THE ANTIOXIDANT SCAVENGING SYSTEM, NUTRIENT UPTAKE AND NITROGEN METABOLISM.

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Abtract : As a toxic anthropogenic pollutant, chromium (Cr) poses a serious threat the sustainable agricultural production and food safety. Here, the hydroponic experiment was conducted to determine the impact of single and/or combined application of hydrogen sulfide (H_2S) donor, sodium hydrosulfide (NaHS; 100 µM) on growth, nutrient uptake, oxidative stress biomarkers, antioxidant machinery and nitrogen metabolism of bean (*Phaseolus vulgaris* L.) plants submitted to 10 µM Cr for 24 days. Chromium stress suppressed plant elongation and biomass, but it elevated leaf Cr accumulation, superoxide and hydroxyl radicals as well as hydrogen peroxide levels and protein carbonylation. However, NaSH applied jointly or singly with Cr improved plant growth by enhancing the activities of the key oxidative defense system enzymes such as catalase, superoxide dismutase and peroxidase. Chromium treatment reduced uptake of Mg, K, Ca, Mn, Fe and Zn and lowered activities of enzymes of nitrogen metabolism (nitrate reductase, nitrite reductase, glutamine synthase and glutamate synthase) in leaves. Exogenous NaHS conceivably stimulated endogenous H_2S which can be involved to remove Cr poisoning. Thus, it is evident that nitrogen metabolism up-regulation H_2S-mediated may become a promising tool for increasing the tolerance of bean plants to Cr toxicity.

Keywords: *Bean, Chromium, Mineral nutrients, Oxidative stress*

C. AFFICHE N° : 91.

EFFECT OF NACL ON GROWTH GERMINATION AND SOLUBLE SUGARS CONTENT IN FENUGREEK SEEDS

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Abtract : The influence of NaCl on germination rate, growth, and soluble sugar content in fenugreek seeds was investigated
Six concentrations of sodium chloride (0, 40, 80, 120, 160, 200 Mm) were used. Results indicated that all investigate traits were affected by salt stress ;as salinity caused significant reduction in means of finalgermination percentage, germination index, seedling vigor index, energy of germination, shoot and root lengths, shoot and root fresh weights, shoot and root dry weights, seedling height reduction and relative dry weigh,and salinity also affected on imbibition of seeds and content of total souble sugars.

Keywords- *Fenugreek, Trigonella foenum-graecum L., Germination parameters, Seedling characters, Salinity levels, souble sugars.*

C. AFFICHE N° : 92.

TOTAL PHENOLIC CONTENTS, FATTY ACID COMPOSITION AND ANTIOXIDANT ACTIVITY FROM TUNISIAN PURSLANE (*PORTULACA OLERACEA* L.) LEAVES AND STEMS VARIABILITIES

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Background: *Portulaca oleracea* is listed in the World Health Organization as one of the most used medicinal plants. Although, wild purslane is an edible plant in many parts of the world, there is a great interest in the cultivation of this overlooked weed in the U.S. as a food crop due to its nutritive content and antioxidant properties. In addition, this plant is culinary used in Mahdia and Monastir. Purslane has been identified to contain the highest amount of omega-3 fatty acids, especially alpha-linolenic acid (ALA) than any green leafy vegetable.
The objective of this research was to estimate the variability of total phenolic contents, fatty acids composition, and antioxidant activity of Tunisian cultivated *P. oleracea* at different plant parts (stems and leaves).
Materials/Methods: Different samples were analysed for their fatty acids by GC-FID and total phenolic contents using Folin–Ciocalteau and the scavenging effect of DPPH (2,2-diphenyl-1-picrylhydrazyl) radicals was evaluated. Dried residues from stems and leaves of purslane were extracted using two solvents (ethanol and methanol).
Results: Results showed that Purslane plant parts have high nutritional value. Stems were proven to contain primarily palmitic acid (20.6%) and linoleic acid (35.52%), while leaves exhibited an abundance of ALA (56.97%). In addition, the content of polyphenols in purslane varied depending on the solvent mainly in leaves. In fact, stems showed a content of total phenolic of 47.1 mgEAG/g of dried weight, while in leaves, the range varied from 35.78 to 44.60 mg EAG/g of dried weight. In addition, the extracts from both leaves and stems exhibited an antioxidant activity with IC_{50} values of 2.31 and 2.05 mg/ml respectively with the DPPH assay.
Conclusion: As a conclusion the presence of high amounts of antioxidants, omega-3 fatty acids make purslane an important food for reducing the risk of chronic diseases and outweighs the health risks.

Keywords: *Portulaca oleracea ; total phenolic contents; antioxidant activity; fatty acids, variability.*

C. AFFICHE N° : 93.

POTENTIAL OF ANIMAL MANURE AMENDMENTS IN COMBATING CALCAREOUS INDUCED IRON DEFICIENCY IN PEARL MILLET

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Abtract: Calcareous soils are known for their nutritional disorders due to the insoluble form of iron that limits free Fe availability for crops. However, it is well established that organic fertilization improves the physicochemical and biological properties of the soil and can mitigate nutrient deficiency.
According to this approach, a greenhouse experiment was conducted on four pearl millet genotypes cultivated on calcareous soil added with an increasing concentration of animal compost as a sustainable approach to mitigate lime-induced Fe deficiency and propose an organic farming system. Fe mobility in the soil-plant system, plant growth, chlorophyll, and photosynthesis were analyzed.
All plants grown in calcareous soil developed specific iron deficiency symptoms, with varying intensities and dates of emergence depending on genotype. The addition of compost significantly improved iron availability in the calcareous soil, increased Fe uptake and accumulation in the plant, alleviated symptoms of iron chlorosis, and stimulated photosynthesis and plant growth. Animal compost improved calcareous soil characteristics, followed by Fe availability and uptake. The genotypic differences observed in this study confirmed the specific performance of IP19586 and IP13150, which expressed higher capacities of Fe remobi1lization in the rhizosphere, Fe uptake, and preferential allocation to shoots.

Keywords*: Animal compost, Calcareous soil, iron, pearl millet, Photosynthesis, Spad index*

C. AFFICHE N° : 94.

NUTRITIONAL FRUIT QUALITY OF A TUNISIAN APRICOT CULTIVAR UNDER DIFFERENT FARMING SYSTEMS

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Abtract : In Tunisia, the annual apricot production is about 37400 Tons which represent 12.81% of the stone fruits production (DGPA, 2022). The area is about 8500 ha and Testour (North-west of Tunisia; 36° 33' N and 09° 26' E) is the 4th producing region. In the recent years, many comparatives investigations on Prunus fruit quality regard to farming system have been released. The purpose of this study is to compare some physico-chemical and phytochemical characteristics of fruit of early apricot local cultivar "Oud Rhayem" grown under conventional and organic farming systems at Testour region. For each cultivation system, 30 fruits were harvested at commercial maturity stage and analyzed for some physical characteristics (weight, size "lateral width", firmness, and skin color). The 30 fruits were divided in 3 lots of 10 mixed fruits each and some chemical (Total soluble solid, pH, Titratable acidity, Sweetness index, and Ripening index) and phytochemical characteristics (β-carotene, phenolics, flavonoids and anthocyanins) of fruit were investigated. The results showed that under organic farming system, biggest and firm apricots were produced with highest values of a* measured on skin. Moreover, this system improves the nutritional quality of fruit. In fact, organic apricots were characterized by the highest total content of phenolics (116.03 mg GAE/100g FW) flavonoids (13.41 mg catechin/100g FW) and anthocaynins (18.70 mg cyaniding-3-glucoside/100g FW) and they were rich in β-carotene content (0.020 mg/100g FW). Whereas, no significant variation of studied chemical parameters were found between the two farming systems. As a conclusion, the cultivar "Oud Rhayem" exhibited the best nutritional fruit qualities under organic farming system and it is well appreciated by the consumers. It will be an interesting genotype in breeding programs to improve the organic fruit quality. In addition, we recommend farmers in Testour region to extend the areas of this cultivar in order to cover the demand of market with early and healthy organic apricots.

C. AFFICHE N° : 95.

ABOUT SOME MEDICINAL PLANTS USED IN THE FIGHT OF SIDE EFFECTS OF CHEMOTHERAPY

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Abstract: Every year, thousands of new cases of cancer are diagnosed and many deaths are reported. Chemotherapy remains a main approach to treatment for different cancers, it has side effects that can be in some cases serious and annoying. In this case, the patient can use herbal medicine to alleviate or eliminate the disorders associated with chemotherapy.
An ethnobotanical survey on the plants used by patients undergoing chemotherapy to combat the adverse effects of the latter, was carried out at the anti-cancer center of Annaba using a questionnaire asked directly on 319 patients for two months (from January 7 to March 8, 2018) using pre-established questionnaire sheets, in order to collect the necessary information on the patient (age, sex, type of cancer and family history...) and on the use of the plants (names of the plants, part used, method of preparation, route of administration, dosage, duration of treatment, efficacy, other effects observed...).
Nausea and/or vomiting, diarrhea and constipation are the most commonly mentioned side effects. The results of this survey identified 27 plants divided into 20 families with a predominance of the family Lamiaceae. The survey also revealed that the most commonly used parts are fruit, leaves and seeds. The most commonly used method of preparation is infusion (60.49%). Most patients use these plants for an indefinite period of time (38.27%). The reduction of the side effect is the most observed result (50.61%) and the majority of patients (82.72%) find that the herbal medicine used has no disadvantages.
Based on the results of this study, it can be deduced that herbal medicine can be used to combat certain side effects of chemotherapy (nausea, vomiting, transit disorders, stomach ache, insomnia, anxiety ...), it ensures benefits and significant contributions in the fight against these effects, and it has a good overall safety and safety profile.

Keywords: *Phytotherapy, Ethnobotanical survey, Cancer, Chemotherapy, CLLC.*

C. AFFICHE N° : 96.

CHARACTERIZATION OF *SILYBUM EBURNEUM* AND *SILYBUM MARIANUM*: AN INVESTIGATION INTO THE PHYTOCHEMICAL PROFILES AND THE ANTIOXYDANT PROPERTIES OF DIFFERENT ORGANS

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Abstract: The milk thistle (*Silybum marianum* L. (Gaertn)) is a Mediterranean spontaneous edible plant and the only known representative of the genus *Silybum*, although some authors mention a second species, *Silybum eburneum* Coss. et Dur., which is a marginalized species. The biological and biochemical characterization of the different organs of *S. eburneum* has not been studied to date. Therefore, this study aimed to investigate the total phenolic and flavonoid contents, as well as the antioxidant activities (DPPH, FRAP, and total antioxidant activity) of the methanolic extracts of varied organs (leaves, stems, flowers, and seeds) of *S. eburneum* and *S. marianum* collected from two arid Tunisian regions: Sidi Bouzid and Medenine, respectively. The results showed that there was a highly significant difference in the physicochemical composition and antioxidant power of the extracts from the diverse organs of both species. Specifically, *S. marianum* and *S. eburneum* seeds presented the highest total phenol (161.364 ± 13.911 and 61.771±9.417 mg GAE/g dw) and flavonoid contents (41.886 ± 0.438 and 18.096±0.549 mg QER/g dw), respectively. These findings confirm the important antioxidant activity observed in the seeds compared to the other organs. The study demonstrates that the genus *Silybum* could be a promising source of natural bioactive molecules for use in the functional food, pharmaceutical, and cosmetic industries. Further research is needed to explore the potential applications of these bioactive compounds. This is the first report to provide a biological and biochemical characterization of these plants, which could contribute to the conservation and sustainable use of this marginalized species.

Key words: *Antioxidant power, Silybum eburneum, Silybum marianum, total phenol contents*

C. AFFICHE N° : 97.

TREHALOSE AS AN INDICATOR OF DROUGHT STRESS TOLERANCE IN THE RHIZOSPHERE MICROBIAL COMMUNITY

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ABSTRACT : Water is vital for all living rhizospheric organisms. However, numerous microorganisms have adapted to survive in environments in which water is scarce. This study aimed to assess the change in microbial and soluble sugar profiles in the rhizosphere of olive trees under drought conditions. The analytical method consisted of the extraction of rhizospheric microbial sugars (using a mixture of chloroform and 0.01 M K2SO4) and soluble sugars (using only K2SO4, without chloroform). Among identified microbial sugars, trehalose was the major compound for well-watered and water-stressed plants. The main soluble sugar detected in well-watered olive tree rhizosphere was rhamnose. However, glucose was established as the predominant soluble sugar in the rhizosphere of water-stressed plants. Trehalose accumulated primarily under drought conditions (up to 80% of total sugars compared to mannitol (7%), sucrose (3%) and myo-inositol (2%)), suggesting a much broader role of trehalose in the rhizospheric microbial stress response based on its ability to act as a compatible solute.

Keywords*: Trehalose, Olea europaea, Drought, Rhizosphere, Microorganisms*

C. AFFICHE N° : 98.

ETHNOBOTANICAL STUDY OF SACCOCALYX SATUREIOIDES COSS AND DUR FROM ALGERIAN SAHARA

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Abtract : The Ain defla area offers an eccentric and very diverse botanical landscape, linked to the circumstances of the climate, the soil and the relief. It is characterized by numerous medicinal plants which arouse great interest, by their therapeutic, organoleptic and odorous properties and their uses in traditional herbal medicine. To complete our study An ethnobotanical survey was conducted using 29 questions questionnaire on a population of 304 people about lamiaceae family species called Saccocalyx satureioides. Results indicate that the majority of individuals in the selected population of the Ain defla area are interested in herbal medicine, however few people know the plant nomenclature, or type of culture, dosage, treated diseases, different modes of use (preparation and administration), and especially toxicity and secondary effects of the plant.

***Key words** : Medicinal plants, Ethnobotany, Phytotherapy, Saccocalyx satureioides Coss and Dur, Lamiaceae*

C. AFFICHE N° : 99.

EFFECT OF PROPOLIS EXTRACTS AS A NATURAL PRESERVATIVE ON QUALITY AND SHELF LIFE OF MINCED BEEF MEAT PATTIES DURING REFRIGERATED STORAGE

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Abtract : Propolis is a byproduct widely used in folk medicine due to its valuable biological and pharmacological properties. Today, this product enjoys a worldwide reputation as a natural substance widely accepted in many countries as a dietary supplement to improve health and prevent diseases. The objective of this study was to valorize the the antioxidant activity of crude ethanolic extract (EEP) and its 4 fractions of propolis in relation to their phenolic contents. Finally, the efficacy of EEP and fractions to extend the shelf life of minced beef meat during refrigerated storage was studied. Crude EEP and fractions showed high amount of total phenolic and especially flavonoids correlated with high antioxidant capacities but at different degrees. This variability is mainly related to their chemical composition which depends qualitatively and quantitatively on the polarity and the extracting power of the solvent. The conservative effect of propolis (extract and fractions) on minced beef was measured at 3rd, 7th and 14th day of refrigerated storage. Generally, the enrichment of meat with propolis allowed a better stabilization of the total acidity, the pH and the color indices, an improvement of the antioxidant capacity (DPPH test, FRAP) and inhibition of the Metmyoglobine formation, lipids peroxidation and bacterial growth as compared to no-treated meat during the storage period. All of these results may justify the use of propolis as a source of bioactive molecules and its integration in the food industry as an antioxidant, antimicrobial and as a bio-preservative agent..

***Mots clés :** Cucurbita maxima, by-products, antibacterial activity, antioxidant activity, total phenolic content.*

C. AFFICHE N° : 100.

IONIC COMPETITIVITY INFLUENCES ROOT H-ATPASE AND FE-CHELATE REDUCTASE ACTIVITIES AND DETERMINES COMMON BEAN TOLERANCE TO IRON DEFICIENCY

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Abtract: Plants take up mineral nutrients from the soil to produce organic compounds. Because of their close relationship with Keys metabolic reactions in the plant, several nutrients are considered necessary, among them iron, zinc, calcium, phosphorus... Such elements are known by their complementarity, while the absence of one disturbs the uptake and distribution of the others. Mineral constraints are known to exist in some problematic soils, such as calcareous ones where high calcium carbonate content and limited iron availability induce nutritional imbalances for the plant. The common bean (*Phaseolus vulgaris* L.) is a so-called strategy I species whose iron uptake is mainly in ferrous form (Fe^{2+}). In calcareous soils, this form is almost absent because of the precipitation of Fe into an unavailable form (ferric-Fe) due to the alkaline pH. To overcome this problem, strategy I plants induce root membrane H-ATPase activity that acidifies the rhizosphere and stimulates the root Fe-chelate reductase (Fe-CR) enzyme that catalyzes the reduction of insoluble Fe (Fe^{3+}) to the available form (Fe^{2+}). However, genotypic differences in response to iron deficiency have been observed among species, genotypes, and varieties. The exploration of this genetic potential in screen-tolerant varieties represents a useful, sustainable, and efficient tool to overcome this nutritional disorder, particularly in calcareous soils.

The objective of the present study was to investigate the relationships between some essential nutrients (iron, zinc, and calcium), iron nutrition and distribution, key metabolic functions, root membrane H-ATPase, and Fe-CR in common beans. To this end, three genotypes (coco blanc, coco nain and innovial) were grown hydroponically under iron deficient condition, as compared to control ones. Measurements were made on rhizosphere acidification, Fe reductase activity, chlorophyll biosynthesis, iron, zinc, and calcium nutrition, and related interrelationships were established.

The main results obtained show that iron deficiency significantly decreased plant growth, photosynthetic pigments, the spad index, and H-ATPase and Fe-CR activities with respect to genotypes. Iron concentration decreased in all genotypes against a significant increase in Ca and Zn uptake and accumulation in roots. Some genotypic differences in response to iron deficiency were observed, and coco nain demonstrated higher tolerance capacities via improved H-ATPase and Fe-CR activities, which improve Fe uptake at the expense of Ca and Zn. The taken-up Fe was translocated to shoots to support chlorophyll biosynthesis, photosynthesis, and plant growth. The sensitivity of coco blanc, and to a lesser degree innovial, was explained by the overaccumulation of Ca and Zn in roots when Fe is deficient in the medium.

***Keywords**: Common bean, Fe-chelate reductase, iron , calcium, zinc , rhizosphere acidification*

C. AFFICHE N° : 101.

PRODUCTIVITY AND BIOLOGICAL N_2-FIXATION IN WHEAT- FABA BEAN INTERCROPPING SYSTEMS IN SEMI- ARID CLIMATE OF TUNISIA

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Abstract: The world's human population is expected to increase to over 9.8 billion by the end of 2050, which is why crop productivity should be further increased without deteriorating soil fertility, the environment, or food quality. Synthetic nitrogen fertilizers are used in large quantities to increase crop productivity in the short term. However, the indiscriminate and unbalanced use of these synthetic fertilizers affects soil quality in the long term. Otherwise, the recurrent droughts, infertile soils, salinity, climate change, and other inputs are putting crop production in jeopardy. Improving food and nutrition security must be prioritized and requires the deployment of effective agricultural technologies. In the face of limited external resources, the question of how to effectively utilize the available resources in a continuum of circumstances becomes critical. New cultural practices are now strongly recommended in order to install sustainable, economical, and non-polluting crop production systems. Integration of grain legumes as intercrops with cereals for low-input farming systems in the Mediterranean agrosystem increases nitrogen cycling and availability through biological nitrogen fixation for smallholder farmers suffering from the high cost of chemical fertilizers. Otherwise, the introduction of N_2-fixing legumes in cereal cropping systems improves other nutrients' (P, K, OM, C,...) cycling and promotes agrosystem resilience. Moreover, it offers a means to balance the environmental and socio-economic objectives of farming.

According to the above approach, a field experiment was conducted in the experimental plot of the Faculty of Sciences and Techniques of Sidi Bouzid on the Tunisian faba bean (Vicia faba) cultivar beldi and the durum wheat (Triticum durum desf.) cultivar karim in a completely randomized design (own culture and mixculture). Analyses focused on the physiological behavior and yield of the two species according to the cropping system.

obtained results showed the importance of wheat-faba bean intercropping in the remobilization of nutrients in the rhizosphere and its positive impact on the biological activity of the rhizosphere. Wheat grown in a Faba bean mixture has high plant growth, photosynthesis, and chlorophyll biosynthesis potential, as compared to own culture, whereas faba bean expressed lesser physiological behavior. The nodular diagnosis showed the installation of nodules fixing atmospheric nitrogen on the faba bean root system, thus creating a biological source of nitrogen in favour of durum wheat. The most important fact is the very significant stimulation of biological activity in the soil that has resulted in a significant remobilization of essential nutrients. These rhizospheric conditions resulted in an improved plant mineral nutrition, activation of photosynthesis, plant growth, and a higher final yield of durum wheat. The calculated Land Equivalent Ratio (LER) confirmed the effectiveness of the intercropping system as compared to the native culture.

***Keywords** : Boron, Chlorophyll, photosynthetic, Growth, Wheat.*

C. AFFICHE N° : 102.

PHYTOCHEMICAL ANALYSIS AND IN VITRO BIOLOGICAL ACTIVITY OF SALVIA OFFICINALIS EXTRACTS

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Abstract:

The objectives of this study were to define the phenolic profile, antioxidant and antimicrobial properties of extracts from *Salvia officinalis* herbs used in traditional medicine. The results indicated that the extract inhibits scavenges stable 2,2-diphenyl-1- picrylhydrazyl (DPPH) and 2,2′-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) cation radicals. In the present study, *Salvia officinalis* was potent antibacterial agent against Staphylococcus aureus, Staphylococcus epidermidis, Bacillus subtilis, Escherichia coli and Pseudomonas aeruginosa. The results of this study could be helpful to develop medicinal preparations and uses of this species as an antimicrobial and wound healing agent.

***Keywords:** Salvia officinalis, phenolic content, antioxidant activity, antibacterial effect.*

C. AFFICHE N° : 103.

IMPORTANCE OF ROOT EXUDATION IN THE OF DURUM WHEAT RESPONSE TO IRON DEFICIENCY

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Abstract: In the widespread calcareous soils of Tunisia, iron is mainly found in insoluble form that is not available for plants. Symptoms of iron deficiency are commonly observed and a significant reduction in the yield was recorded. Durum wheat (*Triticum durum* Desf.) is one of these strategic crops suffering from iron deficiency. However, strategy II plants to which belongs durum wheat are known by their ability to exudate phytosiderophore (PS) in the rhizosphere that chelate Fe by forming Fe-PS complex, easily absorbed by root plants. Several studies have shown that this capacity of PS exudation could be a functional trait that determines crop tolerance to Fe deficiency. According to this approach, a greenhouse experiment was conducted on three Tunisian wheat genotypes (karim, khiar and inrat100) grown in hydroponics and subjected to different Fe concentrations (0, 10, 20, 40 and 60µM). Plant growth, SPAD index, Fe nutrition and distribution, chlorophyll fluorescence and PS exudation were investigated in order to express the genotypic differences in response to this mineral constraint and identify the most tolerant genotype. An in-depth analysis of the relationships and correlations between these physiological and biochemical parameters was made to highlight the functional traits underlying durum wheat tolerance to iron deficiency.

Obtained results demonstrated that increasing iron concentration in the rhizosphere significantly increased plant growth, chlorophyll fluorescence (Fv/Fm) and chlorophyll biosynthesis. However, genotypic differences are observed, Karim showed the highest tolerance to iron deficiency (0 to 10 µM Fe), INRAT100 the most sensitive whereas Khiar occupied an intermediate position. Analysis made on phytosiderophores exudation demonstrated that these organic compounds are extruded under Fe deficiency, confirming thus the strategy II adopted by wheat species. Otherwise, a clear genotypic differences were recorded, karim who shown better physiological behavior under limited Fe availability (0- 10 µM Fe) produced more PS and remobilize more Fe than khiar and INRAT100.

Taken together, our results suggested that the main trait underlying durum wheat tolerance to iron deficiency is the capacity of root exudation of PS.

Keywords*: phytosiderophores, Iron deficiency, Chlorophyll fluorescence, Wheat.*

C. AFFICHE N° : 104.

FUNCTIONAL DISSECTION OF THE PHYSIOLOGICAL TRAITS PROMOTING DURUM WHEAT (*TRITICUM DURUM* DESF.) TOLERANCE TO DROUGHT STRESS

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Abstract: In Tunisia's arid and semi-arid lands, drought stress remains the most critical factor limiting agricultural production due to low and irregular precipitation. The situation is even more difficult because of the scarcity of underground water for irrigation and the climate change that has intensified and expanded the aridity. One of the most efficient and sustainable approaches to mitigating drought stress is exploring genotypic variability to screen tolerant genotypes and identify useful tolerance traits. To this end, six Tunisian wheat genotypes (*Triticum durum* Desf.) were cultivated in the field, under a greenhouse and natural light, to be studied for their differential tolerance to drought stress.

This objectifs are, Study the effect of water stress on the physiological behaviour (growth, photosynthesis, water relations, etc.) of available genotypes in order to identify genotypic variability in response at this physiological level. Use the contrasting genotypes (tolerant/sensitive) to further study the mechanisms associated with this tolerance/sensitivity at the cellular level: osmotic adjustment, mineral nutrition and water relations.

Depending on the genotypes, drought stress significantly decreased plant growth, chlorophyll biosynthesis and photosynthesis; stimulated osmolytes accumulation and disturbed water relationsThe most tolerant genotypes (salim and karim) accumulated more potassium (K) and proline in their shoots, allowing them to maintain better tissue hydration and physiological functioning. The osmotic adjustment (OA), in which potassium and proline plays a key role determines wheat tolerance to drought stress. The calculated drought index (DI), drought susceptible index (DSI), drought tolerance index (DTI), K use efficiency (KUE) and water use efficiency (WUE) discriminated the studied genotypes and confirmed the relative tolerance of salim and karim.

Keywords *Drought susceptible index; drought tolerance index; durum wheat; Photosynthesis; proline, relative osmolyte content*

C. AFFICHE N° : 105.

STUDY OF THE BEHAVIOUR OF DIFFERENT FABA BEAN VARIETIES AGAINST INFESTATION BY TWO SPECIES OF BROOMRAPE (*OROBANCHE FOETIDA* AND *OROBANCHE CRENATA*) AND SEARCH FOR SOME MECHANISMS INVOLVED IN RESISTANCE

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Abstract: The behavior of four faba bean varieties toward *Orobanche foetida* and *O. crenata* infestation was examined under pots. A high significant reduction in leaf number and shoot dry weight were observed for the susceptible variety Bachaar. This reduction was linked to a severe decrease in CO_2 assimilation and a significant drop in F_v/F_m ratio (the quantum yield of photosystem II). While, the F_v/F_m ratio remained constant at approximately 0.8 in the resistant varieties Chourouk, Chams and Zaher. For these resistant varieties, Orobanche parasitism did not significantly decrease CO_2 assimilation. The inability of the susceptible cv. Bachaar to adjust its photosynthesis under parasitism attack is the consequence of lower instantaneous water use efficiency (WUE), witch results from an acclimation failure compared with the resistant varieties.

Mots clés : *Féverole, Orobanche foetida, Orobanche crenata, résistance*

C. AFFICHE N° : 106.

EFFECT OF ARSENIC TOXICITY ON THE PHOTOSYNTHETIC MACHINERY OF BEAN PLANTS (*PHASEOLUS VULGARIS* L.)

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Abstract: Arsenic (As) is considered one of the most toxic metalloids for living organisms. The exposure to high concentrations of As can be deleterious to plant tissues. The main aim of the present study is to investigate the effects of high concentrations of Na_2AsO_2 (10, 15, 20, and 25 µM) on bean plants (*Phaseolus vulgaris* L. var. Coco-nain rose) grown hydroponically for 21 days. After As exposure, plants exhibit phytotoxicity symptoms marked by chlorosis mainly on the second foliar stage with an obvious reduced leaf area. Roots were drastically damaged showing necrosis concomitantly to a noticeable reduction of the second ramifications. The plant biomass and elongation were also affected especially when plants were treated with 20 and 25 µM of As. The inhibitory effects of As on plant growth were directly associated with the reduced CO_2 assimilation (A), stomatal conductance (g_s), and transpiration (E). Interestingly, intercellular CO_2 (Ci) remained unchanged for all different treatments. These evidences presume that the limited g_s cannot explain alone the inhibition of photosynthesis when plants are subjected to As. By contrast, plants submitted to As showed an increase in the light compensation point (*LCP*) in tandem with a reduced dark respiration (*Rd*). Furthermore, the apparent quantum yield (ϕ) declined significantly especially when plants were submitted to 25 µM of As. Despite the absence of enough evidence on the effects of As on the photosynthetic machinery of bean plants, it is assumed that the inhibitory impacts of As can be ascribed to the hindrance of the non-stomatal attributes mainly CO_2 fixation by the Rubisco and the light efficiency of the photosystem II.

Keywords: *Arsenic, photosynthesis, Phaseolus vulgaris L.*

C. AFFICHE N° : 107.

STUDY OF THE ECO-PHYSIOLOGICAL BEHAVIOUR OF THE GERMINATION OF *ANAGYRIS FOETIDA* L. SEEDS WITH A VIEW TO THEIR PRESERVATION

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Abtract : Our work focuses on the eco-physiological behavior of germination of the seeds of *Anagyris foetida* L. It is a shrubby legume, of Mediterranean origin, quite common in Algeria.

a tolerant plant that can improve dry soils to nitrogen due to being a legume plant and that can be very important in a reforestation program in some arid and semi-arid regions of the Mediterranean basin. In addition, its flowers are important for beekeeping. The seed is used as vomitive, purgative.

The objective of this work is to define the viability of the seeds of this species and to seek the optimal thermal conditions for their germination.

The germination tests were carried out under controlled conditions of light, darkness and temperature. Two main germination response variables were studied, the final germination percentage (GP) and the mean germination time (MGT)

The first results showed that the seeds are affected by integumentary inhibition

Germination that was raised by mechanical scarification. They also showed that these seeds are indifferent to photosensitivity since their germinating power is comparable to daylight and darkness. Note also that the thermal germination optimum for this species is between 10°C and 20°C.

These initial results have helped to clarify the viability of *Anagyris foetida* seeds and to define the optimal conditions for their germination. This data will certainly be used in the conservation of this taxon

Mots clés : *Anagyris foetida L., germination, viability, temperature, light, conservation.*

C. AFFICHE N° : 108.

CHEMICAL CHARACTERIZATION OF PHENOLIC EXTRACT FROM ARTEMISIA HERBA-ALBA (ASSO.) USING LIQUID CHROMATOGRAPHY WITH PHOTODIODE ARRAY COUPLED WITH ELECTROSPRAY IONISATION MASS SPECTROMETRY AND THE STUDY OF ITS BIOLOGICAL ACTIVITIES

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Abtract : Artemisia herba-alba Asso. (subgen. Seriphidium, Asteraceae family) is widespread in semi-arid and arid steppes of North Africa, Spain, the Middle East, and the Northwest of Himalaya. A. herba-alba was extensively used in traditional medicine to treat diabetes, hypertension, colds, intestinal disturbances, scorpion/snake bites, and parasitic infections.

Total phenols, flavonoids, flavonols, and flavanols of the methanolic extract of the aerial part of A. herba-alba were determined. The extract was analyzed by liquid chromatography with photodiode array coupled with electrospray ionisation mass spectrometry and allowed to identify of 10 phenolic compounds. Apigenin-6-C-glycosyl flavonoids and caffeoylquinic acids were identified. Chlorogenic acid and 1,4 dicaffeoylquinic acid being the major constituents. Methanolic extract exhibited a considerable antioxidant activity as evaluated by 2,2-diphenyl-pycrilhydrazil hydrate scavenging activity, reducing power, β-carotene bleaching test, and chelating ability. Analysis of the antibacterial activity showed that A. herba-alba methanolic extract are efficient against gram positive and gram negative bacteria.

Mots clés : *Artemisia herba-alba, liquid chromatography with photodiode array coupled with electrospray ionisation mass spectrometry, C-glycosyl flavonoids, Caffeoylquinic acids, Biological activities.*

C. AFFICHE N° : 109.

EVALUATION OF THE EFFECT OF DIFFERENT SOIL TYPES ON POMOLOGICAL AND OIL CONTENT OF OLIVE TREES (OLEA EUROPAEA)

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Abstract : Since Tunisia is at the same time a Mediterranean and a Saharan country the soils show all the signs of this climatic, morphological and geological diversity. The distinct type of soils leads to an agricultural system characterized by continuous and productive territories for agriculture with a very important vegetation diversity. We aimed to estimate the effect of four different type of soil (sandy, clay, red and tuffeau) on the pomological parameters of the olive (Olea europaea) trees.
The results of this study showed that the type of soil has no effect on the water balance of the olive tree as shown by the results of the relative water content (RWC). However, pomological parameters presented a significant difference among the four type of soils. Mainly, tuffeau soil presented the high oil content (22.24%), pulp/stone ratio (0.723) and the average fresh weight (0.817g). While the high humidity rate and maturity index were presented by fruits collected from clay soil (51.98) and (4.48), respectively.

Keywords*: Type of soil, Olive, oil content,*

C. AFFICHE N° : 110.

ALLELOPATHIC EFFECT OF *TETRACLINIS ARTICULATA* (VAHL) MAST (FROM ALGERIA) ON GERMINATION AND GROWTH OF *LACTUCA SATIVA* L.

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Abstract : The present study deal with an endemic medicinal plant from western Algeria extract allelopathic activity (*Tetraclinis articulata*) on germination and growth for *lactuca sativa* L. The tested seeds were germinated in petri dishes. Increasing concentrations (0.25, 0.50, 0.75 and 1%) extracts effect was tested on germination and growth of *Lactuca sativa* L. Germination test of different fractions from liquid- liquid partition of *Tetraclinis articulata* (chloroform, ethyl acetat and butanolic fractions).
At the same time, *T. articulata* extracts at three different concentrations (10%, 30% and 50%) were prepared and tested on *Lactuca sativa* seeds in pots.
We also tested these extracts at different concentrations 1.5 and 3% on *Lactuca sativa* seedlings (foliar spray).
Inhibitory effects with variable intensities were observed on *L. sativa* the seeds germination and growth. The aqueous extract of *T. articulata* exhibits the strongest inhibition activity on *L. sativa* seeds at all tested concentrations.
T.articulata ethyl acetate and chloroform fractions exhibit *Lactuca sativa* germination inhibition while butanolic fraction exhibits growth inhibition.
Germination in pots mixed with crude extract of *T. articulata* for all tested concentrations shows inhibition on germination and for the foliar spraying, growth inhibition is observed for different fractions and all the concentrations tested.
It is noted that *Tetraclinis articulata* contains allelopathic compounds that can replace synthetic bioherbicides.
The selective allelopathic effects can be of considerable interest for the control of weeds in the crops cultures. Indeed, the allelopathy may replace nefast phytosanitary products for the environment.

Keywords : Allelopathy activity, Tetraclinis articulata, Germination, Growth, Lactuca sativa.

BIOTECHNOLOGIE

C. AFFICHE N° : 111.

SCREENING OF LIGNOLYTIC FUNGI FOR THE BIODEGRADATION OF FLUROQUINOLONE ANTIBIOTICS

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Abtract : Fluoroquinolones are among the most widely used families of antibiotics in the world due to their broad spectrum of action. They are therefore widely used to treat human and veterinary infections. Unfortunately, these xenobiotics are poorly metabolized and more than 70% of these antibiotics are released into nature, mainly through wastewater, in unchanged form. In addition, wastewater treatment plants (WWTPs) are unable to remove most antibiotics, especially fluoroquinolones, which remain in the WWTP water and can reach surface and groundwater. The presence of these drugs in nature is of great concern, mainly because the diffusion of these compounds in the aquatic system contributes to the development and global spread of antibiotic resistance. In this study, we tested the degradation capacity of 10 different fluoroquinolone antibiotics by 9 different strains of ligniolytic fungi (Bjerandera Adusta, Porosterum spadicium, Irpex Lacteus, Trametes versicolor, Pleuroteus ostreatus, Pyconporus cinnabarinus, Ganoderma spadicium, Phanerocaete chrysosporium, and Goloyphulm trabtum). Among these strains, Bjerkandera Adusta and Porosterum Spadicium showed the highest percentages of degradation after 15 days of liquid culture. Indeed, HPLC results showed that these fungi were able to completely degrade, respectively, 8 and 6 out of 10 antibiotics. Moreover, for most of these antibiotics, a total loss of residual antibiotic activity, estimated in the presence of Ecoli bacteria, was noted. The monitoring of extracellular enzymatic activities at different phases of culture was also performed: no laccase activity was detected in the two strains considered, however a Manganese peroxidase activity was measured in both cases.

Mots clés : *Screnning, Biotransformation, Fluoroquinolnes, Fungi, Antibiotics*

C. AFFICHE N° : 112.

IN VITRO CULTIVATION OF TWO HALOPHYTES: SALICORNIA FRUCTICOSA AND ARTHROCAULON MACHROSTACHYUM

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Abstract: Halophytes are plant species that are widely found in saline habitats such as beaches, post-industrial wastelands, irrigated lands, salt marshes, and others. Excessive salinity, which can limit plant growth, is not harmful to halophytes, which have developed various defense mechanisms that allow them to survive in harsh environments. Furthermore, they show great variability in their morphology and physiological adaptations to salinity. In this context, the present study aims to use *in vitro* micropropagation of *Salicornia fructicosa* and *Arthrocaulon machrostachyum* for rapid characterization, propagation, and selection of superior genotypes (higher salt tolerance) for subsequent regeneration and valorization of plants.

A reliable and rapid *in vitro* regeneration protocol using axillary nodes as starting material was established for the two halophytes plant species which were cited above. In fact, shoot explants were surface sterilized and then cultured on half-strength Murashige and Skoog 1962 basal medium supplemented with 0.5 $mg.l^{-1}$ BAP, 20 $g.l^{-1}$ sucrose and 0.8% agar, designed by MS_1. To evaluate the tolerance of Tunisian halophytes to salinity, cuttings of 1.5 cm of length were exposed to various NaCl concentrations ranging from 0, 150, 200, 300, 400, 500 and 600 mM for 40 days. Results indicated that the lack of NaCl as well as the incorporation of 600 mM of NaCl on MS_1 medium restricted significantly the shoot induction and length of both *Salicornia* and *Arthrocaulon* species. However, the highest number of shoots, the average shoot elongation, and shoot percent of regeneration were observed on MS_1 medium enriched with 400 and 500 mM of NaCl. On the other hand, explants cultured on MS_1 enriched with 100, 200, and 300 mM of NaCl exhibited an overshoot elongation, but the axillary buds have a delay in bud burst. For the intense mass propagation phase, 400 and 500 mM of NaCl were selected to propagate indefinitely halophyte clones. For *in vitro* rooting, half-strength MS medium supplemented with 1.0 $mg.l^{-1}$ of IBA was most appropriate.

The explants responded satisfactorily to increasing NaCl concentration, indicating that NaCl was a necessary component of the medium. This shows the tolerability of halophytes to soil salinity. To conclude, the *in vitro* micropropagation of halophytes has been successfully carried out. In vitro halophytes will be evaluated for their phytochemical contents.

Mots clés : *Halophyte, micropropagation, NaCl, Salicorina, Arthrocaulon, Salt tolerance*

C. AFFICHE N° : 113.

ULTRASOUND-PROMOTED LIPASE CROSSLINKED ENZYME AGGREGATES CATALYSED ESTERIFICATION OF GLUCOSE AND FATTY ACIDS

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Abtract : Sugar fatty acid esters, widely called sugar esters, are odorless nonionic surfactants. They have gained attention thanks to their anti-bacterial and antifungal activity, while they are also reported as insecticides and miticides.

Lipase-catalyzed acylation of sugars with activated carboxylic esters in organic solvents is well documented in the literature. This one-step enzymatic strategy has been extended to SFAEs synthesis, providing a promising approach for cleaner production, thus gained widespread popularity. When catalyzed by lipases, sugars can be acylated by esterification with fatty acids or transesterification with active carboxylic acid esters to produce SFAEs.

In this study, we report our results on enzymatic sugar ester synthesis between glucose and oleic acid mainly but also the influence of ultrasound irradiations and the various parameters such as the reaction time, the solvent, the molar ratio between sugar and fatty acid, and the initial amount of water in the medium. Where possible, we will model the curves obtained to provide industrially important kinetic data.

Mots clés : *Glucose, Ultrasound, Fatty acid esters, Lipase, Tensioactifs*

C. AFFICHE N° : 114.

A2-A1 MILK THE IMPACT OF GENETIC VARIATION CATTLE ON MILK COMPOSITION

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Abtract : Recently, a new type of cow's milk has been commercialized in the markets, called A2 milk. this call comes from the allelic composition at chromosome 6. The aim of this study was to investigate the relationship between the β-casein CSN2 genotypes (A1A1, A1A2, A2A2) and the biochemical characters and fatty acid composition of milk. Twenty-four milk samples from Jersey cows from the same herd from a farm in Hungary were studied. Animals were grouped according to β-casein genotype variants A1A1, A1A2 and A2A2. A1A1 milk had a significantly higher content of monounsaturated fatty acids (<0.001) and a lower content of saturated fatty acids (<0.001). A2A2 milk had a higher content of polyunsaturated fatty acids (<0.001) in milk. Moreover, the three varieties of milk show no significant difference for the composition of the polyunsaturated between CSN2 genotypes A1A1, A1A2 and A2A2. Also, no significant difference was observed in physicochemical composition of the milk. Accordingly, selective selection of genotypes with preferred qualities can improve milk and dairy products. In conclusion the fatty acid content the milk could be influenced by CSN2 genotypes A1A1, A1A2 and A2A2.

Mots clés *:A2 milk, physicochemical composition, β-casein, polymorphysm*

C. AFFICHE N° : 115.

CO-PRODUCTION OF PROTEOLYTIC, AMYLOLYTIC AND CELLULOLYTIC ENZYMES BY STACHYBOTRYS MICROSPORA: STABILITY AND COMPATIBILITY WITH COMMERCIAL LAUNDRY DETERGENT.

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Abtract : In this work, three interesting enzymes: proteases, amylases and cellulases were produced simultaneously by the same fungus, *Stachybotrys microspora.* The highest enzymatic cocktail production was carried out at 30°C for 96 hours after adding 0.1% NaCl and 1.5% wheat bran as a carbon source in the basal culture medium. The effect of maltodextrin, sucrose or polyethylene glycol 4000 addition during the lyophilisation has been studied on enzyme activity and stability for liquid and powder enzyme formulation. Maltodextrin (MD) is the best additive to protect the activities of proteases, amylases and cellulases. Moreover, the liquid formulation of theses enzymes exhibited excellent stability and compatibility with 1% MD and 10% glycerol. It is interesting to note that we have developed two new enzymatic cocktails formulations (liquid and powder) stable at room temperature for 60 days and highly compatible with detergents. Comparing the washing performance of different formulations containing our enzyme cocktails to commercial ones showed significantly better removal of different types of stains. Finally, this research shows a cost-effective approach to simultaneously produce proteases, amylases and cellulases from *Stachybotrys microspora* that could be considered as a compatible detergent-additive in the green detergent industry.

C. AFFICHE N° : 116.

APPLICATION OF BOX-BEHNKEN DESIGN IN OPTIMIZATION FOR EXOPOLYSACCHARIDES EXTRACTION FROM CULTURED *HALAMPHORA* SP. DIATOMS (SB1 MK575516.1): CHARACTERIZATION AND IN VITRO ANTIOXIDANT ACTIVITY

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Microalgal polysaccharides are increasingly discussed as sustainable feedstock for the commodity markets. The halotolerant diatom *Halamphora* sp. (SB1 MK575516.1) synthesized a large amount of exopolysaccharides (EPS). This microalga was isolated from Sfax solar saltern (Tunisia) and cultured in bacth photoautotrophic mode in F/2 Provasoli medium at 22°C and a salt concentration of 100 g. l^{-1} at lab-scale. In this study, response surface methodology (RSM) based on Box-Behnken design (BBD) was employed to optimize the aqueous extraction of crude exopolysaccharides from *Halamphora* sp. The optimal extraction conditions with an extraction yield of 18.45 % were as follows: extraction temperature at 45 °C, extraction time of 60 min, and water to raw material ratio of 40 mL. g^{-1}. The EPS of *Halamphora* are found to be hetero-sulfated-anionic polysaccharides that contained carbohydrate (76.33 ± 0.18 %), protein (0.15 ±0.026 %), uronic acids (5.44 ± 0.080%) and sulfate (7.56 ± 0.86 %). The carbohydrate fraction, characterized by GCMS , was composed of xylose , L-Galactose , D-Galactose, Glucose, Ribitol, Trehalose, Mannose and Inositol with corresponding mole percentages of 40.55, 13.25, 13.00, 9.95, 9.82, 3.48, 2.90 and 2.28, respectively. Furthermore, the evaluation of the antioxidant activity in vitro suggested that EPS from *Halamphora* sp. strongly scavenged radicals, prevented radical $OH^{\cdot}$ and reduced activity of NBT.

***Keywords**: Halamphora, exopolysaccharides extraction, Characterization, antioxidant activities.*

C. AFFICHE N° : 117.

THE STUDY OF ANTIOXIDANT AND ANTIBACTERIAL PROPERTIES OF PEELS, SEEDS AND BRANDIES OF PUMPKIN (*CUCURBITA MAXIMA*)

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Abtract : Antioxidants are a wide group of chemical compounds characterized by high bioactivity. They affect human health by inhibiting the activity of reactive oxygen species. Therefore, they limit their harmful effect and reduce the risk of many diseases, including cardiovascular diseases, cancers, and neurodegenerative diseases. The purpose of this study was to determine the antioxidant activity of extracts from seeds, peels and brandies of Cucurbita maxima variety Batati in relation to their content of total phenols. Results obtained showed polyphenols values ranged from 12 to 26 mg gallic acid equivalent/gDR. The antioxidant activity expressed as median inhibitory concentration (IC_{50}) showed appreciable inhibition percentages. The results obtained showed a clear relationship between the content of total phenolics with antioxidant activity. Extracts were also studied for in-vitro antibacterial activity against *Salmonella typhimurium*, *Enterococcus sp*, *Candida albicans*, *Pseudo aeruginosa* and *Staphylococcus aureus*. Pumpkin seeds extract inhibited the growth of all bacteria with different percentages. However, peels and brandies extracts showed moderate activity against most bacterial strains. The study showed considerable diversification of the antioxidative and antimicrobial activities of pumpkin by-products.

***Mots clés** : Cucurbita maxima, by-products, antibacterial activity, antioxidant activity, total phenolic content.*

C. AFFICHE N° : 118.

USE OF ABIOTIC ELICITORS TO ENHANCE THE *IN VITRO* ACCUMULATION AND BIOACTIVITY OF TREE WORMWOOD SECONDARY METABOLITES

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Abstract: *Artemisia arborescens* L., well known as tree wormwood, is a typical species of the Mediterranean flora with ornamental, aromatic and medicinal use. This species has been used since the ancient times for its medicinal virtues including antidiabetic, anti-inflammatory, anticancer, tonic, antispasmodic, sedative and abortifacient properties. The health promoting effects of medicinal plants depend mainly on their richness in secondary metabolites compounds. Despite their interest, plant secondary metabolites are accumulated in low amounts. The enhancement of the concentrations of these high-value phytochemicals is the main challenge for plant biotechnologists and breeders. In this study, the effect of NaCl and KCl used as two abiotic elicitors on the concentration of phenolics and volatile metabolites in the *in vitro* regenerated microshoots of *Artemisia arborescens* L. was investigated. The obtained findings showed that the application of 100 mM NaCl or KCl to one-month old *in vitro* cultured microshoots increased significantly the accumulation of total polyphenols, flavonoids, condensed tannins and volatile compounds. The highest improvement rates of total polyphenols (80%) and flavonoids (53%) over the control were obtained with NaCl elicitor. On the other hand, KCl elicitor has been shown more efficient in the enhancement of condensed tannins (430%) and volatile metabolites (39%) contents. Furthermore, the obtained results highlighted a significant increase in the antioxidant potentials of ethanolic and volatile metabolites extracts of the treated microshoots for both abiotic elicitors. The obtained findings confirmed the efficacy of abiotic elicitation as an alternative strategy to improve the *in vitro* production of high value secondary metabolites with increasing demand in agrochemical, pharmaceutical, cosmetic and food industries. Further investigations are required to optimize the experimental conditions of elicitation under *in vitro* production system and to elucidate the molecular mechanisms implicated in the response of vitroplants to the applied elicitors.

***Keywords**: Artemisia arborescens L., in vitro culture, Abiotic elicitation, Secondary metabolites, Bioactivity.*

C. AFFICHE N° : 119.

METHYL JASMONATE INDUCES OXIDATIVE/NITROSATIVE STRESS AND THE ACCUMULATION OF ANTIOXIDANT METABOLITES IN *PHOENIX DACTYLIFERA* L.

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Abtract : Methyl Jasmonate (MeJA) is known to play a key role in regulating metabolic changes governing the growth and development in plants, and stimulating the *in vitro* productivity of medicinal secondary metabolites. Our study was aimed at exploring the eliciting effects of increasing concentrations (50, 100, and 200 µM) of MeJA. We cultivated actively proliferating buds of *Phoenix dactylifera* L. cv. Barhee in a temporary immersion system and we monitored the accumulation of bioactive compounds after 7 days of culture. Total phenolic (TPC) and flavonoid (TFC) contents were determined by high-performance liquid chromatography (HPLC), Fourier-transform infrared (FT-IR), radical scavenging activity using DPPH and ABTS assays. We also explored the activity of phenylpropanoid pathway enzymes, namely phenylalanine ammonia-lyase (PAL), tyrosine ammonia-lyase (TAL) and polyphenol oxidase (PPO). Our results revealed that high MeJA concentrations induced an increase in the levels of PAL, TAL, PPO. Several stress markers such as Hydrogen peroxide (H_2O_2), Nitric oxide (NO), Malondialdehyde (MDA), Superoxide dismutase (SOD), Catalase (CAT) and Guaiacol peroxidase (GPOD) were also found to increase. Besides, MeJA caused subsequent elevations of the amount of catechin, 4-Hydroxybenzoic acid, caffeic acid and *p*-Coumaric acid and antioxidant capacity with the lowest DPPH and ABTS IC50 values. Microscopic observations using fluorescence probes such as fluorescein diacetate (FDA) and acridine orange/ethidium bromide demonstrated that the supplementation of MeJA to culture media induces the death of many cells.

Keywords: *Methyl Jasmonate, Phoenix dactylifera L., Phenolic, temporay immersion system, antioxidant capacity*

C. AFFICHE N° : 120.

ENCAPSULATION IN ALGINATE AND ALGINATE COATED-CHITOSAN IMPROVED THE SURVIVAL OF NEWLY PROBIOTIC IN OXGALL AND GASTRIC JUICE

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Abstract : The main probiotic microorganisms known to date are members of two genera of lactic acid bacteria (LAB), namely Lactobacillus and Bifidobacterium. In fact, foods containing probiotic bacteria belong to the class of "functional foods". The latter contain at least 10^7 CFU/g of probiotic bacteria and should be consumed at levels higher than 100 g/day to have beneficial effects on health.

This study was undertaken to develop an optimum composition model for the microencapsulation of a newly probiotic on sodium alginate using response surface methodology. The individual and interactive effects of three independent variables, namely sodium alginate concentration, biomass concentration, and hardening time, were investigated using Box–Behnken design experiments. A second ordered poly1nomial model was fitted and optimum conditions were estimated. The optimal conditions identified were 2% for sodium alginate, 10^{10} UFC/ml for biomass, and 30 min for hardening time. The experimental value obtained for immobilized cells under these conditions was about 80.98%, which was in close agreement with the predicted value of 82.6%. Viability of microspheres (96%) was enhanced with chitosan as coating materials. The survival rates of free and microencapsulated *Lactobacillus plantarum* TN8 during exposure to artificial gastrointestinal conditions were compared. The results revealed that the encapsulated cells exhibited significantly higher resistances to artificial intestinal juice (AIJ) and artificial gastric juice (AGJ). Microencapsulation was also noted to effectively protect the strain from heating at 65 ◦C and refrigerating at 4 ◦C. Taken together, the findings indicated that microencapsulation conferred important protective effects to *L. plantarum* against the gastrointestinal conditions encountered during the transit of food.

Keywords*: Microencapsulation, Alginate, Chitosan*

C. AFFICHE N° : 121.

EXTRACTION, CHARACTERIZATION, AND STRUCTURE OF A NOVEL HETEROPOLYSACCHARIDE FROM *LEPIDIUM SATIVUM* AND ITS EFFECTS ON WOUND HEALING IN DIABETIC RATS

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Abtract: The present study undertakes the extraction of a novel polysaccharide from *Lepidium sativum* (PLS) and the determination of its physicochemical composition and antioxidant properties, as well as its potential wound healing activity in alloxan-induced diabetic rats. This polysaccharide presented a lighter natural color, whose luminosity (L^*), red-green intensity (a^*), and blue-yellow intensity (b^*) were recorded at 63.26, 5.87, and 27.28, respectively. The PLS was structurally characterized by Fourier transform infrared (FT-IR) spectroscopy, UV spectrum, high performance liquid chromatography (HPLC), gas chromatography (GC), nuclear resonance magnetic (NMR), and high-pressure gel filtration chromatography. The FT-IR and UV spectra showed the characteristic band of polysaccharides. According to HPLC, the crude PLS is a heteropolysaccharide composed of glucose, xylose, and galactose. Results obtained by ^{1}H NMR indicated that PLS consisted of three monosaccharide residues with α and β anomers. This novel polysaccharide had an average molecular weight of 98.51 kDa and displayed potential antioxidant activities determined through three different assays: scavenging activity against 2,2′-azino-bis-3-ethylbenzothiazoline-6-sulphonic acid (ABTS), 2,2-diphenyl-1-picrylhydrazyl (DPPH) scavenging assay,and reducing power. These results strongly support the beneficial effects of the PLS to accelerate wound healing in diabetic rats. Indeed, its application significantly increased wound contraction percentage (98 ± 1:11%) after 14 days of experiment. Furthermore, the histological assessment of the PLS-treated group demonstrated complete reepithelialized wounds by accelerating collagen synthesis. In general, the findings affirmed that PLS is efficient on wound closure in alloxan-induced diabetic rats.

Mots clés : *Heteropolysaccharide, Lepidium sativum, extraction, diabetic rats.*

C. AFFICHE N° : 122.

WATER SOLUBLE POLYSACCHARIDE FROM BROWN SEAWEED: EVALUATION OF FUNCTIONAL PROPERTIES AND ASSESSMENT OF MULTI-BIOLOGICAL ACTIVITIES

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Abstract: A novel water-soluble polysaccharide (WSPS) was extracted from a Tunisian brown seaweed and purified. Functional properties were estimated based on emulsifying activity and foaming ability. Based on DPPH free radical analysis, the natural antioxidant capacity of the polysaccharide was investigated. Furthermore, WSPS demonstrated an effective antibacterial activity against both Gram+ and Gram- bacteria in a concentration-dependent manner. In conclusion, our research showed that WSPS might be employed as a strong natural additive and could take the role of synthetic antioxidant compounds in the food industry.

***Mots clés** : Macroalgae, Polysaccharide, Functional properties, Antioxydant, Antibacterial*

C. AFFICHE N° : 123.

PROCESSING OF UNDERVALUED DATES BIOMASS FROM COMMON CULTIVAR (*PHOENIX DACTYLIFERA L.*) FOR SEQUENTIAL PRODUCTION OF SOLUBLE SUGARS SYRUP AND BIOGAS

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Abstract : Date production is usually associated to a considerable loss either in common cultivars or in fruit picking and storage stages. This discarded biomass is not very well valued up to now especially in bioenergy production. The Tunisian second-grade cultivar 'Kenta' was biochemically characterized in the present study. 'Kenta' discarded flesh is rich in soluble sugars (79.5VS ± 0.8%VS) and fibers (7.4 ± 0.5%VS). The crude fibers were recovered after soluble sugars extraction. The biochemical composition analysis showed that this by-product contains mainly carbohydrates (33.2 VS ± 0.7%VS) and proteins (8.8 VS ± 0.1% VS) making it a suitable feedstock for biogas production. A biorefinery concept was therefore developed based on soluble sugars (date-syrup) aqueous extraction and biogas production via anaerobic digestion of the residual fibers. The proposed concept showed interesting results since it permitted the co-production of date syrup, as high-added value product, with 0.6 g sugars/gVS and biogas with maximum methane yield of 225 mL CH4/gVS fibers. This study presents a proof of a sustainable processing approach allowing an almost bioconversion of undervalued secondary date variety and integrates the concept of circular bio-economy.

Keywords: *Common date · Biorefinery · Crude fibers extract · Biogas · Date-syrup*

C. AFFICHE N° : 124.

OPTIMIZATION OF A NEW CULTURE MEDIUM BASED ON CAROB JUICE FOR THE GROWTH OF LACTIC ACID BACTERIA USING RESPONSE SURFACE METHODOLOGY

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Abstract : Due to its proven technological and economic potential and various attributes, carob (*Ceratonia siliqua* L.) is used in numerous biotechnological fields as a new abundant bio-resource in Algeria, particularly its waste products, which can be used as a new alternative to formulate highly economical substitute culture media.

The objective of this study was to optimize the composition of a new culture medium based on carob juice using the response surface methodology, in which carob juice was added to the culture medium after sterilization to substitute for various ingredients of the M17 medium. The execution of the experimental design (CCD) with 30 trials for 4 studied factors allowed for the definition of the optimal concentrations of this new culture medium, including the concentration of carob juice.

Statistical analysis of the obtained model showed a significant effect of carob juice on the composition of this new medium, particularly on bacterial growth, with a coefficient of determination (R^2) greater than 0.9. The obtained results clearly demonstrate that carob juice is a good resource for the strategy envisaged and remains an ingredient that displays maximum yield for the growth of lactic acid bacteria.

Keywords*: Carob juice, lactic acid bacteria, culture medium, optimization, response surface methodology*

C. AFFICHE N°: 125.

GREEN SOLVENTS FOR OIL EXTRACTION FROM CUMIN (*CUMINUM CYMINUM*) SEEDS: EXPERIMENTAL AND THEORETICAL STUDY USING HANSEN SOLUBILITY PARAMETERS

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Abtract: Oilseeds are of great interest because of their high nutritive, functional as well as industrial values. They can provide diet with a high concentration of monounsaturated fatty acids (MUFAs) and polyunsaturated fatty acids (PUFAs) which are beneficial for human health and can protect against cardiovascular diseases. Recently, besides oleaginous species, several new plants have been investigated as new sources of functional vegetable oils. Studies have stated that seeds of some Apiaceae species are sources of valuable oil in particular cumin (*Cuminum cyminum*). This study assesses the performance of five bio-based solvents to replace hexane for the extraction of oil from cumin seeds. Solvent screening was achieved through theoretical approach using Hansen Solubility Parameters (HSPs) for comprehension of the dissolving mechanism predictions and an experimental protocol based on GC-FID analysis. Experiments validated theoretical predictions indicating that MeTHF was the best alternative solvent to replace hexane. Moreover, the obtained extract exhibited a good antioxidant activity. In conclusion, MeTHF could be a potential green industrial alternative to the petroleum solvents to obtain seed oils with high yield and quality.

C. AFFICHE N° : 126.

THE ANTIOXIDANT EFFECT OF *CITRUS LIMETTA* EXTRACTS IN HUMAN S SKIN ORGAN

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We were interested in studying sweet lime (*citrus limetta*) known for its richness in different compounds characterized by their important biological properties. The present work focused on extracting the peel of sweet lime by the maceration technique. The determination of phenolic compounds (hexane: 2.57 ± 0.0198; ethanol 150 ± 3.4; aqueous: 164.64 ± 2.37 mg equivalent in mg GAE/g DM), and in flavonoids (hexane: 1.544 ± 0.045; ethanol 64.991 ± 1.61; aqueous: 75.915 ± 0.65 mg equivalent mg QE/ g DM). Antioxidant activities were studied by direct, reactive oxygen species assay using chemical systems (TAA, DPPH, ABTS+, FRAP). The antioxidant effect on lipid peroxidation was studied in the biological system (cell culture), by measuring the levels of MDA and DC in HeLa cell line after H2O2 treatment. Our results showed protection against lipid peroxidation, highlighted by a significant decrease in MDA and DC levels ($p < 0.5$ and $p < 0.01$, respectively). The results showed a cytotoxic effect of the hexane extract on HeLa cell lines. In addition, the histological study on the skin fragments showed dose-dependent protection of our extracts against lesions caused by hydrogen peroxide

***Keywords**: Citrus Paradisi; Antioxidant Activity; Antitumor Activity; MTT; HeLa; MCF-7*

C. AFFICHE N° : 127.

ANALYSIS OF BACTERIAL COMMUNITY OF THE SPONTANOUS CACTUS PEAR WINE FERMENTATION

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Abstract: In alcoholic beverages, the complex microbial activities inside the anaerobic fermentation are determinant for the production of metabolites that affect the overall organoleptic properties. Inoculated fermentations using selected starter cultures of Saccharomyces is widely used, however, the contribution of endogenous and multitudinous bacteria, naturally present in opuntia fruit spontaneous fermentations, generally provides sensorial complexity of beverages. In the present study illumina Miseq sequencing platform was first employed to characterize bacterial diversity of wine Opuntia fermentation. Secondly some acetic bacteria are isolated and characterized. The research results showed that one dominated domain was detected in cactus pear fermented wine with 99% bacteria and 0.2% Archaea. Firmicutes was the most abundant phylum in the analyzed samples with 77%. Cyanobacteria and Proteobacteria are respectively the second and the third phylum observed. 08 families were visualized. This study might be helpful in achieving better control and optimization of the cactus fruit fermentation and its biochemical composition.

***Mots clés**: wine, Miseq sequencing, bacteria, Opuntia ficus indica, fermentation*

C. AFFICHE N° : 128.

PREPARATION OF FERMENTED MILK BASED ON LLL

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Abstract : Dairy products are very consumable in our society. At the industrial level, the manufacture of the latter requires the use of lactic starter cultures. These levain are a raw material that represents a very important role in the elaboration of dairy derivatives. The absence of national production of lactic starter cultures forces our country to resort to imports of these cultures which have a very high cost in foreign currency. We are interested in this problem. Our objective is to search for strains with a good technological power in order to produce our own raw materials (lactic starter cultures) that are reliable and specific to our country and that contribute to the national production of the various dairy derivatives and that participate in the improvement of the productivity yield. For this purpose, the starter cultures were isolated from local dairy products and identified by PCR and 16S RNA sequencing. However, were tested their technological power and then were incorporated into milk for the preparation of a fermented milk. It is expected that the dairy industry has a bright future ahead of it.

KEYWORDS: LACTIC FERMENT, PCR, RNA16S SEQUENCING, FERMENTED MILK

C. AFFICHE N° : 129.

PHYTOCHEMICAL ANALYSIS AND EVALUATION OF BIOLOGICAL ACTIVITIES IN ACHILLEA LIGUSTICA.ALL.

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The present study is interested in valorizing the species *Achillea ligustica* all. located in the two zones of Ain Drahem and Feyja through the vegetable extracts and essential oils.
Indeed, this research work consists in evaluating the various parts of the plants: inflorescences, aerial parts and roots by the dosages of the various phenolic compounds (total polyphenols, flavonoids and flavonols) and the antiradical power of the extracts measured by the two tests DPPH and ABTS. Then, all the tested extracts underwent a study of their enzymatic activity by measuring their inhibitory power of α amylase, one of the main targets of treatments against type II diabetes disease. For the essential oils of the inflorescences and aerial parts of both species, the chemical compositions were studied by GC-MS and the cited biological activities.
The contents of phenolic compounds and flavonoids indicate that the inflorescences of Ain Drahem are richer than those of Feyja with contents respectively 150.578 ug EAG/mg E and 144.8 ug ER/mg E. For the aerial parts and the roots of Feyja are richer than those of Ain Drahem. Concerning the contents of flavonols the extracts of Feyja site are higher than those of Ain Drahem .
The results of the antioxidant activity show that the extracts of inflorescences and roots of Feyja site are higher than those of Ain Drahem (131.644 ug eq trolox/mg E and 25.733 ug eq trolox/mg respectively) for the DPPH test and (777.355 ug eq trolox / mg E and 609.81ug eq trolox /mgE respectively) for the ABTS test. For the aerial parts it is those of the site Ain Drahem which have more important activities. Concerning the results of the inhibitory activity of α amylase, the inhibition of the extracts of inflorescences of Feyja is stronger than those of Ain Drahem, on the other hand the aerial parts and the roots of the site Ain Drahem generate activities more important than those of the site Feyja.

Key words: *Achillea ligustica.all, essential oils, polyphenols, flavonoids, flavonols, antioxidant activity.*

C. AFFICHE N° : 130.

USING (MEDT) THEORY TO UNDERSTAND THE FORMATION OF A BIOACTIVE HETEROCYCLE

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Abtract : Heterocyclic compounds are of paramount importance in many regards. They are present in small as well as large and complex molecules and have broad applications. Natural products such as vitamins, alkaloids, macrocycles and flavonoidsare in the base of heterocycles. Heterocycles are also found in a wide variety of biologically active synthetic compounds such as pharmaceuticals and agrochemicals. As a consequence of its ability to form various non-covalentint eractions with the biological target, more than 90% of new drugs contain heterocycles and the interface between chemistry and biology, at which so much new scientific insight, discovery and application are taking place crossed by heterocyclic compounds The selectivity and molecular mechanism of the intramolecul ar [3+2] cycloaddition (IMDC) reaction of nitrone-alkene generated from m-allyloxybenzaldehyde has been studied computationally using B3LYP/6-31G(d) theoretical method. The energy profiles indicate that this IMDC reaction favours kinetically the formation of the fused-endo, as observed experimentally. The solvent has no influence on the mechanism and selectivity, but it increases slightly the activation energy and decreases the exothermic character of this IMDC reaction. The analysis through electron localisation function (ELF) of the favourable fused-endo pathway shows that the formation of the C–O and C–C new bonds occurred via a non-concerted synchronous one-step mechanism. The analysis of noncovalent interaction using Non-covalent interaction (NCI) and QTAIM analyses of the structure of the fused-endo transition state indicates that thehydrogen-bonde formed at this approach is the origin for the favouring of the fused-endo pathway.

Key words*: Bioactive compound, Mechanism, Selectivity, IMDC, MEDT*

C. AFFICHE N° : 131.

DEVELOPMENT OF GELATIN-CRUDE PECTIN ACTIVE FILMS AND APPLICATION IN OLIVE OIL PRESERVATION

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Abstract: The present study aims to develop composite active packaging films using bovine gelatin (G) incorporated with crude pectin from sweet orange pomace (SOPP) at different proportions. The crude SOPP was highly methylated and exhibited high antioxidant and antibacterial properties due to the presence of galacturonic acid and phenolic compounds. The incorporation of SOPP improved the gelatin-based film's physicochemical, structural, thermal, and mechanical properties. Furthermore, the G-SOPP films showed efficient antibacterial activity against G (+) and G (-) bacteria and high antioxidant potential according to different mechanisms. G-SOPP film designed in a pouch could slow the photooxidation process of virgin olive oil over a long storage time, without altering its organoleptic properties. Overall, this study highlighted the potential use of gelatin-pectin films as an active packaging for foods.

C. AFFICHE N° : 132.

INHIBITORY EFFECT OF UV ON SURFACE CONTAMINATION

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Summary : Fungal contamination of air handling units is a widespread phenomenon in buildings with central heating, ventilation, and air conditioning systems and is a potential source of contamination for occupied spaces. Fungi have been found on air filters, insulation, and cooling coils. This contamination often contributes to building-related illnesses, including infectious diseases and hypersensitivity diseases like allergic rhinitis, asthma, and hypersensitivity pneumonitis. In addition, acute toxicosis and cancer have been attributed to respiratory exposure to mycotoxins. UV radiation in the 250-260 nm range is lethal to most microorganisms, including fungi, yeast, bacteria, viruses, protozoa, and algae. The use of UV lamps at the right distance and at the right time has been an established means of disinfection of surfaces and air for years, and its use in clinical settings and food treatment applications has steadily increased in recent years. In conclusion, this study provides new insights into the development of surface disinfection technologies.

C. AFFICHE N° : 133.

VARIABILITY OF *PINUS HALEPENSIS MILLER* NEEDLES ESSENTIAL OIL FROM ELEVEN TUNISIAN REGIONS

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Abtract : Essential oils (EOs) have received in recent years a growing interest. Several studies have reported high pharmacological potential of EOs from Pinus species. The objectives of this study were to investigate the chemical variations of *Pinus halepensis* needles EOs collected from eleven regions belonging to different bioclimatic zones in Tunisia and to assess their antioxidant and anti-tumoral potentials to provide information for suitable and promising harvesting conditions and to investigate new biological activities not reported previously.
Needles of *P. halepensis* were harvested from eleven localities. EOs were extracted with Clevenger apparatus and identified by chromatography-mass spectrometry. The antioxidant potential was assessed by three tests: DPPH, ABTS and FRAP. All these assays are based on electron or hydrogen transfer. Resazurin test was used to evaluate the cytotoxic activities against the hormone-dependent human MCF-7 breast cancer cells and colon adenocarcinoma cells HT-29.
Chemical profiles demonstrated a significant ($P < 0.05$) variability among the different EOs. The main identified compounds were caryophyllene (48.77 ± 2.26), phenyl isovalerate (22.22 ± 2.26), β-myrcene (15.55 ± 5.65) and α-pinene (14.52 ± 2.26). Further, it was shown that EO from Tabouba displayed the highest DPPH scavenging (IC_{50} = 73.03 mg/mL). While Elmahres exhibited the most potent ABTS radical's inhibition (IC_{50} = 197.87 mg/mL). It has been perceived that the FRAP test was more sensitive than DPPH and ABTS assays for all tested oils. Indeed, nine EOs out of eleven exhibited the highest capacity to reduce the ferric ion (Fe^{3+}) with IC_{50} values ranging from 1.23 ± 0.34 mg/mL to 1.98 ± 0.16 mg/mL and with no significant difference between them. For the cytotoxic capacities, Kettana (Ket) was the most efficient against MCF-7 cell line with IC_{50} value better than doxorubicin used as positive control.
Obtained results showed significant variability of EOs extracted from needles *P. halepensis* harvested from eleven localities. Thus, this study could contribute to the selection of the most promoting site of collection according to the intended biological capacities and/or volatile compounds. In addition, all EOs demonstrated important biological activities that were reported for the first time mainly cytotoxic effect against MCF-7 breast cancer cells and colon adenocarcinoma cells HT-29. Overall, the current study solicits *P. halepensis* as a medicinal plant and as a rich source of biomolecules with a large therapeutic interest.

Mots clés : *Pinus halepensis, essential oil, chemical composition, antioxidant activity and cytotoxic activity.*

C. AFFICHE N° : 134.

BOT33: A NON-TOXIC PEPTIDE PURIFIED AND CHARACTERIZED FROM *BUTHUS OCCITANUS TUNETANUS* SCORPION VENOM

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Abtract: Scorpion venom is a source of promising bioactive compounds, such as ion channel ligands that are invaluable tools for studying the structure and function of potassium channels. Bot33 has revealed less than 40% identity with other known alpha-KTx families. This peptide displayed a neutral amino acid (Leucine), in the position equivalent to lysine 27, described as essential for the interaction with Kv channels. Bot33 did not show any toxicity following i.c.v. injection until 2µg/kg mouse body weight. Due to its very low venom concentration (0.24%), Bot33 was chemically synthesized. Unexpectedly, this peptide has been subjected to a screening on ion channels expressed in *Xenopus laevis* oocytes, and it was found that Bot33 has no effect on seven Kv channel subtypes. Interestingly, an *in silico* molecular docking study shows that the Leu27 prevents the interaction of Bot33 with the Kv1.3 channel. All our results indicate that Bot33 may have a different mode of action from other scorpion toxins, which will be interesting to elucidate.

Mots clés : *scorpion venom; potassium channel–Kv; voltage-dependent potassium channel ; peptide ; alpha-KTx familie.*

C. AFFICHE N° : 135.

THE USE OF HYDOLYTIC ENZYMES IN THE TREATMENT OF PHYTOPATHOGENIC FUNGI

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Abstract : Various strategies exist to prevent, reduce, or manage plant fungal diseases. Current agronomic methods depend on chemical fertilizers and insecticides. These agricultural inputs have contributed significantly to recent gains in crop output and quality. Microbial enzymes help bacteria multiply in a specific habitat by acting as biocatalysts for biochemical processes. It has long been recognized that rhizosphere microorganisms may boost plant development and suppress phytopathogens with numerous ways. Excreting hydrolytic enzymes is one of the acknowledged biocontrol methods for preventing phytopathogens like chitinases, cellulases, proteases, and glucanases. Biological management may soon replace chemical fungicides and new molecular approaches are now available to study antagonist-pathogen interactions, rhizosphere antagonist ecology, and biocontrol agent efficacy. Because agro-ecosystems are dynamic structures with numerous factors affecting disease and crop productivity, alternative strategies to manage crop diseases are useful in various environments. Diverse crop systems need management options other than biological control to successfully prevent disease development and yield loss.

Mots clés: *Biocontrol, Biopesticide, Crop diseases, Enzyme, fungicides, Plant Pathogen*

C. AFFICHE N° : 136.

ALGORITHMIC ANALYSIS TO OPTIMIZE BIOACTIVE METABOLITES RECOVERY: THE CASE OF CAPSAICIN EXTRACTION FROM *CAPSICUM ANNUUM* L.

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Abstract: Machine learning algorithms were forcefully proposed as computational technology that facilitates various complicated steps in biological sciences. Here, we focus on the optimization of capsaicin extraction process, the main alkaloid implicated in the spicy taste of hot pepper, a compound with widespread applications from agri−food to medicine.
Three modeling approaches were considered, response surface methodology linked to desirability function (RSM−DF), artificial neural network coupled with genetic algorithm (ANN−GA), and Simulink simulation. The effect of four process variables, viz. drying temperature, concentration, solvent, and extraction time were investigated using I−optimal design proposed by RSM model.
The higher capsaicin recovery (0.0163 mg/g DW) was recorded with the following parameters: 90°C drying temperature, 54 g/L concentration, and 48.75 min of extraction with acetonitrile. Drying temperature and concentration are the most influencing variables, whereas, no effect was noted for the solvent. The three models have been successful in predicting the capsaicin content within the range of experimental variables. Still, ANN prediction is more accurate than RSM and Simulink with a higher coefficient of determination (R^2) (0.9901 vs. 0.9602 and 0.9607, respectively) and a lower mean squared error (*MSE*) (1.19E−07 vs. 3.54E−07 and 3.49E−07), root mean squared error (*RMSE*) (3.45E−04 vs. 5.95E−04 and 5.91E−04), and absolute average deviation (*AAD*) (2.142% vs. 3.377 and 3.590%). The superiority of ANN−GA approach was evidenced as well in the optimization step with higher recovery and less deviation between optimized and validated values.
Inspired from the biological evolution process, genetic algorithm was successfully applied to optimize a secondary metabolite compound extraction. Equivalently, unlimited applications of this technology could be announced subsequently in various research topics.

Keywords*: Artificial neural network, response surface methodology, optimization, genetic algorithm, extraction, capsaicin*

C. AFFICHE N° : 137.

PHYSICHOCHEMICAL CHARACTERIZATION OF *EUCALYPTUS* LEAF AND ITS EFFECT ON CHEWING GUM QUALITY

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Abtract : Demand for health oriented products such as functional food products is increasing. The aim of the present work was to determine the effect of the addition of *Eucalyptus* leaf as a functional ingredient in sugar-free chewing gum.
Eucalypltus leaf sampling was carried out in three tunisian areas ; Haouaria, Makther and Haffouz. Characterization of the vegetal material has proven its richness in terms of phenolic compounds, minerals, protein and fiber contents. Sample from Haouaria showed the richest phenolic composition and the best antioxidant properties. This sample was consequently chosen to be incorporated in chewing gum in two forms ; the dried powder at a 1% incorporation percentage and the powdered phenolic extract, incorporated in chewing gum at 0.1%.
Sensory analysis showed that the incorporation of *Eucalyptus* leaf dried powder and powdered phenolic extract, both in chewing gum, promoted high consumer acceptance, thereby providing long lasting flavour. In technological point of view, the incorporation of *Eucalyptus* leaf dried powder at 1% improved textural properties of the prepared chewing gum. In conclusion, the chewing gum made with *Eucalyptus* leaf dried powder demonstrated to be an appealing product for people who seek healthier foods with potentially functional and natural ingredients.

Keywords: *Eucalyptus* leaf; antioxidant activity; chewing gum; sensorial analysis; Textural properties.

C. AFFICHE N° : 138.

EVALUATION OF METAL OXIDE NANOPARTICLES TOXICITY ON MARINE ALGAE THROUG CYTOTOXICITY AND OXIDATIVE STRESS ANALYSIS

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Abstract: Nanoparticles (NPs) represent a special class of materials since their physicochemical properties differ from those of raw materials. The increasing NPs use in commercial products exacerbates their potential releases into the aquatic environment. However, the fate of NPs in the environment and their potential effects on aquatic organisms are still poorly understood. Moreover, even though some of the waste enters the environment through a freshwater environment, the interactions between nanoparticles and marine organisms are still largely unstudied.
In this study, we investigated the effects of two commercial NPs, silicon dioxide (SiO_2) and zinc oxide (ZnO), on marine organisms, especially microalgae. In fact, the cell's response to NPs has been evaluated at the physiological, biochemical and molecular levels. A comparison of growth inhibition levels of microalgae populations was performed by determination of IC_{50}. Cell viability and the production of enzymatic and non-enzymatic antioxidants were also evaluated in microalgae cells exposed to NPs using MTT test (3-(4,5-dimethylthiazol-2-yl)-2,5 bromide - diphenyltetrazolium) and biochemical analyses. Otherwise, the genotoxic effects were investigated by RT-qPCR. In fact, the expression level of stress response genes (caspase) and genes linked to polysaccharides synthesis were evaluated. We demonstrate that microalgae exposure to NPs induces an enzymatic defense mechanism involving polysaccharide biosynthesis and apoptotic processes. The obtained results are relevant to understand the main drivers of cellular responses to NPs exposure.

***Key words** : Nanoparticles, SiO2, ZnO , Marine microalgae, Gene, Transciptional expression*

C. AFFICHE N° : 139.

ANTIOXIDANT ACTIVITY, PHENOL AND FLAVONOID CONTENTS OF *TERFEZIA BOUDIERI* CHATIN

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Abtract : Oxidative stress is an essential factor in the genesis of several pathologies, such as cancer, cardiovascular and neurodegenerative diseases (Alzheimer's and Parkinson's). Today, natural compounds of medicinal mushroom origin appear as possible therapeutic alternatives for these diseases caused by these free radicals.
The present study aimed to determine the total phenol and flavonoid content, the antioxidant potential of two extracts (acetone and methanolic) of desert truffle namely *Terfezia boudieri* Chatin collected from the semi-arid region Naâma, as well as the correlation between antioxidant activity and total phenolic compounds content was also investigated by principal component analysis (PCA).
The results of the determination of total polyphenols obtained by the Folin Ciocalteu method and of total flavonoids by the aluminium trichloride method showed that the methanolic extract is very rich in these compounds compared to the acetone extract. The polyphenol levels of the latter corresponded to 41.05± 0.58 µg EAG/mg and 15.17± 0.29 µg EAG/mg respectively, while, those of the flavonoids were 56.80± 0.88 µg EAG/mg and 31.80± 0.44 µg EAG/mg.
The results of the in vitro study of antioxidant activity assessed by DPPH show that the methanolic extract exhibited a significantly ($p<0.001$) high antioxidant activity with IC_{50} value of 511.33 ±0,58 µg/mL, compared to reference standards (α-Tocopherol, BHA and BHT).
The results of the principal component analysis (PCA) showed a strong positive correlation (Pearson's coefficient r >0.80) between antioxidant activity and total flavonoid content proving that the observed activity of *T. boudieri* extracts is due to flavonoids.
Finally, these results confirm the possibility of using desert truffles as a powerful antioxidant in the pharmaceutical or food industry as food additives to extend the shelf life of food products or food supplements.

Mots clés : *Desert truffles, Terfezia boudieri, DPPH, maceration, ANOVA, PCA, phenolic profile.*

C. AFFICHE N° : 140.

ENZYMATIC SYNTHESIS OF A HYDROXYTYROSOL OLEATE

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Abstract: Biosurfactants are valuable, surface active and biologically efficient microbial amphiphilic molecules awarding a high biotechnological interest. The present investigation describes a new enzymatic approach to produce the lipophilic hydroxytyrosol (HT) ester using immobilized microbial lipase. Initially, high purify oleuropein (OLE), of the olive tree (*Olea europaea L.*) leaves, was extracted then hydrolyzed by *Serratia* sp W3 lipase, at 45°C and 150 rpm for 24 h to produce hydroxytyrosol, elenolic acid and glucoside. Several esterifications expriments, between oleic acid and the produced hydroxytyrosol, were performed using three different immobilized biocatalysts, the lipase from *Candida antarctica* B (Novozym 435), the extracellular lipase from *Yarrowia lipolytica* (lip2), and the recombinant lipase from *Serratia* sp w3. The thin-layer chromatography (TLC) technique was adopted for preliminary analyses based on the retention factor (Rf). Identification of the esterification's main products was performed by the high-performance liquid chromatography HPLC). Results revealed that the higher esterification yield was observed when using Novozym 435 as biocatalyst at 45°C and 150 rpm after 24 h and among the different solvent tested, the ethyl acetate showed the higher yield conversion. HPLC profiles showed, by comparing to the control sample, a reduction of the hydroxyyrosol and olein peak intensities in favor of the appearance of a new intense peak corresponding to the synthesized ester: the hydroxytyrosol oleate.

Mots clés*: Biosurfactants:, Hydroxytyrosol, Candida antarctica B lipase , Serratia SpW3 lipase, Oleuropein,elenolic acid glucoside ,Oleic acid, esterification*

C. AFFICHE N° : 141.

BIOLOGICAL PROPERTIES OF DIPLODUS PROTEIN HYDROLYSATES: POTENTIAL APPLICATION TO MEAT PRODUCT PRESERVATION

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Abtract : *Diplodus annularis* proteins were subjected to enzymatic hydrolysis with a view to generate novel bioactive peptides with antibacterial and antioxydant activity. Results showed that DPHs (*Diplodus* protein hydrolysates) obtained by treatment with savinase (DPH-S) exhibited the highest degree of hydrolysis (DH=15,42%) than that produced by Alcalase (DH=8,14%). In addition, the protein hydrolysates at different concentrations expressed different degrees of antioxidant abilties, evaluated by several antioxidant assays. Thus, The hydrolysate generated by savinase displayed the best antioxidant activity, in terms of ferrous chelating activity (IC_{50}=2,19 mg/mL), DPPH radical scavenging ability (IC_{50}=3,76 mg/mL) and reducing power activity (1,92±0,12). Moreover, DPH-AL exhibited the highest β carotene bleaching inhibitory effect(IC_{50}=4,41 mg/mL). Antibacterial activities of DPHs were also judged. DPH-S appeared the most important inhibitory effects against six bacterial species. The application of DPHs on minced meat as preservative minimized the lipid oxidation and reduced the microbial proliferation during the storage. These obtained results revealed that *Diplodus* hydrolysates represent new promising natural source of bioactive peptides for the replacement of the synthetic additives widely used in food manufacture.

***Keywords**: Diplodus annularis; Hydrolysis; Antioxidant property; antibacterial activity; Peptides*

C. AFFICHE N° : 142.

ANTIBACTERIAL ACTIVITY OF LACTIC ACID BACTERIA STRAINS AGAINST ENTEROBACTERIAL STRAINS RESPONSIBLE FOR URINARY TRACT INFECTIONS CONCERNING CHILDREN OF BEJAIA REGION (ALGERIA).

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Abstract : In Algeria urinary infections concerning children are increasingly important. The resistance of strains isolated from urine to antibiotics involves the search for other substances for the treatment of urinary tract infection.

This work deals with the isolation of pathogenic bacteria responsible for urinary infections of 400 children. The study of the antibacterial effect of 30 strains of lactic acid bacteria (BL) against these pathogenic bacteria was carried.

The identification of enterobacterial strains isolated from the urines of 400 older children from 2 to 12 years is carried out by biochemical galleries. The resistance of these strains to antibiotics is studied by antibiogram test. The antibacterial activity of 30 trains of BL selected as preliminary according to their probiotic properties belonging to *Lactiplantibacillus kind*, is studied by the spot and wells test.

The identification of isolated strains showed a predominance of *E. coli* (44.68%) followed by *Klebsiella pneumoniae* with 29.78%.

30 strains of Enterobacteriaceae were found to be resistant to third generation cephalosporins. *E. cloacae* are the most resistant species (50%). An image of synergy was observed in 7 strains signifying the production of enzymes of the ESB, this being 3 strains of *E. coli*, 3 of *Klebsiella pneumoniae* and 1 strain of *Proteus mirabilis*.

The results of spot test and wells test against the enterobacterial strains show a broad spectrum of activity (18 - 35 mm) of all the strains BL tested. however, only one strain of lactobacillus showed antibacterial activity after neutralization of the supernatant and treatment with proteases. Molecular identification by PCR showed that this strain is a *Lactiplantibacillus plantarum*

The results obtained can suggested the use of lactic acid bacteria last like an alternative to antibiotics

***Key words**: urinary infections, antibacterial activity, Lactiplantibacillus, enterobacterial strains.*

C. AFFICHE N° : 143.

ANTIBACTERIAL ACTIVITY OF LACTIC ACID BACTERIA STRAINS AGAINST ENTEROBACTERIAL STRAINS RESPONSIBLE FOR URINARY TRACT INFECTIONS CONCERNING CHILDREN OF BEJAIA REGION (ALGERIA).

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Laboratory of Applied Microbiology, Department of Microbiology, Faculty of Nature and Life Sciences, University of Bejaia, 06000, Algeria

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Key words: *urinary infections, antibacterial activity, Lactiplantibacillus, enterobacterial strains.*

C. AFFICHE N° : 144.

COMPARISON OF PROTEIN EXTRACTION YIELD BY APPLYING DIFFERENT CELL DISRUPTION METHODS TO THE MICROALGA *DUNALIELLA SALINA*

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Abstract: Population growth combined with increasingly limited resources of arable land and freshwater has resulted in a need for alternative protein sources.
Some species of microalgae have proven to be an important source of proteins since they contain similar levels to those of traditional protein sources, so they have been applied in medical, food and feed industries. However, due to the presence of the rigid cell wall structures, cell disruption pretreatment approaches, which contribute to increased protein extraction yield while preserving the molecular integrity of the extracted proteins, should be applied. Hence, this work summarizes several mechanical techniques for *Dunaliella salina*'s cells disruption which were applied to break the cell wall, among others Ultrasonication, sonication, freeze / thaw cycles and mechanical grinding in the presence of alumina or liquid nitrogen.
After conducting cell disruption, the protein concentration in aqueous media was determined using Lowry method. Results have shown that mechanical grinding under liquid nitrogen is the most effective method with an extraction yield relative to the dry biomass equal to 21.67% while 13.9%, 10.2% were found for grinding with alumina and successive freeze/ thaw cycles (5 cycles), respectively. Freezing / thawing (5 cycles) followed by mechanical grinding with alumina has improved the extraction yield which has resulted in 16.6%. Lower efficiencies were observed for sonication (30 minutes (on-time 5 min and off-time 1 min), 20 KHz, 6.42%) and for ultrasonication for 30 minutes (9.65%) (at the frequency of 20 kHz at amplitudes of 90% and 200 W power output.
The best extraction method has been adopted for the extraction of proteins which will subsequently undergo enzymatic hydrolysis to generate bioactive peptides of great interest because of their nutritional and various medicinal properties like antioxidant, antihypertensive, antimicrobial and anti-diabetes activities.

Key words: Microalgae, protein extraction, cell disruption methods, bioactive peptides.

C. AFFICHE N° : 145.

EVALUATION OF BIOLOGICAL ACTIVITIES, PHYTOCHEMICAL SCREENING AND COMPARATIVE STUDIES OF SYNERGISTIC ACTIVITIES OF AQUEOUS AND ETHANOLIC EXTRACTS FOR PHARMACEUTICAL FORMULATION

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Abstract : Current researchs are focused on molecules with biological activities of natural origin.
This work focuses on the study of extracts of *Lemon balm sp., Myrtus sp., Erica sp.* and *Acanthus sp.,* the screening tests of the extracts gave us a general idea on the secondary metabolism of the plants. In addition, studies of the anti-oxidant, antibacterial and anti-inflammatory activities of the extracts were performed.
The antibacterial effect of the extracts is evaluated by the agar diffusion technique against six bacterial strains: *Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Bacillus subtilus, salmonella typhimirium and Staphylococcus Epidermidus* and three fungal strains: *Saccharomyces cerevisiae, Candida albicans and Aspergillus brasiliensis.*
The quantitative evaluation of phenolic compounds showed that the highest amount of polyphenols was recorded by the extract of *Erica sp.*
The determination of flavonoids by aluminum trichloride method revealed high contents of *Melissa sp.* extract (38.4 mg EQ /g).
The antioxidant activity studied by the DPPH free radical reduction method revealed that two extracts seem to be good radical scavengers, the extracts of *Erica sp.* and *Melissa sp.*
The phytochemical screening showed that: the aqueous extracts are rich in polyphenols, coumarin alkaloids, quinone, tannins, saponins, terpenoids. As for the ethanoic extracts, they contain polyphenols, alkaloids and terpenes. In addition to tannins, coumarins and quinine with low quantities compared to the aqueous extracts.
Acanthus sp. and *Erica sp.* extracts showed antimicrobial activity against most strains tested, the best activity was against *P.aeroginosa* with a significant inhibition zone equal to 33.67mm and 25.45mm respectively.
Our plants revealed anti-inflammatory, antimicrobial and antioxidant potentialities. And our formulated ointment was compliant according to the European pharmacopoeia standards.

***Keywords** : synergistic effect, phytochemical, antioxidant activity, antimicrobial activity, anti-inflammatory activity.*

C. AFFICHE N° : 146.

ANALYSIS OF GENETIC DIVERSITY IN TUNISIAN AND INTERNATIONAL ACCESSIONS OF SUNFLOWER (*HELIANTHUS ANNUUS* L.) USING MICROSATELLITE MARKERS

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Abstract: Sunflower (*Helianthus annuus* L.) is a major oil crop, cultivated throughout the world. However, knowledge related to its genetic constitution in Tunisian sunflower is still scarce. The purpose of the present study is to analyze genetic variation of 26 local and 7 introduced sunflower accessions using 15 simple sequence repeats (SSR) markers. Ten among the 15 SSR primers used revealed clear polymorphic bands and were able to amplify 29 alleles with an average of 2.9 alleles per locus. The polymorphism information content (PIC) values were ranged from 0.35 for the ha2682 marker to 0.75 for the ha4136 marker with an average of 0.50. The percentage of total polymorphism varied from 50 to 100% with a mean value of 91%. Eight out of the 10 SSR primers showed 100% polymorphism. The dissimilarity coefficient values varied from 0.00 to 0.81 with an average of 0.41. The unweighted pair group method with arithmetic mean (UPGMA) dendrogram clustered the accessions into 3 distinct groups. The group (A) contained 28 accessions and the groups (B) and (C) included two accessions in each group. The accession TL17 was not clustered among the three mentioned groups. These results ensure a fundamental interest for the development of sunflower breeding programs in Tunisia.

***Keywords**: Helianthus annuus; genetic diversity; microsatellite; cluster analysis*

C. AFFICHE N° : 147.

EFFECTS OF SUPPLEMENTATION WITH *L. PLANTARUM* TN8 ENCAPSULATED IN ALGINATE-CHITOSAN IN BROILER CHICKENS

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Abtract: This study was undertaken to investigate the effects of supplementation of probiotic strain Lactobacillus plantarum TN8 encapsulated in sodium alginate-chitosan or a commercial blend of essential oils on total cholesterol, High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL) and growth performance of broiler chickens. The results showed that the broiler chickens supplemented with encapsulated *L.plantarum* TN8 or essential oil has a higher growth than the control group. After 35 days, the weight means were 1860 and 1880 g respectively in dietary supplementation with probiotic or essential oil, while they are 1800 g in the control group. The evolution of the feed consumption and feed conversion per week showed that the supplementation of encapsulated TN8 strain or essential oil in broiler chickens food has a positive influence on their appetite. Similarly, supplementation of the feed with this encapsulated strain significantly reduced the rate of cholesterol (HDL and LDL) as well as the contents of triglycerides in broiler chickens. Through our study, it appears that the use of the probiotic supplementation or essential oil to broilers were found to be better than the control group of chickens, resulting in a significant economic impact and promoting effect on health.

Mots clé: *Probiotic supplementatio, Blood parameter, Growth performance*

C. AFFICHE N° : 148.

LAUNDRY DETERGENT COMPOSITIONS COMPRISING RENEWABLE COMPONENTS BASED ON MICROBIAL ENZYMES

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Abstract: The use of enzymes in detergents is becoming more common, particularly in the formulation of household detergents. This interest in proteases stems primarily from their contributions in terms of consumer-recognized cleaning efficiency, success in improving fabric quality, and an improvement in the performance/price ratio due to the availability of increasingly effective enzymes combined with lower industrial production costs. Microbial proteases are favored over other sources because they have almost all the properties required for industrial applications. The global enzyme market is currently valued at $ 10.6 billion, with proteases accounting for 60% of that amount. More than two-thirds of the global enzyme market is dominated by microbial alkaline proteases, which are used in the detergent industry. The present investigation was related to the study of a new alkaline protease designated as SPBV produced by *Bacillus velezensis* strain F35, newly isolated from wastewater from a detergent company, as well as its biochemical characterization. The optimum production of 7500 U/mL on the Erlenmeyer scale was obtained at 37°C after 24 h of culture. The purification techniques used in this work, made it possible to lead to a homogeneous enzymatic solution. It is an enzyme belonging to the family of serine proteases because it was inhibited by specific inhibitors of serine enzymes (DFP and PMSF). The optimum of the protease activity of SPBV is obtained at pH 10 and at 60°C on casein. This peptidase remains practically stable at basic pH (8-11) for 75 min (80% of its activity was retained after 6 h). Its thermoactivity and thermostability were considerably improved by calcium at 2 mM with half-life times of 35 and 450 min at 60 and 50°C, respectively. SPBV was distinguished by a wide specificity with respect to protein substrates and it is endowed with better catalytic efficiency and degree of hydrolysis on casein compared to commercial and purified enzymes. SPBV protease exhibits stability and remarkable compatibility with liquid and solid detergents compared to Alcalase™ Ultra 2.5 and Savinase® type EX 16L, type EX. Finally, the addition of SPBV protease to the detergent solution improves the performance of Class detergent in the sense of better discoloration of blood, chocolate and egg yolk stains. In conclusion, the SPBV protease seems to meet the majority of the properties of a good protease for the detergence formulations. A unique eco-friendly liquid laundry detergent (Class) enhanced with enzyme and further comprising bleaching and oxidizing agents, and nonionic surfactants, naturally occurring builders, and optional additives, to yield remarkably effective yet environmentally responsible detergents. The SPBV protease produced from *Bacillus velezensis* strain F35 respond to most of the criteria, which are required for this enzyme to be applied as an additive in the Class laundry detergent formulation and therefore, present an eco-friendly alter-native for the partial substitution of chemical products harmful to the environment.

Keywords*: Spin-off, Start-up, Eco-friendly, Enzymes, Laundry detergents compatibility.*

C. AFFICHE N° : 149.

EXTRACTION, CHARACTERIZATION AND UPGRADING OF NATURAL UNCONVENTIONAL OILS

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Abstract: In this work, we propose the idea to make an innovation in the production of oils from unconventional natural sources plants such as a *Rhamnus cathartica* Plants. These unconventional oils can be used in the food sector, pharmaceutical or energy fields. These objectives of working, first, is to extract unconventional oils, then to characterize them physico-chemical, in addition, to follow the digestibility in vitro by lipolytic enzymes and finally, to make a biotechnological valorization. Considering the disadvantages of the hot extraction process affecting the oil quality, a cold extraction method was used in this study to extract Rhamnus cathartica Plants whole seedpod oil. Crude oil yield was 17 % (on dry matter basis) which is in close agreement with previous results (6.9 %) under similar conditions. Lipid composition provides a detailed fingerprint of each oil and allows evaluating its nutritional quality. The global GC-FID analysis of Rhamnus cathartica Plants oil revealed the presence of *Rhamnus cathartica* has a considerable level of essential polyunsaturated fatty acids. In the sake of comparison, oleic, linoleic and palmitic acids are the most abundant fatty acids in both Rhamnus cathartica and extra virgin olive oil (EVOO). Rhamnus cathartica oil has higher amounts of linoleic (16.5 % vs. 16.21 %) and palmitic (16.8% vs. 15.82 %) acids than EVOO. Oleic acid is however same abundant than in EVOO (62.4 % vs. 62.37 %).The determination of triacylglycerols (TAG) was monitored by the HPTLC method. As expected, *Rhamnus cathartica oil* is characterized by the abundance of long-chain TAG, DAG and F.F.A. Similar composition values are also found in other oleic acid-rich vegetable oils like EVOO and hazelnut oil**.** In results, *Rhamnus cathartica* oil has many biopharmaceutical benefits including moderate antioxidant and antihypertensive activities. The potential use of unconventional oil is diversifying for example use a multifunctional lipid excipient for the development of new lipid formulations.

Mots clés: Unconventional oils, digestibility, biotechnological valorization

C. AFFICHE N° : 150.

BIOACTIVITY OF *PLECTRANTHUS AMBOINICUS* ESSENTIAL OILS AGAINST PATHOGENIC FUNGI OF SHURB SPECIES IN NORTHWESTERN TUNISIA

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Abstract: Various plant species in Tunisian forests are in progressing degradation for decades, causing significant ecological and economic impacts. Recently, field surveys showed the seriousness of this decline phenomenon which extends over large forest areas. A wide range of pathogen fungi was reported to be involved in this decline mainly *Biscogniauxia mediterranea*, *Lasiodiplodia* sp. and *Pleurophoma* sp. These fungal pathogens are commonly isolated from various plant species as causal agents of cankers and necrosis in cork oak forests. In view of their escalating occurrence and impact on woodlands, control actions must be carried out in order to limit their propagation. In this context, the use of essential oils extracted from aromatic plants could present a sustainable approach to fungal biocontrol. Therefore, in this work, essential oils from *Plectranthus caninus* are tested for their efficacy against isolated phytopathogens. The results of in vitro tests showed interesting antifungal activity by inhibiting the mycelial growth of the pathogens. The use of natural compounds derived from aromatic plants provides enhanced ecological safety and mitigates the probability of pathogen occurrence.

Keywords: *Antifungal activity, Biocontrol, Essential oils, Phytopathogens.*

C. AFFICHE N° : 151.

EVALUATION OF ENZYME INHIBITION AND CYTOTOXIC PROTECTION EFFECTS OF *PHAEODACTYLUM TRICORNUTUM* EXTRACTS

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Abtract : Microalgae are known as emerging sources of biologically active biomolecules. The current research focused on assessing oh the potential of extracts derived from *Phaeodactylum tricornutum* to inhibit human acetylcholinesterase, pancreatic alpha-amylase, and demonstrating protection effects *in vivo* against induced hepatic and nephrotic toxicity.

Ultrasound assisted methanol extraction were carried out on different lyophilized *Phaeodactylum tricornutum* biomasses, obtained under different culture conditions by varying media composition (conway, ASW-algal and f/2 media) to provoke secondary metabolites production under nutritive stresses. Inhibitions of acetylcholinesterase and pancreatic alpha-amylase were studied in microplate spectrophotometer using respectively acetylthiocholine iodide/5,5 dithiobis-2-nitrobenzoïc acid and starch as substrates, and by varying the extracts concentrations. Both donepezil and acarbose that were used as effective pure inhibitors for positive control reactions. Further characterization was focused on total polyphenols, carotenoids contents and the DPPH antioxidant activity. *In vivo* protection effects against hepato-toxicity and nephro-toxicity were studied in Wistar Mouse.

Three methanolic extracts were prepared by maceration in methanol (10 % w/v) assisted by ultrasound of three biomasses derived from cultures characterized by different amounts of nitrogen and phosphorus (ASW-algal, f/2 and Conway media). Our results showed that the f/2 extract has interesting inhibition capabilities of both acetylcholinesterase and amylase (IC50 of 0,71 mg/mL and 0,14 mg/mL respectively), compared to pure drug donepezil and acarbose taken as positive controls (IC50 of 1,17 µg/mL and 37 µg/mL respectively). This extract was further characterized by measuring antioxidant activity by the DPPH scavenging assay (IC50 = 0,43 mg/mL), the total polyphenols (10,58 mg EAG/g dry extract) and the carotenoids contents (7,2 mg/g dry extract). These interesting biochemical properties led us to study their correlation with biomass production. Under the conditions used, a growth rate (µmax) of 0,21 d^{-1} associated with a generation time of 3,3 d of this algae were recorded and considered as acceptable compared to bibliographic data and for the intended application. F/2 extract assayed as protector against hepatotoxicity and nephrotoxicity were induced by CCl4 and cisplatine, respectively. Biochemical parameters that were determined to assess the toxicity and the the protection effects were plasmatic urea, uric acid, creatinine, transaminases (ALAT, ASAT), Lactate deshydrogenase LDH), Phosphatase alkaline (ALP). Furthermore hepatic and nephrotic antioxidant enzymes and yield of lipid peroxidation were measured in both the liver and kidney. Overall the results a dose dependant protection effects was obtained from the *P. tricornitum* varying for the tested parameters from 18 to 65% compared to the response toxicity induced par the chemical reagent.

The present study showed the potential *of Phaeodactylum tricornutum* extracts as an alternative and sustainable source to manage neurodegenerative diseases and diabetes by inhibition of enzymes involved in, in addition to their protector effects against hepatotoxicity and nephrotoxicity. Structural characterization of the chemical composition and the delivery of these microalgae or their extracts as nutraceutical constitute a promising road to be explored.

Mots clés : *Phaeodactylum tricornutum, acetylcholinesterase, alpha-amylase, inhibition, hepato and nephrotoxicity, IC50*

C. AFFICHE N° : 152.

SYNTHESIS AND CHARACTERIZATION OF MAGNETIC FE_3O_4/HYDROXYAPATITE NANOCOMPOSITE

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Abstract: In the recent years, nanoscience is employed as one of the most significant research and advanced field in the modern science. Due to the manifestation of new technology during the past decade, researches in the field of nanotechnology, especially, engineered nanomaterials have received remarkable attention for targeted drug delivery

Many factors can influence the drug release profile such as particle size and morphology. The smaller the particle size, the greater the loading of the drug by the latter, the more the release will be controlled

The objective of this work is to synthesize and characterize magnetic nanocomposite using fructose as a green capping agent.

The synthesis of the magnetic nanocomposite, Fe_3O_4 and hydroxyapatite, was carried out by the Co-precipitation method. The effect of different synthesis parameters such as the molar ratio between calcium precursor and green capping agent, stirring speed and calcination temperature were studied to reach optimal conditions.

The purity, crystallinity and morphology of the synthesized nanocomposite were assessed by FTIR Fourier Transform Infrared Spectroscopy, X-ray Fraction (XRD), Scanning Electron Microscopy with Energy Dispersive X-ray analysis (EDAX) and Analysis Differential Scanning Calorimetry (DSC).

The experimental results revealed that the nanocomposites synthesized in the presence of fructose as a green capping agent are pure, crystalline, spherical and discrete particles of reduced size. Therefore, the magnetic nanocomposite, Fe_3O_4 and hydroxyapatite, synthesized based on fructose as a green matrix can act as a good biomaterial for biomedical applications more particularly the drug controlled release system.

Key words: *nanocomposites, iron oxide Fe_3O_4, hydroxyapatite, green capping agent, Fructose.*

C. AFFICHE N° : 153.

ACTIVITE BIOLOGIQUE D'UNE SERIE DE NITRONS AROMATIQUES

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Abstract :
Des tests microbiologiques d'une série de nitrones sont effectués. Les résultats obtenus montrent que les composés présentent une bonne activité antimicrobienne et que cette activité est sensible à la substitution. Aussi, l'addition de surfactant a amélioré cette activité. Les résultats sont affinés par la mesure de la CMI sur seize microorganismes cibles. De même, des tests d'activité antioxydant des nitrones en utilisant trois tests chimiques: la méthode de DPPH «1,1-dipheny1-2 picrylhydrazule», la méthode de blanchissement de β carotène et la méthode FRAP «ferric réducing antioxydant» sont réalisés. Ces tests montrent que les composés présentent un pouvoir antioxydant similaire ou meilleur à celui de la nitrone de référence l'α-phényl-N-tertbutylnitrone (PBN).

Mots clés: *activité antioxydante, test β-carotène, teste microbiologique, nitrone aromatique.*

C. AFFICHE N° : 154.

ETHANOL EXTRACT OF OREGANO (ORIGANUM VULGARE L.) FROM ALGERIA WITH ANTIBACTERIAL ACTIVITY

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Abtract : Oregano (*Origanum vulgare* L.) is a popular culinary Mediterranean herb for a long time with antioxidant and antibacterial properties; it is traditionally used, particularly in the Mediterranean region. It belongs to the Labiatae family that has long been used in cooking and folk medicine. This work reports antimicrobial effect extract from dried leaves and stem of *O. vulgare* against Meticilline-resistente *Staphylococcus aureus* (MRSA) and pathogenic bacteria. Maceration with ethanol and water were used for extraction.

Agar well diffusion method has been used to determine the antibacterial of crude ethanolic and aqueous extracts against Gram-positive bacteria (Meticilline-resistente *Staphylococcus aureus* (MRSA), *Satphylococcus aureus* ATCC 6538, *Bacillus subtilis* ATCC 6333 and *Bacillus cereus* ATCC 14579), Gram-negative bacteria (*Escherichia coli* ATCC 25922, *Salmonella enterica* subsp. *enterica* serovar *typhi* ATCC 14028, *Klebseilla pneumonie* ATCC 4352 and *Pseudomonas aerogenosa* ATCC 1408). Amoxicillin and Clavulanic Acid (30µg) were used as positive control for all strains, while DMSO as negative control.

All bacteria showed to be sensitive to the inhibitory effect of oregano ethanolic extract, except *Pseudomonas aeruginosa* and *Klebsiella pneumonia*. The highest antimicrobial activity was observed for *Satphylococcus aureus*, Meticilline-resistente *Staphylococcus aureus* (MRSA), *Bacillus cereus* and *Salmonella typhi*, with the formation of a halo of >50± 0.52 mm, whereas the lowest activity was verified for *P. aeruginosa* and *K. pneumonia* (halo of only 10±1.56 mm). The aqueous extract showed a moderate activity, the diameter of the zones of inhibition for Gram-positive bacteria range from (17.66 ± 0.57 mm) to (11.33 ± 1.52 mm), and for Gram-negative bacteria, they range from (08 ± 1.73 mm) to (14.33 ± 2.51 mm). Higher inhibition zone was detected against *S. typhi* (18.33±1.52mm).

The findings indicated that oregano extract could be exploited as a natural antibacterial source with potential applications in various commercial preparations.

Mots clés : *Antibacterial, Pathogenic bacteria, (MRSA), Oregano, Medicinal plant.*

C. AFFICHE N° : 155.

ANTAGONISTIC EFFECT OF PROBIOTIC STRAINS OF LACTIPLANTIBACILLS PLANTARUM ISOLATED FROM LOCAL FRUITS

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Abtract : In this study, we tested lactic acid bacteria (LAB) strains isolated from blackberries (Rubus.sp), prickly pears (Opuntia ficus-indica), fresh figs (Ficus carica) and dates (Phoenix dactylifera) from the kabylian region located in the north of the country of Algeria. Twelve isolates were screened for their probiotic potential, with a survival rate at acidic pH of up to 98.71% and a bile resistance rate of up to 58.8%. As for the surface properties, the best results obtained are 89.56% for the hydrophobicity test and 82.1% for the self-aggregation test. Ten isolates were selected and identified by 16s rRNA sequencing.

The antimicrobial activity of the identified strains and their culture supernatant were tested. The culture supernatant showed inhibitory effects towards Escherichia coli and Staphylococcus aureus. Antimicrobial compounds in the supernatant were characterized using the pH neutralization method.

These results allow the selection of probiotic strains with a good antimicrobial activity and antioxidant effect to be used in food bioconservation or administered in food matrices as a probiotic to improve the quality of food as probiotics to improve the health of consumers.

Mots clés : *Lactic acid bacteria, Lactiplantibacillus plantarum, probiotic, antagonism, fruits.*

C. AFFICHE N° : 156.

EFFECTS OF DIETARY SUPPLEMENTATION *LACTIPLANTIBACILLUS PLANTARUM* ON THE GROWTH AND MICROBIOLOGICAL CHARACTERISTICS OF TUNISIAN BROILER CHICKENS (*ARBOR ACRES*).

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Abstract : Lactic bacteria are well known for their production ofhealthy metabolites that are still poorly explored. The aim of the present study is to identify the lactic acid bacteria isolated from the clam Ruditapes decussatus and to evaluate its effect as dietary probiotic supplement on growth performance and lactic florafor intestines of broiler chickens ArborAcres. A large collection of LAB sampled from Ruditapes decussatus (intestinal tract). A group of 25 LAB among the whole collection was tested for their bioactive potential (antimicrobial) and identified using biochemical and molecular tools. Their antimicrobial potential and exoenzymes production were determined in addition to their antibiotic sensitivity. We selected the hyperactive bacterium Lactiplantibacillus plantarum for testing in poultry farming. A total of 200 chicks aged one day are divided into 3 experimental batches (66 chicks per treatment) and were fed, for 42 days, with a staple food supplemented (Probiotic batch) with (chemical supplemented batch) and a Control batch. The results revealed that the lactic bacteria Lactiplantibacillus plantarum obtained is a Gram+, oxidase-, catalase- of the genus Lactobaccillus with a significant antagonistic activity against pathogens with an important positive effect on the chickens with stabilization of mortality rate and on feed consumption. These results highlight a better assimilation of the nutrients induced by the probiotic supplementation. The addition of Lactiplantibacillus plantarum in the feed increased the total number of Lactobacillus in the duodenal flora of chiken compared to controls after 10, 28 and 42 days of age. Our results reveal the effect of the probiotic Lactiplantibacillus plantarum as a bio supplement of chicken feed. Fleshthat deserves further studies to elucidate the mechanisms of action.

Keywords: *Lactic acid bacteria; Antimicrobial resistance; Probiotic; Lactiplantibacillus plantarum ;broiler chickens.*

C. AFFICHE N° : 157.

IDENTIFICATION OF UNDERLYING HUB GENES ASSOCIATED WITH CARDIOVASCULAR DISEASES BY INTEGRATED BIOINFORMATICS ANALYSIS

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Abtract :

Background and aim: Cardiovascular diseases (CVDs) are still one of the leading diseases that threaten human health, exhibiting increasing morbidity and mortality rates. The aim of this study is to explore the molecular mechanisms involved in CVD through comprehensive bioinformatics analysis.

Methods: In this study, a bioinformatic pipeline was performed to screen genes: The Mesh database was used to extract the specific terms associated with cardiovascular diseases (CVDs). Then, the Gene Expression Omnibus (GEO) and the DisGeNET catalog were used to identify differentially expressed genes (DEGs) related to CVDs. A new shortlist of genes was submitted to WebGestalt Database, after removing overlapping genes, for Gene ontology (GO) enrichment analysis. Therefore, the interaction network of protein-protein internet (PPI) was built using the STRING database to explore the correlation between these DEGs. A Centiscape plug-in was carried out to screen the hub genes. Furthermore, the enrichment analysis of Gene Ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG), drug and disease associations were performed as well as target miRNA and target TF were predicted.

Results: A total of 11499 DEGs closely related to 84 cardiovascular diseases were identified. Similarly, 821 hub genes were selected from the PPI network. The top 10 hub genes involved in the majority of CVDswere as follows: TNF, IL6, VEGFA, TGFB1, IL10, AGT, EDN1, IL1B, TP53, and AKT1. The results of enrichment analysis revealed that these hub genes were mostly involved in infection (viral, bacterial and parasite), inflammation and cancer-association pathways in several CVDs. Moreover, a large number of microRNAs are considered to be key markers for CVDs, including miR-22, MIR-29 and miR-30a. In addition, a collagenase, interleukin inhibitors and anti-inflammatory agents are identified as potential drugs for the key hub gene candidates involved in CVDs and its associated diseases such as diabetes mellitus.

Conclusion: The results revealed an important crosstalk between cardiovascular diseases and underlay the importance of the commun pathways and pivotal genes that may provide new ideas for future therapies.

Mots clés : *Cardiovascular diseases, Gene Expression Omnibus, Microarray, association studies, DisGeNET catalog, differential gene expression, hub genes.*

C. AFFICHE N° : 158.

PRESERVATION OF POULTRY MEAT USING *EUCALYPTUS GLOBULUS* ESSENTIAL OIL DURING REFRIGERATED STORAGE.

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Abtract : Several countries have limited the use of synthetic and chemical preservatives due to their harmful effect on health. As a result, researchers have shifted their view towards exploiting new bio-preservatives, while relying on the current trend of consumers to follow natural diets. Several studies have been fixed on the use of plant extracts, such as essential oils thanks to their biological properties. In order to contribute to the enhancement of the Tunisian flora with a view to identifying new substances potentially of biological interest, we have carried out a study of the essential oils of the leaves of *Eucalyptus globulus* from Kairouan (Tunisia). The study of the chemical composition of the essential oil by GC-MS has identified that 1,8 cineole (33.69%) was the major compound, of the essential oil of this plant and the oxygenated monoterpenes constitute the predominant class. In another hand, the addition of *Eucalyptus* essential oil to the chicken meat, improved its biochemical quality while following the evolution of the pH, the flora of the aerobic mesophiles and the loss of water and evolution. Estimating the expiration date by the accelerated aging method allowed the shelf life of chicken meat to be extended by two to three days, compared to the control chicken meat. Therefore, results encouraged the use of *Eucalyptus* essential oil with a view to substitute the synthetic compounds having harmful effects on the health of consumers.

C. AFFICHE N° : 159.

BIOINGENERING AND BIOTECHNOLOGICAL APPLICATION OF MELGHIRIBACILLUS THERMOHALOPHIUS NARI2A^T PROTEASE: THE CASE OF THE SAPN

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Abstract: Microbial life is present not only in familiar world for example, in air, soil, and lakes, but also in geothermal oil field. Petroleum reservoirs are sites with respect to their physico-chemical characteristics. They are ecological niches from which taxonomically, physiologically, and phylogenetically unusual microbes can be isolated. These are main source for a biotechnological and industrial process. They host a variety of prod-Subtilisins are initially expressed as an inactive precursor, called pre-pro-subtilisin, composed of a signal peptide (SP) fused with a pro-peptide (Pro) at the N-terminus of the protein.The leading factor prompting attention to subtilisins is the industrial utility of this type of enzyme. To satisfy these requirements in addition to providing alternative evolutionary properties, subtilisins need to be remodeled through protein engineering. The genus *Melghiribacillus* is a newly identified member of the *Bacillaceae* family, which integrates the *Bacilli* class as of 2015. In fact, the *sapN* gene, encoding the extracellular subtilisin SAPN, a serine alkaline protease from *Melghiribacillus thermohalophilus* Nari2A^T, was isolated, sequenced, and heterologously expressed in *Escherichia coli* BL21(DE3)pLysS using pUT57 and pTrc99A vectors and in *E. coli* BL21-AI™ using the Gateway™-pDEST™17 vector. Conversely, three cassettes encoding pre-pro-subtilisin (rSAPN/SP-Pro-M), pro-subtilisin (rSAPN/Pro-M), and the mature-subtilisin (rSAPN/M) were hyper-expressed in yeast (*Pichia pastoris* strain SMD1168 and X33) using the pPICZαC vector. rSAPNs were purified, characterized, and compared to wild-type SAPN. Compared to SAPN and untagged rSAPNs, $(His)_6$-tagged enzymes showed the highest activity and stability at alkaline pH and high temperature, the highest hydrolysis degree on crab and shrimp by-products, and the best catalytic efficiency. It was found that His_6-rSAPN/SP-Pro-Ms expressed in yeast (*P. pastoris*) strains was more active than those produced in bacteria (*E. coli*). To initiate structure-function relationships, a three Dimensional (3D)-model of the Pro-SAPN was built based on the available structures of common subtilisins. These data constitute a pivotal first step toward the creation of new efficient rSAPNs with enhanced catalytic properties and high potential for biotechnological and industrial uses. Given its novel properties and characteristics, the His_6-rSAPN enzyme produced in *Pichia pastoris* strain SMD1168 has proven to be a potential candidate for biotechnological applications.

KEYWORDS*: MELGHIRIBACILLUS THERMOHALOPHILUS, SUBTILISIN, EXPRESSION, E. COLI, P. PASTORIS, COMPARATIVE MODELING.*

C. AFFICHE N° : 160.

BIODEGRADATION OF THE FLUOROQUINOLONE ANTIBIOTIC "LEVOFLOXACIN" BY FREE AND IMMOBILIZED LACCASE IN THE PRESENCE OF HBT

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Abstract: Antibiotics are considered as miraculous molecules that would allow humanity to eradicate bacterial infections diseases. The overconsumption and misuse of these molecules cause environmental contamination and contribute to the development of antibiotic resistance. In this context, several studies have focused on the removal of these micropollutants by physicochemical processes. Despite the promising results obtained, antibiotics can bypass water treatment processes and can end up directly in the environment. In addition, high operating costs, and the formation of toxic by-products are also obstacles for the application of these technologies. However, biological treatment, known as bioremediation is regarded as a promising and cost-effective alternative, among these methods, biodegradation by fungal strains that efficiently degrade a variety of antibiotics. In this work, a fungal strain *Coriolopsis aff. gallica* capable of effectively degrading a persistent fluoroquinolone (Levofloxacin) in nature was isolated, then a study was carried out on the effect of physico-chemical factors (HBT concentration, enzyme concentration, antibiotic concentration, pH and temperature) on the degradation of the antibiotic by free and immobilized laccase by inclusion into alginate beads in the presence of a laccase mediator HBT. The degradation processes were analyzed in solid medium. The results show that free laccase showed the highest removal efficiency degradation of 50 mg/L Levofloxacin in the presence of 2.5 mM HBT, whereas immobilized laccase was able to effectively degrade only 10 mg/L Levofloxacin in the presence of 2.5 mM HBT.

Keywords: *fluoroquinolone, Levofloxacin, laccase, Coriolopsis gallica, biodegradation, mediator, immobilization.*

C. AFFICHE N° : 161.

ANTIOXIDANT ACTIVITY AND BACTERIAL VIABILITY OF NATURAL PLAIN YOGURT CONTAINING WHOLE CHIA SEEDS (*SALVIA HISPANICA*)

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Abtract : In a perspective of enhancing the nutritional value, the rheological properties and sensory attributes of yogurt, whole chia seeds were added to the formulation of natural plain yogurt at concentrations of 1, 2 and 3% (named Y1, Y2 and Y3 respectively). Traditional yogurt was taken as a control (CY). pH, TTA and syneresis rate were measured on obtained yogurts at days 1, 7, 14, 21 and 28 of refrigerated storage and the results revealed some fluctuations of pH of yogurts, that were independant of the percentage of chia incorporation. Furthermore, pH values tend to decrease gradually as the storage time is prolonged. TTA results showed that the addition of chia seeds had an impact on the acidity of yogurts since significant differences ($P<0,05$) were noticed between samples. Syneresis rates recorded higher values for CY, indicating better whey retention of enriched yogurts compared to the control. Antioxidant activity as estimated by DPPH and ABTS tests, increases with the increase of the incorporation rate in chia seeds. Hence, the highest values are recorded by Y3. The study of the evolution of antioxidant activity in function of storage time showed that the lowest percentages of DPPH and ABTS inhibition are noticed at D_{28}, while the highest are observed at D_7 for CY and Y1 and at D_{14} for Y2 and Y3. Enumeration of LAB (Lactic Acid Bacteria, consisting in *Streptococcus thermophilus* and *Lactobacillus bulgaricus*) revealed a stimulating effect of chia seeds addition on the viability of yogurts' bacteria since enriched natural yogurts had significantly higher amounts than the control. The statistical study of the effect of the storage duration on the growth of LAB showed a gradual increase of their number, starting from D_1, until reaching maximum values (for all the samples) at D_{14} and then will gradually decrease until the last day of incubation (D_{28}). Our study demonstrated a positive effect of chia seeds incorporation in natural yogurt, traduced by lower syneresis rates, higher antioxidant activity and better LAB viability.

Mots clés : *Natural plain yogurt, chia seeds, Physico-chemical properties,LAB counts, Aspergillus*

C. AFFICHE N° : 162.

BEEF MEAT PHYSICO-CHEMICAL QUALITY AND ANTIOXIDANT ACTIVITY AS AFFECTED BY COATING BASED ON MYRTLE *(MYRTUS COMMUNIS L.)*, AND ROSEMARY (*ROSMARINUS OFFICINALIS L.*) EXTRACTS DURING STORAGE

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Abtract : The meat industry has grown substantially in recent years due to the increasing demand for meat products and its nutritional properties. Lipid oxidation is considered as one of the major deteriorating process of meat during storage. The combination of edible films and coatings along with natural antioxidants can preserve food and improve their quality and safety. Thus, the aim of this study waas to evaluate the effects of alginate-based edible coatings containing natural antioxidant Myrtle (Myrtus communis L.), and Rosemary (Rosmarinus officinalis L.) extracts) on fresh beef physico-chemical quality and antioxidant activity during storage for 12 days at 2°C. The meat used for this study was the Longissimus dorsi (LD) muscle. Homogenous steaks of 2.5 cm thick were obtained from each muscle and were then randomly and equally divided into four groups: uncoated samlpes (CON); samples with edible coating (AEC); samlpes with edible coating and 200 ppm rosemary extract (ROS), samlpes with edible coating and 200 ppm myrtle extarct (MYRT). The alginate-based edible coatings incorporated with Myrtle and Rosemary extracts, significantly ($p<0.01$) decreased lipid oxidation in the meat for up 12 days of display with TBARS value of 0,39 mg MDA/kg and 0,78 mg MDA/kg, respectively. The DPPH scavenging activity of meat samples from ROS and MYRT groups were the highest ($p<0.001$) among all treatments with 62, 68% and 64, 82%, respectively. Meat coated with Myrtle and Rosemary extracts was redder, had a more intense chroma and was more tender. Therefore, alginate edible coatings containing natural extracts have potential application in meat products to maintain their quality during the shelf-life.

***Keywords**: Meat, quality, edible coating, natural extarcts.*

C. AFFICHE N° : 163.

IMPACT OF DIVERSE CULTURE MEDIUM ON PHOTOAUTOTROPHIC GROWTH AND BIOACTIVE METABOLITES ACCUMULATION OF *PORPHYRIDIUM* SP.

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Abstract: Microalgae produce numerous metabolites with significant biological activities and considerable industrial potential. However, the taxonomic diversity of these microorganisms has been poorly explored.
A newly isolated strain from the Tunisian coast was identified based on the 18S rRNA encoding gene as belonging to the *Porphyridium* genus. The effect of Pm, F/2 and Hemerick for 52 days on *Porphyridium* sp. growth was investigated. The highest biomass production was recorded with Pm medium. The highest pigments, starch and proteins contents were observed with F/2 medium. The Hemerick medium proved to be the most suitable for the production of lipids and exopolysaccharides.
To achieve the best production efficiency in actual production applications, growth medium should be selected in accordance with various product accumulation goals. Further investigation is required with a focus on particular nutrients in one culture medium to find out the induce impact of nutrients to the biomass and metabolites accumulation.

***Key words :** Porphyridium* sp.; Metabolites; Culture; Pigments, Polysaccharides.

C. AFFICHE N° : 164.

TITLE: COMPARISON OF DIFFERENT INFUSIONS OF MYRTUS COMMUNIS L.: EFFECTS ON BIOLOGICAL ACTIVITIES

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Abstract: This work focused on comparing different leaf and fruit infusions of Myrtus communis.

The use of two complete factorial designs for the infusions of leaves with two-factor and three-factor infusions of fruits allowed the detection of the possible effects of the different parameters interfering with the quality of the infusions.

The results of the experimental design of myrtle leaf infusions concluded that only the effect of the factor "temperature of the infusion water" was significant for polyphenol contents. Regarding antioxidant activities, the effects of the two factors "water's pH" and "temperature of the infusion water" as well as the interaction between them were considered significant.

Regarding the experimental design of myrtle fruit infusions, the three factors used "Water temperature", "Fruit color" and "Fruit collection month" showed a highly significant difference for polyphenol contents and condensed tannin contents, of which only the interaction temperature/color and temperature/collection month was found to be significant for condensed tannin contents. The evaluation of antioxidant activity by the DPPH (180.42 mg Eq Trolox/ g DW) and ABTS (= 648,47 mg Eq Trolox/ g DW) tests showed that all three factors are influential.

Optimizing the prepared infusions to maximize the desired responses suggested an infusion of myrtle leaves prepared at pH=7.4 and infusion water temperature of about 105°C with a value of polyphenols content 149,285 mg EQ gallic acid/g DW and antioxidant potential of 273,6 mg Eq Trolox/ g DW for DPPH test. As for the myrtle fruit infusions, the maximum effects are reached with an infusion of the black fruits collected in November and infused at a temperature of 105°C with a value of condensed tannins 1,45 mg Eq Catechin/ g DW.

Mots clés : *Myrtus communis, infusions, phenolic compounds, biological activities, experimental design.*

ENVIRONNEMENT

C. AFFICHE N° : 165.

POTENTIAL OF *OPUNTIA FICUS-INDICA* FRUIT PEELS AS BIO-ADSORBENT FOR URBAN WASTEWATER TREATMENT

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Abstract : Due to their high content of mucilage, a hydrocolloid biopolymer, the fruit peels of *Opuntia ficus-indica* (*OFI*) of the *Cactaceae* family may potentially apply in wastewater treatment as a natural bio-coagulant. The objective of this research is to investigate the performance of the fruit peels in treating raw urban wastewater. The treatment was optimized by varying the concentration of the OFI peels' powder (0, 50, 60, 70, 80, 90, 100 $mg \cdot L^{-1}$). Physicochemical characterization of the raw urban wastewater was carried out before and after treatment. The results showed a decontamination the wastewater studied.

Keywords: *Bio-coagulant, Opuntia ficus-indica, urban wastewater.*

C. AFFICHE N° : 166.

NON-TREATED HOSPITAL WASTEWATER ADVERSE EFFECTS ON *DAPHNIA MAGNA*: OXIDATIVE STRESS RELATED BIOMARKERS

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Abstract: Hospital wastewaters (HWWs) are heavily loaded with several hazardous substances, particularly pharmaceutical residues. However, to date, HWWs are considered of similar quality to domestic effluents in many countries, and often, discharged to conventional wastewater treatment plants (WWTPs) without any pretreatment which may increase the resulting environmental risk. Therefore, in this research work, we aimed to study the adverse effects of a raw HWW, collected from a general hospital located in Mahdia city (Tunisia), on the early life stages of *Daphnia magna*. Neonates aged < 24h were acutely (48 h) exposed to the non-treated HWW at different proportions (3.12%, 6.25%, and 12.5%; v/v). Biomarkers of oxidative stress [catalase (CAT) and total and selenium-dependent glutathione peroxidase (total GPx; Se-GPx), phase II biotransformation isoenzymes glutathione-S transferases (GSTs) and lipid peroxidation (LPO)] were measured using spectrophotometric methods. The obtained results showed a significant decrease in the enzymatic activities of CAT and GSTs. LPO content in daphnids was also decreased after the exposure. However, a significant dose-dependent increase was observed for Se-GPx activity. Considering this set of data, the tested HWW induced a disorder in the antioxidant defense system, but without resulting in oxidative damage. In general, the toxicity of HWW cannot ruled out in this study and further analyses are needed.

***Mots clés** : Hospital wastewaters, Oxidative stress biomarkers, Pharmaceutical residues, Daphnia magna, Water pollution.*

C. AFFICHE N° : 167.

MOLECULAR INTERACTIONS OF POLYVINYL CHLORIDE MICROPLASTICS AND BETA-BLOCKERS (DILTIAZEM AND BISOPROLOL) AND THEIR EFFECTS ON MARINE MEIOFAUNA: COMBINED IN VIVO AND MODELING STUDY

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Abtract : microplastic polyvinyl chloride on marine meiofauna was tested in laboratory microcosms. An experimental factorial design was applied, using meiobenthic fauna collected from the Old Harbor of Bizerte (NE Tunisia), but with a main focus on the nematode communities. The meiobenthic invertebrates were exposed to two concentrations of Diltiazem and Bisoprolol, of 1.8 µg.L^{-1} and 1.8 mg.L^{-1}, respectively, and one concentration of polyvinyl chloride (i.e. 20 mg.kg^{-1}), separately and mixed. The overall meiofauna abundance was significantly reduced in all treatments, mainly that of polychaetes and amphipods. Moreover, the juveniles-gravid female ratios of the nematode communities were the lowest in the 1.8 µg.L^{-1} Bisoprolol treatment and for the 1.8 mg.L^{-1} mixture of Diltiazem and microplastics, suggesting that different dosages influence the maturity status of the examined species. The demographic results were also supported by in silico approach. The simulation of molecular interactions revealed acceptable binding affinities (up to −8.1 kcal/mol) and interactions with key residues in the germ line development protein 3 and sex-determining protein from Coenorhabditis elegans. Overall, the experimental outcome strongly indicates synergistic interactions among the beta-blockers Diltiazem and Bisoprolol and the microplastic polyvinyl chloride on marine nematode communities.

Key words: *Polyvinyl chloride, Meiobenthic nematodes, Sex ratio, Molecular interactions, Functional traits*

C. AFFICHE N° : 168.

DETERMINATION OF PHENOLIC COMPOUNDS AND ANTI-INFLAMMATORY ACTIVITY OF *MARRUBIUM VULGARE* METHANOL EXTRACTS

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Abstract:

This work aims to study the determination of phenolic compounds and anti-inflammatory activity of methanolic extracts of leaves and flowers of *Marrubium vulgare*, harvested from north-western Algeria, with the aim of valorizing the plant species growing spontaneously in Algeria.

The extracts were obtained by maceration; the determination of phenolic compounds was carried out spectrophotometrically using the Folin Ciocalteu reagent method for polyphenols, the colorimetric method with aluminum trichloride for flavonoids and the vanillin method for tannins. The anti-inflammatory activity was performed by the plantar edema test induced by injection of carrageenan in *Wistar* rats.

As a result, we found that methanol extracts of *Marrubium vulgare* are very rich in phenolic compounds, and the anti-inflammatory activity results showed that they have a very strong anti-inflammatory power, which is close to that of diclofenac.

These results suggest that extracts of *Marrubium vulgare* can be an alternative, a substitute for synthetic anti-inflammatory drugs. It would be interesting to continue investigations in order to isolate and identify the molecules responsible for this action, which are safe for the environment.

Key words: *phenolic compounds; methanolic extracts; Marrubium vulgare; anti-inflammatory activity.*

C. AFFICHE N° : 169.

ANALYSE OF ECOLOGICAL INDICATIONS BASED ON THE ANALYSIS OF PELLETS COLLECTED FROM BIRD OF MEDJERDA PLAIN.

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Abstract : One of the fundamental features for the monitoring and conservation of wild populations is the concept of trophic niche. In this context, the analysis of the diet of birds frequenting the plain of Majerdah *(CattleHeronBubulcus ibis, White Stork Ciconia Ciconia and the Little Owl Athene* noctua) was carried out using 60 reject pellets during the nesting period of 2022. Microscopic observation of 60 pellets of rejection reveals that the species concerned by this study are mainly insectivores and occasionally feed on vertebrates. Their diets are practically similar with a rate exceeding 50%.
Theirfoodspectraiscomposedmainlyby coleoptera (>70% for all species). The total number of animal taxa consumed varies between 5 taxa for the owl (Beetles 88.87%; Hymenoptera 14.95%; Birds 2.73% ; Arachnids 1%; Reptiles 0.44%), 10 taxa for the Stork (Beetles 93.24%; Lepidoptera 3.39%; Orthoptera 0.93%; Reptiles 0.81%; Amphibians 0.47%; Hemiptera 0.39%; Birds 0.22%; Mammals 0.19%; Hymenoptera 0.19% ; Dermaptera 0.17%) and 12 taxa for Cattle egrets (Coleoptera 82.99%; Lepidoptera 5.27%; Orthoptera 4.79%, Annelida 2.23%; Hymenoptera 2.04%; Amphibians 1.87%; Birds 1 0.7%; Mammals 0.83%; Parasites 0.73%; Aracnids 0.69%; Gastropods 0.12%; Fishes 0.04%). In addition to these animal prey, vegetable matter (min = 1.25% and max = 2.02%) has been identified as well as mineral matter and plastic (min = 1.64% and max = 9.87%). The presence of these elements in the pellets of rejection is related to the nature of the anthropized feeding areas frequented by these birds, in particular the dumps. Based on this study, these breeding populations were opportunists that show high ecological plasticity. They are able to modify their feeding behavior depending on prevailing local conditions.

***Key words** : Lowland birds - Medjerdah–pellets - Diet.*

C. AFFICHE N° : 170.

ÉVALUATION DE LA CONTAMINATION MÉTALLIQUE DU SOL À PROXIMITÉ DES ZONES URBAINE ET INDUSTRIELLE DE LA RÉGION D'ANNABA (NORD-EST DE L'ALGÉRIE)

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Résumé : Les concentrations des métaux dans les sols de la région d'Annaba (Nord-Est de l'Algérie) ont été évaluées et leurs relations avec les caractéristiques du sol ont été étudiées. Des échantillons ont été prélevés sur quatre sites différents a proximité des zones urbaine et industrielle.

Les sols sont modérément alcalins, ont une teneur élevée en matière organique, et sont faibles en carbonate. Les concentrations moyennes de métaux sont 3.869 (Cadmium), 33.130 (Plomb), 136.108 (Zinc), 24.462 (Cuivre), 123,573 (Cobalt), 100.087 (Chrome) et 196.746 (Barium) les unités (mg/ kg).

Les concentrations des éléments trace métalliques (ETM) dans les sols des sites ayant une activité intense ou étant proches d'activités anthropiques étaient plus élevées que dans le site de référence. Ce qui est dû à une accumulation provient d'activités humaines.

Une corrélation de Pearson ainsi qu'une analyse en composante principale ont démontré que le chrome et le cuivre sont d'origine naturelle tandis que le cadmium, le plomb et le zinc sont d'origine anthropique. Les concentrations élevées de (Cr), (Ba) et le (Co) aux quatre sites sont dues à des activités industrielles, alors que les autres métaux proviennent de la géologie du sol.

***Mots clés :** évaluation ; contamination ; ETM ; sole ; zone urbaine.*

C. AFFICHE N° : 171.

VARIABILITY OF NUTRIENT IN THE UPSTREAM AND DOWNSTREAM OF BNI-HAROUN DAM, NORTHEAST ALGERIA

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Abtract : The dam of Beni-Haroun is considered a strategic achievement in the development program of water resources sector. This study aims at assessing the physicochemical quality of rivers water at the entrance of Beni-Haroun dam for each of oued Rhumel, oued Endja, oued Radjas and oued El-kotone and in the exit of Beni-Haroun dam. This study also aims to monitor and evaluate raiwater for rural (Terrai Bainan and Tassadane Haddada) and urban (Mila center and Constantine center) areas. During this study, we followed some physical (pH), dissolved oxygen (DO), electrical conductivity (EC), Total Dissolved Salt (TDS) and water flow) and chemical (phosphorus (PO_4), inorganic nitrogen (NID), nutrite (NO_2) and nitrate (NO_3), Silicium (SiO_4) and ammonuim (NH_4)) indications of rivers water from January 26th, 2022 to March 26th 2022, as well as for rainwater in rural and urban areas during precipitation days from January 6th, 2022 to March 22nd, 2022. The results obtained showed high concentrations of inorganic nitrogen (NID) at the entrance of Beni-Haroun dam at oued Rhumel, where we recorded contents up to (79.70 µM) in February, medium content of ammonium (28.18 µM), nitrates (from 21.42 to 74.29 µM), phosphorus (from 0.18 to 5.32 µM), silicium (130.65 µM). On the other hand, we noticed a remarkable decrease in nutrients at the exit of Beni-Haroun dam. The maximum nutrient concentrations were recorded in the fourth station (oued Rhumel). This increase is due to human activities which are considered as a major factor in the fluctuation of nutrient levels. The change in rainwater nutrients concentration in rural (Terrai Bainen and Tassadane Haddada) and urban (Mila center and Constantine center) areas is mainly due to the human influence represented by the various agricultural and industrial activities that have significantly contribute to air pollution.

Mots clés : *Beni-Haroun Dam, nutrients, flow, water pollution.*

C. AFFICHE N° : 172

ISOLATION, CHARACTERIZATION AND PRELIMINARY IDENTIFICATION OF NEW BACTERIAL STRAINS FROM EFFLUENTS OF PHOSPHATE FERTILIZERS INDUSTRY IN SOUTHERN TUNISIA, GAFSA

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Abstract: The wastewaters from phosphate fertilizer industries (WPFI) discharged into the environment without any prior treatment constitute a real threat for ecosystems and human health. In this study we determined the physico-chemical characteristics of the effluent as well as its bacterial contents. The obtained results showed that WPFI was highly acid (pH 2), saline (58 g/l) with elevated electric conductivity (EC= 44.80 ms cm^{-1}). In addition, it contained heavy metals Cd, Pb, Cr and Fe with 0.7, 2.06, 4.70 and 44.12 mg/l, respectively. Also, they were overloaded with phosphate (1352.42 mg/l), sulfate (1347.4 mg/l), fluorine (1072.60 mg/ml), sodium (9271.56 mg/l) and chlorine (1310.94 mg/l). All these elements exceeded the national and international standards. The microbiological characterization showed the presence of low charge of revivable aerobic bacteria as total coliforms, fecal coliforms and sulfite-reducing bacteria. We have isolated five pure strains (S_1, S_2, S_3, S_4 and S_5) which were characterized for their morphological, cultural and biochemical properties as well as their resistance to extreme conditions. All strains were found to be gram negative, three of them were mobile (S_1, S_2, S_9). The preliminary identification of the isolated strains via API 20E test resulted in 4 different genus (*Providencia*, *Vibrio*, *Chyseobacterium* and *Stenotrophomonas*). These genus had remarkable resistance to potentially toxic elements (especially towards Cd, Pb, Cr and Fe), revealed by Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentrations (MBC) methods.

Key words: *extremophile bacteria, biochemical characterization, heavy metals, MIC, MBC*

C. AFFICHE N° : 173.

BIODIVERSITY STUDY OF THE MACRO INVERTEBRATE COMMUNITY OF THE GROUNDWATER IN THE WILAYA REGION OF SOUK-AHRAS (NORTH-EAST OF ALGERIA)

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Abstract : In Algeria, the groundwater constitutes an essential capital for the supply of underground drinking water, estimated throughout the country at 6.7 billion m³ of groundwater is poorly distributed at barely 25% of the groundwater and is located in the north of the country, where more than 70% of the population lives. The groundwater environment is not only a vast reservoir of water but also a biotope for many taxonomic groups. Concerning this study carried out on the inventory of the underground fauna during a period of eight months in the region of Souk-Ahras on 14 stations (10 wells and 4 springs) from a biological perspective, all the results obtained revealed that the study of the macro invertebrates of the underground waters in the Souk-Ahras region (North-East of Algeria) made it possible to collect 1715 individuals belonging to 4 (*Insects, Crustacea, Citellata, Gastropods*) classes and 29 families. The aims of the present work is to make an inventory in order to determine the structure, composition and taxonomic richness of aquatic invertebrates in the region of the wilaya of Souk- Ahras, (North-East of Algeria).

Key words: *groundwater, macro invertebrates, wells, spring.*

C. AFFICHE N° : 174.

ACUTE TOXICITY OF A MOLLUCICIDE "METALDEHYDE 6% GR" ON CANTAREUS ASPERSEUS AND CANTAREUS APERTUS (GASTEROPODA, PULMONATA)

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Abstract: This work aims to evaluate the acute toxicity (96h) of a "metaldehyde, GR 6%" mollucicide, widely used in agriculture, on two common species of land snail (Cantareus aspersus and Cantareus apertus); in the Mila region; Using the method of treatment by topical application at concentrations: 36, 48, 300, 400 and 600 (µg/snail). The results obtained from the treatment indicate that this mollucicide exerts a toxic effect on the snails and can contaminates the soil; thus, the treated snails show a series of symptoms such as: the excessive secretion of mucus, they will be inactive and immobile with a refusal of food followed by death, compared to the control snails which present their normal usual activities. Concerning the treated snails, the mortalities are dose-dependent, with a high mortality rate mainly for the 300 and 400 µg/snail doses. The established sublethal dose, LD_{10} of metaldehyde is 1236 µg/snail, the lethal dose LD_{50} is 14783 µg/snail and the LD_{90} is 176866 µg/snail in the Cantareus aspersus species. Concerning the Cantareus apertus species, the sublethal dose, LD_{10} of metaldehyde established is 2087 µg/snail, the DL_{50} is 9506 µg/snail, the DL_{90} is 5.164e+006 µg/snail. This shows the toxic effect of the mollucicide on snails. These results confirm the role of C. aspersus and C. apertus species as bioindicators of soil pollution by pesticides and molluicides.

Keywords*: Acute toxicity, me aldehyde, C .asperseus, C. apertus, bioindicator, Pollution, Algeria*

C. AFFICHE N° : 175.

RESPONSE OF A GREEN MICROALGA TO STRESS INDUCED BY HEAVY METALS: STUDY OF THE ASSOCIATED METABOLIC AND CELLULAR EFFECTS

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Abstract: Non-essential heavy metals pose a threat to the environment and human health. Dissecting their toxicity mechanisms is of major importance for proper environmental risk assessment and elimination.
Several physico-chemical methods have been developed for the remediation of water contaminated by metal ions. However, these methods are quite expensive and lack effectiveness. Phycoremediation represents an alternative of choice offering better performance at a lower cost, compared to conventional treatment technologies.
It is now accepted that the growth of microalgae and their biochemical compositions are necessarily affected by biotic and abiotic factors. Heavy metals have effects on various physiological and biochemical processes of microalgae

In the present study, a newly isolated green microalga was exposed to increasing doses of heavy metals and the physiological and biochemical responses were monitored. A follow-up of the microalgae growth, the production of photosynthetic pigments and molecules with high added value were analyzed by microbiological and biochemical approaches. An evaluation and subcellular localization of reactive oxygen species (ROS) generated following microalgae exposure to heavy metals were carried out, by BODIPY labeling coupled with microscopy. In addition, Fourier transform infrared spectroscopy was applied to highlight the various changes that affected the macromolecular composition of microalgae following their exposure to heavy metals.
Inhibition of the microalgae growth, as well as a decrease in its total chlorophyll content, were observed. In addition, an overproduction of ROS was highlighted. The FTIR spectra obtained revealed major changes: shifts, insertions and deletions of characteristic peaks attributed to functional groups precisely in the region of the spectra of fatty acids (3000-2800 cm^{-1}) and polysaccharides (1200-900 cm^{-1}). An increase in carbohydrate levels was observed, highlighting an involvement of polysaccharides and lipids in the defense mechanisms of microalgae to stress induced by heavy metals.
Thus, the present study is relevant for understanding the main biological effects of heavy metal on the eukaryote cell model : green microalgae.

Mots clés : *Heavy metals , Green microalga, ROS, BODIPY, remediation*

C. AFFICHE N° : 176.

EVALUATION DE LA QUALITÉ PHYSICOCHIMIQUE DES EAUX USÉES TRAITÉES PAR TROIS ARGILES NATURELLES ET ACTIVÉES

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Abtract: the discharge of wastewater by treatment plants into natural environments reinforces the spread of pollutants, which constitutes a real danger for the environment. Hence, it is necessary to develop new purification techniques based on the use of natural materials such as clay. This study aims to evaluate the physicochemical characteristics (pH, Conductivity, COD, BOD etc.) of wastewater taken from Lessouda WWTP (Sidi Bouzid, Tunisia) before and after treatment with AM, HJ1 and HJ2 clays. In fact, the results of these analyses estimated that the wastewater treated in the Lessouda WWTP is characterized by an average physicochemical quality except for the chemical oxygen demand (COD) and phosphate which do not respect Tunisian standard (NT .106.002). Thus, we noted that the treatment of these effluents by the various types of clay enormously improved their physicochemical quality, particularly in the cases of treatment by clay (HJ1) and clay AM activated by an acid (chloride of hydrogenated) reactivated with a base (sodium carbonate) because they can be reused or released into the environment without any risk. This work confirmed the effectiveness of water treatment by natural and activated clays in optimizing their physicochemical parameters.

Mots clés : *argile, argiles Activées, eaux usées, paramètres physicochimiques*

C. AFFICHE N° : 177.

EFFECT OF PHOSPHOGYPSUM ON SALINE SOIL AND ON GROWTH AND ANTIOXYDANT ENZYMES ACTIVITIES OF DATE PALM (*PHOENIX DACTYLIFERA* L.)

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Abtract : In this study, we investigated the effect of amendment of saline soils by different rates of phosphogypsum (PG) on saline soil and *date palm* growth. Different substrates were prepared by mixing saline soil with different concentrations of phosphogypsum from 0% to 40%. A culture period of 18 months was performed and then plant morphology, physiological and biochemical parameters were determined. Our results showed that an improvement of the soil quality was noticed after addition of PG by the decrease of pH and electrical conductivity and an increase of phosphate and calcium contents. In addition to that, plant growth was improved in PG -supplemented substrates especially at 10 and 20% concentrations, compared to control. However, higher concentrations of PG (30 and 40%) significantly increased the concentration of oxidative stress indicators in plant tissues such as MDA and H_2O_2. All these data suggested that date palm (*Phoenix dactylifera* L.) can tolerate the PG amendment at doses greater than 30% in saline soil by activating antioxidant enzymes that reduce the accumulation of ROS in plant tissues and thus limit oxidative damages. Hence, the amendment of saline soils by PG at 10 to 20% concentrations can have a positive impact on date palm (*Phoenix dactylifera* L.) growth. It can be used as an alternative fertilizer at specific concentration.

Key words : *Phosphogypsum, Saline Soil, Amendement, Date palm (Phoenix dactylifera L.), Oxydative Stress*

C. AFFICHE N° : 178.

STUDY OF ANTIBIOTIC RESISTANCE AND ENVIRONMENTAL ISSUES IN ESTUARINE AND COASTAL TUNISIA ENVIRONMENTS

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Abstract: The spread of antibiotic-resistant bacteria (ARB) and their antibiotic-resistant genes (ARGs) have shown expansion in most natural surroundings, including water, soil, and sediments, causing and presenting health problems for humans and animals.

The ecological impact and environmental concerns of antibioresistance in aquatic and littoral habitats are discussed in this paper. Antibiotic pollution levels in marine, coastal water lakes, and river water flowing into the Mediterranean Sea were reported in all gathered data. Likewise, their impact on the marine and lake environment in terms of the emergence of ARB and ARGs was described. Several significant scientific research databases, including Science Direct, PubMed, and search engines like Google Scholar, were used to filter all cited and adopted publications. We found that heavy metals, minerals, organic pollutants, and other environmental factors influence the way of antibiotic distribution; while ARGs are affected by antibiotic residues, environmental factors, microbial communities, and mobile genetic elements (MGEs). In addition to endangering marine life and human health, antibiotics and ARGs disrupt microbial populations and natural biogeochemical cycles. Our findings showed an in-depth understanding of the transport and environmental behaviors of antibiotics and ARGs in the estuarine and coastal ecosystems of the Mediterranean Sea.

Keywords: *Tunisia; Aquatic environment; Mediterranean Sea; Antibiotic resistance; Environmental diffusion; Antibiotic-resistant genes.*

C. AFFICHE N° : 179.

LAUNDRY DETERGENT COMPOSITIONS COMPRISING RENEWABLE COMPONENTS BASED ON MICROBIAL ENZYMES

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Abstract: The use of enzymes in detergents is becoming more common, particularly in the formulation of household detergents. This interest in proteases stems primarily from their contributions in terms of consumer-recognized cleaning efficiency, success in improving fabric quality, and an improvement in the performance/price ratio due to the availability of increasingly effective enzymes combined with lower industrial production costs. Microbial proteases are favored over other sources because they have almost all the properties required for industrial applications. The global enzyme market is currently valued at $ 10.6 billion, with proteases accounting for 60% of that amount. More than two-thirds of the global enzyme market is dominated by microbial alkaline proteases, which are used in the detergent industry. The present investigation was related to the study of a new alkaline protease designated as SPBV produced by *Bacillus velezensis* strain F35, newly isolated from wastewater from a detergent company, as well as its biochemical characterization. The optimum production of 7500 U/mL on the Erlenmeyer scale was obtained at 37°C after 24 h of culture. The purification techniques used in this work, made it possible to lead to a homogeneous enzymatic solution. It is an enzyme belonging to the family of serine proteases because it was inhibited by specific inhibitors of serine enzymes (DFP and PMSF). The optimum of the protease activity of SPBV is obtained at pH 10 and at 60°C on casein. This peptidase remains practically stable at basic pH (8-11) for 75 min (80% of its activity was retained after 6 h). Its thermoactivity and thermostability were considerably improved by calcium at 2 mM with half-life times of 35 and 450 min at 60 and 50°C, respectively. SPBV was distinguished by a wide specificity with respect to protein substrates and it is endowed with better catalytic efficiency and degree of hydrolysis on casein compared to commercial and purified enzymes. SPBV protease exhibits stability and remarkable compatibility with liquid and solid detergents compared to Alcalase™ Ultra 2.5 and Savinase® type EX 16L, type EX. Finally, the addition of SPBV protease to the detergent solution improves the performance of Class detergent in the sense of better discoloration of blood, chocolate and egg yolk stains. In conclusion, the SPBV protease seems to meet the majority of the properties of a good protease for the detergence formulations. A unique eco-friendly liquid laundry detergent (Class) enhanced with enzyme and further comprising bleaching and oxidizing agents, and nonionic surfactants, naturally occurring builders, and optional additives, to yield remarkably effective yet environmentally responsible detergents. The SPBV protease produced from *Bacillus velezensis* strain F35 respond to most of the criteria, which are required for this enzyme to be applied as an additive in the Class laundry detergent formulation and therefore, present an eco-friendly alter-native for the partial substitution of chemical products harmful to the environment.

***Keywords**: Spin-off, Start-up, Eco-friendly, Enzymes, Laundry detergents compatibility.*

C. AFFICHE N° : 180.

CHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITIES OF CALLISTEMON CITRINUS GROWN IN TUNISIA

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Abtract: Food production is now limited by multiple abiotic and biotic constraints that affect yields. It is therefore vital for agriculture to find sustainable solutions to ensure healthy food for consumers. For that reason, the pesticide industry should introduce classes of biological pesticides with new mechanisms of action to control the evolution of weeds and fungi. Chemical composition of essential oil isolated by hydrodistillation from Callistemon citrinus presented 0.78 % which was analyzed by gas chromatography-mass spectrometry (CG/SM). 7 compounds were identified, representing 99.99% of the total oil. C. citrinus proved to be rich in oxygenated monoterpenes in particular α-pinene (6.37%) and 1,8-cineole (90.13%). this richness gived the essential oil a significant antioxidant activity. The study of antifungal against four phytopathogenic fungi: Fusarium Oxysporum, F. Culmorum, F. Oxysporum from lycoparsici and Fusarium redolens. Antifungal activity of C.citrinus essential oil revealed a significantly inhibition of the growth of four of the genus Fusarium from the lowest dose (2µl/ml). In addition, the herbicidal properties of the oil, tested on six weed species (Trifolium campestre, Sinapis arvensis, Lolium rigidum, Raphanus sativus and Triticum durum). The essential oil strongly inhibited seed germination and seedling growth of tested weeds in a dose and species' weed dependent manner. the essential oil of C. citrinus with their broad spectra of action against a large number of fungal species and weeds are a very promising alternative, without being a source of danger to human health or environment pollution.

Keywords: C. citrinus, Essential oil, antioxidant activity, Fusarium, weeds.

C. AFFICHE N° : 181.

ASSESSMENT OF PHOSPHATE PROCESSING WASTEWATERS: BIOCHEMICAL OXIDATIVE STRESS, AND PHYTOTOXICITY

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Abstract: During this work, ecotoxicological tests were carried out from the phosphate processing wastewater in M'dhilla. The physio-chemical analysis of the samples showed that the effluents are highly charged with resistant bacteria, also pollutant materials expressed as suspended matter and dry matter of 54.03 and 573.75 mg/l, respectively, as well as high amounts of potentially toxic elements (Cd, Pb, and Cr). In the same way, it has revealed the presence of high electrical conductivity (7.46 ms/cm) could be explained by the abundance of chlorides and sodium. . It should be taken into account that the DCO/ BOD ratio provides an initial estimation of the potential biodegradability of the organic matter in a given effluent. Additionally, the study of the toxicity of this kind of wastewater, based on the calculation of the germination index of *Trigonella foenum-graecum*), *Cicer arietinum*) and *Lens culinaris* revealed significant toxic effects. Indeed, we have isolated bacterial strains called S9, S11, S13, and S14 having the ability to growth on a sterilized effluent with agar-agar plates, to use them in subsequent detoxification process. Finally the analysis of the correlation matrix between the potentially toxic metal content and the germination index (GI) values shows significant correlations ($p \leq 0.01$).

Mots clés: *Phytotoxcity, Biomonitoring, Oxidative stress*

C. AFFICHE N° : 182.

CHEMICAL COMPOSITION AND PHYTOTOXIC EFFECT OF ESSENTIAL OILS OF PINUS PONDEROSA (DOUGL.) GROWN IN TUNISIA

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Abstract : To protect agricultural crops enormous number of synthetic pesticides are used. However, its excessive use resulted the development of pesticide resistance, toxicological implications to human health and increased environment pollution. The development of natural herbicides can be a solution to decrease the use of synthetic pesticides such as resistance and environmental pollution.

The chemical composition and phytotoxic activity of the essential oils isolated using hydrodistillation from the needles of *Pinus Ponderosa* from Tunisia were evaluated. Gas chromatography with mass spectrometry detection (GC/MS) analysis of essential oil identified of 23 constituents, representing 93.87 % of the total oil. The composition was dominated by oxygenated monoterpenes fraction (64.66%), with α-pinene (37.78 %), β-pinene (24.32%) and the sesquiterpenes hydrocarbons, germacrene-D (7.26%). The phytotoxic effects of essential oil from *Pinus ponderosa* were tested on *Phalaris canariensis* L., *Trifolium campestre* Schreb. and *Sinapis arvensis* L.. The essential oil strongly inhibited seed germination and seedling growth of tested weeds in a dose dependent manner. Seed germination of S. arvensis was half reduced under the application of 1 µl/ml essential oil. For the rest of weeds *T. campestre* and *P. canariensis*, 1 µl/ml essential oil has reduced almost 40% of germination seed. The use of 4 µl/ml essential oil reduced the germination rate to 6.66 % for *T. campestre* and 13.33 % for *P. canariensis* seeds, and showed a total inhibition of seedling growth for all tested seeds. Moreover, malondialdehyde content and electrolyte leakage, of seedlings treated with essential oil were also affected. Based on our preliminary results, the essential oils of forest trees particularly *P. ponderosa* could be suggested as eco-friendly alternative to chemical herbicides.

Keywords*: Pinus ponderosa, Essential oil, phytotoxic effect, weeds, MDA*

GENETIQUE ET IMMUNOLOGIE

C. AFFICHE N° : 183.

GENOME-WIDE STRUCTURE AND EVOLUTION OF THE WRKY TRANSCRIPTION FACTOR FAMILY IN THE MEDITERRANEAN OLIVE (*OLEA EUROPAEA* SUBSP. *EUROPAEA*) AND THEIR DIFFERENTIAL EXPRESSION AMONG OLIVE CULTIVARS WITH DISTINCTIVE OIL QUALITY

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Abstract: WRKY proteins are plant specific transcription factors involved in various developmental and physiological processes as well as biotic and abiotic stress responses. WRKY genes have been identified and characterized in multiple plant species; however, little information is available regarding this significant gene family in the Mediterranean olive tree, *Olea europaea*. In the present study, we performed a genome-wide investigation of the architecture and evolution of *Olea europaea* WRKY genes (OeWRKYs), and compared them with their orthologs in the model angiosperm *Arabidopsis* (AtWRKYs) and the olive sister genus *Sesamum indicum* (SiWRKYs). A hundred and fifty six (156) OeWRKY proteins encoded by the *O. europaea* genome were filtered and classified into three groups: group I (23 proteins), group II (107 proteins), and group III (26 proteins). Group II proteins were further categorized into five phylogenetic sub-groups (IIa-e). Groups II and III were more closely related to group I C-terminal WRKY domains (I-C), while group I N-terminal WRKY domains (I-N) clustered as a monophyletic subtree. Physicochemical properties, including protein size, length of the coding sequence (CDS), protein molecular weight (MW) and isolelectric point (pI) were analyzed. Subcellular prediction revealed that 93% (145/156) of OeWRKY proteins are probably located in the nucleus region, whereas the remaining proteins (7%) were predicted to be located in the cytoplasm (3/156), peroxisome (4/156) and chloroplast (4/156). These findings suggest that different OeWRKY proteins might operate in different microenvironments. *Olea europaea* WRKY proteins within the same group/subgroup were found to share a similar motif composition, supporting the reliability of group classification. Comparative evolutionary analysis revealed that the olive genome (1.31 Gb) held approximately twofold WRKY genes, as *Arabidopsis* (genome size 125 Mb), and *Sesamum* (350 Mb), with a lower genome-wide density in *O. europaea*, which is due to genome size (C-value) and chromosome number (K-value) expansion occurring during *Oleaceae* and *O. europaea* genome histories. Further, we identified 50 pairs of paralogous WRKY genes among OeWRKYs, while only 15 pairs of orthologous OeWRKY/SiWRKY genes were found, suggesting that most duplicated OeWRKYs arose from recent, olive-specific or *Oleaceae* family-specific whole genome duplication (WGD) events, independent from WGDs in non-*Oleaceae* Lamiales, such as Sesame (*Pedaliaceae*). We are currently analyzing WRKY genes expression profiles based on RNA-Seq data and qRT-PCR in fruit tissue among Tunisian and non Tunisian olive cultivars with distinctive oil quality. Our study provides a reference informative gene characterization and candidate genes for genetically enhancing olive oil quality.

Keywords*: Transcription factor, Gene family, Genome-wide analysis, WRKY, Functional genomics, Expression analysis, olive oil.*

C. AFFICHE N° : 184.

TUNISIAN EXTRA VIRGIN OIL REGULATES INFAMMATORY RESPONSES MEDIATED BY MUC-1/ STAT3 SIGALLING PATHWAYS IN DEXTRAN SULFATE SODIUM (DSS)-INDUCED COLITIS MOUSE MODEL

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Extra Vierge Olive oil (EVOO), the main fatty component of the Mediterranean diet, exhibits numerous biological functions which may confer protection from certain chronic diseases related to oxidative stress, inflammation and the immune system. Ulcerative colitis (UC) is a chronic bowel disease characterized by colonic mucosal inflammation and associated with immune system dysregulation. We investigated whether Olive oil administration is able to confer protection in a mouse model of dextrane sodium sulfate (DSS)-induced colitis through the regulation of inflammatory mediator of immune system STAT3 and muc-1 expression**.** EVO cultivar (Chetoui) from the North Region of Tunisia, La Mannouba namely Chetoui. Eight-week-old Balb/C mice were housed under pathogen-free conditions and randomized based on body weight and were divided into four groups called: (1) Control, (2) DSS, (3)EVOO and (4)DSS-EVO. EVOO were administered daily by oral gavage starting a day prior to DSS administration throughout the whole duration of the experiment. Colitis was induced by administration of 2% DSS in drinking water for two cycles (5 days of DSS followed by 10 days of water) during 30 days through the duration of treatment. Phosphorylated Stat3 and muc-1 expressions were studied by immunohistochemistry. Administration of EVOO significantly reduced the severity of colitis (DAI score) and alleviated the macroscopic and microscopic signs of the disease. Our results showed the immunomodulatory effect of EVOO on STAT3 and muc-1 expression in colon tissue.Our data further validate the well-known positive effects of EVOO supplementation in promoting human health by reducing progressin of intestinal inflammation and immune responses.

Key words : *Olive Oil, colitis, inflammation, immune response.*

C. AFFICHE N° : 185.

AGRO-MORPHOLOGICAL TRAITS ASSESSMENT OF TUNISIAN MALE DATE PALMS (*PHŒNIX DACTYLIFERA* L.) FOR PRESERVATION AND SUSTAINABLE UTILIZATION OF LOCAL GERMPLASM

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Abtract : Date palm (*Phœnix dactylifera* L.) like other crop species in the arid Mediterranean region is being threatened by genetic erosion and climate change. Therefore, the understanding and assessment of the diversity extent of this species is a primary requisite for preserving these crop resources. This study was designed to quantify the potential of Tunisian male date palms using a set of agro-morphological characteristics of flowering traits and inflorescence morphology. The flowering time traits exhibited a trend of precocious phenotype at emergence spathe trait and the dominance of the full-season phenotype at the opening date. At inflorescence morphology, all observed traits expressed wide ranges which reflected the broad variability of the evaluated male genotypes. Significant difference was recorded for the majority of the examined traits with a high significant variation in the tree quantitative traits: Spathe Total Length, Spathe Maximum Width and Length o the brunched part. Our phenotypic investigation has allowed the identification of male genotypes with desirable agronomic traits thus forming available genetic resources for preservation and effective utilization purposes.

Keywords: *Date palm, agro-morphological characteristics, precocious phenotype, Inflorescence morphology, desirable agronomic traits.*

C. AFFICHE N° : 186.

STUDY OF THE INFLAMMATORY PROFILE IN OVERWEIGHT AND OBESE SUBJECTS OF THE TUNISIAN POPULATION.

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Introduction : Several studies have shown that obese people suffer from chronic internal inflammation. Biological markers of inflammation such as C-reactive protein (CRP) are part of the parameters evaluated during the follow-up of obese patients. This one allows to measure in return the degree of the inflammation.
Objective : The objective of the present work is to study the values of the CRP in overweight and/or obese patients of the Tunisian population according to the various categories of body mass index (BMI).
Materials and methods : This is a cross-sectional study with analytical aim on 40 healthy subjects (BMI ≤24.9 KG /m^2) recruited in the laboratory of Biophysics of the Faculty of Medicine of Sousse and on 80 overweight and obese subjects (BMI > 25 Kg / m^2) recruited in the department of endocrinology CHU Farhat Hached of Sousse - Tunisia. The assays of the lipidic and inflammatory profiles were carried out by the Bekman-Coulter analyzer at the Biochemistry Department of the Farhat Hached University Hospital in Sousse, Tunisia.
Results and discussion : The results obtained show that the population of overweight and obese subjects presented higher plasma concentrations of triglycerides, total cholesterol and LDL-cholesterol than those in healthy subjects. In contrast, plasma HDL-cholesterol levels were statistically increased in normal weight subjects. Plasma CRP concentrations were higher in overweight and obese patients compared with normal weight subjects and increased with BMI values.
Conclusion : In conclusion, in our population, CRP values are increased in overweight and obese subjects and should therefore be interpreted taking BMI into account.

keywords: *obesity, C-reactive protein, body mass index*

C. AFFICHE N° : 187.

CLINICAL APPLICATION OF WHOLE EXOME SEQUENCING FOR NEUROLOGICAL DISEASES

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Abtract : The advent of Next-Generation Sequencing (NGS) technologies opened up new perspectives for the molecular diagnosis of genetic diseases. In all medical fields, but particularly in neurology, this new strategy offers better efficacy and faster variant identification, allowing better support and care for patients and their families. Whole Exome Sequencing (WES) is now the diagnostic tool of choice for neurological diseases that often exhibit clinicogenetic overlaps. We used this technique to identify pathological variants in patients from two Algerian families with an uncertain clinical orientation of Hereditary Spastic Paraplegia (HSP). The analysis of the exome data and the interpretation of the effects of the variants were performed via the Rare Diseases-Connect Genome-Phenome Analysis (RD-Connect GPAP) Platform. Using WES allowed us to identify the pathological variant c.1786C>T (p.Leu596Phe) in the PLA2G6 gene, in the homozygous state in patients from Family 1, as well as the pathological variant c.286G>A (p.Gly96Arg) in the GPT2 gene, in the homozygous state in patients from Family 2. These variants have already been identified and linked to two diseases that clinically overlap with the HSP: infantile neuroaxonal dystrophy 1 (OMIM # 256600) and neurodevelopmental disorder with microcephaly and spastic paraplegia (OMIM # 616281), respectively. Our findings have enabled us to make the right clinical diagnosis for our patients after long diagnostic odysseys. They also illustrate the usefulness of WES as a powerful tool for diagnosing neurological diseases.

***Keywords** : Sequencing, NGS, Diagnosis, Neurology, Exome, WES, Variant, RD-Connect GPAP*

C. AFFICHE N° : 188.

ASSOCIATION OF INTERFERON-Γ +874A POLYMORPHISM WITH THE RECURRENCE OF CYSTIC ECHINOCOCCOSIS IN ALGERIAN POPULATION.

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Introduction : Cystic Echinococcosis (CE) is recognized as one of the world's major zoonoses caused by the larval stage (metacestode) of the tapeworm *Echinococcus granulosus*. Cytokines production imbalance plays an important role in controlling the immunopathogenesis of the disease. At present, no report on cytokines genetic polymorphisms has been conducted during CE.

Objective: The aim of this study was to analyze the relationship between +874 A/T interferon-γ gene polymorphism and the recurrence of CE as well as its association with inflammatory parameters in hydatid patients.

Materiel and methods: In this case-control investigation, genotyping was determined by Single-Specific-Primer Polymerase-Chain-Reaction (SSP-PCR) technique from DNA samples of Algerian primary and relapsed CE patients.

Results: The results of allele distribution of IFN-γ gene polymorphism showed a significant increase in the T high producer allele in primary CE patients (OR= 3.12; p=0.01) and the A low producer allele in relapsed patients (OR= 0.32; p=0.01). In addition, the genotype distribution study showed that the homozygous TT and heterozygous TA genotypes were more frequent in primary CE patients (OR = 0.13; p = 0.04 and OR = 0.18; p = 0.024 respectively); conversely, relapsed patients exhibited higher percentage of homozygous AA genotype (OR = 5.90; p = 0.014). These data suggested that A allele and AA genotype would be associated with susceptibility to recurrence while T allele and TT and TA genotypes will be rather protective. Furthermore, stratifying analysis according to nitric oxide and TNF-α levels indicated no significant difference in genotypic frequencies for this SNP (p >0.05). However, our results demonstrated that the TT+TA genotype was associated with higher nitric oxide amounts in primary CE patients compared to relapsed patients (p = 0.0121). These findings illustrated the potential of the genotype in modulating the NO production during CE.

Conclusion: Our study is, to our knowledge, the first to explore cytokines genetic polymorphisms in CE. This SNP would constitute a predictive biomarker of hydatid patients at risk of treatment failure and development of secondary echinococcosis. Understanding the molecular mechanisms involved in hydatid disease is essential for the identification of risk factors and the development of targeted therapies.

MICROBIOLOGIE ET VIROLOGIE

C. AFFICHE N° : 189.

ISOLEMENT ET CARACTÉRISATION D'ACTINOMYCÈTES PRODUCTEURS DE SUBSTANCES BIOACTIVES À PARTIR D'ÉCOSYSTÈME HYPERSALIN

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Abtract : Dans le présent travail, 71 souches d'actinomycètes ont été isolées à partir de 7 différents saumures de la Sebka de Monastir. Les propriétés physico-chimiques des différents sédiments ont été analysées (densité, salinité, concentration en Ca, Mg, SO4 et KCl).
En se basant sur les caractères culturaux, morphologiques et microscopiques, 4 différents genres ont été décrits : *Streptomycete* (58 souches), *Pseudonocardia* (4 souches), *Nocardia* (2 souches) et *Micromonospora* (2 souches), et seulement 5 souches ont été classées comme étant des Non-streptomycetes. Ces souches ont été cultivées dans différents milieux de culture, et leurs activités antimicrobiennes ont été testées sur 5 différents microorganismes pathogènes: 2 bactéries Gram-négatif (*Acinetobacter baumannii* 5973 et *Pseudomonas aeruginosa* 5919), 2 bactéries à Gram-positif (*Staphylococcus aureus* résistant à la méticilline et *Staphylococcus aureus* ATCC 6538P), et une levure (*Candida albicans*). 34 souches sur un total de 71 sont actives contre au moins un des microorganismes testés. Les extraits antimicrobiens actifs sur les bactéries Gram-négatif ont été analysés par HPLC et spectroscopie de masse à haute performance. Plusieurs molécules bioactives (des antibiotiques, des siderophores et des antifongiques) ont été identifiées comme Deferoxamine, Naphthyridinomycin, Nocardamine, Daidzein et Genistein. Certaines molécules, identifiées dans le présent travail, ne figurent pas dans la base de données de la fondation MEDINA ont été également détectés dans les extraits des souches A8 et A11. De ce fait, ces extraits particuliers ont été testés sur un grand nombre de bactéries Gram-négatif et ils ont montré leur efficacité.
Ces résultats prouvent l'importance de ces environnements particuliers et relativement inexplorés dans la découverte de nouveaux métabolites secondaires.

Mots clés : *Actinomycete, Streptomyces, Sebkha , HPLC, Spectrométrie de masse*

C. AFFICHE N° : 190.

MULTIPLE *IN VITRO* ANTIBACTERIAL ACTIVITY EVALUATION OF *THYMUS CAPITATUS, LAURUS NOBILIS* AND *CORIANDRUM SATIVUM* TUNISIAN ESSENTIAL OILS

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The objective of the present study is to assess the antibacterial potency of *Thymus capitatus*, *Laurus nobilis* and *Coriandrum sativum* essential oils, using different *in vitro* assays that provide best evaluation against *Escherichia coli*. After essential oil extraction, the identification and quantification of tested essential oils constituents was made *via* GC/MS analysis. Then, their antimicrobial activities were screened, by measuring firstly the inhibition zone diameter generated by each essential oil. Then, the minimum inhibitory concentrations of tested essential oils were determined using micro-dilution assay. Finally, the percentage of bacterial growth inhibition was evaluated for *T. capitatus*, *L. nobilis* and *C. sativum* essential oils at 2 mg/ml concentration in liquid medium. For each *in vitro* test, the antibacterial potency of tested essential oils was compared to Amoxycilin (30 µg/ml). GC/MS data analysis revealed that carvacrol (71%), 1.8 cineol (44%) and camphor (64%) were distinguished as major compounds of thyme, laure1 and coriander essential oils, respectively. Concerning the antimicrobial activity assessment, obtained results illustrated that the studied essential oils were efficient against tested bacteria with varying magnitude. The inhibition diameters varied from 11 to 25 mm (for *L. nobilis* and *T. capitatus*, respectively), while Amoxycilin generated an inhibition zone limited to 5 mm. Besides, the determination on the minimum inhibitory concentrations demonstrated interesting potencies of tested essential oils with CMIs inferior to 5 mg/ml. Concerning the percentage of bacterial growth inhibition, gathered results highlighted that using 2mg/ml of each tested essential oils was able to inhibit the growth of more than 50% of the initial bacterial load. Interestingly, *T. capitatus* essential oil was the most active essential oil in all tested *in vitro* assays. These findings are to be taken into consideration for a successful application of these natural preservatives in food industries.

Keywords. *E. coli; Essential Oils; Antibacterial Activity.*

C. AFFICHE N° : 191.

BASES MOLÉCULAIRES DE LA MULTIPLICATION DU VIRUS MUTANT DU COXSACKIEVIRUS B3 IN VITRO, IN VIVO ET EX VIVO.

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Résumé: Les coxsackievirus B (CVB) appartiennent à la famille des *Picornaviridae*, au genre entérovirus et à l'espèce des entérovirus humains B. Le génome viral du CVB3 est un ARN simple brin de polarité positive. Pour le CVB3, le ribosome est recruté en amont d'un codon AUG appelé l'AUG cryptique (AUGc) différent de l'AUG initiateur mais plutôt le triplet à partir à partir duquel les ribosomes balayent jusqu'à arriver au codon initiateur. Il a été rapporté que des mutations localisées au niveau de l'AUGc de CVB3 affectent le niveau de la traduction du génome viral et conduisent à un mutant défectueux par rapport à la souche sauvage. L'objectif du présent travail consiste à évaluer les capacités réplicatives et traductionnelles du mutant AUGc en comparaison avec la souche sauvage in vitro et ex vivo, tester les capacités infectieuses des deux souches sur un modèle murin. Nos résultats montrent que la mutation AUGc réduit la synthèse du brin d'ARN positif et contribue à l'obtention d'un phénotype atténué sur modèle animal. Ces résultats mettent l'acens sur le rôle et l'importance de ce triplet dans l'efficacité du processus réplicatif et traductionnel du virus. Il est vraisemblable alors que l'AUGc est un déterminant moléculaire de la virulence du CVB3, ce qui permettrait son utilisation pour la conception d'un vaccin atténué anti-CVB3.

C. AFFICHE N° : 192.

IN VITRO STUDY OF THE VIRULENCE OF *ACINETOBACTER BAUMANNII* CLINICAL STRAINS

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Abtract : *Acinetobacter baumannii* has become a very problematic pathogen worldwide. It causes nosocomial infections, particularly in severely ill patients with indwelling medical devices. Numbers of studies focused on the virulence of this bacterium are few. Identify the characteristics of its virulence could contribute to the development of recent therapeutic approaches to control infections caused by this bacterium. This present work aims to study two essential virulence factors of *A. baumannii*; biofilm formation and the effect of iron availability on the survival of five strains of *A. baumannii*, recovered from various clinical specimens. The metabolic activity of bacteria within biofilms is monitored using the XTT reduction technique based on the ability of metabolically active cells to reduce tetrazolium salt (2,3-bis [2-methyloxy-4- nitro-5-sulfophenyl]-2H-tetrazolium-5-carboxanilide) (XTT). Iron limitation is obtained by culturing the strains on two culture media, M9 medium and LB medium, supplemented with a synthetic iron chelator; 2,2'-dipyridyl (DIP). Multidrug-resistant isolates of *A. baumannii* are able to form biofilms with different intensities and are characterized with high metabolic activities. They are also able to grow in an iron-limited environment with different rates.

Key-words: *Acinetobacter baumannii, in vitro, virulence factor, biofilm, XTT, iron-limited conditions*

C. AFFICHE N° : 193.

THE FIGHT AGAINST *CANDIDA ALBICANS* IN ALGERIA

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Abtract : People around the world have resorted to herbal medicine, due to the increase in antibiotic resistance and the side effects of synthetic drugs. Our research focused on the in vivo antifungal activity of three ointments formulated on the basis of methanolic extract of *Citrus aurantium* peel, ethanolic extract of the aerial part of *Artemisia herba alba asso*, and essential oil of *Artemisia herba alba asso*. Wistar rats were made immunosuppressed by Dexamethazone and Tetracycline. Three strains of *Candida albicans*, S1, S2 and S3 were inoculated. The fungal load of the area tested, the weight of the rats, as well as the macroscopic and microscopic appearance of the skins were determined. Cutaneous candidiasis was manifested as red, thick, scabbed lesions, mostly located on the infected area of the animals. Microscopic observation of histological skin sections of animals infected and treated with the ointments, P1, P2 and P3 showed a well-preserved architecture of the skin. Erythema, edema, ulceration, erosion were seen in the skin of animals receiving placebo or Nystatin. The P3 ointment exerted a very powerful antifungal effect against especially the strain S1 compared to the other ointments (log 3.07±0.006 CFU/ml). The weight was regained significantly in the groups of animals receiving the ointments and a regression of growth was observed in the untreated animals and those treated by Nystatin and placebo. The EAH and MCP ointment and the essential oil of Artemisia developed, allowed to retain their significant antifungal activity against Candida.

C. AFFICHE N° : 194.

EPIDEMIOLOGIC STUDY OF CORONAVIRUS (SARS-COV 2) IN MILA DISRICT, ALGERIA

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Abtract : COVID-19 is an infectious disease recently emerged in Wuhan city, Hubei Province, China. The infection was then linked to SARS-CoV-2 virus which is a non-segmented positive sense RNA virus. Typically, fever, cough and tiredness are some of the most frequent symptoms. Infected patients may also exhibit severed shortness of breath, low blood oxygen, lung damage as the infection progress. Our retrospective epidemiological study, conducted in Mila district, was based on clinical data analysis from 957 hospitalized patients that were admitted to both 'Meghloui brother's' and 'Tobal brothers' hospitals. Our findings showed that there was a correlation between number of coronavirus-infected individuals and the population density. Men are more susceptible to COVID-19 infection than women and this seems due to the high expression level of ACE2 SARS-CoV-2 receptor. Furthermore, COVID-19 severity was generally associated with coexisting chronic diseases. Our results showed that Omicron variant infected frequently younger individuals then older ones due to development of patients immune system during the three first waves.

Mots clés : *COVID-19, SARS-CoV-2, Virus Infections, ACE2.*

C. AFFICHE N° : 195.

EPIDEMIOLOGICAL STUDY OF THE USE OF A SYMBIOTIC AND ITS INFLUENCE ON ZOOTECHNICAL PERFORMANCE AS WELL AS THE INTESTINAL MICROBIAL LOAD IN BROILER CHICKENS

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The aim of this study is to evaluate the impact of the supplementation of a symbiotic on the zootechnical performance, the digestive flora in total and faecal coliforms and in *Escherichia coli* in broiler chickens.
3080 broiler chicks from the ARBOR ARCES strain divided into two batches (control and experimental) each containing 1540 subjects will be followed for 63 days.
The results obtained indicate that supplementation with a symbiotic did not significantly reduce the following zootechnical indices (food intake, consumption index, conversion index and weight gain) and this despite the differences recorded in favor of the supplemented batch P> 0.05. However, this treatment significantly reduce at the end of breeding (D63) the average live weight of the experimental batch as well as the mortality rate where we recorded a decrease of nearly 44% **P<0.05**. On the other hand, the symbiotic did not reduce the number of coliforms (total and faecal) nor *Escherichia coli* in supplemented chickens compared to control chickens p>0.05.
Our results reveal controversial results that deserve possible experiments carried out under better conditions and with a larger sample in order to better elucidate the effect of the symbiotic.

Mots clés: *symbiotic, supplementation, broiler chickens, zootechnical performance, digestive microflora.*

C. AFFICHE N° : 196.

CHARACTERIZATION OF *BACILLUS CEREUS* GROUP INFECTING BACTERIOPHAGES BY WHOLE-GENOME SEQUENCING : ARE THESE PHAGES ACTUALLY SAFE FOR THERAPEUTIC USE IN FOOD SYSTEMS ?

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The *Bacillus cereus* group is a widespread foodborne pathogen with a persistent ability to form biofilm, and with inherent resistance to traditional treatment in the food industry.
Bacteriophages are a promising biocontrol agent that could be applied to prevent or eliminate biofilms formation. The study of phages genomic properties is one of the main steps to assess their safety for therapeutic use against *Bacillus cereus* group biofilms formation in food systems. This process enables detection of genes that make phages potentially harmful for the patient or the environment, such as antibiotic resistance, lysogeny, and pathogenicity genes.
In this study, two isolated *Bacillus cereus* bacteriohages Ø1BC3990 and Ø1BC478 were characterized.
Extracted DNA of each phage was sequenced by GenoScreen using Illumina Miseq. Functional annotation was performed using Multiphate 1.0 pipeline. A blast alignement of the two phages was also performed in order to compare their DNA sequence. Ø1BC3990 and Ø1BC478 share a common genome organization. Genes are grouped according to their function, in the same order, and genome size is identical within margin of error (37 026 bp for Ø1BC3990 and 37 328 bp for Ø1BC478). The two phages are however different, as overall identiy is 94.72%. The blast alignement demonstrates that some regions of the genome are not shared by the two phages. Among these differences, it appears that Ø1BC478's genome contains more accessory genes than Ø1BC3990's.

Gene annotation revealed the presence of the following lysogeny-related genes: a recombinase, LexA repressor, XRE transcriptional regulator, phage antirepressor, and immunity to superinfection protein. The latter is not present in phage Ø1BC3990. Although the presence of the genes doesn't imply their expression, it is likely that these two phages are temperate. Desptite the fact that no antibiotic resistance or pathogenicity genes were found, the potential phage therapy usage of Ø1BC3990 and Ø1BC478 is compromized: numerous author advise not to use temperate phages for phage therapy.

Keywords: *Bacillus cereus group, Bacillus cereus group, bacteriophage, characterization, genome annotation, WGS*

C. AFFICHE N° : 197.

ETUDE EPIDEMIOLOGIQUE TRANSVERSALE ET CARACTERISATION MOLECULAIRE MICROBIOLOGIQUE DE LA DIARRHÉE BOVINE DANS LA REGION DE SIDI BOUZID

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Abtract: Norovirus, *Salmonella* and *Escherichia. Coli* (*E.* coli) are the main pathogens causing diarrhea disease in cattle on cattle farms in the region of Sidi Bouzid (Central Tunisia). This study aims, through a cross-sectional survey, to describe certain farming practices reported as risk factors in the onset of diarrhea in farms in the governorate of Sidi Bouzid as well as a search for the prevalence of Norovirus, *E. Coli* and *Salmonella* in the faeces of diarrheal cattle. The main objective of this work, conducted in Creuse during the year 2021, is to determine the importance of the main pathogens in diarrhea in cattle according to several risk factors, in particular age, sex, housing, breeding method, feeding method and type of water drunk. Bacteriological analyzes of the faeces of 60 diarrheal cattle reveal the presence of Escherichia coli strains in 87% of diarrheal cattle as well as Salmonella were detected in 22% of diarrheal cattle. Concerning noroviruses, virological analyzes confirmed their presence in faeces with a rate of 52% of diarrheal cattle. The results found in this study proved to be effective in determining the main causes of diarrhea in cattle.

Mots clés : *Bovins, diarrhée, Echerchia.coli, Salmonella, norovirus, RT-PCR*

C. AFFICHE N° : 198.

POTENTIAL FOR PLANT GROWTH PROMOTION OF *STENOTROPHOMONAS RHIZOPHILA* STRAIN IS26 ON TOMATO UNDER SALT STRESS CONDITIONS

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Abstract : The use of halotolerant beneficial plant growth-promoting (PGP) bacteria is considered a promising eco-friendly approach to improve the salt-tolerance of crops. Forty-four (44) endophytic bacteria were isolated from the roots of the three native halophytes *Atriplex halimus* L. and *Lygeum spartum* L. that were collected from Djelfa (Algeria) and were evaluated for their potential to tolerate salt (NaCl). Subsequently, the 10 best endophytic isolates were selected, namely IS05, IS07, IS08, IS09, IS14, IS24, IS26, IS38, IS39 and IS43. Molecular taxonomy, by 16S rDNA sequencing and the phylogenetic study of the selected isolates resulted in a great diversity and made it possible to link them to 8 genera and 9 different species with similarity rates greater than 99% at the exception of the isolate IS39 which showed a low rate of 96.94% with *Kocuria arsenatis* and probably represents a new species, the isolate IS26 having subsequently shown better PGP properties and a good capacity for modulating salt stress. been identified as *Stenotrophomonas rhizophila*. All 10 strains were screened for their potential to alleviate salt stress and the PGPB effect on tomato (*Solanum esculentum* L. *cv*. Aïcha) at 0 and 7 $dS.m^{-1}$ of NaCl under Petri-dishes experiment revealed that five strains IS09, IS26, IS38, IS39 and IS43 improved the growth of tomato seedlings by highlighting germination rate, shoot and root lengths and biomass. Under greenhouse conditions at 0 and 7 $dS.m^{-1}$ of NaCl, their evaluation, through various tomato plant trials, permitted the distinguishment of the isolate IS26 as the most effective seed inoculum for both mitigation of salt stress and PGP.

Keywords*: Native halophytes, Endophytic bacteria, PGPB, Salt-tolerance, Solanum esculentum L. cv. Aïcha*

C. AFFICHE N° : 199.

ASSESSMENT OF BIOFILM FORMING POTENTIAL AND ANTIMICROBIAL RESISTANCE PROFILE OF *S. AUREUS* AND *P. AERUGINOSA* ISOLATED FROM MEDICAL DEVICES

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Abstract : *Pseudomonas aeruginosa* and *Staphylococcus aureus* are an important causes of devices related infections notoriously difficult to manage. Their biofilm forming capacity can lead to treatment failres and infection recurrence. This study was undertaken with an aim to assess the biofilm-production capacity of *Pseudomonas aeruginosa* and *Staphylococcus aureus* isolated from urinary catheters and Peripheral venous catheters, and to correlate antibiotic resistance with biofilm formation ability of these strains.

Bacterial identification was based on standard microbiological procedures. qualitative and quantitative detection for biofilm production were performed by Congo red agar (CRA) and Tissue Culture Plate (TCP) methods respectively. Antibiotic susceptibility testing was done using the Kirby-Bauer disc diffusion technique. Data were collected and processed for statistical analysis. Out of 22 strains of *P. aeruginosa* and *29 strains of S. aureus*, CRA method detected 27.27% (06) of *P. aeruginosa* and 24.14% (07) of *S. aureus* strains as strong producers while 9.09% (02) of *P. aeruginosa* and 51.72% (15) of *S. aureus* strains were moderate producers. Whereas, 9.09% (02) of *P. aeruginosa* and 37.93% (11) of *S. aureus* strains were strong producers and 54.55% (12) of *P. aeruginosa* and 48.28% (14) of *S. aureus* strains were moderate producers of biofilm by TCP method. According to the antibiotic susceptibility test, higher antibiotic resistance was observed in biofilm producing bacteria than non biofilm producers. biofilm producers and non producers *S. aureus* strains were resistants to Pénicillin (100%) and susceptible to Vancomycine (100%) and Teicoplanine (100%). While, All *P.aeruginosa* strains exhibited a susceptibility to almost all the used groups of antibiotics except for Ticarcillin (18,18%), Pipéracillin (27,27%), Imipénèm (100%) and Rifampicin (100%).

biofilm-dependent catheter-associated infections is an emerging problem. Morever, the biofilm formation ability is significantly linked to antibiotic resistance.

Keywords *:Staphylococcus aureus, Pseudomonas aeruginosa, biofilm formation, antibiotic resistance, catheters.*

C. AFFICHE N° : 200.

EPSTEIN BARR-VIRUS AND BREAST CARCINOMA: ASSOCIATION WITH CLINICOPATHOLOGICAL PARAMETERS AND OVERALL SURVIVAL

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Abstract: Several risk factors have been involved in the progression of breast cancer. Recent investigations have reported that EBV genome may contribute to breast carcinogenesis. However, the etiological role of EBV is still controversial. This study aims to evaluate the prevalence of EBV in Tunisian breast carcinoma and to find a potential correlation between EBV and clinicopathological features as well as their impact on overall survival.

Formalin Fixed Paraffin Embedded (FFPE) sections from 50 patients were included in this study. EBV DNA was determined by polymerase chain reaction. The biomarkers expression (HER2, ER and PR) was i*mmunohistochemically* assessed. Bivariate and multivariate correlation was statistically explored.

The mean age of patients was 55.5 ± 14.71 years. The tumor size ranged from 0.1 to 13.5 cm, with a mean range of 3,16 ± 1,97 cm. PCR results showed that 38% were positive for EBV DNA. Expression rate of HER2, ER and PR was 26%, 84% and 74% respectively. Spearman correlation showed that EBV was significantly and positively correlated with HER2 *($p = 0.043$)*, high SBR grade (*$p = 0.023$*) and tumor size (*$p = 0.001$*). Inverse significant association between EBV and hormonal receptors was also observed (ER (*$p = 0.018$*) and PR (*$p = 0.043$*)). Multivariate analyses confirmed the association between EBV and HER2 expression. Survival analysis showed that patients with positive EBV had significantly shorter overall survival than those with negative EBV (*$p \leq 0.001$*). Using Cox proportional hazard model, we confirmed the significant prognostic impact of EBV with overall survival in breast carcinoma patients.

To conclude our data highlights the prevalence of EBV in breast cancer. Moreover, EBV was correlated with poor prognostic features such as HER2, high SBR grade, tumor size, lack of hormonal receptors and worse overall survival suggesting that EBV could lead to breast cancer progression.

Keywords*: Epstein–Barr virus, Breast Carcinoma, clinicopathological parameters, Overall survival.*

C. AFFICHE N° : 201.

EVALUATION OF THE SENSITIVITY OF BACTERIA TO ANTIBIOTICS USED IN POULTRY FARMING

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Abtract : Bacterial resistance to antibiotics is a major public health problem. The main objective of this study is the determination of antibiotic susceptibility of reference bacterial strains by the agar diffusion method.

The results of our study show that the reference strain Staphylococcus aureus is sensitive to tetracycline and erythromycin. The reference strain Pseudomonas auruginosa is sensitive to colistin. And the reference strains Escherichia coli and Klepsiellapneumoniae are sensitive to colistin and tetracycline.

Thus, this study is a routine test carried out in bacteriology laboratories and allows in the majority of cases to guide veterinarians in the choice of an appropriate antibiotic therapy.

Keywords: *sensitivity, antibiotic, reference strain, agar diffusion.*

C. AFFICHE N° : 202.

OCCURRENCE OF *LEPTOSPHAERIA MACULANS- LEPTOSPHAERIA BIGLOBOSA* CAUSING BLACKLEG OF OILSEED RAPE IN TUNISIA

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Abtract : Oilseed rape (*Brassica napus* L.) has been newly reintroduced in the Tunisian national cultivation systems since 2014 (Medimagh et al., 2018). One of the most important reported fungal threats in worldwide oilseed rape production is blackleg disease (phoma stem canker). Blackleg symptoms as described by Rouxel and Balesdent (2005) have been also observed in Tunisian fields in April- May, of the year 2018 and in the following two years. Different oilseed cultivars showed varying incidences from 10-100% and attack severity of 10% to almost 45%. In the laboratory, we were able to confirm the presence of both *Leptosphaeria* species in Tunisia (*L. maculans* and *L. biglobosa*) on the basis of morphological macroscopic and microscopic criteria of the sexual and asexual forms and other biological traits in vitro. PCR amplifications of the internal transcribed spacer (ITS) region, the actin gene, and the β-tubulin gene were also performed and has confirmed the presence of both species in almost all Tunisian oilseed growing regions. These fundings will be useful for the diagnosis and further management of blackleg disease.

Mots clés: *Lepotsphaeria maculans, Leptosphaeria biglobosa, oilseed rape, identification, field survey.*

C. AFFICHE N° : 203.

ANTIMICROBIAL EFFECT OF THE AQUEOUS EXTRACT OF DATE PITS (PHOENIX DACTYLIFERA L.); "DEGLET NOUR" VARIETY

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Abtract : Introduction: Deglet-Nour is considered to be the best date variety in Algeria. Date kernels which are widely used in southern Algeria and marketed in several forms: coffee, kernel oil, shampoo, creams and date kernel lotion;

Objective: To highlight the antimicrobial activity of the aqueous extract of the kernels of dates varieties Daglat Nour (Tolga Biskra), by the method of diffusion on agar.

Material and methods: we evaluated the antibacterial activity against reference and clinical strains by the diffusion method on technical agar of wells; The latter consists of depositing the extract of the plant in a well drilled with a punch on the surface of the agar previously inoculated with the microbial strain to be studied (Escherichia coli, Staphylococcus aureus and Pseudomonas aerugenosa).

Results and discussion: The results obtained reveal a total resistance of the strains tested vis-à-vis the aqueous extract of the stones of the Deglet Nour variety dates. There are few studies on the antibacterial activity of the pits of the Deglet Nour variety dates, but we compared our results with other varieties, we found that they are consistent with the study of Chikh et all 2013 on the pits of the "Ajwa" variety from Saudi Arabia concerning the weak even negative antibacterial effect of the aqueous extract of date pits against the strains studied.

Key words : *Phoenix dactylifera L, aqueous extract, diffusion method, Staphylococcus aureus*

C. AFFICHE N° : 204.

PRODUCTION OF A BIOACTIVE MOLECULE BY A NEW THERMOHALOPHILIC BACTERIAL SPECIES.

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Abtract : In order to follow the research theme of our laboratory on the isolation of potentially interesting bioactive metabolites in therapy, a strain was isolated and attached to a new taxon. This is the *Melghirimyces algeriensis* EX strain (Addou *et al*. 2012). The metaboloma of the ethyl acetate extract from the cells was studied by UV-Vis spectrometry. Then this isolate was screened for antagonistic activities.

To highlight the antagonistic activities, it has been tested against many Gram+ bacteria, Gram- and fungi. No activity was detected against all of these target germs.

For this, we extended the target germs to the Archaea (Quadri *et al.* 2016). 6 strains of Archaea belonging to different species have been tested. A positive result was found on one of them: Haloarcula californiae isolated from a sebkha. This original activity is important because it concerns a *Haloarchaea*, known to be sensitive to anti-tumour metabolites. That could explain his inaction on all the other germs tested.

La production de l'activité a été entreprise en milieu liquide. La cinétique de croissance et de production a été étudiée. Elle a montré que la production s'effectue à l'extérieur des cellules pendant la phase stationnaire. L'extraction de la fraction liquide du milieu a été réalisée avec l'acétate d'éthyle.

The active extract was then studied by CCM followed by bioautography to locate the active spots. the active spot was detected from Rf= 0.38.

A purification was carried out by HPLC. A start of characterization by UV-visible spectrophotometry and Infra red was carried out. Studies are continuing for a final product characterization.

Keywords*: biotechnology, thermohalophilic bacteria, extracellular molecules, antimicrobial activity, Archaea.*

C. AFFICHE N° : 205.

ASSIMILATION OF CHOLESTEROL BY LACTIC ACID BACTERIA ISOLATED FROM LOCAL FERMENTED FOODS CASE OF BEROUIL AND SMEN

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Abtract : Excess cholesterol is associated with cardiovascular disease (CVD), a major cause of death worldwide. Current therapeutic measures, lifestyle, dietary interventions and pharmaceutical agents for the regulation of cholesterol levels are insufficient.
Lactic acid bacteria have demonstrated the potential to lower cholesterol levels through different mechanisms, including the production of compounds that inhibit cholesterol synthesis enzymes such as 3-hydroxy-3-methylglutaryl coenzyme A.
17 lactic strains isolated from fermented local foods BEROUIL (B) and SMEN (S) are tested for their effectiveness as anti-cholesterol treatments. The assimilation of cholesterol was studied in the culture media MRS, M17, Mayeux in the presence of bile salts. the most efficient strains are: lactobacillus 4 of the SMEN which has a high cholesterol assimilation capacity (total cholesterol = 41 mg / ml; 56.64 mg / dl for HDL cholesterol and 63.55 mg / ml for cholesterol LDL) in MRS broth, Enterococcus faecium4.N isolated from BERWIL assimilates 0.2mg/ml of total cholesterol, 45.12 mg/dl of HDL and 50 mg/dl of LDL cholesterol. In the M17 broth 5mg/ml of total cholesterol, 7.04 mg/dl of HDL and 13.79 mg/dl of LDL cholesterol are assimilated by Lactococcus lactis sub.sp1(P) isolated from BERWIL. Lactococcus lactis sub.sp1(P) isolated from BERWIL has the highest assimilation with an LDL/HDL ratio = 1.95mg/dl and which can be a treatment for cardiovascular diseases

***Keywords**: fermented foods (BERWIL and SMEN) / lactic acid bacteria / cholesterol assimilation*

C. AFFICHE N° : 206.

EXTRACTION, PURIFICATION ET CARACTÉRISATION PARTIELLE D'UN ANTIBIOTIQUE DC 81 PRODUIT PAR STREPTOMYCES SP. SF3

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Abtract : Sur la base des caractères morphologiques, des souches d'actinomycètes ont été isolées à partir de différents écosystèmes. Le potentiel antimicrobien de ces souches a été estimé vis-à-vis de différents microorganismes pathogènes: 2 bactéries Gram-négatif (*Acinetobacter baumannii* 5973 et *Pseudomonas aeruginosa* 5919), 2 bactéries à Gram-positif (*Staphylococcus aureus* résistant à la méticilline et *Staphylococcus aureus* ATCC 6538P), et une levure (*Candida albicans*). Les souches les plus actives ont été identifiées, par séquençage de l'ARNr 16S, comme étant appartenant au genre *Streptomyces*. L'extraction des biomolécules a été effectuée par deux solvants organiques, l'acétate d'éthyle et l'acide formique. La purification de l'extrait a été réalisée par chromatographie liquide haute performance (HPLC) couplée à la spectroscopie de masse Electrospray (EI). Le temps de rétention et la masse exacte de chaque composant sélectionné sont comparés avec la base de données à haute résolution de la Fondation MEDINA puis à la base de données internationale Chapman et Hall. Plusieurs biomolécules intéressantes ont été identifiés dont un antibiotique DC 81(pyrrolo[2, 1-c][1, 4]benzodiazépines (PBD)). Ce dernier est un antibiotique et un antitumoral puissant. Ces résultats prouvent l'importance des souches d'actinomycètes dans la production des biomolécules actives.

***Mots clés :** Actinomycetse, Streptomyces, Antibiotique DC81, HPLC, Spectrométrie de masse*

PHARMACOLOGIE ET TOXICOLOGIE

C. AFFICHE N° : 207.

PESTICIDE EXPOSURE AND HEALTH RELATED ISSUES IN MALE REPRODUCTIVE SYSTEM

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ABSTRACT : Pesticides can damage the male reproductive system in a number of ways. They may cause reproductive toxicity with direct damage to the structure of the cells or as a result of biotransformation into metabolites. They can alter DNA structure. They may also act like hormones in the endocrine system and disrupt the function of the natural endogenous hormones, when doing so they are often called endocrine disrupting chemicals. This study was carried out to investigate the harmful effect of pesticides on reproductive, endocrinological and histopathological parameters. For this purpose, A total of 24 adult Wistar rats were divided into 4 groups of 6 animals each were treated with (ACMP+PRO) by orally administration (60,100 mg/BW) respectively, Animals were observed for clinical toxicity, over a period of 12 weeks, the rats were sacrificed and the parameters are determined.
The results show signs of toxicity and mortality follow the administration of ACM and PRO, it is a disorder of nervous system illustrated by locomotor disorders (ataxia, paresis) and by signs of neuromuscular stimulation (tremors, prostration).
From the analysis of our results, we observed a significant decrease in weight gain during treatment with both ACM and PRO, there was also a significant decrease in testicular weight in groups of rats treated with pesticide.
On the endocrine level, a significant decrease in testosterone is observed in animals of lots ACM, PRO and their mixture compared to the control group, $p < 0.001$.
On macroscopic plan, pesticides cause alterations in tissue structures of the testis, and a decrease of sperm cells in the light of the epididym, compared with the witness.
Conclusions: The gonadotoxic effect of pesticides and insecticides was reflected from the study and it was concluded that pesticide and insecticide exposure has got a definite relation with the infertility of the subjects evaluated in the study.

Key words: *Acetamiprid, Propineb, toxicity, reproduction, pesticide.*

C. AFFICHE N° : 208.

PREVENTIVE EFFECT OF *CUSCUTA AUSTRALIS* EXTRACT AGAINST CCL4-INDUCED HEPATOTOXICITY IN RATS

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Abstract: The aim of this study is to investigate the plausible therapeutic effect of aqueous extract of *Cuscutaaustralis*(EACA), for its hepatoprotective capacities in rats intoxicated with CCl4. Male Wistar rats were divided into three groups: control group, CCl4 group treated with tetrachloromethane (13 mg/kg of body weight bw), and a group (EMCA+CCl4) treated with EACA (30 mg/kg bw) and injected with CCL_4 during 21 days. Our results showed that EMCA presented interesting hepatoprotective capacities against CCl4 induced liver injury, as evidenced by preventive DNA fragmented, and normalised the hepatic biomarkers parameters (ALT, AST, GGT, and LDH), as well as, restored the elevated lipid profile (LDL-C, TC, TG, and HDL-C).Furthermore, EACA reduced oxidative stress in liver tissue notably, by inhibiting the lipid peroxidation and enhancing the hepatic antioxidants activities (CAT, SOD and GPX).However, administration of EACA resulted in marked improvement in liver function in rats.

Key words : *Cuscuta australis; tetrachloromethane; hepatoprotective; oxydative stress.*

C. AFFICHE N° : 209.

EVALUATION OF THE ACUTE TOXICITY EFFECTS OF ALCOHOLIC EXTRACTS OF *PISTACIA LENTISCUS* LEAVES, *ALLIUM SATIVUM* BULBS AND *TRIGONELLA FOENUM-GRÆCUM* SEEDS ON HEPATIC AND RENAL FUNCTION OF BROILER CHICKENS

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Abstract : In order to collect ethnobotanical information about growth and health promoter plants as feed additive in broiler chickens, three medicinal plants leaves of *Pistacia lentiscus,* bulbs of *Allium sativum* and seeds of *Trigonella foenum-grœcum* used by traditional medical practitioners for the treatment of several ailments of microbial and non-microbial origins were investigated for acute toxicity study. A total of 24 mixed sex broiler chicks (ISA 15) were obtained. At 21 days of age, the chicks were allocated at random into four groups of six (06) birds each. Three groups were administered a single oral dose of 2,000 mg kg^{-1} b.wt. while 5 mL distilled water was given to the control group of birds as placebo. Tissues were harvested and processed for photomicrographic examinations. Macro and microscopic observations indicated no alteration in liver and kidneys of the treated birds with 2000 mg kg^{-1} of selected herbal plants extract. Similarly for the hematological and biochemical study, no changes were observed. Acute toxicity study indicated that water suspensions of selected herbal methanolic extracts are not toxic when administered by the oral route to experimental birds at 2000 mg kg^{-1} b.wt. In conclusion, the results obtained in the present study are in agreement to a certain degree with the traditional uses of the plants estimated as prophylaxis against various diseases and promote of health.

Key words : *Acute toxicity, Broiler chicks, Medicinal plants, Methanolic extract.*

C. AFFICHE N° : 210.

IN VIVO EVALUATION OF *OROBANCHE FOETIDA* EXTRACT PROTECTIVE EFFECT AGAINST ISOPROTERENOL-INDUCED INFARCTION IN RATS

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Abstract: *Orobanche foetida*, is a root parasite known for its devastating effects in its native habitats. Despite its parasitic nature, this plant has a rich history of being used in traditional medicine due to its bioactive compounds with potential therapeutic applications. The aim of the current study was to assess the potential cardiopreventive effect of the aqueous extract of *O. foetida (*AEOF) on isoproterenol-induced infarction in rats. The biomolecules content was evaluated using LC/MS analysis. Animals were randomly allocated into four groups of eight rats each: control group, ISO group treated with isoproterenol (85 mg/kg of body weight bw), a group (AEOF) pretreated with aqueous extract of *O. foetida* (30 mg/kg bw), and a group (AEOF+ISO) infarcted after being pretreated with the aqueous extract of *O. foetida*. AEOF has evinced a cardioprotective effect by improving the lipid profile (total cholesterol, triglycerides, LDL-C, and HDL-C) ($p < 0.05$), normalizing the ECG pattern, and preventing heart injury markers from leaking in cardiomyocytes that were altered by ISO injection. Furthermore, AEOF pre-treatment significantly reduced oxidative stress by increasing the content of myocardial glutathione GSH and the activity of superoxide dismutase SOD and glutathione peroxidase GSH-Px ($p < 0.05$), as well as reducing lipid peroxidation ($p < 0.05$). Additionally, AEOF reduced the elevated fibrinogen rate and prevented myocardial necrosis and improved interstitial edema and neutrophil infiltration in infracted rats, as seen through histopathological examination.

Key words*: O. foetida; Cardioprotection; Myocardial infarction; Isoproterenol; Oxidative stress*

C. AFFICHE N° : 211.

NON-ALCOHOLIC *ERIBOTRYA JAPONICA* SEED OIL-BASED HAND SANITIZER

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Abstract: Since the start of the Covid-19 pandemic and the use of hydroalcoholic solutions and sanitizers to disinfect hands has become a daily gesture. The high demands of alcohol-based products during times of crisis will more often lead to a shortage. Thus, the necessity for other alternatives to meet the demands, preferably eco-friendly effective low-cost formulas. The objective of this study was to prepare a non-alcoholic gel based on *Eriobotrya japonica* seed oil that would be effective against a broad spectrum of pathogens. The fatty acids profile was also examined using GCMS. The results showed that the prepared hand sanitizer gels had antimicrobial activities against different gram-positive and gram-negative bacteria. The highest antibacterial effect was observed against *listeria monocytogenes*. Furthermore, the GCMS analysis showed that the oil is rich in polyunsaturated fatty acids namely omega-6 with more than 53% in addition to omega-9 and 3, which are known for their beneficial effect on the skin and strong antimicrobial effects. The findings suggest that the use of *Eriobotrya japonica* seeds oil in hand sanitizers formulas can be as effective as commercial alcohol-based products.

Mots clés : *Hand sanitizer, non-alcoholic, Eriobotrya japonica seeds, oil, GCMS.*

C. AFFICHE N° : 212.

IN VIVO EVALUATION AND MOLECULAR DOCKING STUDIES OF *EUCALYPTUS TRANSCONTINENTALIS*. SEEDS EXTRACT PROTECTIVE EFFECT AGAINST ISOPROTERENOL-INDUCED INFARCTION IN RATS

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Abstract : The aim of the current study was to assess the potential cardiopreventive effect of the methanolic extract of *Eucalyptus transcontinentalis* (MEET) on isoproterenol-induced infarction in rats. The biomolecules content was evaluated using LC/MS analysis. On the 29th and 30th days, two successive injections of isoproterenol (ISO) were given to Wistar rats to provoke myocardial infarction following pretreatment with either MEET (60 mg/kg b.w) or Pidogrel (Pid; 2 mg/kg b.w.). A total of 22 phenolics were identified. Results showed that MEET offered cardioprevention by normalizing the ST segment and reducing the elevated cardiac risk parameters. The altered lipid biomarkers together with the plasma ionic levels were improved. Additionally, MESM inhibited the cardiac oxidative stress generated by ISO injection though enhancing antioxidant enzymes (GSH, CAT, SOD and GPX) which reduced lipid peroxidation and protein oxidation. MEET reduced DNA fragmentation as well as the infarct size observed by TTC staining. The histopathological findings revealed less muscle separation and fewer inflammatory cells in the ISO + MEET -treated rats. Results of the docking simulation indicated that biomolecules in MEET was inhibitory mainly due to hydrogen bonding interactions with PDI, ACE and TGF-β1 proteins which could highlight the antithrombotic and antifibrotic capacity of MEET.

Key words: *Eucalyptus transcontinentalis; isoproterenol; anti-ischemic; cardioprotection; oxidative stress*

C. AFFICHE N° : 213.

DIMINUTION DE LA STÉROÏDOGENÈSE ET DOMMAGE TESTICULAIRE INDUITE PAR LA CONSOMMATION INDIRECTE ET RÉPÉTITIVE D'UN INHIBITEUR DE L'ÉTHYLÈNE "1-MÉTHYLCYCLOPROPÈNE" CHEZ DES RATS WISTAR.

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Abtract : La production mondiale des fruits et légumes a atteint 1160 millions de tonnes de mètres dans la dernière décennie. Cependant la totalité de ces aliments n'arrive pas à la table du consommateur à cause des pertes qualitatives et quantitatives au cours de la chaine de distribution et de stockage, en effet entre 25 et 40 % des fruits et légumes récoltés sont perdus annuellement. Une des technologies qui a révolutionné le monde de l'agriculture ces 20 dernières années est le 1-méthylcyclopropène (1-MCP), ce dernier est un régulateur d'hormone végétale sous forme de vapeur qui se dépose sur les tissues externes des végétaux et inhibe l'effet de la phytohormone 'éthylène' ce qui a pour effet de retarder la croissance et la maturation des fruits et légumes climactérique. Permettant ainsi aux agriculteurs et au commerçant de manipuler, stocker, et distribuer les végétaux pendant de longue durée et distance. Aujourd'hui cette molécule et bien d'autres similaires émergent le marché à cause de leur disponibilité, facilité d'utilisation, et de leur prix abordable. Par ailleurs, le 1-MCP peut interférer avec l'alimentation des consommateurs car, malgré son classement étant que régulateur d'hormone végétale et interagit principalement avec les tissues végétales, cela ne l'empêche pas d'interférer avec le système des mammifères. En effet des résidus du 1-MCP sue les fruits et légumes traités peuvent être ingérés par les consommateurs de façon quotidienne. De plus le 1-MCP se dégrade en deux types de métabolites à savoir le 1-CMP et 3-CMP déjà classé comme mutagènes et carcinogènes. D'autre part, plusieurs investigations ont révéler l'effet des régulateurs d'hormones végétales sur les tissues des mammifères et ils ont prouvé qu'ils pouvaient induire une toxicité indépendamment de la durée du traitement et de la quantité ingéré cependant, aucune étude n'a été réalisé a fin d'élucider l'effet de la consommation d'une alimentation contaminé avec le 1-MCP sur les biosystèmes des organismes non ciblés à savoir les mammifères. De ce fait le but de cette étude été d'évalué l'effet d'un régime alimentaire contaminé avec des doses infimes de 1-MCP sur la stéroïdogenèse et l'histologie des testicules des rat males wistar pendant une durée de 90 jours. Pour ce faire ; On a préparé un régime alimentaire à base de pommes bio contaminés avec deux doses respectives de 1-MCP à savoir 5 mg/kg/jr et 6,5 mg/kg/jr pendant une période de 90 jours consécutive. Le lot témoin a reçu un régime alimentaire non contaminé. A la fin du traitement on a mesuré les taux sériques de testostérone, les taux testiculaires d'MDA et on a effectué des coupes histologiques coloré à l'hématoxyline et éosine a fin de recherché des éventuelles dommages tissulaires. Nos résultats montrent une augmentation hautement significative des taux d'MDA accompagné par une chute des taux de testostérone sérique. Les photo-micrographes ont révéler une modification de l'architecture des tubes séminifères des testicules des rats traité avec la plus forte doses ainsi qu'une diminution au niveau de la concentration des spermatozoïdes. Nos résultats sont en faveur d'une diminution de la stéroïdogenèse et donc de la fonction testiculaire des rats mis en évidence par le taux d'MDA favorable a une destruction cellulaire probablement suite a une peroxydation lipidique. La repro- toxicité généré par le 1-MCP est une découverte qui doit être pris en considération pour la préservation de la santé du consommateur.

Mots clés : *1-methylcyclopropène, inhibiteur d'éthylène régime alimentaire contaminé, repro-toxicité, testostérone*

C. AFFICHE N° : 214.

EXTRACTION, CHARACTERIZATION, ANTIOXIDANT AND IMMUNOMODULATORY ACTIVITIES OF POLYSACCHARIDES *FROM ABELMOSCHUS ESCULENTUS* SEEDS

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Abstract : The okra plant, *Abelmoschus esculentus* (L.) Moench, a native plant from Africa, as a well-known medicinal and food plant, has important physiological activities and health benefits, and polysaccharide is its main bioactive component. Extraction, characterization and antioxidant activities of polysaccharides *from Abelmoschus esculentus* seeds (PSS) were investigated in the study. Their structural properties were further confirmed by FT-IR. The immunomodulatory activity of the PSS and their tendency to stimulate the phagocytic activity of granulocytes and macrophages was performed. Scavenging effects against reactive oxygen species induced lipid, protein and DNA damage were evaluated. The overall *in vitro* assay suggests that polysaccharides *from Abelmoschus esculentus* seeds exhibit high antioxidant activities evidenced by its ability to scavenge hydroxyl radicals and protect against biological macromolecular oxidative damages. The immunomodulatory activity results demonstrated that the phagocytic activity of PSS by enhancing phagocytic ability of macrophage.

C. AFFICHE N° : 215.

PHYSICO-CHEMICAL CHARACTERIZATION OF SPIRULINA ARTHROSPIRA PLATENSIS AND EVALUATION OF ITS ADSORPTION ON HYDROXYAPATITE

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Abtract : Arthrospira platensis, better known as Spirulina (SP), is one of the most important microalgae species. It possesses a rich metabolite pattern, including high amounts of natural pigments. In this study, we applied a many strategy based on Fourier Transform Spectrometry (FTIR), Raman Spectroscopy, thermogravimetric Analysis (TGA) and Inductively Coupled Plasma analysis (ICP) for the characterization of Spirulina. The present contribution was aimed also at exploring SP/hydroxyapatite interactions. SP adsorption on a synthetic carbonated nano crystalline apatite characterized (by FTIR, Raman, TG-DTA) was investigated in detail, pointing out a good agreement with Sips isothermal features.

FTIR spectra of SP have been recorded in the region of 3428-3320 cm-1 to 620-490 cm-1 in the different frequency ranges. We obtained three Raman characteristic peaks through density functional. The TG curve indicated the existence of three main weight losses. The most relevance of inorganic micronutrients in SP is iron, magnesium, calcium, zinc, phosphorous, manganese, copper and chrome. They are important for nutrition human bone.

SP was found to adsorb effectively onto hydroxyapatite. Vibrational spectroscopy data (FTIR and Raman) pointed out spectral modifications up on adsorption, confirming chemical-like interactions between SP and hydroxyapatite. The present study is intended to serve as a basis for future research works involving SP and apatite nanocrystals/nanoparticles in view of biomedical applications.

C. AFFICHE N° : 216.

COMPARATIVE STUDY OF THE EFFECT OF AMOXICILLIN AND ESSENTIAL OILS EXTRACTED FROM GARLIC AND MINT ON CERTAIN PATHOGENIC BACTERIA IN HUMANS

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Abstract : Recent studies have been based on the extraction of essential oils from medicinal plants in order to test their antibacterial power and to find substitutes for treatments based on molecules of chemical origin. The objective of this work is the extraction of essential oils from the pods of *Allium sativum* and the leaves of *Mentha spicata*. Then, to test the antibacterial effect of essential oils on pathogenic bacteria (*E. coli*, *K. pneamoniae* and *S. aureus*) and to make a comparison with the antibiogram (Amoxicillin). The extraction of the essential oils resulted in a yield of 0.09% and 1.32% for *Allium sativum* and *Mentha spicata* respectively. The antibacterial effect of the essential oils was reflected by the presence of inhibition zones with diameters ranging from 12 to 30 mm. The largest zone of inhibition was found in *Klebsiella pneumoniae* (30 ± 3.73 mm diameter) and this is due to the effect of *Allium sativum* essential oil. The essential oil of *Mentha spicata* showed a significant effect against the bacterial strain *Staphylococcus aureus* with an average of 29.66±4.58 mm. The effect of amoxicillin on pathogenic bacteria was reflected by the presence of inhibition zones (from 26 to 32 mm). A concentration of mint essential oil of 6.25% was able to inhibit the growth of *Klebsiella pneumonia*e and *Staphylococcus aureus* while the same concentration of *Allium sativum* essential oil was able to inhibit the growth of *Klebsiella pneumoniae*.

***Keywords**: Essential oil, Pathogenic bacteria, Amoxicillin.*

C. AFFICHE N° : 217.

POTENTIAL INHIBITOR OF MELANOGENESIS, EVALUATION OF PHENOLIC COMPOUNDS REPOSITIONING BY MOLECULAR DOCKING

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Abtract : The skin color is the result of a subtle mixture of melanic pigments produced by specialized cells, the melanocytes, whose embryological origin is the neural tube. In the skin, the melanocytes are located in the basal layer of the epidermis and in the hair bulb. Melanogenesis represents the mechanism at the origin of the synthesis of melanins which takes place within an intracytoplasmic organelle, of the family of secretory lysosomes, called "melanosome". Two families of melanins are produced: eumelanins of brown or black color and pheomelanins of yellow or red-orange color, which are less photoprotective. Three main enzymes of melanogenesis have been identified: tyrosinase and tyrosinases related proteins 1 and 2. In this work, we are interested in the evaluation of the interaction of some phenolic compound with tyrosinase and to study the pharmacokinetic parameters of candidate molecules for this pharmacological activity

A random selection of 130 phenolic compounds were chosen for their biological activity, their structures data files were downloaded from the database of the National Center for Biotechnology Information (National Library of Medicine). The docking was carried out by the DockThor (A Free Web Server for Protein-ligand Docking). Grid settings: center x = 14.213, center y = 38.986, center z = 67.162. Pocket size: total size x = 40, total size y = 40, total size z = 40 and was discretization = 0.4200. the genetic algorithm settings were; number of evaluations = 500000 population size = 750, number of runs = 12 and seed at run #1 = -1985. The evaluation of pharmacokinetic parameters was performed is SwissADME: a free web tool to evaluate pharmacokinetics, drug-likeness and medicinal chemistry friendliness of small molecules, kojic acid was used as a drug reference.

According to our studies, the ranking of docking scores has risen to a range of values that varies between -6.030 and -8.492. kojic acid was ranked 3rd with a score of -6.182. the two phenolic compounds that exceeded our standard are Gallic acid and cis-p-Coumaric acid with scores of -6.030 and -6.075. the correlation between the physicochemical properties of the phenolic compounds studied showed that the scores present remarkable correlations with the topographic surface, the rotational protons and the sizes of the molecules. which explains the variation in skin permeability. The residues ligands interaction showed that the kojic acid build with the protein packet by four Hydrogen bonds with Asp2 (G), Leu1 (G), Asp35 (E). also, the kojic acid interact with the protein by tow Non-bonded contacts with Met53 (E) and Gln34(E). Similarly, the Gallic acid were bonded with tyrosinase with three residues: Glu72(E), Ala19(H), Leu1(F). Likewise, cis-p-Coumaric acid Ala19(E), Leu1(G) and Glu72(H). Those compounds showed a competitive inhibitory effect on tyrosinase. Consequently, they can be a potential inhibitor of melanogenesis

In conclusion, the molecular docking of phenolic compounds proved that they have a high affinity to several residues in tyrosinase pocket. Consequently, they can be a potential inhibitor of melanogenesis.

C. AFFICHE N° : 218.

ANTI-INFLAMMATORY AND CYTOPROTECTIVE EFFECTS OF *LAURUS NOBILIS* AGAINST ACETIC ACID-INDUCED ULCERATIVE COLITIS IN RATS.

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Abstract: *Laurus nobilis* is an aromatic medicinal plant known for its pharmacological properties. It is widely cultivated in Algeria and is specifically used in therapeutics for the treatment of different gastrointestinal problems. The aim of this study was to assess the antioxidant and the anti-inflammatory properties of the *Laurus nobilis* methanolic extract (LNME) *in vitro* and to investigate their effects in a rat model of experimental colitis.

The total phenolic (TPC) and flavonoid (TFC) content was measured using standard colorimetric assays. The *in vitro* antioxidant activity of LNME was evaluated by combining different tests, namely DPPH, ABTS, ferric-reducing antioxidant power (FRAP), and cupric-reducing antioxidant capacity (CUPRAC). The protein denaturation technique was used to determine the anti-inflammatory activity. Finally, the *in vivo* extract's impact was assessed utilizing intracolonic instillation of acid acetic in rats.

The findings of the first part of the study showed that the LNME possessed high levels of total phenolics and flavonoids, which exhibited the highest antioxidant capacity with IC_{50} values of 91.24±0.82 and 20.05±0.04 µg/mL for DPPH and ABTS radical scavenging activity respectively, and $A_{0.50}$ values of 67.50±0.14, 54.35±0.07 µg/mL for chelating effects and reducing ferric power respectively. Additionally, the tested extract had a greater inhibitory effect (92.81±0.60%) against the heat-induced denaturation of BSA in a dose-dependent manner. The results of the second part of the study showed that the administration of 2 mL/kg BW of acetic acid (3%) intra-rectally for 5 days, caused several changes in body growth, hematopoietic parameters, and severe histopathological alterations in the colon compared to the controls. Nevertheless, the co-treatment with 250 mg/kg BW of LNME has notably lessened some harmful effects of acetic acid and protected colic inflammation.

The current study suggests that LNME displays antioxidant and anti-inflammatory potential as well as a cytoprotective impact against acetic acid-induced colitis in rats.

Keywords: *Acetic acid, Anti-inflammatory, Antioxidant, Laurus nobilis, Ulcerative colitis.*

C. AFFICHE N° : 219.

ACUTE TOXICITY AND ANTIMICROBIAL ACTIVITY OF AN ALGERIAN SAHARA MEDICINAL PLANT: *EPHEDRA ALATA ALENDA*

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Abtract : Plant extracts are used in galenical preparations to treat many diseases. Ephedra alata alenda was chosen for this study because of its high resistance to extreme ecological conditions and its high therapeutic value. This work aims to evaluate some pharmacotoxicological properties of Ephedra alata alenda extracts from Ouargla (Algeria). The histological study was implemented by the double staining method. The evaluation of the bioactive metabolite content was estimated by calculating the extraction yields of the aqueous and organic phase. The toxicity of the aqueous extract was assessed in vivo. The antimicrobial activity of the extracts obtained was evaluated on seven bacteria and two reference yeasts by the aromatogram method.The results of histological section analyses revealed the different tissues and storage sites of the metabolites synthesized by the plant. The LD50 of the aqueous extract is higher than 100 mg/kg. The microbiological study showed sensitivity of only four bacteria to plant extracts (Pseudomonas aeruginosa (ATCC 9027), Staphylococcus epidermidis (ATCC 12228), Escherichia coli (ATCC 8739) and Staphylococcus aureus (ATCC 6538)). The ethanolic extract is more active on the tested germs than the aqueous extract because the MIC is lower. Ephedra alata alenda is a source of interesting bioactive metabolites and do not pose a risk of toxicity like some other therapeutical.

Key words : *Ephedra alata alenda, Extracts, acute toxicity, LD50, antibacterial activity, antifungal activity*

C. AFFICHE N° : 220.

PHYSICO-CHEMICAL CHARACTERIZATION OF SPIRULINA ARTHROSPIRA PLATENSIS AND EVALUATION OF ITS ADSORPTION ON HYDROXYAPATITE

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Laboratory of Sciences Material and Environment, Faculty of Sciences of Sfax, B.P. 1171, 3000, Sfax, Tunisia.

Abtract : Arthrospira platensis, better known as Spirulina (SP), is one of the most important microalgae species. It possesses a rich metabolite pattern, including high amounts of natural pigments. In this study, we applied a many strategy based on Fourier Transform Spectrometry (FTIR), Raman Spectroscopy, thermogravimetric Analysis (TGA) and Inductively Coupled Plasma analysis (ICP) for the characterization of Spirulina. The present contribution was aimed also at exploring SP/hydroxyapatite interactions. SP adsorption on a synthetic carbonated nano crystalline apatite characterized (by FTIR, Raman, TG-DTA) was investigated in detail, pointing out a good agreement with Sips isothermal features.
FTIR spectra of SP have been recorded in the region of 3428-3320 cm-1 to 620-490 cm-1 in the different frequency ranges. We obtained three Raman characteristic peaks through density functional. The TG curve indicated the existence of three main weight losses. The most relevance of inorganic micronutrients in SP is iron, magnesium, calcium, zinc, phosphorous, manganese, copper and chrome. They are important for nutrition human bone.
SP was found to adsorb effectively onto hydroxyapatite. Vibrational spectroscopy data (FTIR and Raman) pointed out spectral modifications up on adsorption, confirming chemical-like interactions between SP and hydroxyapatite. The present study is intended to serve as a basis for future research works involving SP and apatite nanocrystals/nanoparticles in view of biomedical applications.

C. AFFICHE N° : 221.

PROTECTIVE AND LITHOLYTIC EFFECT OF *POLYGONUM MARITIMUM* HYDROETHANOLIC EXTRACT ON THE KIDNEYS OF RATS WITH ETHYLENE GLYCOL-INDUCED NEPHROLITHIASIS''

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Abstract : The current study was aimed to explored the potential preventive activity of *Polygonum maritimum* extract (PME) against urinary lithiasis induced by ethylene glycol in adult male rats. The biomolecules of PME content was evaluated using LC/MS analysis. Administration of ethylene glycol (0.75% in water) caused hyperoxaluria, hypercalcemia and a decrease in urinary volume associated with an increase in pH. In addition, microscopic examination revealed large crystals and oxalic aggregates in comparison to the control group. PME hydroethanolic extract (37.5 and 50 mg/kg) was administered orally in a gastric tube in a preventive diet for 15 days and 28 days of treatment. The PME supplementation has considerably ($p<0.05$) restored urea, uric acid, creatinine concentration, as well as pH. In addition, PME pretreatment leads to a strong diuresis that helps to eliminate crystalline debris. This antilithiasis activity was higher than that observed after treatment with drug lithos (215 mg/kg) which is enhanced by the histological study. Overall, the obtained findings showed that PME posses a strong inhibitory action on the different lithogenic stages as well as an improvement in kidney function.

Key words: *Urolithiasis; Ethylene glycol; Polygonum maritimum,*

C. AFFICHE N° : 222.

PRÉDICTION INSILCO DU METABOLISME, TOXICITÉ, ET CARCINOGENECITÉ D'UN REGULATEUR DE CROISSANCE VEGETALE UTILISÉ SUR LES FRUITS ET LEGUMES « 1-METHYLCYCLOPROPENE »

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Abtract : La technologie des régulateurs d'hormones végétales (PGRs) ne cessent d'émergé mondialement, ces derniers sont des inhibiteurs de phytohormones qui sont utiliser principalement pour bloquer les différents aspects du développement des plantes tel que la fluorescence, la maturation, le pourrissage, le changement de gout et de d'odorat. Aujourd'hui, sous l'influence de la demande exaspéré du marché pour la disponibilité des tous types de fruits et légumes indépendamment de leur saison de récolte, le consommateur se retrouve face à l'exposition quasi inévitable d'aliments traités avec des PGRs soit importé d'autres pays ou traité localement et stocker pendant plusieurs mois. Le 1-methylcyclopropène est l'un des PGRs les plus utilisé, sous sa forme active ; c'est un gaz qui se dépose sur les fruits et légumes climactériques retarde leur le murissement et prolonge leur conservation. Les résidus de ce dernier peuvent être ingéré par le consommateur à des infimes doses et probablement interféré avec les biosystèmes. De plus les PGRs sont considérer comme hépatotoxique, néphro-toxique, et repro-toxique. Par ailleurs le 1-MCP se métabolise en deux résidus déjà classé par le comité de carcinogénicité comme étant des molécules hautement cancérigènes. Plusieurs études ont démontré le mécanisme d'action du 1-MCP sur les cellules des plantes mais jusqu'à à ce jour aucune n'a a été réalisé sur des tissues de mammifères. L'objectif de la présente étude est de faire une analyse in silico du 1-MCP commerciale afin de prédire sa toxicité, mutagénécité, et carcinogénécité chez les rongeurs. Le serveur en ligne SwissADME a été utilisé pour obtenir les paramètres physicochimiques, pharmacocinétiques et toxicologiques du 1-MCP. Le serveur Web ProTOXII a été utilisé pour prédire la dose de valeur DL 50% du 1-MCP, la classe toxicologique ainsi que les toxicités y compris l'hépato-toxicité, la cancérogénicité, l'immuno-toxicité, la mutagénicité et la cytotoxicité. Le service Web ROSC-Pred a été utilisé pour prédire la cancérogénicité d'organes spécifiques de rongeurs. Les résultats ont montré que le 1-MCP vue son poids moléculaire, été transportable à travers la voie trans-cellulaire et de ce fait été bio-disponible, par contre, il avait un faible taux d'absorption intestinale et ne traverse pas la barrière hématoencéphalique. D'autre part ; les résultats ont montré que le 1-MCP avait une toxicité de class 4 avec une DL 50% prédis a 810 mg/kg. Le 1-MCP ne montré pas des signes d'hepatotoxicité, immunotoxicité, ou cytotoxicité cependant, les résultats ont révélé qu'il été a 40 % mutagène et a 60 % carcinogène ; les organes avec une forte probabilité de carcinogénécité été les reins chez les rats males et l'utérus chez les femelles.

Mots clés : *1-methylcyclopropène, paramètres hématologiques, étude insilico, régulateur d'hormone végétale, rats*

C. AFFICHE N° : 223.

EVALUATION OF THE ANTIOXIDANT ACTIVITY OF THE ESSENTIAL OIL OF *MENTHA SPICATA* FROM EL-BAYED-ALGERIA

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Abtract : Essential oils represent a source of bioactive molecules and are the subject of numerous studies for their possible use as an alternative for the protection of foods against oxidation. Antioxidant means any substance which, when present in low concentration compared to that of the oxidizable substrate, significantly delays or prevents the oxidation of this substrate.
The present work aims to evaluate the antioxidant activity of the essential oil of *Mentha spicata* L. from the production unit (Florest).
The antioxidant activity of essential oil of *Mentha spicata* L., was tested in vitro by the method of DPPH (2,2-diphenyl-1-picrylhydrazyl) demonstrated the presence of a significant antioxidant effect following the calculation of the percentage of inhibition and the IC 50 either; 10.13mg/ml. However, this value remains high compared to that of ascorbic acid (0.0056 mg/ml) which is used as a positive control.
This work has revealed the importance of the species of *Mentha spicata* L., and which therefore deserves to occupy an honorable place in traditional Algerian medicine.

Keywords: Mentha spicata L., essential oil, antioxidant activity.

C. AFFICHE N° : 224.

AN INSIGHT INTO THE PROGNOSTIC, AND THERANOSTIC VALUE OF SNAIL EXPRESSION IN PRIMARY PROSTATE CANCER

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Abstract: Prostate cancer (PC) remains one of the most complicated cancers in men. Snail is one of the transcription factors of Epithelial-mesenchymal transition (EMT) expected to have a high impact on oncogenesis development and progression. The assessment of Snail gene expression was established on 111 formalin-fixed paraffin-embedded prostate tissues (FFPE) from patients with prostate cancer and 16 controls. The gene expression was determined using real-time quantitative reverse transcription (RT-qPCR), the $2^{-\Delta\Delta Ct}$ method and was analyzed using SPSS version 21. The ROC-curve analysis demonstrated that Snail could correctly discriminate between tumors at diagnosis/non-tumor state, with an AUC=0.735 (p=0.003; IC95%= 0.639-0.831). Furthermore, our data revealed a positive correlation between median Snail gene expression and prognostication tool of PC as the higher Gleason score (≥8vs.<8) (p <0.0005), advanced stages (p<0.0005), distant and lymph node metastasis (NxM1 vs. N0M0) (p=0.000). In addition, Multivariate Survival Analysis using Cox's Regression Model revealed that Snail was a potential predictor for OS (p=0.05), PFS (p=0.006), and resistance for acid-Abiraterone drug (p<0.001). Our findings emphasize the need to further examine and validate Snail as a novel therapeutic target in aggressive form of PC.

***Keywords**: Snail, Twist, Prognostic, Abiraterone drug, Prostate cancer*

C. AFFICHE N° : 225.

STUDY OF THE TOXICITY OF TRACE MÉTALS IN THE LIVID SEA URCHIN *PARACENTROTUS LIVIDUS* (LAMARCK, 1816) IN THE GOLF COURSE OF SKIKDA, ALGERIA.

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Abtract : The objective of this study is to determine the lethal doses of two very toxic heavy metals, cadmium and lead on edible sea urchins and the evaluation of the effect of treatment by these heavy metaux on vitellogenin levels and the biochemical composition of the gonads of this species. Metals were added to sea urchin culture at two concentrations: 2.83 µg/l and 2.89 µg/l cadmium chloride and 10 mg/l and 15 mg/l lead oxalate. These doses correspond to LC10 and LC25 respectively. Vitellogenin levels and biochemical parameters were determined at different times (0, 24, 48, 72 and 96 hours) of treatment.

Toxicological tests show a positive correlation between the mortalities and the doses tested. In addition, LC50, LC90 and LC25 concentrations were determined from the regression line expressing mortality as a function of cadmium and lead doses.

Results of the vitellogenin assay show that cadmium and lead cause a significant decrease in vitellogenin levels in the gonads. Metabolite assay results indicate that treatment of sea urchins with both metals induces disturbances in the biochemical composition of female gonads. Indeed, a significant decrease in carbohydrate levels was noted after 24 hours of treatment. However this metal causes a significant increase in protein levels after 48 hours of treatment.

Variations in these parameters reflect the toxicity of these two heavy metals (cadmium and lead) to this species.

Mots clé:Paracentrotus lividus, Bioassays, Heavy metal, vitellogenin, Biochemical composition.

C.AFFICHEN° :226.

SCREENING OF THE EFFICIENCY OF ESSENTIAL OILS OF THREE LAMIACEAE PLANT SPECIES IN INHIBITING GROWTH PARAMETERS OF TWO ISOLATES OF Plenodomus Tracheiphilus (SYN. Phoma Tracheiphila)

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Abtract: Citrus mal secco disease, caused by Plenodomus tracheiphilus (syn. Phoma tracheiphila) is a very serious and incurable tracheomycosis on citrus. Facing the difficulties in managing the disease by traditional measures, the use of essential oils (EO) to control P. tracheiphilus appears to be a promising alternative. In this study, we investigated the effect of EO of thyme (Thymbra capitata), rosemary (Rosemarinus officinalis) and sage (Salvia officinalis) extracted by hydrodistillation on the development of P. tracheiphilus. Among these three Lamiaceae plant species, thyme produced the highest EO yield. The effect of these EOs on the mycelial growth of two isolates of P. tracheiphilus (Pt36 and Ptba) was evaluated by two methods: the mixing method and the well diffusion method. The ANOVA analysis showed a highly significant difference ($P < 0.001$) between the mycelial growth recorded by the two methods but also revealed a strong positive correlation of 97% for the isolate Pt36 and 93% for the isolate Ptba for the classifications of EO inhibition by the two methods. In addition, the results indicate that thyme EO is the most effective product that completely stopped the mycelial growth of the fungus in solid medium. For rosemary and sage EOs, mycelial growth inhibition reached up to 69 and 58%, respectively. The inhibition of sporulation rate in liquid medium was also evaluated when the two fungal isolates were cultured in presence of the EOs and the highest inhibition was recorded under thyme EO application with 88% and the lowest with sage EO with 52% in average. These results have demonstrated the good in vitro antifungal activity of thyme EO on the development of P. tracheiphilus. Qualitative and quantitative analysis of the EO volatile profile is needed to investigate the active compound responsible of the antifungal activity of thyme EO.

Mots clés : Plenodomus tracheiphilus, essential oils, Thymbra capitata, Rosemarinus officinalis, Salvia officinalis.

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