

**Les Sections de Sfax et de Gafsa de la Société
Chimique de Tunisie**
En collaboration avec
**Le Laboratoire de Chimie Organique (LR17ES08) de
la Faculté des Sciences de SFAX**
&
**Le Laboratoire d'Application des Matériaux à
l'Environnement, l'Eau et l'Energie (LR21ES15) de la
Faculté des Sciences de GAFSA**

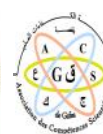
Organisent

Un séminaire International

Intitulé

**La Chimie au profit de la Médecine et
l'Environnement
(CME-2023)**

22-25 Octobre 2023, Tozeur



Topics

Synthesis and Extraction of biologically active molecules

Extraction et characterization of fatty substances

Valorization of materials for environment

Elaboration of biomaterials and nanomaterials

Elaboration of materials for wastewater treatment

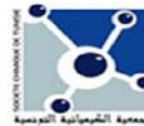
Scientific Committee

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Program



Program

Sunday 22 October 2023

Sunday 22 October 2023	
15.00	Welcoming participants and check in

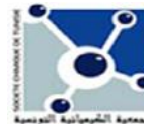
Monday 23 October 2023

Monday 23 October 2023				
09.00-09.30	Opening Ceremony			
09.30-10.00	Plenary Lecture 1 (Pr. Mohammad JAWAID)			
Oral Communications Session 1				
	Room A		Room B	
10.15-10.30	OC1	Ben Salah Hichem	OC4	Chibi Souad
10.30-10.45	OC2	Mzoughi Zeineb	OC5	Kamel Essid
10.45-11.00	OC3	Faten Mannai	OC6	Laghouiter Oum Kelthoum
11.00-11.45	Coffee break + Poster Session 1 (PC1-PC37)			
Oral Communications Session 2				
11.45-12.00	OC7	Moalla Rekik Dorsaf	OC11	El Hadi Djamel
12.00-12.15	OC8	Raoudha Abbassi	OC12	Attar Tarik
12.15-12.30	OC9	Omrani Sondes	OC13	Maamria Jihen
12.30-12.45	OC10	Souilah Amal	OC14	Mnafki Rim
13.00	Lunch			

Monday 23 October 2023

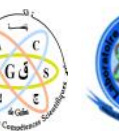
Monday 23 October 2023				
14.30-15.00	Plenary Lecture 2 (Pr. Ramzi KHIARI)			
Oral Communications Session 3				
	Room A		Room B	
15.15-15.30	OC15	Maghchiche Abdelhak	OC23	Ghwaidia Sabrine
15.30-15.45	OC16	Salmi Chaima	OC24	Elaissi Ameer
15.45-16.00	OC17	Aggoun Khaled	OC25	Datoussaid Yazid
16.00-16.15	OC18	Sfar Manel	OC26	Chergui Achour
16.15-16.30	OC19	Arfaoui-Elhif Rim	OC27	Zaaboubi Siham
16.30-16.45	OC20	Soltani Siwar	OC28	Ayachi Amani
16.45-17.00	OC21	Bougatef Hajer	OC29	Haiouani Kheira
17.00-17.15	OC22	Neghmouche Nacer Salah	OC30	Benhebal Hadj
19.00	Dinner			





Tuesday 24 October 2023					
08.30-09.00	Plenary Lecture 3 (Pr. Nouredine ALLOUCHE)				
Oral Communications Session 4					
	Room A			Room B	
09.15-09.30	OC31	Si Tayeb Fatima	OC39	Farhat Donia	
09.30-09.45	OC32	Ghazghazi Hanene	OC40	Lafi Ridha	
09.45-10.00	OC33	Mnasri Aziza	OC41	Dakhouche Soumia	
10.00-10.15	OC34	Ben Salah Donia	OC42	Hafidh Afifa	
10.15-10.30	OC35	Achech Amel	OC43	Trifi Beyram	
10.30-10.45	OC36	Bouzina Lila	OC44	Sourour Salhi	
10.45-11.00	OC37	Alatrache Abir	OC45	Dakhouche Soumia	
11.00-11.15	OC38	Laghouiter Oum Kelthoum	OC46	Zitouni Amel	
11.30-12.30	Poster Session 2 (PC38-PC72)				
13.00	Lunch				
15.00	Excursion				

Wednesday 25 October 2023					
08.30-09.00	Plenary Lecture 4 (Pr. Sami MNIF)				
Oral Communications Session 5					
	Room A			Room B	
09.15-09.30	OC47	Hamdi Ali M. Mohammed	OC51	Boukerche Said	
09.30-09.45	OC48	Herissi Labidi	OC52	Brahim Imene	
09.45-10.00	OC49	Mehdi Raoudha	OC53	Bensafiddine Feriha	
10.00-10.15	OC50	Golea Lynda	OC54	Etteyeb Naceur	
10.30-11.00	Closing Ceremony				



Speakers Abstracts

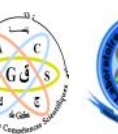




Dr. Mohammad Jawaid is currently working as Senior Fellow (Professor) at Biocomposite Technology Laboratory, Institute of Tropical Forestry and Forest Products (INTROP), Universiti Putra Malaysia (UPM), Serdang, Selangor, Malaysia, and also has been Visiting Professor at the Department of Chemical Engineering, College of Engineering, King Saud University, Riyadh, Saudi Arabia since June 2013. Recently he joined as Distinguish Visiting Professor at Malaysian Japan International Institute of Technology (MJIT), Kuala Lumpur. He is Director of Start-up Company-FiberStrong Pvt Ltd and Research advisor of Kenaf Venture Global (KVG), Malaysia. He has more than 20 years of

experience in teaching, research, and industries. His area of research interests includes hybrid composites, lignocellulosic reinforced/filled polymer composites, advance materials: graphene/nanoclay/fire retardant, modification and treatment of lignocellulosic fibers and solid wood, biopolymers and biopolymers for packaging applications, nanocomposites and nanocellulose fibers, and polymer blends. So far, he has published 55 books, 75 book chapters, more than 350 peer-reviewed international journal papers, and several published review papers under top 25 hot articles in science direct during 2013–2018. He also obtained 6 Patents and 5 Copyrights. H-index and citation in Scopus are 75 and 25233 and in Google scholar, H-index and citation are 88 and 34218. He is founding Series Editor of Composite Science and Technology, Sustainable Materials and technology, and Smart Nanotechnology Book Series from Springer-Nature. He worked as guest editor of special issues of SN Applied Science, Current Organic Synthesis and Current Analytical Chemistry, International Journal of Polymer Science, IOP Conference Proceeding. He also in Editorial Board Member of Journal of Polymers and The Environment, Journal of Plastics Technology, Applied Science and Engineering Progress Journal, Journal of Asian Science, Technology and Innovation and the Recent Innovations in Chemical Engineering. He is also life member of Besides that, he is also reviewer of several high-impact international peer-reviewed journals of Elsevier, Springer, Wiley, Saga, ACS, RSC, Frontiers, etc. Presently, he is supervising 8 Ph.D. students and 30 Ph.D. and 13 Master's students graduated under his supervision in 2014–2022. He has several research grants at university, national, and international levels on polymer composites of around 3 million Malaysian ringgits (USD 700,000). He also delivered plenary and invited talks in international conferences related to composites in India, Turkey, Malaysia, Thailand, the United Kingdom, France, Saudi Arabia, Egypt, and China. Besides that, he is also a member of technical committees of several national and international conferences on composites and material science.

Dr. Mohammad Jawaid received Excellent Academic Award in Category of International Grant-Universiti Putra Malaysia-2018 and also Excellent Academic Staff Award in industry High Impact Network (ICAN 2019) Award. Beside that Gold Medal-Community and Industry Network (JINM Showcase) at Universiti Putra Malaysia. He also Received Publons Peer Review Awards 2017, and 2018 (Materials Science), Certified Sentinel of science Award Receptient-2016 (Materials Science) and 2019 (Materials Science and Cross field). He is also Winner of Newton-Ungku Omar Coordination Fund: UK-Malaysia Research and Innovation Bridges Competition 2015. Recently he recognized with Fellow and Chartered Scientist Award from Institute of Materials, Minerals and Mining (IOM), UK. He is also life member of Asian Polymer Association, and Malaysian Society for Engineering and Technology. He has professional membership of American Chemical Society (ACS), and Society for polymers Engineers (SPE), USA.



Ramzi KHIARI



Ramzi Khiari is a senior lecturer at the Higher Institute of Technological Studies in Ksar-Hellal (Monastir, Tunisia) in the Department of Textile Engineering. He graduated in 2005 from the National Engineering School of Monastir in the specialty of Textile Chemistry before getting a Master's degree (2007) from the same institution. Then, he performed a sandwich Ph.D. thesis (2010) between ENIM from the University of Monastir in Tunisia and Grenoble INP in France. Finally, in 2017, he got the diploma of "Habilitation Universitaire" from the University of Monastir, and in 2020 he got the diploma "Habilitation à diriger des Recherches" in Grenoble INP. His research interests focus on the valorization of biomass at multi-scale levels, namely: fibers, nanocellulose, lignin, hemicelluloses, and their use as potential raw materials in several industrial applications (Textile, papermaking, polymeric materials, composites, and nanocomposites). A particular focus is given to vegetal biomass from annual plants, particularly agricultural residues, and industrial wastes. During his career, he coordinated several research projects, mainly projects with industry, and supervised various postgraduation students. He has been a member of scientific committees and organizing committees and participated in national/international evaluation boards.

Noureddine ALLOUCHE est professeur de chimie à la Faculté des Sciences de Sfax et Chef de l'équipe Substances Naturelles au Laboratoire de Chimie Organique. Son activité de recherche est documentée par environ 150 articles scientifiques (https://www.researchgate.net/profile/Noureddine_Allouche) avec un h-



index de 33 et 3500 citations, 2 chapitres dans deux livres et 3 brevets, portant sur l'extraction verte, l'identification, l'isolement et les activités biologiques de substances naturelles ainsi que la valorisation des déchets industriels et des sous-produits agroalimentaires. Il dirige un groupe de recherche de plus de 20 chercheurs. Pr. Noureddine ALLOUCHE a préparé une thèse de doctorat (2000-2005) portant sur la valorisation chimique et biologique des co-produits de l'olivier. Il a effectué un stage post-doctoral (2006-2007) à l'Institut de Chimie des Substances Naturels du CNRS, Gif-sur-Yvette en France portant sur la purification et l'identification de produits naturels anticancéreux à partir de plantes endémiques de la Nouvelle Calédonie.

Pr. Allouche a participé dans un projet INCO-MED “contract ICA3-CT2002-10033” (2002-2004) intitulé: “New technologies for olive mill wastewater detoxification and product recovery”. Pr. ALLOUCHE était/est coordinateur national de certains projets Européens: FP7, ARIMNET, H2020 et Erasmus+:

- 1- CINEA, FP7 project, (2013-2016) entitled: “EU-MED Cooperation to foster Innovation and Exploitation in the Agro-Food Domain”.
- 2- Stomp, ARIMNET project, (2016-2019) entitled: “Sustainable Tomato Production: plant defense enhancement, development of new biopesticides and optimization of environmental, water and chemical inputs”.
- 3- MediHealth, H2020 project, (2016-2020): “Novel natural products for healthy ageing from Mediterranean diet and food plants of other global sources”.
- 4- Erasmus+ (KA 107) project, (2017-2020): “Mobility for learners and staff- Higher Education Student and Staff Mobility”; a project between the University of Sfax (Tunisia) and the University of Berlin (Germany).

L'olivier, une source inépuisable de produits naturels à haute valeur ajoutée

Pr. Noureddine ALLOUCHE

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L'olivier, arbre typique de la zone méditerranéenne, est classé parmi les plantes les plus riches en composés à haute valeur ajoutée. Son fruit, ses feuilles ainsi que son huile retiennent de plus en plus l'attention du monde scientifique pour leur haute valeur diététique associée à leur richesse en composés phénoliques. Après broyage des olives et écart des parties solides (grignons ou tourteaux d'olive) par pressage, la phase huileuse est récupérée et la phase aqueuse, encore appelée margines, est rejetée. Ces effluents, constituent une source considérable de molécules d'intérêts du fait de leur concentration élevée en composés phénoliques et en particulier les ortho-diphénols. Ces composés, de concentration 10 à 100 fois plus grande que celle dans l'huile d'olive, sont connus par une panoplie d'activités biologiques et par leur rôle bénéfique dans la prévention de certaines maladies telles que les maladies cardiovasculaires. Ces ortho-diphénols sont d'un intérêt majeur pour les industries agro-alimentaire et cosmétique qui recherchent des molécules naturelles pour remplacer les antioxydants de synthèse. L'ortho-diphénol majoritaire des margines et des grignons est l'hydroxytyrosol. Ce produit « noble » est réputé comme étant un antioxydant très puissant plus fort même que les antioxydants de synthèse. Il présente aussi une large gamme d'activités biologiques en particulier les activités antioxydante, antibactérienne, anti-infarctus et anti-hypertensive.

Pendant la dernière décennie, la valorisation des ressources naturelles est une préoccupation qui devient de plus en plus importante dans de nombreux pays. Dans ce contexte, notre laboratoire s'est intéressé à la valorisation des dérivés de l'olivier (margines, grignons, feuilles, noyaux) à travers i) l'extraction en continu et l'éco-extraction de biomolécules moyennant des méthodes dites vertes ; ii) la purification et l'identification de produits hits ; iii) l'évaluation de certaines activités biologiques (*in-vitro* et *in-vivo*) des extraits et des produits purifiés ; iv) la synthèse biologique de l'hydroxytyrosol ; v) l'application des éco-extraits dans la stabilisation des huiles végétales et la formulation de compléments alimentaires.

Mots clés : l'olivier, polyphénols, éco-extraction, identification, bioconversion, hydroxytyrosol, activités biologiques



Sami Mnif, PhD Born July 1982

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https://www.researchgate.net/profile/Mnif_Sami



Dr Sami MNIF obtained his baccalaureate in 2001 from Pilote school of Sfax. He received the bachelor's degree in life sciences, the master's degree in molecular and Cell Biology and the PhD degree in biological sciences from the faculty of sciences of Sfax, Tunisia, in 2005, 2007 and 2012, respectively. His habilitation degree was received in 2020 at the National School of Engineers of Sfax. He conducted his PhD at the Centre of Biotechnology of Sfax in collaboration with the Laboratory of Microbiology-IRD, Marseille, France and Laboratory of Environmental Biotechnology, Narbonne, France. The research topic of his PhD was focusing on microbial diversity of some Tunisian oilfields using both Cultural and molecular approaches and the study of biosurfactant production by the hydrocarbonoclastic bacteria. In 2012, Dr Mnif joined the Centre of Biotechnology of Sfax as Assistant Professor where he developed a new field of biotechnological research on the screening of novel molecules to eradicate microbial biofilms. These molecules are produced by microorganisms like endophytic fungi and bacteria or synthetic like organometallic and aromatic structures. Dr Mnif participated and was invited in many international meetings, courses, and workshops in France, Morocco, Serbia and Saudi Arabia. He guided more than 15 graduate and post-graduate students to accomplish their project, master, or thesis (co-supervision) work on microbial biofilms. In 2016, Dr Mnif obtained the grant from TWAS-COMSTECH for the study of biological activities of endophyte microorganisms isolated from Tunisian arid regions. Dr Mnif's original findings were presented in international scientific meetings and have been published in top biotechnological journals with international circulation including Journal of Hazardous Materials, International Biodeterioration and Biodegradation, Lipids in Health and Diseases, Chemistry & Biodiversity, Journal of Applied Microbiology, FEMS Microbiology letters, etc. He has more than 30 publications in periodic journals, 2 invited book chapters. According of the Google Scholar, Dr Mnif has more than 1000 citations in scientific publications and his H-index is 16.



Recent Trends in Combating Microbial Biofilms Using Biotechnological Approaches

Sami MNIF

Associate Professor at Laboratory of Molecular and Cellular Screening Processes, Centre of Biotechnology of Sfax, Tunisia

Abstract:

In recent years, there has been a steady rise in microbial resistance to antibiotics and biocides currently in use, posing ongoing challenges for prevention and treatment. The persistence of infections and therapeutic failures have been linked to microenvironments in which microbes can adapt and thrive. In many of these settings, biofilms play a pivotal role in promoting the longevity of infections, whether they are associated with implanted medical devices (such as catheters, heart valves, and lenses) or within bodily tissues (as seen in the case of cystic fibrosis). Furthermore, biofilms have significant implications in the food industry, contributing to the deterioration of food's sensory properties and the emergence of foodborne contaminations.

The growth and formation of biofilms are tightly regulated and accompanied by metabolic changes that can influence bacteria's responsiveness to antibiotics, disinfectants, and biocides. A primary objective of our research is to identify natural or synthetic molecules capable of inhibiting biofilm growth. One potential source of anti-biofilm compounds lies in microbial metabolites derived from endophytes. Following an initial screening process, selected molecules undergo comprehensive evaluation to quantify their potential and efficacy in reducing bacterial viability within biofilms. Essential oils derived from plants may contain remarkable molecules capable of regulating microbial pathogenesis and virulence, including those with antibiofilm properties.

According to current knowledge, the Quorum Sensing (QS) system plays a crucial role in regulating bacterial virulence and biofilm formation. Therefore, it is of great significance to elucidate the action spectra of these antagonists and their targets within signaling pathways, with the aim of assessing their effectiveness as QS inhibitors.

Keywords: *Biofilm, Quorum sensing, natural or synthetic molecules, anti-virulent.*

Oral Communications Abstracts



Oral Communications List

Ref.	ID	Communicating Name	TITLE
OC1	O-498226	Ben Salah Hichem	Etude phytochimique des polysaccharides sulfatés de deux algues marines Tunisiennes : Gracilaria gracilis et Ulva lactuca et exploration de leurs activités biologiques
OC2	O-499002	Mzoughi Zeineb	Supercritical extraction technology in orange peels polysaccharides: Chemical characterizations and biological activities
OC3	O-495906	Faten Mannai	Formulation and characterization of bioplastic films based on cactus cladode mucilage
OC4	O-496855	Chibi Souad	Valorization of Jatropha curcas and Ricinus communis L seed oils to produce biodiesel via Transesterification Process
OC5	O-492690	Kamel Essid	Valorisation alimentaire et industrielle des huiles végétales : synthèse d'esters de sucre avec des anhydrides mixtes gras
OC6	O-492358	Laghouiter Oum Kelthoum	Fatty acid composition, tocopherols and antioxidant activity of seed oil of two Algerian date palm cultivars (Phoenix dactylifera).
OC7	O-493924	Moalla Rekek Dorsaf	Wound healing effect of Three Tunisian oils: Hazelnuts, Sweet almond and Abricot
OC8	O-496797	Raoudha Abbassi	Chemical structure and antioxydant properties of date seeds extract (Phoenix dactylifera L.) in alloxan induced damage in rats
OC9	O-495566	Omrani Sondes	Intercalation of a pharmaceutical compound in a modify clay
OC10	O-495330	Souilah Amal	synthèse de matériaux carbone par voie sol-gel
OC11	O-494042	El Hadi Djamel	Etude de l'Influence de la Taille des Particules de la Poudre sur le Rendement et la Qualité de l'Huile essentielle d'écorces des Fruits de Bigaradier
OC12	O-487618	Attar Tarik	Protection anticorrosion au moyen d'un médicament expiré dans un environnement acide
OC13	O-496051	Maamria Jihen	Influence of solvents on physicochemical properties on tin sulfide synthesized by sol-gel: Application to photocatalytic degradation of Rhodamine B under UV and Sunlight
OC14	O-495803	Mnafki Rim	Posidonia Oceanica balls: Chemical Composition and lignin extraction
OC15	O-498377	Maghchiche Abdelhak	Antimicrobial and Antioxidant Potentials of Nanoparticles Synthesized from Medicinal Plants
OC16	O-492224	Salmi Chaima	Synthese verte de Mn ₃ O ₄ nanoparticules : caracterisation, Applications avec étude moleculaire
OC17	O-495322	Aggoun Khaled	Phenolic content, antioxidant, enzymatic, and anti-inflammatory activities of ethyl acetate extract from Athamanta sicula L. grown in Algeria
OC18	O-496615	Sfar Manel	Ultrasonic-assisted extraction of red pepper waste polysaccharide: Structural characterization, antioxidant, antiglycation and -amylase inhibitory activities
OC19	O-493730	Arfaoui-Elhif Rim	Development of an innovative scaffold with antibiofilm properties using Tunisian clay, polyvinyl alcohol and extra-virgin olive oil via emulsion templating
OC20	O-494583	Soltani Siwar	Etude structurale du tartonrin issu de Thymelaea tartonraira et évaluation de son potentiel antileishmanien : Etudes in-vitro et in-silico
OC21	O-495017	Bougatef Hajer	Development of a novel method for the purification of phycocyanin pigment from Spirulina platensis and evaluation of its anticancer properties
OC22	O-496555	Neghmouche Nacer Salah	In vitro antioxidant and antibacterial effects of ethanolic extracts from the leaves and stems of Oudneya Africana R. grown in the El Oued
OC23	O-496508	Ghwaidia Sabrina	Use of Tunisian Opuntia ficus-indica cladodes and polyurethane waste as a low cost renewable admixture in cement mortar preparations
OC24	O-496063	Elaissi Ameer	Composition chimique des huiles essentielles de cinq espèces de pins poussant en Tunisie et étude de leur pouvoir antioxydant
OC25	O-487657	Datoussaid Yazid	Etudes expérimentales et théoriques d'inhibiteurs dérivés de l'aminothiophène sur la corrosion de l'acier au carbone en milieu acide perchlorique

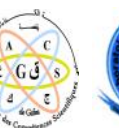
(CME-2023)

Chemistry for Medicine and the Environment

October 22-25, 2023



Ref.	ID	Communicating Name	TITLE
OC26	O-494706	Chergui Achour	L-Asparaginase production by <i>Streptomyces hydrogenans</i> CA04 isolated from the Djurdjura Mountain in Algeria: Optimization using Box Behnken Design (BBD)
OC27	O-495889	Zaaboubi Siham	Exploration Ethnobotanical Study of Medicinal Plants in the Eastern Region of Algeria (Seriana, Batna Province): Unlocking the Traditional Healing Treasures.
OC28	O-496507	Ayachi Amani	Caractérisation structurale d'un flavonoïde triglycosidique à partir de l'extrait méthanolique des tiges d' <i>Anthyllis henoniana</i> et détermination de son action sur les espèces réactives de l'oxygène (EROS)
OC29	O-000006	Haiouani Kheira	Efficient Synthesis of N-Benzyloxycarbonyl (Cbz)-protected 2-aminoalkanesulfonyl Chlorides with Functionalized Side Chains
OC30	O-496077	Benhebal Hadj	Elaboration et caractérisation de nanomatériaux spinelles pour le traitement des eaux par photocatalyse
OC31	O-000007	Si Tayeb Fatima	Aromatherapy and anxiety: systematic review of clinical studies
OC32	O-000008	Ghazghazi Hanene	Biological activity of three lichen species
OC33	O-000009	Mnasri Aziza	Synthesis of N-Heterocyclic carbene-palladium-PEPPSI complexes and their biological activities
OC34	O-000010	Ben Salah Donia	Synthesis of N -Heterocyclic carbene-palladium-PEPPSI complexes and their catalytic activities
OC35	O-498593	Achech Amel	Cu ₃ (BTC) ₂ hybrid material via conversion of copper (II) hydroxide: synthesis and characterization
OC36	O-498554	Bouzina Lila	Elaboration d'un matériau à base de caroube et son application dans le traitement des eaux usées
OC37	O-498295	Alatrache Abir	Deutération de molécules biologiquement actives : de la catalyse à la spontanéité
OC38	O-492360	Laghouiter Oum Kelthoum	Evaluation de l'activité antioxydante et antibactérienne d'huile essentielle de menthe poivrée cultivée dans la région de Ghardaïa.
OC39	O-492565	Farhat Donia	Cellulose nanofibrils extracted from <i>Citrus aurantium</i> tree waste, an effective agricultural waste management approach: characterization and potential applications
OC40	O-497340	Lafi Ridha	The effect of head group of surfactant on the adsorption of methyl red onto modified coffee residues.
OC41	O-487599	Dakhouché Soumia	Evaluation of the effect of the antibiofilm activity of bioactive molecules extracted from plants
OC42	O-496826	Hafidh Afifa	New human elastase inhibitor
OC43	O-498006	Trifi Beyram	Dégradation photocatalytique d'un polluant pharmaceutique par g-C ₃ N ₄ /TiO ₂
OC44	O-495825	Sourour Salhi	Photo-Fenton type Oxidation of Congo Red by a Heterogeneous Catalyst
OC45	O-492148	Dakhouché Soumia	Chemical composition, antibacterial and anti-biofilm activities of selected essential oils produced by medicinal plants in Algeria.
OC46	O-498994	Zitouni Amel	Synthesis of a novel system TTF-acceptor applied as a colorimetric sensor for transition metal
OC47	O-492053	Hamdi Ali M. Mohammed	Une nouvelle biosynthèse de nanocomposite MgO/PEG pour l'élimination des polluants organiques des solutions aqueuses sous irradiation solaire
OC48	O-498097	Herissi Labidi	Study on the effect of Cu doping on the properties of ZnO thin films deposited by ultrasonic spray pyrolysis
OC49	O-498722	Mehdi Raoudha	Détermination de la composition chimique par LC-ESI-MS d'extraits des écorces des racines de <i>Rhus Sp</i> et évaluation de leurs activités biologiques
OC50	O-492013	Golea Lynda	Screening phytochimique et activité biologique d' <i>Artemisia vulgaris</i>
OC51	O-495738	Boukerche Said	Synthesis and characterization of Fe ₃ O ₄ nanoparticles. Application to the degradation of rhodamine B
OC52	O-495845	Brahim Imene	Effect of Aqueous Extract from <i>Artemisia herba alba</i> asso on <i>Tuta absoluta</i>
OC53	O-489868	Bensafiddine Feriha	Effet antioxydant et antiinflammatoire des extraits de trois plantes locales
OC54	O-496374	Etteyeb Naceur	Kombucha fermentation of black tea and palm by-products: total phenolic content and bioactivity



Etude phytochimique des polysaccharides sulfatés de deux algues marines Tunisiennes : *Gracilaria gracilis* et *Ulva lactuca* et exploration de leurs activités biologiques

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Abstract:

But : En raison de leurs diverses activités biologiques, de nombreux polysaccharides isolés d'algues marines ont suscité une grande demande dans le domaine biomédical en tant qu'aliments fonctionnels et sources de nouveaux produits pharmaceutiques [1]. Cette étude vise à caractériser les polysaccharides sulfatés de deux algues *Gracilaria gracilis* et *Ulva lactuca* récoltées en Tunisie ainsi que d'évaluer leur activité biologique.

Méthodes : La composition en monosaccharides a été déterminée par GC-MS et les structures chimiques des polysaccharides sulfatés ont été caractérisées par spectroscopie IR. La capacité antioxydante de différents extraits de polysaccharides a été analysée à l'aide de trois méthodes complémentaires : piégeage de radicaux DPPH, pouvoir réducteur (FRAP) et capacité antioxydante totale (CAT).

Résultats : Les polysaccharidiques de *Gracilaria gracilis* (PLSG) et *Ulva lactuca* (PLSU), extraits à chaud, ont montré des teneurs élevées en phénols et flavonoïdes totaux. Les analyses par GC-MS des deux polysaccharides ont révélé la présence d'xylose, du glucose, du ribose et d'allose comme monosaccharides majoritaires. Le dépouillement du spectre IR montre que PLSG et PLSU sont des polysaccharides sulfatés caractérisés par les groupes C-O-S (854 cm^{-1}), S = O (1234 et 1473 cm^{-1}), C=O (1636 et 1637 cm^{-1}) et OH (3278 cm^{-1}). En outre, ces deux polysaccharides ont montré une activité antioxydante intéressante en utilisant 3 tests différents. Les résultats indiquent l'existence d'une corrélation linéaire remarquable et significative entre la puissante activité antioxydante des polysaccharides et leurs fortes teneurs en composés phénoliques.

Conclusion : Les résultats ainsi obtenus suggèrent la possibilité d'utiliser les polysaccharides sulfatés de ces deux algues comme agents antioxydants prometteurs dans plusieurs applications industrielles (cosmétiques, pharmaceutiques...).

Mots clés : *Gracilaria gracilis*, *Ulva lactuca*, polysaccharides sulfatés, caractérisation chimique, activité antioxydante.

Référence bibliographique :

[1] Kolsi R.B.A., Ben Salah H., Jarda N., Chaaben R., Jribi I., Feki A., Rebai T., Jamoussi K., Allouche No., Blecker C., Belghith H., Belghith K. (2017). Sulphated polysaccharide isolated from *Sargassum vulgare*: Characterization and hypolipidemic effects. *Carbohydrate Polymers* 170, 148-159.



Supercritical extraction technology in orange peels polysaccharides: Chemical characterizations and biological activities

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Abstract:

This study explores the application of supercritical fluid extraction (SFE) technology for the isolation of polysaccharides from orange peels and investigates their chemical characteristics and biological activities *in vitro* (antioxidant and α -amylase inhibitory). Polysaccharides obtained from orange peels have gained recognition for their potential functional and therapeutic properties in various industries. Moreover, the chemical characterizations of the extracted polysaccharides were comprehensively examined, encompassing structural analyses, molecular weight distribution assessments, and monosaccharide composition determinations. Advanced analytical techniques, such as FTIR spectroscopy, NMR spectroscopy, and GC-MS, were employed for a detailed understanding of their chemical properties. Furthermore, the biological activities of these orange peel polysaccharides were evaluated through *in vitro* assays, focusing on their antioxidant effect and potential α -amylase inhibitory properties. The results shed light on the unique attributes of polysaccharides extracted using supercritical technology, providing insights into their application in the food, pharmaceutical, and cosmetic industries. This research underscores the significance of supercritical extraction as a valuable technique for the isolation of bioactive compounds from orange peels, offering opportunities for the development of functional ingredients with diverse industrial applications.

Keywords: Orange peels, polysaccharides, supercritical fluid extraction (SFE), chemical characterizations, biological activities.

Formulation and characterization of bioplastic films based on cactus cladode mucilage

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Abstract:

Bioplastics are derived from monomers and/or biopolymers resulting from biological processes and/or a combination with plastics of fossil origin. The combination of biopolymers with polymers from fossil resources improves end-of-life biodegradability. In this way, this study aims to investigate the ability of cactus mucilage (CM) to elaborate bioplastic composite films mixed with synthetic petroleum polymers. CM-based films were formulated using different concentrations of mucilage. The microstructure, film physical and barrier properties, solubility, thermal stability, and toughness of the produced films were studied. The results reveal that CM-based films' behaviors depend on the mucilage concentration. The addition of synthetic polymers to CM films produces compatible, hydrophobic, flexible, and stiffer films with low moisture contents and important barrier properties. The elaborate films were thermally stable at high temperatures. The biodegradability of the composite films buried in the ground shows that the produced bioplastic films are 100 % biodegradable. Furthermore, CM-based films can benefit specific applications, especially food packaging.

Keywords: Cactus, mucilage, bioplastic, film.

Valorization of *Jatropha curcas* and *Ricinus communis* L seed oils to produce biodiesel via Transesterification Process

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Abstract:

Biodiesel is a mixture of mono-alkyl esters used as an alternative fuel to diesel. It is obtained by the transesterification of vegetable oils or animal fats with a light alcohol. This research work focuses on the valorization of two Euphorbiaceae plants: *Jatropha curcas* and *Ricinus communis* L. These two plants can thrive in the most arid lands and withstand harsh weather conditions. The mature seeds of these two varieties can produce a significant amount of vegetable oil through a simple heating process in the presence of methanol, resulting in biodiesel with a very low sulfur content. The choice of these two plants as energy crops is justified by the fact that their seeds contain high-energy-value oil with properties comparable to diesel, and they are readily available. Both oils are non-edible.

Keywords: Biodiesel; Transesterification; Vegetable oil; *Jatropha curcas*; *Ricinus communis* L.

VALORISATION ALIMENTAIRE ET INDUSTRIELLE DES HUILES VEGETALES : SYNTHÈSE D'ESTERS DE SUCRE AVEC DES ANHYDRIDES MIXTES GRAS

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Résumé:

Les esters de sucre des acides gras sont des agents tensioactifs non ioniques qui ont d'excellentes performances et de nombreuses utilisations. Ce travail est consacré à la synthèse d'esters de sucre par la réaction d'estérification du sucre avec des anhydrides mixtes carboxyliques et palmitiques en utilisant la résine Amberlyst-15 comme catalyseur acide hétérogène. Ces anhydrides doivent être stables et réagir comme des agents acylants. L'influence de différents paramètres de réaction, tels que le rapport molaire (saccharose/anhydride), le type de solvant et le temps de réaction sur le rendement de la réaction d'estérification a été étudiée. La réaction d'estérification du saccharose avec l'anhydride benzoïque palmitique mixte conduit à un mélange d'esters de saccharose et d'acide palmitique avec un bon pourcentage de conversion. L'anhydride mixte était à la fois réactif et sélectif pour la préparation d'esters d'acides gras.

Mots Clés: acide gras, anhydride mixte, catalyse hétérogène, résine Amberlyst-15, esterification, lipid esters.

Fatty acid composition, tocopherols and antioxidant activity of seed oil of two Algerian date palm cultivars (*Phoenix dactylifera*).

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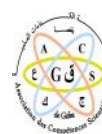
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Résumé:

Seed samples of date palm cultivars were analyzed for oil content, fatty acid and tocopherol profiles. Gas liquid chromatography and high performance liquid chromatography were used for fatty acid and tocopherol analysis, respectively. The oil contents of date palm seeds varied between 4,7% and 6,5% DW. The main fatty acids in the oils are oleic (37.89-55.00 %), followed by lauric and myristic acids (11.19-24,91 % and 12,91-19,26% respectively). The study of the insaponifiable fraction permitted to identify the sterols and tocopherols contents (4.5-8.44 mg/100g DW), (0.24-0.65 mg/100g DW) respectively. The major tocopherol in the seed oils of date were α -tocopherol ($p < 0.05$). As a result, the present study shows that date seeds are rich source of edible oil used for human consumption as well as additives in food, for medicinal use, in cosmetics, pharmaceuticals and food industries.

Mots-clés: Date seeds Oil; Fatty acids; Tocopherols; DPPH assay.



Wound healing effect of Three Tunisian oils: Hazelnuts, Sweet almond and Abricot.

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Abstract:

This study is part of a framework for the valorization of oils extracted from recognized medicinal plants (sweet almond, hazelnut and apricot) for their use in pharmacotherapy thanks to their antioxidant and healing properties. A study of the quality indices of the oils and the specific extinction indices K230 and K270 is well present to characterize our oils. A chromatographic analysis was carried out to determine the fatty acids contained, with a study of the contents of polyphenols and colored pigments. The evaluation of the antioxidant activity was carried out through the -carotene test, DPPH and the reducing power.

30 rats were divided into four batches of 6 rats each after experimental induction of a mechanical injury: a control batch of untreated rats (physiological saline), a batch of rats treated with the reference Cicaflora wound healing agent, three batches of rats treated with the oils studied. The evaluation of the healing of the lesions was made through a qualitative and quantitative histological analysis of these lesions after animal sacrifice.

Skin healing was absent in all control rats. The healing power of the mixture was higher than that of the reference products. The histological analysis of the biopsies of the treated rats showed a collagen density comparable to that of the reference rats but the tissue regeneration and epithelialization were more complete at the level of the treated biopsies.

The evaluation of the antioxidant activity of the oils shows a high antioxidant potential through three tests including the DPPH antiradical test, the FRAP iron ionization test and the beta carotene bleaching test.

Our results show that our oils have good qualitative and quantitative values to be exploited in the pharmaceutical and dermatological fields.

Keywords: Wound healing, oxydatif stress, oils, phytotherapy.

Chemical structure and antioxidant properties of date seeds extract (*Phoenix dactylifera* L.) in alloxan induced damage in rats

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Abstract:

The study was conducted to examine the antioxidant activity and evaluate the protective effects of DSPK against alloxan-induced damage in the liver, kidney, and pancreas in diabetic rats. **Group 1 (Control):** control group, that did not receive any treatment, **Group 2 (Diab):** alloxan was injected intraperitoneally (120mg/kg body weight) for two days, **Group 3 (DSPK):** treated only by date seeds powder added in the diet (300g per kg) for 6 weeks, **Group 4 (DSPK+Diab):** alloxan-diabetic rats treated with date seeds powder (300 g/kg). Estimations of biochemical parameters in blood were determined. TBARS, SOD, CAT, and GPx activities were determined. A histopathological study was done by immersing pieces of both organs in a fixative solution followed by paraffin hematoxylin-eosin staining. In addition, the antioxidant activities of DSPK were evaluated by DPPH radical scavenging activity, FRAP reducing power, and ABTS free radical scavenging. The results revealed that date seeds significantly decreased serum levels of glucose, cholesterol, triglycerides, urea, creatinine, T-protein, ALP, D-biliand T-bili activities. In addition, superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx) activities that had been reduced in liver, kidney, and pancreas of the treated group were restored by DSPK treatments and, therefore, the lipid peroxidation level was reduced in the same organs compared to the control group. Additionally, the histological structure in these organs was restored after treatment with date seeds powder.

Keywords: Antioxidant, Alloxan, phytotherapy, Oxidative stress, *Phoenix dactylifera*.

Intercalation of a pharmaceutical compound in a modify clay

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Abstract :

This work examining the beneficial effect of a Tunisian clay for drug delivery applications.

The clay studied is a montmorillonite-like smectite (Sm-Na) in a purified state and the organoclay derivative (HDTMA-Sm) in a modified state as a drug carrier for metformin hydrochloride (MET), In order to prove the MET loading into the clays. These materials were characterized by X-ray diffraction, differential scanning calorimetry, cation exchange capacity, specific surface area measurement, X-ray fluorescence spectroscopy, and Fourier-transformed infrared spectroscopy. Studies indicated surface adsorption, as well as clay-drug interactions through hydrogen bonds and electrostatic interactions for the hybrid (MET/Sm-Na) and hydrophobic interactions and cation exchange for the hybrid (MET/HDTMA-Sm). The results showed that the clays (Sm-Na) and (HDTMA-Sm) are capable of adsorbing the MET, reaching a maximum load of 12.42 and 21.97 mg.g⁻¹, respectively.

The adsorption isotherms were fitted by the Freundlich model, indicating heterogeneous adsorption of the studied adsorbate-adsorbent system, and followed pseudo second-order kinetics. The calculation of G° indicated the spontaneous and reversible nature of the adsorption. The calculation of H° indicated a physical adsorption for the purified clay (Sm-Na) and a chemical adsorption for the modified clay (HDTMA-Sm). The release of intercalated MET was studied in simulated gastric and intestinal fluids. The release results reveal that the purified clay (Sm-Na) and the modified organoclay (HDTMA-Sm) can be used as carriers in controlled drug delivery in future clinical applications.

Keywords: Clay minerals, Active ingredient, Excipient, Smectite.

Synthesis and characterizations of Carbon Xerogels from Resorcinol and Formaldehyde

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Abstract:

The sol-gel method consists in obtaining very pure products from selected precursors containing only carbon and oxygen as heteroatoms to form a polymeric resin. The proposed synthesis reaction is a polycondensation of resorcinol with formaldehyde in two different media (water and acetone) in the presence of catalysts and at two temperatures (25 and 50 ° C). By varying the parameters, an optimization is carried out, by the factorial design method (2k): by following three characteristics of the nanoxerogels prepared: the density, the gel time and the reaction yield. The results indicate the best conditions for the synthesis of a carbon nanoxerogel

Keywords: *xerogel, sol-gel, charbon actif*

Étude de l'Influence de la Taille des Particules de la Poudre sur le Rendement et la Qualité de l'Huile Essentielle d'Écorces des Fruits de Bigaradier

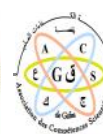
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Résumé:

Le but de ce travail est d'étudier l'effet de la taille des particules de poudre d'écorces sur le rendement et la qualité des huiles essentielles de bigaradier (oranger amer : *Citrus aurantium L.*). Les écorces ont été séchées, découpées, broyées et tamisées. L'extraction d'huile essentielle (HE) à partir de 8 échantillons de bigaradier est réalisée par hydrodistillation assistée par micro-ondes (HDMO) (dispositif type Clevenger monté sur micro-onde). Les résultats obtenus montrent que lorsque les particules ont une taille inférieure à 300 μ m, le rendement d'huile essentielle augmente proportionnellement avec la taille des particules en passant de 5,04 % à 21,84 %. Au-delà de 300 μ m de diamètre, le rendement d'HE devient inversement proportionnel à la taille des particules et il passe de 21,84 % à 2,52 %. Ce qui montre que le diamètre des particules a un effet remarquable sur le rendement en huile essentielle. D'autre part, les mesures de la densité et l'indice de réfraction des huiles essentielles, montrent que la taille des particules n'a pas d'influence sur la qualité des huiles essentielles extraites. Les résultats de la CG/MS montrent que la composition qualitative des huiles essentielles de bigaradier est globalement équivalente quelque que soit la taille des particules.

Mots-clés : *citrus aurantium*, huile essentielle, hydrodistillation, taille, particule, rendement.



Protection anticorrosion au moyen d'un médicament expiré dans un environnement acide

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Résumé:

La performance du médicament Tabeta a été examinée comme un inhibiteur de corrosion pour l'acier au carbone en solution acide par la méthode de perte de poids. L'influence de la concentration de l'inhibiteur, de la température et du temps d'exposition sur l'efficacité de l'inhibition et la vitesse de corrosion ont été étudiées. Les résultats expérimentaux ont révélé que le médicament expiré est un inhibiteur efficace et que son efficacité d'inhibition augmente avec l'augmentation de la concentration pour atteindre un maximum de 95,89 % à 0,5 mg/L à 293 K. Les paramètres thermodynamiques indiquent que la réaction d'adsorption sur la surface du carbone est spontanée.

Mots-Clés: Protection inhibitrice, Environnement, Médicament expiré, Paramètres thermodynamiques.

INFLUENCE OF SOLVENTS ON PHYSICOCHEMICAL PROPERTIES ON TIN SULFIDES SYNTHESIZED BY SOL-GEL: APPLICATION TO PHOTOCATALYTIC DEGRADATION OF RHODAMINE B UNDER UV AND SUNLIGHT

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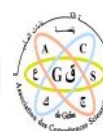
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Abstract:

In our study, we focus on the synthesis of tin sulfide nanoparticles by conventional sol-gel method using SnCl_2 and $\text{CS}(\text{NH}_2)_2$ as precursors and two different solvents like hexane and triethylamine. The effect of solvent on the physicochemical properties of tin sulphide nanoparticles was characterized by X-ray diffraction (DRX), scanning electron microscopy (SEM), thermal gravimetric (TGA), Fourier transformed infrared spectroscopy (FTIR), photoluminescence (PL) and UV-Visible.

DRX results confirmed the formation of two phases of tin sulfide such as SnS and SnS_2 structure with crystallite size in the range of 11–12 nm. The SEM images showed the formation of cubic particles for SnS and spherical particles for SnS_2 . From the optical studies, it is found that the band gap energy showed two values 1,74 eV for SnS_2 and 1,5 eV for SnS. The effects of type solvent on the photocatalytic activity of tin sulfide nanoparticles were examined by the degradation of Rhodamine B (RhB). As a result of the photocatalytic tests the good performance of SnS and SnS_2 has an excellent response after the degradation of rhodamine B.

Keywords: SnS, SnS_2 , NPs, sol-gel, photocatalytic degradation, RhB, UV, sunlight.



***Posidonia Oceanica* balls: Chemical Composition and lignin extraction**

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Abstract:

Posidonia oceanica balls are the dominant seagrass in the Mediterranean Sea. This biomass has great potential for use as a novel lignocellulosic material on an industrial scale. The rational valorisation of these available renewable resources fits very well with the recent sustainable approach, commonly established everywhere. During this paper, the chemical composition of *Posidonia oceanica* balls was established according to the TAPPI standard methods. The obtained results show clearly that the marine biomass presents a high polysaccharide i.e. 68% and it can be justified to investigate in many applications and especially to produce fibre.

The delignification step was done by using the soda-anthraquinone process. The obtained fibre was characterized by several methods by determining their mechanical, chemical, thermal and morphological behaviours.

Keywords: *Posidonia oceanica*, fibre, surface morphology, characterization.



Antimicrobial and Antioxidant Potentials of Nanoparticles Synthesized from Medicinal Plants

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Abstract:

The eco-friendly synthesis of nanoparticles (NPs) using plants and other natural resources has gained momentum due to the increasing demand for green chemistry and nanotechnology. Green synthesis technology facilitates the creation of NPs from medicinal plants, ensuring physiological safety, costeffectiveness, and environmental friendliness. In this context, ZnO NPs, which possess a wide range of potential applications, particularly in the biomedical field for enhancing antibacterial activity, were synthesized using ecologically sound methods. In this study, we employed an aqueous extract of the *Retama sphaerocarpa* (L.) plant as both a biological reducing agent and a stabilizing agent for the synthesis of ZnO NPs derived from zinc acetate dihydrate ($Zn(CH_3COO)_2 \cdot 2H_2O$). Various analytical techniques, including UV-Visible spectroscopy, infrared spectroscopy, and X-ray diffraction analysis, were employed to characterize the resulting Nano powder. The X-ray diffraction experiments confirmed the crystalline nature of the nanoparticles and provided insights into their particle size.

The UV-Vis absorption spectra displayed a distinct absorption peak at 370 nm, while FTIR spectral analysis confirmed the presence of metal-oxygen groups in the synthesized ZnO NPs. Further investigation into the biological properties of these NPs revealed their strong antibacterial activity against both *Staphylococcus aureus* (S. aureus) and *Escherichia coli* (E. coli).

Notably, these results demonstrated significant antibacterial efficacy compared to conventional medications, highlighting the potential of plant-based NP synthesis as an outstanding approach to develop versatile and environmentally friendly biomedical products, especially for pharmaceutical applications as antibacterial formulations. Additionally, the *Retama sphaerocarpa* (L.) plant exhibited substantial antioxidant potential and emerged as a promising biocompatible candidate with potential applications in pharmacology and therapeutics.

Keywords: Nanoparticles (NPs), Medicinal plants, Antibacterial formulations, Antioxidant potential, Pharmaceutical applications.

Synthèse verte de Mn₃O₄ nanoparticules : caractérisation, Applications avec étude moléculaire

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Résumé:

La nouvelle synthèse de Mn₃O₄ à partir de feuilles de Pistacia lentiscus a été préparée en utilisant la méthode de synthèse verte. Elle utilise un processus de mélange direct pour améliorer les propriétés de photodégradation et examiner ses propriétés physiques à l'aide de diverses techniques de caractérisation, notamment la diffraction des rayons X (XRD), la spectroscopie infrarouge à transformée de Fourier (FTIR), la microscopie électronique à balayage (SEM), l'analyse par dispersion d'énergie (EDX) et la spectrophotométrie UV-Visible (UV-Vis). La diffraction des rayons X révèle une phase cubique de Mn₃O₄ de granulométrie 28,7 nm. Les images SEM montrent les nanoparticules sphériques d'un diamètre de 37 nm.

L'écart d'énergie optique des nanoparticules de Mn₃O₄ était de 1,8 eV, ce qui en faisait un catalyseur efficace sous la lumière du soleil. L'activité photocatalytique des colorants bleu de bromophénol (BPB) et bleu d'ortho-toluidine (O-TB) à une concentration de colorant de 5×10^{-5} mol/L indique d'excellentes efficacités de dégradation de 98 % et 95 % en 70 minutes, respectivement, sous irradiation solaire. Cette activité photocatalytique a été expliquée avec une étude moléculaire utilisant Materials Studio. Le Mn₃O₄ est un excellent nanocomposite candidat pour les applications de photodégradation et pourrait être utilisé pour sa capacité potentielle à développer des techniques conventionnellement utilisées.

Mots-Clés: Synthèse verte, Dégradation photocatalytique, Mn₃O₄, Colorants organiques, Nanocomposite, énergie d'adsorption

Phenolic content, antioxidant, enzymatic, and anti-inflammatory activities of ethyl acetate extract from *Athamanta sicula* L. grown in Algeria

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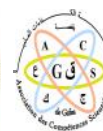
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Abstract:

In this study, we have explored the pharmacological potential of a species belonging to the Apiaceae family (*Athamanta sicula* L.). Plant extraction was carried out using methanol, followed by the use of solvents with increasing polarity to extract specific phenolic compound families. The phenolic content of the butanolic extract was determined, and several biological activities were performed, including protein denaturation inhibition, DPPH assay, and the potential to inhibit tyrosinase enzyme. The results demonstrate good antioxidant activity with an IC₅₀ of 90.72±0.73 µg/mL, strong inhibition of protein denaturation with a percentage of 83.29%, and moderate activity against the tyrosinase enzyme with an IC₅₀ of 360.00±0.14 µg/mL. These results can be attributed to the high content of phenolic compounds observed in the extract, with 305.5686±1.11 µg GAE/mg of extract for polyphenols and 103.47±0.73 µg EQ/mg for flavonoids.

Keywords: *Athamanta sicula*, antioxidant, enzymatic, anti-inflammatory, phenolic extract.



Ultrasonic-assisted extraction of red pepper waste polysaccharide: Structural characterization, antioxidant, antiglycation and α -amylase inhibitory activities

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Abstract:

Currently, the high added-value compounds contained in plant by-products and wastes offer a wide spectrum of opportunities for their reuse and valorization, contributing to the circular economy. These biowastes contain a great level of marketable bio-products extracted for added-value products such polysaccharides. Current study deals with polysaccharide extraction from pepper waste (CAP) using ultrasonic extraction technique. The extracted polysaccharide was characterized using Fourier Transform Infrared Spectroscopy (FTIR) analysis, UV-vis, Size Exclusion Chromatography (SEC/MALS/VD/DRI), GC-MS after hydrolysis and NMR. Polysaccharide from pepper waste was composed of galactose, glucose arabinose, rhamnose, xylose, mannose and fructose in molar percentage of 64.5 %, 7.0 %, 4.7%, 2.9 %, 2.6 %, 7.2 % and 11.1 %, respectively with a weight average molecular weight of 504 000 g/mol. Finally, results showed that pepper waste polysaccharide presents strong antioxidant activities and an interesting antiglycation and α -amylase inhibitory properties.

Keywords: By-products valorization, polysaccharides, ultrasonic-assisted extraction, α -amylase.

Development of an innovative scaffold with antibiofilm properties using Tunisian clay, polyvinyl alcohol and extra-virgin olive oil via emulsion templating

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Abstract

The emulsion templating technique has been used to fabricate a biobased porous scaffold that possesses both antibiofilm and antioxidant properties. This innovative approach opens up new avenues for the manufacture of porous materials with precise control of pore size. Taking into account environmental and economic factors, our material was manufactured using polyvinyl alcohol (PVA) as the polymer matrix, raw Tunisian clay as the stabilizing agent in the Pickering emulsion and extra virgin olive oil (EVOO) as the oil phase. PVA is a preferred choice for the production of dressings due to its ability to maintain a moist environment, thus facilitating the healing process. Clay was used as a barrier against bacteria and as emulsifier due to its nanoscale and layered structure. In EVOO, the polyphenolic compounds have antioxidant activity and fatty acids have a plasticizer role. X-ray fluorescence, X-ray diffraction and Fourier transform infrared spectroscopy were used to analyze the raw clay. Then, the obtained films were structurally and chemically characterized, and their performance, antimicrobial activity against *Pseudomonas aeruginosa*, and antioxidant activity were evaluated. The emulsion characterization showed that clay addition increased the emulsion stability index to 98%, even after 3 months of storage. This was explained by the irreversible adsorption of clay platelets on the droplet surface that formed a rigid shell to prevent coalescence. The film characterization demonstrated that the oil: water ratio did not influence the surface porosity, although it affected the pore size uniformity and interconnection. Conversely, shortening the curing time improved the surface porosity. The resulting PVA-clay/EVOO scaffold displayed an exceptional performance, including high mechanical strength (~2.1 MPa), interconnected porous structure with a size ranging from few μm to $>30 \mu\text{m}$, and hydrophobic properties ($\sim 90^\circ \pm 2$). In addition, the scaffold exhibits considerable anti-adhesive and antibiofilm properties against *Pseudomonas aeruginosa*. It could therefore be used in the early stages of wound healing to prevent biofilm formation, and represents a promising candidate for controlled drug delivery with potential applications in soft tissues.

Keywords: Pickering emulsion, soft-tissue, Green material, clay, Extra virgin olive oil, anti-adhesive and anti-biofilm properties.



Etude structurale du tartonrin issu de *Thymelaea tartonraira* et evaluation de son potentiel antileishmanien : Etudes *in-vitro* et *in-silico*

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Résumé

Cette étude concerne l'analyse approfondie du tartonrin, un nouveau flavonoïde isolé d'une plante indigène de la région méditerranéenne : *Thymelaea tartonraira*. Notre objectif principal est de déterminer la structure moléculaire du tartonrin et d'évaluer son potentiel antileishmanien, en utilisant à la fois des approches *in-vitro* et *in-silico*.

Dans un premier lieu, nous avons réussi à isoler le tartonrin et à caractériser sa structure chimique à l'aide de techniques spectroscopiques avancées (RMN mono et bidimensionnelle, HRMS, IR, UV). Cette étape cruciale nous a permis de confirmer la pureté du composé, ouvrant ainsi la voie à des investigations plus approfondies.

Dans le cadre de l'étude biologique *in-vitro*, nous avons évalué l'effet du tartonrin sur la croissance des parasites *Leishmania*, responsables de la leishmaniose. Les résultats montrent que le tartonrin exerce une activité significative contre ces parasites, suggérant un potentiel antileishmanien prometteur. Des analyses complémentaires ont été menées pour évaluer la toxicité du composé vis-à-vis des cellules hôtes (macrophages Raw 264,7), avec des résultats encourageants quant à sa sélectivité.

Parallèlement, des études *in-silico* ont été entreprises pour mieux comprendre les mécanismes d'action potentiels du tartonrin contre *Leishmania*. Nous avons choisi la ptéridine réductase, une enzyme clé dans le métabolisme des parasites *Leishmania*, comme cible principale de nos investigations. Ces simulations ont révélé des informations précieuses sur les sites de liaison et les modes d'interaction, jetant ainsi la lumière sur les voies potentielles de traitement de la leishmaniose.

Mots clés : Activité antileishmanicide, Cytotoxicité, Tartonrin, *Thymelaea tartonraira*.

Development of a novel method for the purification of phycocyanin pigment from *Spirulina platensis* and evaluation of its anticancer properties

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Abstract:

Phycocyanin (PC) pigment, as a natural blue dye, has particular applications in various fields. It is a water-soluble protein which has anticancer, antioxidant and anti-inflammatory properties.

In the present work, we introduce an efficient procedure for the purification of PC pigment, followed by conducting a comprehensive investigation of its cytotoxic effects on human breast cancer (MCF-7) cells. A novel four-step purification procedure including cell lysis step by freeze-thawing, precipitation with CaCl₂, microfiltration step and ion exchange chromatography was employed, achieving a high purity form of PC with purity index (PI) of 0.65. A highly purified PC was employed to evaluate its anticancer activity. The inhibitory effects of highly purified PC on the proliferation of human breast cancer cells (MCF-7) have detected by MTT assay. Interestingly, PC was most active with 50% of cell proliferation inhibition at 4 mg/mL, while it is much safer and less toxic on normal cell line (HEK-293). Moreover, the dose dependent treatment of MCF-7 cells with PC resulted in inhibition of cell migration in the wound healing assay.

Therefore, these potential features of PC make it a promising drug candidate for further development in cancer treatment.

Keywords: *Spirulina platensis*, Purification, Phycocyanin, Anticancer properties.

In vitro antioxidant and antibacterial effects of ethanolic extracts from the leaves and stems of *Oudneya Africana* R. grown in the El Oued

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Abstract:

This work is a part of the development of *Oudneya africana* R.'s (of the Brassicaceae family) aerial parts (leaves and stems). To that end, the ethanolic extracts of this plant were examined for their total phenolic content (TPC), total flavonoid content (TFC), antioxidant activities (DPPH, ABTS, -carotene and Phenanthroline tests), and antimicrobial activity. In comparison to stem extract, ethanolic leaf extract contained more phenolics (69.75 ± 1.87 g GAE/mg) and flavonoids (91.88 ± 1.94 g QE/mg). Despite having significant antioxidant properties, ethanolic extracts of leaves and stems were less effective than commercial antioxidants like butylhydroxytoluene (BHT) and butylhydroxyanisole (BHA) at inhibiting the DPPH radical, the ABTS radical, the -carotene-linoleate bleaching assay, and the phenanthroline test. On the ABTS assay, ethanolic stem extract had an IC₅₀ value of $15.90 \mu\text{g/mL}$ and -carotene had an IC₅₀ value of $20.21 \mu\text{g/mL}$, both of which showed significant antioxidant activity. With inhibitory diameters of 13 mm and 12 mm, respectively, the ethanolic extract from the leaves and stems demonstrated remarkable antibacterial activity against *Candida albicans*.

The preliminary research presented in this conference identifies *Oudneya africana* R. as a prospective candidate for possessing antibacterial and antioxidant characteristics. It also calls attention to the potential benefits of using this plant as a traditional remedy.

Keywords: Antimicrobial; *Oudneya africana*; antioxidant activity; ethanolic extract.



Use of Tunisian *Opuntia ficus-indica* cladodes and polyurethane waste as a low cost renewable admixture in cement mortar preparations

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Abstract

The concrete industry is one of the most important, but also the most polluting industries of the 21st century due to the cement manufacturing. Many solutions exist in order to reduce its environmental impact; unfortunately they result in a significant drop of the properties of concrete in terms of fluidity, workability, during time and mechanical resistance.

In that scope, cement industry is turned towards the development of new binders which could replace Portland cement, the main component of concretes.

In this project, we studied the possibility of using polyurethane waste and *Opuntia Ficus indica*, mainly cladode powder and cladode juice, as substitute to Portland cement.

The experimental design methodology, which allows the variation of several factors at the same time while reducing the number of tests and the time of realization, was adopted to conduct this work. The aim was to provide clarification and to able to establish mathematical models allowing the highlighting of the individual and combined effects of the factors.

This work was based on a coupled multi-scale and multi-techniques approach assessing in details, the link with mechanical properties (flexion and compression tests), consistency tests, setting time, of synthesized materials to assess the relevance of these new cements.

The aim is not to invent a new technology but to optimize synergy between these compounds in developing new binder matrix.

Composition chimique des huiles essentielles de cinq espèces de pins poussant en Tunisie et étude de leur pouvoir antioxydant

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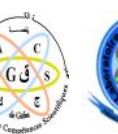
Abstract:

Au début des années soixante, dans le but de diversifier et d'enrichir notre forêt, la Tunisie a introduit plusieurs espèces forestières, y compris le pin. Cette espèce est principalement exploitée pour la production du "zgougou" et pour le bois de chauffage, tandis que leurs huiles restent non exploitées et non valorisées. Dans le présent travail, nous étudions la composition chimique des huiles essentielles des aiguilles de cinq espèces de pins et leurs activités antioxydantes. Les huiles essentielles ont été analysées par CPG/MS et CPG/FID. Les composés majoritaires ont fait l'objet d'une analyse de la variance, d'un classement des moyennes, d'une analyse en composante principale et d'une classification hiérarchique.

L'analyse chimique des huiles essentielles par chromatographie en phase gazeuse nous a permis d'identifier 139 composés représentant 85,6 % à 95,9 % de la totalité des huiles. Ces composés sont classés en 7 classes chimiques et varient significativement selon les espèces. Nous avons détecté 25 composés ayant une teneur 2,0 % dans au moins une huile. Ils sont principalement constitués de monoterpènes hydrocarbonés (25,3 % ± 5,1 % à 67,7 % ± 11,4 %), parmi lesquels le -pinène est le composé majoritaire. L'analyse en composante principale et la classification hiérarchique des composés majoritaires nous ont permis d'identifier quatre groupes, chacun constituant un "chemotype."

L'activité antioxydante de ces huiles essentielles a été évaluée à l'aide des méthodes DPPH, ABTS, FRAP et Molybdène, montrant des variations significatives selon les espèces et la méthode utilisée. Les huiles de *P. canariensis* C.Sm. ex DC. et de *P. pinea* Endl. ont démontré la meilleure activité antioxydante. Ces huiles pourraient être utilisées dans l'industrie cosmétique comme agents anti-âge et dans l'industrie agroalimentaire pour la conservation des aliments.

Keywords: Pinus, Huiles essentielles, Chromatographie en Phase Gazeuse, Analyse en Composante Principale (ACP), Analyse de la Classification Hiérarchique (ACH), activité antioxydante.



ETUDES EXPERIMENTALES ET THEORIQUES D'INHIBITEURS DERIVES DE L'AMINOTHIOPHENE SUR LA CORROSION DE L'ACIER AU CARBONE EN MILIEU ACIDE PERCHLORIQUE

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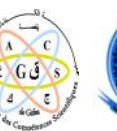
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Résumé:

L'effet de deux dérivés de l'aminothiophène, à savoir le (2-amino-4-phénylthiophène-3-carbonitrile) APTC et le (2-amino-4-p-tolylthiophène-3-carbonitrile) ATTC, en tant qu'inhibiteurs de la corrosion de l'acier au carbone dans un milieu d'acide perchlorique a été étudié. L'étude a été réalisée par la méthode de perte de poids, les calculs de chimie quantique (DFT) et le microscope électronique à balayage (MEB). L'impact des deux dérivés d'aminothiophène en tant qu'inhibiteurs était positivement corrélé avec la concentration, la température et le temps d'exposition. La valeur de l'énergie active de la réaction de corrosion par inhibition de l'acier au carbone est supérieure à celle obtenue pour la solution vierge. Toutes les données expérimentales étaient cohérentes avec l'isotherme d'adsorption de Langmuir, et la valeur et le signe de l'énergie libre d'adsorption obtenus indiquaient que les molécules d'inhibiteur étaient spontanément adsorbées sur la surface du carbone par un mécanisme d'adsorption mixte. L'analyse de la surface par MEB a montré la formation d'un film organique protecteur sur la surface de l'acier. La DFT a confirmé les résultats expérimentaux et a montré que l'effet d'inhibition dépendait de la structure.

Keywords: Aminothiophene, Inhibiteur de corrosion, DFT, Acide perchlorique.



L-Asparaginase production by *Streptomyces hydrogenans* CA04 isolated from the Djurdjura Mountain in Algeria: Optimization using Box Behnken Design (BBD)

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Abstract :

L-Asparaginase is used in the inhibition of the proliferation of tumoral lymphocytes by depletion of L-Asparagin which stops the protein biosynthesis. Among the organisms producing this enzyme, actinomycetes especially *Streptomyces* genus, are an interesting source. The aim of this work is to optimize the production of L-asparaginase by our strain. Our actinomycete strain was isolated from Djurdjura mountains in Algeria; it has been identified based on its morphological, biochemical and her 16S rDNA sequence as *Streptomyces hydrogenans* CA04. The production of extracellular L-Asparaginase has been highlighted. On the other hand, the conditions of the enzyme production: temperature, substrate concentration and glucose concentration were optimized using the RSM method with the Box Behnken Design. The optimal conditions of the enzyme production were (g/L): L-asparagine 7.5; glucose 1.0; in the basis medium containing (g/L): K₂HPO₄ 0.5; MgSO₄·7H₂O 0.1 which gave an enzymatic activity of 5.9812IU/ml at the temperature 25,76°C. The ANOVA test (*P* value = 0.05) and adjusted R² values close to the experimental R² showed that the model of the enzyme production is significant. Strain *Streptomyces hydrogenans* CA04 is producing L-asparaginase with a variable yield and strongly dependent on the 03 factors selected in this study.

Keywords: L-Asparaginase; *Streptomyces*; optimization; Djurdjura Mountains; Box Behnken.



Exploration Ethnobotanical Study of Medicinal Plants in the Eastern Region of Algeria (Seriana, Batna Province): Unlocking the Traditional Healing Treasures.

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Abstract

A study on the distribution and use of medicinal plants by the population of the Eastern region of Algeria was successfully conducted through an ethnobotanical survey. The objective was to gather maximum information on the effects of these plants on users. This study was carried out using 200 questionnaires (both paper and electronic versions) randomly distributed among different population categories.

The obtained results represent an extremely valuable source of information, both for the studied region and for the Algerian national medicinal flora. In the first part, concerning the profile of the surveyed individuals, it became apparent that women are more inclined to possess traditional knowledge and resort to natural therapies, mainly transmitted within their families from one generation to another. The surveyed individuals primarily use the aerial parts and flowering summits in their fresh state, administered in measured doses using a spoon. The preparation method varies depending on the plant used.

Despite the significant importance of medicinal plants in the daily lives of the population, it is important to emphasize that studies aimed at evaluating ethnobotanical knowledge are very rare in the study area. Therefore, it is essential to promote this type of study to facilitate a better understanding of these species for conservation purposes. This, indeed, requires local knowledge of biological characteristics and the development of suitable cultivation techniques.

Keywords: Medicinal plants - Ethnobotany - Traditional medicine - Questionnaire



CARACTERISATION STRUCTURALE D'UN FLAVONOÏDE TRIGLYCOSIDIQUE A PARTIR DE L'EXTRAIT METHANOLIQUE DES TIGES D'*ANTHYLLIS HENONIANA* ET DETERMINATION DE SON ACTION SUR LES ESPECES REACTIVES DE L'OXYGENE (EROS)

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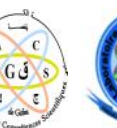
Résumé :

Le présent travail s'inscrit dans le cadre de la recherche de molécules biologiquement actives isolées et purifiées à partir de la plante tunisienne *Anthyllis henoniana* pour la lutte contre certaines maladies et minimiser l'utilisation des produits chimiques employés dans la médecine et l'agriculture.

Avec la progression de la chimie moderne, l'étude des plantes médicinales a permis de déterminer les mécanismes d'action régissant les propriétés thérapeutiques concédées par l'usage traditionnel et a également ouvert la voie à l'utilisation de produits d'extraction ou d'hémisynthèse. Prouver le potentiel d'un principe actif à piéger les radicaux libres présente le premier pas vers la détermination de son effet thérapeutique.

Cette partie de nos travaux de recherche concerne la détermination du profil chimique de l'extrait méthanolique des tiges d'*Anthyllis henoniana* ainsi que sa purification sur HPLC-préparative dans le but d'isoler le composé majoritaire de l'extrait. Ainsi, une étude structurale détaillée à l'aide des méthodes spectroscopiques tels que l'UV et la RMN en utilisant les expériences mono et bi-dimensionnelles (¹H, ¹³C, HSQC, HMBC, COSY, NOESY) a permis son identification à l'**isorhamnétine glucosyl-di-rhamnoside**. Ensuite, nous avons étudié son pouvoir anti-radicalaire moyennant les cellules MDA-MB-231 tout en utilisant des flavonoïdes connus pour leurs puissants pouvoirs inhibiteurs d'EROS.

Mots clés : *Anthyllis henoniana*, LC-MS/MS, HPLC-préparative, RMN, EROS,



Elaboration et caractérisation de nanomatériaux spinelles pour le traitement des eaux par photocatalyse

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Résumé:

La surconsommation ainsi que la pollution massive contribuent considérablement à rendre plus difficile l'accès à l'eau potable dans le monde et en particulier dans les pays aux ressources extrêmement faibles. Ainsi, l'enjeu pour l'avenir est de préserver la quantité et la qualité de l'eau. Cette protection nécessite l'installation de dispositifs d'épuration efficaces et adéquats afin de réutiliser les eaux usées. En plus d'être peu coûteuse et respectueuse de l'environnement, la photocatalyse hétérogène sous rayonnement visible demeure une technologie de traitement adéquate pour l'élimination d'une myriade de polluants organiques et inorganiques. Parmi les matériaux photocatalytiques, les oxydes de structure spinelle présentent un grand intérêt en raison de leur sensibilité à la lumière visible. Dans ce travail, des poudres nanométriques d'oxydes spinelles ont été élaborés par procédé sol-gel, caractérisés par différentes techniques (XRD, SEM et IR) et utilisés comme photocatalyseurs pour la dégradation photocatalytique sous lumière visible de colorants organiques de différentes natures. Les oxydes en question présentaient une certaine stabilité chimique en suspension aqueuse et étaient plus ou moins efficaces pour l'élimination des colorants.

Mots-clés : Photocatalyse hétérogène, Oxydes spinelles, Sol-gel, Colorants.



Aromatherapy and anxiety: systematic review of clinical studies

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Keywords: *Aromatherapy; anxiety; Depression, evidence-based medicine, systematic review.*

INTRODUCTION

In our society, anxiety and depression are serious health issues that affect a large proportion of the population. Unfortunately, drug therapies are not always effective and can lead to drug abuse, delay of therapeutic effect, dependence, and tolerance. Traditionally, aromatherapy has also been used for anxiety relief and mood improvement.

METHOD

We searched international databases including Four English databases (Cochrane Library, PubMed, Scopus, Google Scholar) . The mesh terms “*Aromatherapy; anxiety; Depression, evidence-based medicine, systematic review*” were used. The filter Clinical trial were used in Pubmed. The term “clinical trial” were added when Google Scholar and Scopus were consulted. (27) articles were evaluate, a total of 17 studies were included in the systematic review and 10 articles were conducted in meta-analysis, between the period 2019 to 2023 ,

RESULTS

Sleep quality, anxiety and depression were the principal psychiatric diseases treated. The PSQI and BAI scores were used as dependent variable. The population of patient varied cross studies, there was cancer patients, patients with coronary ICU, burns an in perioperative situations. Lavender and chamomile essential oil were the most evaluated (Ex:Apigenin in the chamomile binds to GABA receptors and can have a sedative, anti-anxiety effect). The studies included 304 participants. Comparison of the PSQI and BAI scores of the patients in the control and intervention groups before and after the intervention showed statistically significant differences in the change in favor of the intervention group ($p < 0.05$). Inhalation aromatherapy may be more effective than massage;

CONCLUSION

Recommendations for the development of an aromatherapy program for clinical practice (preoperative anxiety, oncology, palliative care, hospice) are needed.



Biological activity of three lichen species

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Abstract:

Lichens represent a promising source of bioactive molecules with several biological activities. The objective of this work is the study of secondary metabolites, the evaluation of the antioxidant and antibacterial activities of four lichen species harvested from Bizerte region of two different substrates (soil and tree trunk) as well as a comparison between these studied species. Maceration extraction (75 % ethanol) was then carried out, phytochemical tests, a study of the anti-radical activity by the method of free radical trapping DPPH as well as a study of the antibacterial activity of the extracts obtained by the method of diffusion of disks on medium solid and by the dilution method in a liquid medium. The highest extraction yield is that of the tree trunk lichen: *Ramalina lacera* (3.87%). Phytochemical analysis of the four lichen species revealed a diversified presence of bioactive molecules such as total polyphenols, flavonoids and tannins. The dosage of the latter showed that the ethanolic extract of *Ramalina lacera* indicates the highest levels of secondary metabolites. The study of the antioxidant activity by the method of free radical trapping DPPH also showed that the ethanolic extract of *R. lacera* has the strongest antioxidant potential (IC₅₀ = 13 mg / ml). Finally, the study of the antibacterial activity by the disk diffusion method on solid medium has shown that most of the strains tested are sensitive to various ethanolic extracts. Thus, the ratios of MBC / MIC prove that all the ethanolic extracts of the different species tested exert a bactericidal power against all bacterial strains studied except the ethanolic extract of *R. lacera* which exerts a bacteriostatic action only in *S.aureus* 25762.

Keywords: Lichens, Secondary metabolites, Antioxidant activity, Antibacterial activity, *Ramalina lacera*, *S. aureus*.

Synthesis of N -Heterocyclic carbene-palladium-PEPPSI complexes and their biological activities

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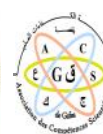
Abstract:

N-heterocyclic carbenes (NHCs) are among the most intriguing classes of ligands that have generated numerous breakthroughs in the field of organometallic chemistry and homogeneous catalysis [1,2]. Because of the numerous applications of heteroaromatic compounds as biologically active compounds and functional materials [3], a series of novel benzimidazolium salts 2 and their new air and moisture stable PEPPSI type Nheterocyclic carbene palladium(II) complexes (PEPPSI: pyridine-enhanced pre-catalyst preparation, stabilisation, and initiation), were synthesized and characterized by means of ¹H and ¹³C{1H} NMR, FTIR spectroscopic methods..

Keywords: palladium, N-heterocyclic carbenes, biological activities.

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Synthesis of N -Heterocyclic carbene-palladium-PEPPSI complexes and their catalytic activities

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Abstract:

N-heterocyclic carbenes (NHCs) are among the most intriguing classes of ligands that have generated numerous breakthroughs in the field of organometallic chemistry and homogeneous catalysis [1]. In recent years, various precatalysts have been used in C-H bond activation. Since 1991 Ardunego et al. 3 isolated the free N-heterocyclic carbene (NHC) for the first time, NHCs have attracted widespread attention due to their superior σ -donating properties. For example, in the design and synthesis of catalysts, NHCs are usually preferred because they can easily stabilize the catalysts. This is also true of the palladium catalytic system and NHCs have been successfully applied in Pd-catalysed cross-coupling reactions in the past decades. In particular, pyridine-enhanced precatalyst preparation stabilization and initiation (PEPPSI) palladium complexes showed good catalytic performance because they are easy to synthesize and use [2-4]. For this reason, we synthesized a novel benzimidazolium salts (**2a-d**) and their palladium-NHC-PEPPSI complexes (**3a-d**) which were tested in the direct C5-arylation of 2-acetylthiophene, Furfuryl acetate, and Furfural with various aryl bromides. The reactive C2-position of heteroarene was blocked in order to maximize the yields of the monoarylated products. All new compounds were characterized by ¹H NMR, ¹³C NMR, IR spectroscopy and MS techniques.

Keywords: palladium, N-heterocyclic carbenes, catalytic activities.

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$\text{Cu}_3(\text{BTC})_2$ HYBRID MATERIAL VIA CONVERSION OF COPPER (II) HYDROXIDE: SYNTHESIS AND CHARACTERIZATION

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Abstract:

Metal-organic frameworks (MOFs) are a class of crystalline hybrid materials prepared via well-established principles of coordination chemistry using the self-assembly of metal ions or metal clusters with organic linkers [1]. The growth of thin, continuous films of MOFs on surfaces has been identified as a pressing research challenge. This is because the application of this material in devices such as sensors and permeable membranes will likely require their interfacing to two or three-dimensional substrate either in the growth stage or within the device itself [2]. Fabrication of MOFs thin films has been achieved by different methods including layer-by-layer deposition. In this work, we describe a simple and straightforward methodology based on the in situ conversion of copper hydroxides to $\text{Cu}_3(\text{BTC})_2$ thin film on glass supports using the layer by layer growth method. The obtained product was characterized by ATR-FTIR (IR) Fourier, X-ray diffraction (XRD) and optical and scanning electron microscopy.

Keywords: copper hydroxide, MOFs, conversion, $\text{Cu}_3(\text{BTC})_2$.

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Élaboration d'un matériau à base de caroube et son Application dans le Traitement des Eaux Usées

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Résumé:

L'application des matériaux en tant qu'adsorbant dans le traitement des eaux résiduaires a suscité une attention considérable ces dernières années. Dans ce travail nous avons synthétisé un adsorbant à base de caroube pour des fins environnementales l'élimination du colorant rouge télon par adsorption. Les conditions optimales pour ce colorant sont, une masse de 140mg, un pH acide égal à 2, une température de 50°C, une vitesse d'agitation non nulle, une concentration de 1mol/l de NaCl (pour une masse d'adsorbant égale à 50mg pour 140mg pas d'effet), un temps d'équilibre de l'adsorption compris entre 15min et 225min pour des concentrations allant de 100 à 400mg/l Le modèle cinétique du pseudo-second ordre a donné la meilleure description pour le colorant rouge télon. La modélisation des isothermes a montré que l'isotherme de Temkin est le mieux adapté pour le Rouge Télon Le processus d'adsorption pour cet adsorbat est endothermique, spontané pour les différentes températures avec augmentation du désordre moléculaire indiqué par la valeur de l'entropie.

Keywords: Adsorption, rouge télon, caroube.



Deutération de molécules biologiquement actives: de la catalyse à la spontanéité

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Abstract:

Le marquage isotopique par le deutérium et le tritium de molécules suscite un grand intérêt, notamment dans l'industrie médicale et pharmaceutique pour la conception de nouveaux médicaments [1]. La deutération de fragments choisis de médicaments peut en effet améliorer leurs propriétés pharmacocinétiques. En effet, les liaisons C-D étant plus stables que les liaisons C-H, le métabolisme oxydatif serait plus lent avec les composés deutérés qu'avec les composés hydrogénés.

De ce fait, les médicaments deutérés seraient plus résistants par rapport aux dégradations enzymatiques et peuvent ainsi présenter une demi-vie prolongée dans le corps ce qui permettrait de réduire les posologies, d'atténuer les effets secondaires et améliorer l'observance du patient.

De nombreuses méthodes de marquage par échange isotopique permettent d'atteindre des enrichissements isotopiques élevés, mais elles requièrent généralement l'utilisation de conditions drastiques [2] (température et pression élevées) ou la catalyse acide, basique ou métallique [2-4].

Cependant, il s'avère que ce marquage isotopique peut avoir lieu spontanément à température ambiante et pression atmosphérique sans catalyse. En effet, on a observé un phénomène inattendu qui s'est produit spontanément au cours de la caractérisation par RMN ¹H d'un principe actif de la famille des -bloquants : chlorhydrate d'Acébutolol. Un échange proton-deutérium s'est produit au niveau d'un groupement méthyle situé en d'une fonction carbonyle, à température ambiante et en présence seulement d'un solvant deutéré, D₂O supposé être inerte. L'échange isotopique observée est analysé en fonction du temps par des expériences RMN ¹H, ¹³C et DEPT 135. Les spectres obtenus ont permis de mettre en évidence l'apparition successive des entités suivantes : CH₃ CH₂D CHD₂ CD₃, signifiant que les trois protons du groupement acétyle se sont comportés comme des protons mobiles d'où l'originalité du résultat détecté. La mobilité des protons acétyles est vérifiée par l'utilisation de bases, fortes et faibles, qui ont permis de réaliser la deutération complète en 30 min. Par ailleurs, la LC-MS à tandem quadripôle temps de vol a confirmé ces échanges H-D et a permis de déterminer les sites de deutération dans la molécule d'Acébutolol et de proposer un mécanisme d'échange impliquant une réaction de tautomérisation céto-énolique. Une étude cinétique a permis également de déterminer les constantes cinétiques et confirmer l'échange dans D₂O et CD₃OD.

Keywords: Hydrogen-deuterium exchange reaction, acebutolol hydrochloride, ¹H-NMR, ¹³C and ¹³C DEPT-135 NMR.

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Evaluation de l'activité antioxydante et antibactérienne d'Huile Essentielle de Menthe Poivrée cultivée dans la région de Ghardaïa.

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Résumé:

Les substances naturelles issues des végétaux ont des intérêts multiples mis à profit dans l'industrie. Les huiles essentielles l'un des métabolites dotés de propriétés biologiques intéressants. Ce travail vise à évaluer l'activité antioxydante et antibactérienne de l'huile essentielle de certaine menthe cultivée dans la région de Ghardaïa dans la région de Ghardaïa et son extrais (*Mentha piperita*). L'activité antioxydante par le test du DPPH a montré que le H.E de cette plante a un pouvoir antioxydant (RSA % >à 84,5%) meilleur que celui de l'acide ascorbique (RSA % >à 79,6%). L'activité antibactérienne étudiée vis-à-vis cinq souches bactériennes montre l'efficacité de cette huile essentielle avec une zone d'inhibition maximale de 40 mm pour Enterococcus faecalis, Staphylococcus aureus est la souche la plus sensible avec un CMI égale à 0.02 µm/ml. Ces propriétés de huile de menthe peut être due é leur richesse en Menthol (46.93%) et du menthone (35.46 %), identifiés par GC-SM.

Mots-clés: Menthe poivrée ; Huile essentielle ; Activité antioxydante et antibactérienne, Analyse CPG.



Cellulose nanofibrils extracted from *Citrus aurantium* tree waste, an effective agricultural waste management approach: characterization and potential applications

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Résumé :

Tunisia is considered one of the most important citrus producers in the world with an annual average production estimated i.e. 416,000 tons. Bitter orange (*Citrus aurantium*) trees can be found in nearly all Tunisian citrus-producing regions and are well suited to the environmental conditions. This plant is known by the benefits of its essential oil and its several applications especially in medical field. However, the discarded waste such as deadwood is often incinerated causing air and soil pollution. This work is to present innovative ways of valorization of the bitter orange tree stem in a respond of the escalating demand of sustainable management of agricultural waste. In the first step, cellulose fibres were successfully extracted from sawer orange stem waste using a chemical approach consisting of the delignification and bleaching of the raw material followed by the chemical composition's characterization of the lignocellulosic biomass. In the second steps, cellulose nanofibrils (CNF) was prepared by TEMPO oxidation as a chemical pretreatment and grinding as a mechanical treatment. The obtained CNF were characterized using different methods such as DSC, XRD, TGA, FT-IR. Finally, its potential application in the textile and bio-packaging industry were tested and evaluated.

Mots-clés : *Citrus aurantium*, cellulose, characterization, bio-packaging.

The effect of head group of surfactant on the adsorption of methyl red onto modified coffee residues.

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Abstract

The effect of the head group structure of surfactant on the adsorption of methyl red (MR) onto modified coffee residues (MCR_s) has been investigated. The coffee residue (CR) was modified by a cationic surfactant, namely Dodecyltrimethyl ammonium bromide (DTAB) and a zwitterionic surfactant, namely N, N-Dimethyldodecylamine N-oxide (DDAO). The CR and MCR_s (DTAB–CR and DDAO–CR) were characterized by using SEM, EDX, BET and FTIR analysis. The effect of pH, contact time and initial MR concentration on the adsorption process was studied. Langmuir and Freundlich isotherm models were used to evaluate the experimental data. Adsorption equilibrium data were fitted to Langmuir isotherm, and the maximum adsorption capacities with DTAB–CR and DDAO–CR was 66.66 and 76.72 mg/g, respectively. On the other hand, the results of kinetic studies showed that the data were in maximum agreement with the pseudo-second-order kinetic model. Based on the experimental data and the proposed adsorption mechanism, it was concluded that zwitterionic surfactant is the most efficient for the adsorption of MR.

Keywords: Head groups; Adsorption; Dye; coffee residue; Isotherm; Kinetic.

EVALUATION OF THE EFFECT OF THE ANTIBIOFILM ACTIVITY OF BIOACTIVE MOLECULES EXTRACTED FROM PLANTS

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Abstract:

The resistance of bacterial biofilms to host antibiotics has led to the search for alternative approaches for bioactive molecules of plant origin capable of destroying the biofilm. Essential oils are natural compounds considered as antibiofilm and antioxidant. This work aims to evaluate the effect of the antibiofilm activity of 3 plant extracts from Souk Al-Ahras against 5 isolated clinical pathogens. *Rosmarinus officinalis*, *Aloysia citrodora* and *Artemisia herba alba* oils provided a yield of (0.93%), (0.24%) and (0.87%) respectively. These essential oils were extracted by hydrodistillation. The study of the antibacterial power by the method of micro-dilution has confirmed certain properties possessed by these essential oils. Indeed, the latter showed an antibiofilm effect against Gram-positive and Gram-negative strains in a dose-dependent manner. The highest antibiofilm activity was seen in *Aloysia Citrodora* extract oil against all bacteria tests. The results obtained in this study represent the great potency of natural from plants as a source of biologically active compounds for the development of future therapeutic antibiofilm agents.

Keywords: *Rosmarinus officinalis*, *Aloysia citrodora*, *Artemisia herba alba*, bioactive molecule, essential oil, antibiofilm.



New human elastase inhibitor

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Abstract:

In search of new bioactive materials, novel hybrid nanomaterials (HNPs) is synthesized. The paramount purpose of this research study is to synthesize a new hybrid nanomaterial and to explore its anti-inflammatory activity, based on human elastase inhibition. The novel Nano material is synthesized via an hydrosilylation reaction between the octavinyl-polyhedral oligomeric silsesquioxane (OVPOSS) used as a silicon source and 1,3,4-triazole-3,5-diamine (guanazole), an important component used in medicinal chemistry research. To confirm the synthesis route, the HNPs chemical structure, is studied by ²⁹Si, ¹³C CP MAS NMR and FTIR spectroscopy. According to the spectroscopic results the 1,2,4-triazole nuclei are tethered to the silica cage, creating a Nano hybrid material wherein Si-N covalent bonds are established. The surface morphological shape and the size of HNPs are visualized and portrayed using the SEM technique. It is noteworthy that the sizes of the HNPs are at the Nanoscale with an average size of approximately 100 nm in diameter. The HNPs inhibitory activity against the human elastase enzyme is studied, and based on the experimental findings the new hybrid nanomaterials has a high inhibition of the human elastase. Safety and biocompatibility of the synthesized HNPs toward normal human epithelial cells are observed. The results demonstrate that the HNPs is highly effective in inhibiting human elastase and could be used as an efficient and potential pharmacophore to care/cure skin inflammation.

Keywords: Nanomaterial; Mesoporous; Human Elastase; Anti-inflammatory.

Dégradation photocatalytique d'un polluant pharmaceutique par g-C₃N₄/TiO₂

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Résumé:

Les activités industrielles, agricoles et urbaines contribuent à la pollution des écosystèmes aquatiques par le rejet de plusieurs polluants organiques dont les contaminants pharmaceutiques suscitant une préoccupation croissante en raison de leur caractère bio-récalcitrant. Il est alors nécessaire de développer des procédés efficaces pour dégrader ce type de polluant. Ainsi, plusieurs travaux se sont focalisés sur leur dégradation photocatalytique. Ces études ont montré que ce procédé employant des semi-conducteurs comme photocatalyseurs est reconnu comme un procédé de traitement de l'eau respectueux de l'environnement, économique et efficace grâce à la formation in situ d'espèces fortement oxydantes capables d'oxyder les polluants organiques d'une manière non sélective jusqu'à leur minéralisation. Parmi les photocatalyseurs les plus utilisés, on peut citer le TiO₂ caractérisé par son pouvoir oxydant sous irradiation UV et de son caractère écologique. Néanmoins, l'activité photocatalytique du TiO₂ présente des performances limitées en raison de sa large bande interdite et de la recombinaison des charges en surface. Par conséquent, au cours des dernières années, des efforts ont été consacrés au développement et à la synthèse de photocatalyseurs plus efficaces et robustes. Dans cette optique, ce travail s'intéresse à la synthèse par la voie hydrothermale d'un photocatalyseur nanocomposite, le g-C₃N₄/TiO₂, et ce pour dégrader la Lévo-floxacine, considéré comme étant un modèle de contaminant pharmaceutique. Après une caractérisation structurale et morphologique du nanocomposite préparé, une évaluation de ses performances photocatalytiques sous la lumière UV et la lumière solaire a été réalisée. L'ensemble des résultats obtenus montre que le nanocomposite préparé peut être considéré comme un photocatalyseur efficace offrant des alternatives réalisables et rentables pour dégrader les polluants pharmaceutiques dans l'eau.

Photo-Fenton type Oxidation of Congo Red by a Heterogeneous Catalyst

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Abstract

A heterogeneous catalyst was synthesized by surface modification of natural hematite using the simple impregnation method. The obtained catalyst was characterized by several techniques proving the surface modification of the hematite. The catalytic performance of prepared catalyst was evaluated in the Fenton type and Photo-Fenton oxidation of Congo red dye. The reactivity and stability of the catalyst was differentiated by studying the influence of the amount of used catalyst, leachate activity and catalyst reuse on the conversion of the initial concentration of Congo red. The oxidation of Congo red was studied under various experimental conditions. The best conversion rate of Congo red was about 89% using the catalyst under optimal conditions: $[H_2O_2]_0 = 1 \text{ mmol/L}$, $\text{pH} = 3$, temperature = 25 °C. The impregnation method allows the preparation of an efficient and stable catalyst.

Keywords: Hematite - Congo red - Fenton type oxidation, Photo-Fenton.

Chemical composition, antibacterial and anti-biofilm activities of selected essential oils produced by medicinal plants in Algeria.

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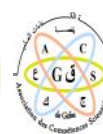
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Abstract:

The resistance of bacterial biofilms to antibiotics has led to the search for alternative approaches for bioactive molecules of plant origin capable of destroying the biofilm. Essential oils are natural compounds with important biological activities. This work aims to study the chemical composition, and to evaluate the antibacterial and antibiofilm activities of 3 Essential oils extracted from plants from Souk Al-Ahras. The antibacterial activities were assessed against 5 isolated clinical pathogens. The essential oils were extracted by hydrodistillation Rosmarinus officinalis, Aloysia citrodora and Artemisia herba alba oils provided a yield of (0.93%), (0.24%) and (0.87%), respectively. The study of the antibacterial activities by the method of micro-dilution showed MICs values from 5 to 20 μ l/ml. The antibiofilm activity showed that essential oils exhibited antibiofilm activities even at sub-MIC concentrations.

This study illustrates the great potential for natural compounds from plants to be used in the development of future phytotherapeutic antibiofilm agents.

Keywords: *Rosmarinus officinalis*, *Aloysia citrodora*, *Artemisia herba alba*, bioactive molecule, essential oil, antibiofilm.



Synthesis of a novel system TTF-acceptor applied as a colorimetric sensor for transition metal

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Abstract

The design and development of chemosensor molecules are mainly based on the notions of complementarity, co-cooperativity and pre-organization[1]. Sensor molecules derived from these concepts have appropriate orientation of functional groups that produce strong covalent and non-covalent interactions between sensors and target guest species [2]. On the one hand, 2,3-Diaminomaleonitrile (DAMN) has been shown to be a valuable π -conjugated organic molecule with wide applications in the field of chemosensors for the detection of ionic and neutral species. On the other hand, tetrathiaful valene (TTF) and its derivatives have played an important role in both the development of multifunctional organic materials, the construction of molecular devices and switchable supramolecular systems [3]. In this context, our research has been devoted to the development of a new Schiff base chemosensors combining the electrochemically active TTF and the diaminomaleonitrile (DAMN) unit. The prepared chemosensor was characterized by elemental analysis and spectral techniques such IR, UV, ¹HNMR, ¹³CNMR, mass spectroscopy. The electrochemical behavior of this compound indicates that it is promising for the construction of crystalline materials. As a preliminary study, this chemosensor was applied also as a colorimetric chemosensor for recognition of transition metal cations in tetrahydrofurane solution using UV-Vis titration.

Keywords : *Tetrathiaful valene, Molecular recognition, DAMN, Sensor, Metallic cations*

Reference :

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Study on the effect of Cu doping on the properties of ZnO thin films deposited by ultrasonic spray pyrolysis

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Abstract:

The aim of this work is to study the effect of the copper concentration on the optical and electrical properties of zinc oxide thin films grown onto glass substrate by chemical spray pyrolysis. ZnO:Cu thin films that contributes to water treatment for environmental recovery were elaborated with different copper concentrations (0, 2, 4, 6, and 8 at. %) from aqueous solutions of zinc acetate dihydrate and copper (II) chloride dihydrate. Substrate temperature, solution concentration, and deposition time were kept constant during the deposition with two different nozzle-substrate distance. By increases the Cu concentration or the approach of the substrate to the spray nozzle during preparation, the transmittance, refractive index, band gap, and electrical conductivity of the films are decrease with increasing the both of the thickness and Urbach energy of these n-type semiconductors films.

Keywords: Thin films, Spray Pyrolysis, Doping, Optical gap, electrical conductivity.

Détermination de la composition chimique par LC-ESI-MS d'extraits des écorces des racines de *Rhus Sp* et évaluation de leurs activités biologiques

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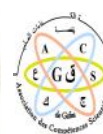
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Résumé:

Les plantes médicinales constituent une source importante de molécules bioactives d'origine naturelle. La mise en évidence de ces composés naturels nécessite de nombreuses étapes souvent longues et coûteuses. Dans le cadre des études chimique et biologique des plantes médicinales entreprises dans notre Laboratoire, nous avons utilisé comme modèle végétal le *Rhus Sp* de la famille des **Anacardiaceae**. Cette plante est un arbuste épineux connu par son potentiel thérapeutique et sa richesse en molécules bioactives particulièrement les acides phénoliques, les flavonoïdes et les tannins. Les écorces des racines ont été séchées, broyées puis extraites par des solvants de polarité croissante. La composition chimique des extraits à l'acétate d'éthyle et au butanol a été déterminée par LC-ESI-MS. Cette analyse a montré la présence de plusieurs composés appartenant aux familles des acides phénoliques et des flavonoïdes. L'évaluation de certaines activités biologiques de ces extraits a montré qu'ils sont dotés d'une forte activité antioxydante mesurée par les méthodes de DPPH, FRAP, NO et CAT. Par ailleurs, ces mêmes extraits ont présenté d'intéressantes activités antidiabétique et antilipidémique.

Mots clés : *Rhus Sp*, composition chimique, LC-ESI-MS, activités biologiques.



Screening phytochimique et activité biologique d'*Artemisia vulgaris*

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Résumé:

Les plantes aromatiques et médicinales sont l'une des sources principales phytochimiques appelés les métabolites secondaires, qui ont été largement utilisés dans la plupart des entreprises pharmaceutiques. Dans le règne végétal, le genre *Artemisia* se compose de petites herbes et d'arbustes que l'on trouve dans les régions semi arides en l'Algérie. Dans notre travail qui est basé sur la valorisation des plantes aromatique et médicinales, nous nous sommes intéressés au cours de cette étude phytochimique de deux extraits chloroformique et méthanolique de la partie aérienne de *Artemisia vulgaris* et évaluer quelques propriétés biologiques de l'extrait méthanolique de cette espèce qui provenant de la région d'Ain Touta Batna telles que : antioxydantes, antibacterienne.

Keywords: *Artemisia vulgaris*, antioxydantes, *Artemisia vulgaris*, antioxydantes, antibacterienne..

Synthesis and Characterization of Fe₃O₄ Nanoparticles. Application to the Degradation of Rhodamine B.

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Abstract:

A significant amount of pollution is affecting the environment as a result of various factors. Among these factors include pharmaceutical waste, chemical waste discharges, pollution, and others. We have therefore turned to a method of treating these wastes to lessen the impact of pollution. Based on a study of photocatalytic activity using a supramagnetic catalyst—the magnetic iron oxide (Fe₃O₄)—photocatalysis offers the potential for the degradation of pollutants.

The magnetic iron oxide, or magnetite (Fe₃O₄), was produced chemically, and the nanoparticles were identified by diffraction of X-rays (DRX) and microscopy with balayage coupled to EDS (MEB-EDS). The synthesized particles were used as a catalyst for the degradation of pollutants that were already present, including Rhodamine B. The following parameters were used to study the photodegradation of Rhodamine B: effect of catalyst mass, effect of solution pH, and effect of catalyst concentration. The results obtained showed a good yield of the degradation of Rhodamine B for acidic pH (pH=2.36), at the mass m=30mg and at the concentration C=3ppm for a minimal time of 35 min.

Keywords: Magnetite, Characterization, Photocatalysis, Degradation of pollutants, Rhodamine B.



Effect of Aqueous Extract from *Artimisiaherba alba assoon Tutaabsoluta*

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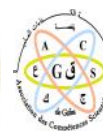
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Abstract:

The use of natural resources to combat crop bio-aggressors, is a new alternative that enters the field of biological control, in order to reduce the usage of chemical control and preserve environment and human health. In order to assess the medicinal plants, present in Batna area, our work focuses on comparing the insecticide activity of the aqueous desert wormwood extract, in the laboratory using four different doses (0,5%; 0.75%; 1% and 1.5%), laboratory sucrose (at 100ppm) vs. untreated modality, against tomato leaf miner. The foliar spraying of the different modalities on tomato plants is applied early in the morning, every 15 days, from 06/05/2023 until 01/07/2023, using a manual sprayer. The results obtained show that when infestation levels are modest, the aqueous extract's (at 0.75% and 1.5%) average efficacy can reach up to 27.28%, which is higher than the other modalities tested. These findings bring up up possibilities for study into potential, less expensive, and simpler control strategies for tomato leaf miners.

Keywords: Medicinal plant, *Artimisiaherba alba asso*, Tomato leaf miner, Aqueous Extract.



EFFET ANTIOXYDANT ET ANTIINFLAMMATOIRE DES EXTRAITS DE TROIS PLANTES LOCALES

Feriha Bensafiddine

Résumé:

La présente étude visait à étudier les propriétés antioxydantes et antiinflammatoires *in vitro* des extraits de trois plantes poussant à l'état spontané dans la région de Laghouat à savoir ; *Atriplex halimus* L., *Cleome arabica* L, et *Hammada elegans* Botsch. Les résultats du dosage des polyphénols obtenus montrent que les teneurs varient entre $0,168 \pm 0,020$ et $4,166 \pm 0,124$ GAE/g de la matière sèche, les taux des composés phénoliques les plus élevés ont été détectés dans les extraits hydroacétoniques et hydrométhanoliques. Le screening phytochimique montre que tous les extraits étudiés contiennent des stérols, terpènes, dérivés anthracéniques combinés, flavonoïdes, tanins, saponines, alcaloïdes et des sucres réducteurs.

On note l'absence des coumarines, les dérivés anthracéniques libres et les O-Hétérosides dans tous les échantillons. L'évaluation de l'activité antioxydante par les quatre tests chimiques, montre que le pouvoir antiradicalaire le plus intéressant a été enregistré pour l'extrait méthanolique de *Hammada elegans* ($EC_{50} = 0,551_0,171$ mg/ml). Cependant, l'extrait acétonique de *Hammada elegans* représente l'activité réductrice la plus importante avec un EC_{50} égale à $0,747 \pm 0,004$ mg/ml. Toutefois, cet extrait possède aussi l'effet chélateurs des ions ferreux le plus élevés ($EC_{50} = 5,749 \pm 0,009$ mg/ml). Ainsi, l'extrait hydrométhanolique de *Cleome arabica* montre la plus grande activité antilipopéroxydative ($EC_{50} = 0,031 \pm 0,000$ mg/ml), une activité qui est aussi significativement supérieure à celle des antioxydants de référence. Par ailleurs, les résultats de l'effet antiinflammatoire montrent que tous les extraits inhibent l'activité de la lipooxygénase et la cyclooxygénase significativement d'une manière dose-dépendante avec des valeurs de IC_{50} vaux $0,382 \pm 0,000$ - $19,210 \pm 0,297$ mg/ml et $0,258 \pm 0,002$ - $1,295 \pm 0,024$ mg/ml respectivement. Ainsi, l'extrait acétonique de *Hammada elegans* qui a montré son pouvoir inhibiteur le plus important, paraît être 2 fois plus important, que celui des inhibiteurs standards (Aspirine et Ibuprofène).

Mots-Clés: *Hammada elegans*, screening phytochimique, activité antioxydante, Effet antiinflammatoire.



Kombucha fermentation of black tea and palm by-products: total phenolic content and bioactivity

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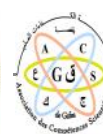
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Abstract:

The production of natural bioactive compounds by fermentation of plants has increased in recent years. The present study aims to evaluate the biological activities of the extracts obtained from the fermentation of black tea and palm by-products with kombucha consortium. After 14 days of incubation, liquid-liquid extractions were performed with ethyl acetate (EtOAc) and butanol to obtain dry extracts, which were used to characterize the bioactivity. Total phenolic content, antioxidant, antidiabetic and anti-inflammatory activities were measured. The results showed that kombucha fermentation significantly increased the total phenolic content in both plants, with the highest amounts in the EtOAc fraction. The antioxidant potential of black tea is more important compared to palm by-products, resulting in an IC_{50} value of 10.1 ± 0.3 (with EtOAc extract). As for the antidiabetic activity, the highest percentage inhibition rate was obtained for black tea with ethyl acetate extract compared to palm by-products, which showed moderate inhibition. As for the anti-inflammatory activity, the obtained extracts are not active.

Keywords: Kombucha fermentation, Bioactivity, Palm, Antidiabetic activity



Poster Communications Abstracts

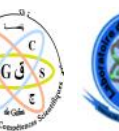


Poster Communications List

Ref.	ID	Communicating Name	TITLE
PC1	P-000004	Hacene LAOUEDJ	Morphological and anatomical comparison of leaves of date palm cultivars (<i>Phoenix dactylifera</i> L) grown in the southeastern region (Algeria)
PC2	P-498364	Boutarfif Wided	Pouvoir antibactérien des huiles essentielles de <i>Salvia.rosmarinus</i>
PC3	P-498095	Ladjarafi Abdelkader	Study of the structural and electronic properties of hetero-bimetallic complexes based on iron and ruthinium
PC4	P-498601	Laib Ibtiissam	Green synthesis of silver nanoparticles using <i>Helianthemum lippii</i> extracts (HI-NPs): Characterization and study of interaction with DNA
PC5	P-498935	Gheraissa Noura	Antimicrobial activity of MeOH extract of <i>Anabasis oropediorum</i> against pathogenic bacteria
PC6	P-496924	Elhleli Hanadi	Preparation And Characterization Of Biomaterials Based On <i>Opuntia Ficus Indica</i> (cactus)
PC7	P-496589	Djelloul Radia	Caractérisation phytochimique de l'huile végétale de lentisque "Pistacia lentiscus", récoltée dans la région d'El Tarf, Extrême Nord Algérien
PC8	P-495829	Sourour Salhi	Fenton type Oxidation of Congo Red by a Heterogeneous Catalyst
PC9	P-495766	Tei Siham	Classifying of Different Medicinal Plant Species from Algeria Using Electrochemical Voltammogram Recording
PC10	P-495751	Ghanem Kenza	Etude de l'influence des paramètres de soudage sur la microstructure et le comportement mécanique des assemblages acier-acier obtenu par soudage à l'arc.
PC11	P-495697	Lebbihi Raouia	A Comprehensive Study of MB Removal using Muscovite Mineral Clay: RSM and ANN Evaluation
PC12	P-495331	Souilah Amal	Synthèse de matériaux carbonés par voie sol-gel
PC13	P-496837	Walha Sandra	Crystal growth, Hirshfeld analysis, thermal behavior and magnetic properties of a new hybrid material (C ₅ H ₁₄ N ₂)[MnCl ₃ (H ₂ O) ₃]Cl
PC14	P-495887	Saad Sara	Zizyphus lotus cellulose for methyl orange elimination
PC15	P-497276	Ahmed Bensatal	In vitro evaluation of the antilithiasis activity of tannins extract of <i>Cucurbita maxima</i>
PC16	P-498867	Mehennaoui Rayane	Adsorption du vert de méthyle en solution aqueuse sur la fibre de luffa
PC17	P-000013	Aziza MNASRI	Effective Synthesis and Biological Evaluation of Dicoumarols: Preparation and Characterization
PC18	P-492516	Sihem Mouanni	Dépollution d'un résidu médicamenteux en présence d'un hétéropolyacide de type keggin
PC19	P-493884	Rahmani Salah-Eddine	Methylene blue (MB) removal from aqueous solution using local apricot stones
PC20	P-492978	Aounallah Samira	Evaluation de la toxicité cellulaire du cyantraniliprole, un nouvel insecticide diamide anthranilique, sur les rats wistar
PC21	P-000001	Bandou Samira	Synthesis and Characterization of Cationic Surfactant Phyllosilicate of Hydroxy double lamellar Or organic clay used for Elimination of Iron ions of industrial waste water Of Algeria Manufactory
PC22	P-496400	Safa Zineb	Extraction and characterization of <i>Cymbopogon schoenanthus</i> essential oil from the Timiaouine region in Algeria
PC23	P-496702	Samet Sonda	Etude de la toxicité in vivo de l'extrait méthanolique de la partie aérienne d' <i>erodium arborescens</i>
PC24	P-498110	Saigaa Narimane	The inhibition corrosion of carbon steel in an acidic medium by ethyl acetate extract of a novel eco-friendly inhibitor <i>Asphodelus ramosus</i>
PC25	P-492900	Fetni Samira	Assessment of Biological Activities of Extracts from an Algerian Plant, <i>Rosmarinus officinalis</i> L.
PC26	P-493612	Debbache Hafidha	Biochar prepared from castor bean shell by chemical activation
PC27	P-000002	Abderraouf Jraba	Effect of Palm Fibers on Thermal and Mechanical Properties of Phosphogypsum Based Plaster
PC28	P-000014	Donia BEN SALAH	Synthesis, structural characterization of silver(I)-NHC complexes and their antimicrobial activities



Ref.	ID	Communicating Name	TITLE
PC29	P-496214	Elhassasna Souhir	Study of the anticancer activity of the plant <i>Scutellaria Baicalensis</i> by molecular docking
PC30	P-497773	Znati Mansour	Synthesis, In vitro and In silico Evaluation of New 1,2,3-Triazole Linked Flavonoid Conjugates as Anti-proliferative Agents
PC31	P-498182	Siouane Soumia	Determination of the specific heat of the one-dimensional relativistic Kemmer oscillator
PC32	P-498517	Kheffache Ouzna	Synthèse de molécule d'intérêt biologique via la réaction de Biginelli
PC33	P-498532	Ramdane Farah	Chemical screening and antioxidant activity of two medicinal plants <i>Origanum majorana</i> and <i>Glycyrrhiza glabra</i> used in the treatment of infertility
PC34	P-496758	Kadri Mounira	Bioactivation of phenols and flavonoids in an aqueous extract of <i>Ephedra alata</i> leaves
PC35	P-498898	Oudini Boutheyna	Activité antioxydante et étude théorique de quelques arylidènes
PC36	P-493439	Djellouli Amir	Elimination des métaux lourds des effluents aqueux à l'aide de bio-biomatériaux hybrides à faible coût
PC37	P-495819	Ounis Amina	Elaboration and characterisation of nanomaterial Co-Doped (In/Ta)-BTO/ZW
PC38	P-496784	Kraiem Jamil	Utilisation des carbonates organiques comme réactifs et solvants verts pour la préparation de molécules bioactives
PC39	P-495885	Khammar Rachida	Theoretical characterization of structural properties and chemical reactivity of an organic material donor of electron-
PC40	P-495595	Kaddour Abdelbasset	Evaluation des activités antidiabétiques et hémolytiques des extraits aqueux de <i>Mentha spicata</i> L. récoltés en Algérie
PC41	P-495649	Bouchekioua Saad	Molecular docking of <i>Drimia Martima</i> components as anti-SARS-COV2
PC42	P-495082	Benreka Soufiane	Hybridation moléculaire d'analogue de la crcumine et les sel thiazol étude leur activité biologique
PC43	P-493634	Ben Seghier Meriem	Phytochemical analysis of components extracted from the heart of date Palm (<i>Heart of Phoenix dactylifera</i> L.) in southeastern Algeria
PC44	P-000011	Abdelli Abderrahmen	In silico assessment of novel morpholine-containing compounds against human legumain and cholinesterase enzymes
PC45	P-495987	Mekni Nejib	Identification of some components of the <i>Pistashia lentiscus</i> fatty oil from the north of Tunisia via a GC/MS chemical analysis
PC46	P-496773	Ferkous Fouad	Extraction et étude des principes actifs du <i>Myrtus</i> de la région d'EL TARG - Algérie
PC47	P-496796	Hamrouni Hania	Green Synthesis of Silver Nanoparticles using six widely available medicinal plants from the southeastern of Tunisia
PC48	P-495927	Benregga Fatima Zohra	Valorisation of <i>Zizyphus Jujuba</i>
PC49	P-495694	Bentarzi Amine	Synthesis of pyrazolone derivatives
PC50	P-495513	Kheiredine Bani	Experimental study of the co-digestion of two organic wastes
PC51	P-492691	Kamel Essid	Esterification of primary, secondary and tertiary alcohols with mixed carboxylic-palmitic anhydrides using resin amberlyst-15 as heterogeneous acid catalyst
PC52	P-495972	Elakremi Manel	Effect of three extraction methods on in-vitro antioxidant and antimicrobial activities of extracts from pistachio shells
PC53	P-496018	Omar Errayes Asma	Synthesis and antioxidant evaluation of some pyrimidine heterocyclic derivatives
PC54	P-496135	Elaissi Ameer	Composition chimique et variabilité de six huiles essentielles commercialisées en Tunisie
PC55	P-496516	Ayachi Amani	Toxicité in vivo de l'extrait méthanolique des tiges d' <i>Anthyllis henoniana</i>
PC56	P-496752	Soltani Siwar	Caractérisation structurale de la daphnorétine et évaluation de son potentiel antileishmanien : Etudes in-vitro et in-silico
PC57	P-496915	Walha Sandra	New Non-centrosymmetric Material (C ₅ H ₉ N ₃)[ZnBr ₄] H ₂ O : Molecular structure, characterization, optical properties and biological activities



Ref.	ID	Communicating Name	TITLE
PC58	P-498592	Achech Amel	Synthesis and characterization of pyrazolate metal organic framework thin film
PC59	P-499004	Mzoughi Zeineb	Optimizing and assessing gluten-free pasta made from spinach
PC60	P-493443	Nouar Yacine	The Impact of Processing Cycle Number on the Performances of Spanish Broom Flour reinforced Recycled Polypropylene Biocomposites
PC61	P-497039	Djamila Djemoui	Exploring the Medicinal Potential of Algerian rosemary: Mineral Content and Essential Oil Analysis
PC62	P-497065	Soudani Asma	Etude des propriétés anticorrosion de l'extrait végétal de <i>S. undulata</i> en milieu acide chlorhydrique 1M pour l'acier au carbone (X70)
PC63	P-498816	Rzig Boutheina	Adsorption performance of tartrazine dye from wastewater by raw and modified sawdust: Equilibrium, isotherms, kinetics and regeneration studies
PC64	P-498932	Messaoudi Hassiba	Reactivity of ZnO material in Biginelli Synthesis
PC65	P-498953	Soudani Kaouthar	Extract plant as an eco-friendly inhibitor corrosion for carbon Steel
PC66	P-499000	Bacha Maroua	A selective detection approach for Hg (II), Cd (II) and Al (III) ions using a pyridine-based colorimetric chemosensor
PC67	P-000003	Bouziane Cheimaa Afaf	Place de l'aromathérapie dans les soins palliatifs des patients cancéreux
PC68	P-000005	Mongi Saoudi	The Attenuation of Dermal Wounds by Modulating Oxidative Stress and Inflammation in Wistar Albino Rats: Beneficial effects of <i>Allium subhirsutum</i> L.
PC69	P-000012	Chiraz Labassi	Synthesis of new fluorescent pyrazolines via the NITEC reaction
PC70	P-000015	Faten Chaouachi	Optimization of the extraction yield of essential oils of <i>Myrtus Communis</i> (Linnaeus) by hydro distillation and chemical characterization
PC71	P-496792	Aloulou Hajer	Study of the treatment efficiency of industrial wastewater using low cost ceramic composite microfiltration membrane
PC72	P-000016	Mokded Fatma	Extraction de sirop et composés phénoliques d'une catégorie de faible valeur marchande de dattes Deglet ENOUR

**MORPHOLOGICAL AND ANATOMICAL COMPARISON OF LEAVES OF DATE
PALM CULTIVARS (*PHOENIX DACTYLIFERA L*) GROWN IN THE
SOUTHEASTERN REGION (ALGERIA)**

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Abstract

This study was carried out in the laboratory of the Faculty of Natural and Life Sciences at the University of ElOued. to study the anatomical comparison of leaves from the date palm of five varieties (Garess, Hamraya, White Deggla, Nour Deggla, Tekermist) cultivated in the area EL-oued (Hassi Khalifa), through a morphological description (the length and width of the frond, payoff) and anatomical study (the diameter of the clipsome of the leaf, the diameter of the large, medium and small vascular bundles, the diameter of the large fibrous bundle, the number of fibrous bundles between the two large bundles, the number of small and medium vascular bundles between the two large bundles, The area of the primary and secondary wood in the large beam, the thickness of the epidermis and waxy layer and the middle tissue).

Through the results obtained, it was found that the Hamraya variety achieved the highest yield by the number of buds in the palm, where this breed is distinguished (Hamraya) with the largest number in the medium vascular bundles compared to other varieties, It was also characterized by the smallest thickness of the wax layer, the diameter of the medium vascular bundle as well as the diameter of the large fibrous bundle, while rest of the characteristics were average compared to the other varieties.

Keywords: *dates palm (Phoenix dactylifera L), morphological traits, leaf anatomy.*



Pouvoir antibactérien des huiles essentielles de *Salvia rosmarinus*

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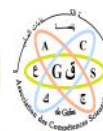
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Résumé

L'étude de recherche a porté sur le pouvoir antibactérien de l'huile essentielle s.rosmarinus sur trois souches de bactéries. Dans cette étude, nous avons réalisé l'extraction et l'identification des huiles essentielles et l'évaluation de leur pouvoir antibactérien sur certaines entérobactéries pathogènes. L'extraction des HE a été réalisée par hydrodistillation. La méthode de diffusion sur milieu gélosé a été utilisée pour déterminer les diamètres des zones d'inhibition. L'activité de l'HE des plantes sur trois souches bactériennes pathogènes "Escherichia coli, Staphylococcus aureus, Micrococcus aureus". Les résultats obtenus à partir des zones d'inhibition de diamètres supérieurs à 45 mm, pour les deux souches bactériennes sur les trois testées dans l'huile étudiée. Les zones d'inhibition enregistrées dépassent le plus souvent celles provoquées par l'antibiotique utilisé. L'HE de s. rosmarinus a montré une inhibition significative de la croissance des 02 souches "Escherichia coli, Staphylococcus aureus" traduite par la formation d'un diamètre d'une zone d'inhibition à l'intervalle (16-45) mm. Cependant, la souche bactérienne micrococcus présente une inhibition moyenne

Mots clés : Salvia rosmarinus. activités antibactérien, huile essentielle



Study of the structural and electronic properties of hetero-bimetallic complexes based on iron and ruthenium

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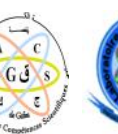
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Abstract:

An experimental and theoretical study was carried out on the influence of the metal M (M=Fe or Ru) and the length of the carbon chain on the structural and electronic properties of neutral complexes of type $[(Cp^*)(dppe)M-(C-C)_x-M(dppe)(Cp^*)]^{0/+2+}$ ($x=2-6$), during the first and second oxidation processes, using density functional theory (DFT). The determination of ionization potentials and total energies showed that neutral complexes are more stable than their cationic congeners (iron proving more stabilizing than ruthenium). The analysis of the frontier orbitals of the neutral complexes showed on the one hand that, when the carbon chain lengthens, the LUMOs decrease in energy while the HOMOs are quite strongly destabilized. On the other hand, the complexes based on Ruthenium increases the energy of the HOMO and therefore has a higher oxidation potential than those of iron. The nature of the metal does not influence the metallic character, HOMOs therefore, complexes based on iron and/or ruthenium have a significant equivalent metallic character. The evaluation of the spin density of the cationic species showed that increasing the length of the carbon chain progressively decreases the spin density of the two metals.

The spin density of hetero-bimetallic complexes has a greater share on the Fe metallic center. The influence of the electro-donor (or acceptor) power on the stability of the complexes has been discussed.

Keywords: Metallic complexes, oxidation, spin density, carbon chain, DFT.



Green synthesis of silver nanoparticles using *Helianthemum lippii* extracts (HI-NPs): Characterization and study of interaction with DNA

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Abstract:

This study's objective was to formulate silver nanoparticles by reducing the extraction of *Helianthemum lippii*. We looked into how AgNPs attach to deoxyribonucleic acid using cyclic voltammetry and spectroscopy (UV-Vis) techniques. Biosynthesized AgNPs were characterized using UV-Visible and FTIR Spectroscopy, powder-XRD, and EDX technics. The UV-vis spectra at 428 nm validated the outcomes of the synthesized AgNPs. The results of SEM, EDX and powder-XRD, examination showed that AgNPs were the crystallite cubic, high purity with size ranged from 4.81 to 12.84 nm. Additionally, the produced AgNPs' FTIR spectra revealed the presence of phytoconstituents that served as capping agents. Also, the experimental findings showed that AgNPs had a strong propensity for binding to DNA through electrostatic interactions, which is supported by binding energy values. To conclude, the current study opens avenues that make them candidates for therapy against many cancer disorders.

Keywords: *Helianthemum lippii* L, Silver nanoparticles, free binding energy, binding free constant.



Antimicrobial activity of MeOH extract of *Anabasis oropedioidum* against pathogenic bacteria

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Abstract

The current investigation aims to assess the biological efficacy of *Anabasis oropedioidum* (*Chenopodiaceae* vent), a native plant in the Algerian desert. The objectives of this study encompass the evaluation of antibacterial properties of the 70% methanol (MeOH) extract obtained from the aerial parts of *A. oropedioidum*, as well as the quantification of its phenolic content through quantitative analysis and FT-IR characterization. The antibacterial potential of the MeOH extract was examined against a panel of six bacterial strains, encompassing both Gram-negative and Gram-positive species. The disc diffusion method was employed to determine inhibition diameters, while the minimum inhibitory concentration (MIC) was assessed using the broth dilution method. The outcomes and ensuing discussions revealed that the MeOH extract exhibited notable antibacterial activity against *B. subtilis*, *L. innocua*, *S. aureus*, *E. coli*, and *P. aeruginosa*, although it demonstrated no efficacy against *S. typhimurium*. In summation, these findings underscore the potential utility of *A. oropedioidum* as a source of bioactive compounds for applications in the food, pharmaceutical, and cosmetic industries.

Keywords: MeOH extract, *Anabasis oropedioidum*, Antibacterial activity.

Preparation And Characterization Of Biomaterials Based On *Opuntia Ficus Indica* (cactus)

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Abstract:

In this work, *Opuntia ficus indica* were first characterized and then valorized according to two different approaches: (i) a simple pyrolysis to make activated charcoal and (ii) a use after a chemical extraction of mucilages to different pH values for microcapsule synthesis. Indeed, a study concerning the characterization of mucilaginous extracts was carried out using several methods and techniques. Fourier transform infrared spectroscopic analyzes of the mucilages revealed the presence of galactose and pectin. Scanning electron microscopy (SEM) revealed that most of the particles adhered together and caused the formation of compact bound agglomerates, which gave different irregularly shaped microstructures. The mucilaginous extracts resulted in encapsulation with a narrow size distribution and diameters ranging from 4 to 12 μm and encapsulation efficiency ranged from 83% to 87%. These results confirmed the deposition of coacervate droplets around the oil drops and clearly showed that the formation of coacervated particles and their deposition on the oil droplets were successive events, in particular via a complex coacervation. In the first approach, the dried cuttings of the trunk of the barbaric fig tree were converted into activated charcoal for the retention of p-nitrophenol. A kinetic adsorption study was carried out and showed that the adsorption equilibrium was reached after 120 min, following a pseudo-second-order model. The study of adsorption isotherms revealed that the Langmuir linear model is the most credible model to describe the adsorption of pNP, and has a maximum adsorption capacity of 16.83 mg / g. After some saturation, the activated carbon was regenerated effectively by washing with NaOH solution. To conclude, both approaches have yielded materials with promising properties, which presents a viable option for rational recovery of abundant industrial waste from a renewable source.

Keywords: *Opuntia ficus indica*, activated charcoal, microcapsule.

Phytochemical characterization of Pistachio vegetable oil (*Pistacia lentiscus*), harvested in the El Tarf Region, Far Northeasten Algeria

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Abstract:

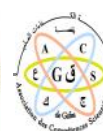
Lentisk oil is used in popular and traditional medicine, mainly in the eastern region of Algeria, for the treatment of various diseases, bronchitis, asthma, stomach ulcer, as well as skin problems, of its richness in active ingredients.

However, little research has been carried out on the physicochemical characterization of this oil, found in virtually all Algerian families.

As a result, we analyzed the physico-chemical parameters (color, moisture, acidity, relative density, peroxidase index, saponification index and refractive index), which allowed us to recognize the quality of this oil and its properties for consumption by the population.

The results of the analyzed parameters, compared to international standards, we have helped to find that collected oils do not comply and present impurities. This is mainly due to the extraction method used, the technique of picking and storage of fruit and oil.

Keywords: *Pistacia lentiscus*, Algerian East, physico-chemical analyses, traditional extraction, lentisk oil.



Fenton type Oxidation of Congo Red by a Heterogeneous Catalyst

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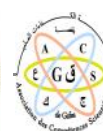
² Organic Chemistry Laboratory LR17ES08, Faculty of Sciences of Sfax, University of Sfax, Tunisia.

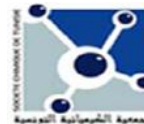
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Abstract

A simple process has been used to develop a heterogeneous catalyst from modified hematite. Different analyses and parameters allowed to characterize the obtained particles. Experiments were performed as a function of pH (2, 4, 6, 8 and 10), temperature (20 °C, 30 °C and 40 °C) and initial concentration (20, until 50 mg L⁻¹). The results obtained during the RC oxidation study show that the catalyst is stable and performs better. The heterogeneous Fenton system was also found to be an effective process for CR removal.

Keywords: Hematite, Catalyst, Congo red, Fenton.





Classifying of Different Medicinal Plant Species from Algeria Using Electrochemical Voltammogram Recording

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Abstract:

Medicinal plants play a crucial role in agriculture and industry production, where it is the major source of biologically active substances used in the pharmaceutical preparations and pharmacotherapy, several studies have been conducted to make sure quality assurance the medicinal plants through applies many modern analytical techniques. In this study, easy and accurate analytical method were development to classification different plants using electrochemical method (differential pulse voltammetry (DPV)) coupled with chemometrics analysis. 89 samples of medicinal plants taken El-Oued region in Algerian were collected and analyzed using data DPV, principal component analysis (PCA) and hierarchical clustering analysis (HCA). Bioactive compounds such as flavonoids, phenolic acids have been description and used to classification plants, and based on these results, closely related plant species can be identified and distinction.

Keywords: medicinal plant, chemometrics analysis, electrochemical method, DPV, PCA, HCA.



Study of the Influence of Welding Parameters on the Microstructure and Mechanical Behavior of Steel-Steel Assemblies Obtained by Arc Welding.

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Abstract:

The study of the electric arc welding effect as well as the influence of the welding parameters on the welded joints are important to meet the needs of manufacturers and the requirements of users in order to be able to study their consequences on the chemical composition, microstructure and micro-hardness of the steel studied. Initially, it is based on experimental work to study the influence of welding parameters on the quality of pipeline welding. Then, the experimental results will be used to determine the optimal arc welding parameters. For the realization of our work, the use of different characterization techniques is recommended such as X-ray fluorescence spectrometry (FRX), atomic absorption spectrometry, optical microscopy (MO), scanning electron microscopy (SEM) associated with EDAX, micro-hardness (HV) and X-ray diffraction (XRD).

Keywords: Welding, Electric Arc, Microstructure, Steel.

A Comprehensive Study of MB Removal using Muscovite Mineral Clay: RSM and ANN Evaluation

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Abstract:

The objective of this study was to assess the potential of mineral clay, specifically muscovite, as an effective adsorbent for the removal of Methylene Blue (MB) from aqueous solutions. The research delved into the influence of initial MB concentration, adsorbent mass, and contact time on the MB removal process, employing the Box-Behnken design (BBD) methodology. Furthermore, the study utilized both Response Surface Methodology (RSM) and Artificial Neural Network (ANN) modeling techniques to construct predictive models for the adsorption process. The performance and predictive accuracy of these models in estimating removal efficiency were rigorously evaluated. Subsequently, the adsorption process underwent optimization using ANN, leading to the determination of the most favorable operating conditions. In terms of predictive accuracy, both the ANN and RSM models demonstrated reasonably acceptable results, with Mean Absolute Error (MAE) values of 0.8601 and 1.8771, and Symmetric Mean Absolute Percentage Error (SMAPE) values of 0.0208 and 0.0360, respectively. Nevertheless, the ANN model emerged as the more preferable choice due to its superior performance, as indicated by the lower SMAPE and MAE values compared to the RSM model.

Keywords: Muscovite, Methylene Blue, Adsorption, RSM, ANN.

Synthesis and characterizations of Carbon Xerogels from Resorcinol and Formaldehyde

Amal Souilah^(1,2) et ELaloui Elimame^(1,2)

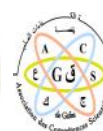
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Abstract:

The sol-gel method consists in obtaining very pure products from selected precursors containing only carbon and oxygen as heteroatoms to form a polymeric resin. The proposed synthesis reaction is a polycondensation of resorcinol with formaldehyde in two different media (water and acetone) in the presence of catalysts and at two temperatures (25 and 50 ° C). By varying the parameters, an optimization is carried out, by the factorial design method (2k): by following three characteristics of the nanoxerogels prepared: the density, the gel time and the reaction yield. The results indicate the best conditions for the synthesis of a carbon nanoxerogel

Keywords: *xerogel, sol-gel, charbon actif*



Crystal growth, Hirshfeld analysis, thermal behavior and magnetic properties of a new hybrid material $(C_5H_{14}N_2)[MnCl_3(H_2O)_3]Cl$

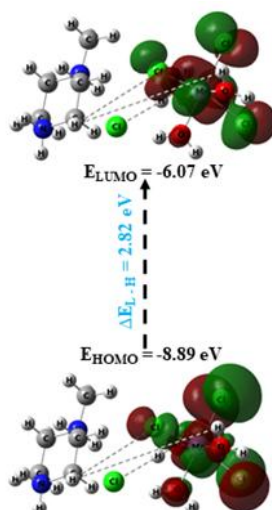
Sandra Walha Dammak^{a,b,*}, Mark M. Turnbull^c, Houcine Naïli^a

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A new hybrid compound, $(C_5H_{14}N_2)[MnCl_3(H_2O)_3]Cl$, **1**, was grown by slow evaporation from an aqueous solution at room temperature. The X-ray diffraction analysis revealed that the compound crystallizes in the monoclinic space group $P2_1/n$. The crystal structure of the Mn(II) complex is characterized as an alternation of 0-Dimensional organic chains and inorganic layers linked together by N/O—H...Cl hydrogen bonds which lead to three-dimensional supramolecular architecture. The thermal decomposition was studied by TGA techniques and Electronic properties such as HOMO and LUMO energies were calculated. The gap energy value can classify this compound among the semiconductors. Magnetic measurements indicate that the compound exhibits extremely weak antiferromagnetic interactions. In the crystal, the molecules are connected by Mn—OH₂...Cl and Mn—OH₂...Cl—Mn, N—H...Cl—Mn and N—H...H₂O—Mn hydrogen bonds into a three-dimensional supramolecular entity. The Hirshfeld surface analysis revealed that the dominant interactions are: Cl...H/H...Cl (54.0%), H...H (41.5%), and O...H/H...O (4.5%).



Zizyphus lotus cellulose for methyl orange elimination

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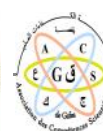
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Abstract:

This study highlights the importance of alkaline delignification as a crucial pretreatment for extracting cellulose fiber from the trunk of *Zizyphus lotus*. To assess the efficiency of the treatment, scanning electron microscopy, Fourier transform infrared spectroscopy, and X-ray diffraction are used to compare the fibers before and after treatment. The resulting cellulose is examined for its potential usage in methyl orange adsorption. The adsorption process is being investigated in batch mode, and numerous parameters such as pH, adsorbent dose, duration, initial concentration, and temperature were evaluated. There were 85-96% recoveries of the adsorbed methyl orange from the generated adsorbent after three sorption-desorption cycles. This demonstrated the remarkable effectiveness of cellulose derived from *Zizyphus lotus* for methyl orange adsorption, as well as its enormous capacity for organic dye removal from aqueous solutions.

Keywords: *Zizyphus lotus*, Cellulose, alkaline delignification, adsorption, Methyl orange.



In vitro evaluation of the antilithiasis activity of tannins extract of *Cucurbita maxima*

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Abstract

Several parts of *cucurbita maxima* have been commonly used as a source of simple medicines in traditional medicine. The objective of this study is to evaluate in vitro the activity antilithiasic of the tannins of the fruits of *cucurbita maxima*, by the model of turbidimetry, in this study we use a spectrophotometer U. V. Hydrolyzable tannin content was determined with potassium iodate test method proposed by Samia Ben-Ali et al [1]. The dosage of total tannin was determined by spectrophotometry, according to the colorimetric method using the Folin-Ciocalteu reagent (FCR) and the casein. The results were expressed as follows: milligram tannic acid equivalent (TAE) per gram of dry extract ($\text{mg TAE g}^{-1}\text{ext}$) [2]. We evaluated the effectiveness of tannins in vitro on the inhibition and dissolution of calcium oxalate (COD) using the turbidimetric technique while for the inhibition the gravimetric technique was used [3]. The results of this study indicate that tannins can be considered as feasible natural products to improve the dissolution efficiency and inhibition of calcium oxalate. Furthermore, in vivo biological studies would have to be carried out on all the metabolites that we have extracted, with a view to their valorization in the medicinal field. The fraction rich in tannins showed inhibition of 58.06 compared to the positive control (sodium citrate: 66.12). The capacity to dissolve the CaOx precipitates of this fraction showed an increased evolution (90.27) compared to the reference solution (sodium citrate: 55.55).

Keywords: *Cucurbita maxima*, Tannins, Inhibition, Anti-lithiasis.

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Adsorption du vert de méthyle en solution aqueuse sur la fibre de luffa

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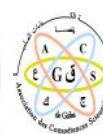
Résumé

Les colorants sont largement utilisés dans différentes industries, Cependant, ces colorants sont à l'origine de la pollution une fois évacués dans l'environnement. Leur élimination devient actuellement un projet très demandé et stimulant.

De nombreuses méthodes ont été développées pour éliminer les colorants, qui inclut la dégradation microbienne, la photocatalyse, la floculation, processus de séparation membranaire et adsorption. Généralement, l'adsorption est la méthode qui est considérée comme une solution conventionnelle et économique.

Dans ce travail, la fibre de luffa, un matériau adsorbant économique, a été développée pour l'élimination du vert de méthyle (VM) à partir de solutions aqueuses. Les fibres de luffa ont été caractérisées. Le pH, le temps de contact et la température ont été examinés de manière approfondie. La cinétique d'adsorption du VM a été étudiée, les constantes thermodynamiques ont été évaluées. Les résultats ont indiqué que l'adsorption de VM sur la fibre de luffa était excellente. L'efficacité élevée d'élimination du VM sur La fibre de luffa a suggéré que la fibre de luffa était un matériau approprié pour le nettoyage de la pollution VM.

Mots clés : Adsorption, Colorants, Matériau vert, luffa, Eaux usées.



Effective Synthesis and Biological Evaluation of Dicoumarols: Preparation and Characterization

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Abstract:

Warfarin and dicoumarol [1,2] were just a few examples of biological and pharmacological products that contained coumarin derivatives. Dicoumarol has been thoroughly explored as a natural anticoagulant medication [3,4] due to its use in the pharmaceutical study. Series of 3,3-arylidene bis (4-hydroxycoumarins) 2 were synthesized by the reaction of aromatic aldehydes with 4-hydroxycoumarin using dodecylbenzenesulfonic acid as Brønsted acid-surfactant catalyst in aqueous media and under microwave irradiation. The present method is operationally simple and the use of water as the reaction medium makes the process environmentally benign. The epoxydicoumarins were then obtained with a good yield by heating 3,3-arylidenebis-4-hydroxycoumarins in acetic anhydride. Techniques such as elemental analysis, ¹H, ¹³C NMR, and infrared spectroscopy were employed to characterize these compounds.

Keywords: dicoumarols, *N*-heterocyclic carbenes, biological activities.

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Dépollution d'un résidu médicamenteux en présence d'un hétéropolyacide de type keggin

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Résumé:

La pollution des eaux due à certains produits chimiques d'origine industrielle (produits pharmaceutiques, colorants ...) constitue une source de contamination de l'environnement et suscite à l'heure actuelle un intérêt particulier à l'échelle internationale.

Ce travail porte sur la dégradation d'un résidu de médicament "permanganate de potassium" en phase homogène en présence d'un hétéropolyacide de type Keggin comme catalyseur. Ce dernier a été caractérisé par différentes techniques physico-chimiques telles que : PCI, IRTF, UV-Visible et DRX.

Les résultats catalytiques ont mis en évidence les effets du temps de réaction et de la masse du catalyseur sur la dégradation du médicament "permanganate de potassium". Un taux de dégradation élevé (68%) a été obtenu en utilisant 0,5 g du catalyseur, 24 mg/l du médicament, sous agitation vigoureuse et pour un temps de réaction de 1h.

Mots Clés: Hétéropolyacide de type Keggin, Permanganate de potassium, Dégradation, Dépollution.

Methylene blue (MB) removal from aqueous solution using local apricot stones

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Abstract:

In this study, the adsorptive removal of methylene blue (MB) dye from aqueous solution, using local apricot stones as adsorbent, was investigated. Activated carbon of apricot stones (ASAC) was prepared using H_3PO_4 . The characteristic properties of the prepared activated carbon were determined using FTIR, SEM and BET analysis. Effects of various factors such as pH, contact time, adsorbent dose were studied. The maximum adsorption capacity was found to be 328.24 mg/g at a temperature of 30°C. Langmuir isotherm and pseudo-second-order model were suitable for this study. The results show that an effective adsorbent could be prepared from local apricot stones for the removal of methylene blue dye from water.

Keywords: adsorption, activated carbon, apricot shell, methylene blue.

Evaluation de la toxicité cellulaire du cyantranilprole, un nouvel insecticide diamide anthranilique, sur les rats wistar

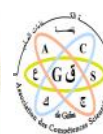
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Résumé

La persistance des résidus de pesticides dans l'environnement et les cultures agricoles est un problème majeur dans le monde entier. Exirel (cyantranilprole) est un insecticide diamide anthranilique de deuxième génération qui a une efficacité biologique contre les insectes ravageurs et peut induire la formation d'espèces réactives de l'oxygène (ROS) ce qui en fait un sujet intéressant. Notre travail consiste à analyser les effets cytotoxiques des résidus de cyantranilprole administrés à différentes concentrations (0,025mg/kg/j ; 0,05mg/kg/j ; 0,075mg/kg/j ; 0,1mg/kg/j) du poids corporel par voie orale pendant 90 jours chez un modèle animal de rats wistar, les résultats du test de labyrinthe classique montrent que l'administration d'Exirel a provoqué une augmentation très hautement significative ($p < 0,001$) du temps d'arrivée dans les lots traités par rapport aux témoins et une diminution très élevée et très significative de l'exploration temps dans les lots traités avec différentes concentrations d'Exirel par rapport aux rats témoins et pour le test de reconnaissance d'objets Les résultats montrent une diminution très élevée et très significative ($p < 0,01$; $p < 0,001$) du temps d'exploration de nouveaux objets et du temps d'exploration d'objets familiers dans le pesticide -rats traités par rapport aux rats témoins. Pour les paramètres de stress oxydatif, les résultats montrent une diminution significative du niveau de GSH cytosolique et une diminution très significative de l'activité GPX cytosolique des cellules cérébrales et une diminution très significative de l'activité de la catalase. L'analyse des valeurs obtenues à partir de l'évaluation de l'activité de l'acétylcholinestérase a montré une diminution hautement significative chez les rats traités par rapport aux témoins. L'examen microscopique des coupes histologiques du cerveau a révélé une structure normale chez les rats témoins. En revanche, une altération histologique du nombre de cellules cérébrales a été observée dans les coupes histologiques du cerveau de rats traités avec différentes doses.

Mots Clés: Exirel, Cyantranilprole, toxicité cellulaire, stress oxydant, rats wistar.



Synthesis and Characterization of Cationic Surfactant Phyllosilicate of Hydroxy double lamellar Or organic clay used for Elimination of Iron ions of industrial waste water Of Algeria Manufactory.

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ABSTRACT

This study based on modification of inorganic compounds named bentonite clay ,after several treatment (purification , Intercalated by cationic surfactant) , then These three samples complexes clays (raw bentonite ,purified bentonite and organic bentonite) respectively were characterized by both Xray diffraction (XRD) and Fluorescence (XRF) Scanning Electron Microscopy (SEM), Fourier transform infrared spectroscopy (FTIR),textural measurements (BET specific surface areas and porosities) and the cationic exchange capacity (CEC).

Corresponding results obtained confirm the good purification of the raw bentonite, then the obtention of the Purified - bentonite indicated by P-Bt also the intercalation of the Pu-Bt by the cationic surfactant (C₂₇H₅₈N-Cl) at low concentrations (0.06M for C₂₇H₅₈N-Cl).

The results obtained give basal spacing values around 15.34Å°;12.55Å°and 15.90 Å°, respectively for verified two aims firstly: The originality of this research, secondly to decrease the cost production of the adsorbents.

Absorption kinetic study of irons ions on these two matrices Pu-Bt, C₂₇H₅₈N-Bt respectively: Were carried out using kinetic models of pseudo-first, pseudo-second-order .

Results obtained at the conditions studies (room temperature $T = 25^{\circ}C$), (*Alcalin medium pH = 8.63*) show clearly the good validity of the pseudo-second-order model which gives a better correlation coefficient both, for C₂₇H₅₈N - Bt ($R^2 = 0.999$) compared to that obtained results by Pu-Bt ($R^2 = 0.960$).

Adsorption isotherms give adsorbed amounts of about 70 mg. g⁻¹ onto C₂₇H₅₈N - Bt complexe, respectively, and 40.33 mg. g⁻¹ for Ac-Bt as reference adsorbent.

These results indicated the adsorption of iron ions from the waste water of the industrial manufactory by the Algerian organo-clays or (Cationic surfactant Hydroxy-phyllosilicate-metallic) after our purification to eliminate of the impurities in the fist ,and our modification by organic surfactant for facilities the phenomenon of sorption mechanism of the iron ions of Algeria waste water manufactories , (through interactions by the chemisorptions) on the surface sites of each used modified organo clays or complexes clays).

Keywords: Bentonite clay, purification; Cationic surfactant, iron ions, Characterization; Sorption.



Extraction and characterization of *Cymbopogon schoenanthus* essential oil from the Timiaouine region in Algeria

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Abstract:

Cymbopogon schoenanthus (L.) Spreng, commonly known as camel grass or lemon grass and called Lemmad in Algeria, possesses considerable importance in traditional medicine owing to its therapeutic attributes for various ailments and its potential as an environmentally sustainable alternative to synthetic pesticides. This study aimed to investigate and define the essential oil extracted from a plant found in the Timiaouine region of southwest Algeria, where it grows abundantly in its native environment. Surprisingly, a comprehensive examination regarding this subject matter has yet to be undertaken thus far. The essential oil extraction from the *C. schoenanthus* plant was conducted using the steam distillation method at the Laboratory of Saharan Natural Resources, University of Ahmed Draia – Adrar, Algeria. This study's main objective was to evaluate this oil's potential value by analyzing of its organoleptic characteristics and physical properties. The study involved the assessment of many parameters, including the percentage yield of essential oil relative to the dry biomass of the plant, as well as an analysis of its density, refractive index, rotatory power, pH and miscibility with ethanol. *C. schoenanthus* has been proven to produce an essential oil with a pleasant aroma, yielding approximately 2.34% and a refractive index of 1.4870. In conclusion, *Cymbopogon schoenanthus* is a plant that provides a significant quantity of essential oil. It holds great importance in traditional medicine and agriculture due to its essential function as a primary component in creating biopesticides. Moreover, further research is necessary to clarify and evaluate the efficacy of its chemical composition to understand this use better.

Keywords: *Cymbopogon schoenanthus*, essential oil, Timiaouine, Algeria.

Etude de la toxicité *in vivo* de l'extrait méthanolique de la partie aérienne d'*Erodium arborescens*

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Notre époque est profondément marquée par la recherche d'une vie plus saine, d'un retour à la nature, aux valeurs essentielles. Mais le succès de la phytothérapie s'explique avant tout par le niveau de maîtrise technique et scientifique. Il est important de préciser que connaître une plante, c'est aussi être conscient de ses limites et de ses dangers car la phytothérapie n'est en aucun cas une technique anodine. Son utilisation thérapeutique nécessite une bonne connaissance de la matière médicale.

Ce travail consiste à évaluer la toxicité de l'extrait méthanolique de la partie aérienne d'*Erodium arborescens* sur des rats Albinos wistar en déterminant les paramètres biochimiques, hématologiques, du stress oxydatif et en réalisant des coupes histologiques sur les organes cibles d'une toxicité (foie et reins).

Le traitement avec l'extrait au méthanol de la partie aérienne d'*Erodium arborescens* à différentes doses (300, 600, 1200 et 1800 mg/kg) pendant 14 jours n'a pas induit la mortalité ni ne déclenchait de signes de toxicité chez les animaux.

De plus, la diminution des valeurs des paramètres d'oxydation lipidique et protéique ne fait qu'appuyer l'hypothèse de l'effet protecteur de l'extrait d'*Erodium arborescens* contre les effets délétères du stress oxydant sur les parenchymes hépatique et rénal ce qui pourrait être expliqué par sa richesse en composés phénoliques.

Mots clés : *Erodium arborescens*, toxicité *in vivo*.

The inhibition corrosion of carbon steel in an acidic medium by ethyl acetate extract of a novel eco-friendly inhibitor *Asphodelus ramosus*

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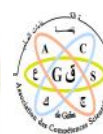
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Abstract:

Ethyl acetate extract of *Asphodelus ramosus* (ARAE) was examined as an anti-corrosion agent for carbon steel (CS) in 1 M HCl acid medium using different techniques, namely weight loss method, potentiodynamic polarization, and electrochemical impedance spectroscopy (EIS) at various temperatures and inhibitor concentrations. An inhibition efficiency of 89.81 % was obtained by the weight loss method at the inhibitor concentration of 700 ppm at 293 K. Increasing the temperature decreases the corrosion inhibition rate. Potentiodynamic polarization results showed that the extract is adsorbed on CS surface according to the Freundlich isotherm, while negative values of the standard free energy of adsorption (ΔG_{ads}^0) suggested the physical spontaneity of the adsorption reaction. Scanning electron microscopy (SEM) and energy dispersive spectrometry (EDS) analyses were performed to examine the surface morphology of inhibited and uninhibited CS samples.

Keywords: Plant extract; hydrochloric acid, SEM/EDS.



Assessment of Biological Activities of Extracts from an Algerian Plant, *Rosmarinus officinalis L.*

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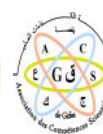
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Abstract

Rosemary, a medicinal and aromatic plant belonging to the Lamiaceae family, is utilized and recognized for its therapeutic virtues in traditional medicine and its abundance in polyphenols. In the pursuit of valorizing this plant, two extracts (ethanolic and aqueous) were assessed for their biological activity and content of polyphenols and flavonoids. Quantitative estimation of total polyphenols and flavonoids through colorimetric methods demonstrated that both investigated extracts are rich in these compounds. Three methods were employed to assess the antioxidant activity of the two extracts: the DPPH radical scavenging test, ABTS assay, and CUPRAC assay. According to the results, both extracts exhibited potent antioxidant activity. Antimicrobial activity was determined using the agar diffusion method against 11 tested strains. Only *Staphylococcus aureus* displayed significant sensitivity to various concentrations of the aqueous extract. The tested anticholinesterase activity revealed that neither of the extracts possessed any capacity to inhibit AChE.

Keywords: *Rosmarinus officinalis L.*, antioxidant activity, antimicrobial activity, anticholinesterase activity.



preparation of activated carbon from castor bean shell by chemical activation: optimization and application for removal of methyl bleu

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Abstract:

High-surface-area porous activated carbon has been prepared from date palm rachis by chemical activation using *ortho*-Phosphoric acid (H_3PO_4) as the agent of activation. The process has been conducted at different impregnation ratios (H_3PO_4 /precursor = 0.5–3) and carbonization temperatures (500–700°C). Activated carbon obtained at optimal conditions was characterized using scanning electron microscopy, Fourier Transform Infrared Spectroscopy, surface area measurement (BET), elemental analyses, pH zero-point charge measurement (pH_{PZC}), Boehm titration, and elemental analysis. The activated carbon obtained has excellent textural properties. The activated carbon obtained was then used as an adsorbent for the removal of methyl orange from aqueous solutions in batch mode. The effects of pH, adsorbent dose, contact time, and initial concentration on the adsorption of methyl orange were examined. The pseudo-first-order model and the pseudo-second-order model were applied to the experimental data to elucidate the possible mechanisms involved in the adsorption of methyl orange onto activated carbon. The experimental data were analyzed by the Langmuir and Freundlich isotherm models. The equilibrium isotherms and kinetics were best described by Langmuir and pseudo-second-order models, respectively.

Keywords: Activated carbon, chemical activation, date palm, adsorption, methyl orange.

Effect of Palm Fibers on Thermal and Mechanical Properties of Phosphogypsum Based Plaster

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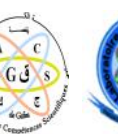
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Abstract:

The present study aims to evaluate the effect of palm fiber on phosphogypsum-based plaster. The studied samples are prepared with a 1:2 PG:water ratio. The amount of fiber varied from 2% to 8%. The obtained results show that PG consists of fairly pure gypsum with some traces of impurities. The fibers have a similar chemical composition, and the SEM indicates a surface change after alcalin treatment. Pure PG has a low resistance to bending and compression due to its low density and porosity. The addition of the fibers does not improve the mechanical characteristics, and this is due to the low density of the composite. Thermal conductivities for the 2% plaster composite and pure PG were both measured to be very low, around 0.1845 W/mK and 0.1391 W/mK, respectively. No matter the type of fiber or the amount utilized, adding fibers to PG has been demonstrated to increase the composite's conductivity.

Keywords: *Phosphogypsum, valorization, composite, mechanical and thermal properties.*



Synthesis, structural characterization of silver(I)-NHC complexes and their antimicrobial activities

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Abstract:

N-Heterocyclic Carbenes (NHCs) have become a well known class of organometallic ligands [1]. NHCs have strong σ -donating but weak π -accepting properties, which show excellent support to stabilize various oxidation states of transition-metal. In recent years, metal NHC complexes containing Au, Pd, Cu, Ru, Pt, Ag and Rh have been widely used in medicine and pharmacy as potential metallopharmaceutical agents [2]. In addition to their antimicrobial and anticancer activity, metal-NHC complexes have also been intensely investigated due to their noteworthy applications in catalysis [3]. Silver(I) complexes have been described as efficient antibacterial agents, in view of their comparable low toxicity and oligodynamic effect [4].

Our objective in this study was the synthesis of novel NHC salts and their silver (I)-NHC complexes, and investigate their antimicrobial activities. All salts and complexes structures were characterized by MS, ¹H NMR, ¹³C NMR and IR spectroscopic techniques.

Keywords: N-heterocyclic carbene, NHC salts, silver(I)-NHC complexes, antimicrobial activities.

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Study of the anticancer activity of the plant *ScutellariaBaicalensis* by molecular docking

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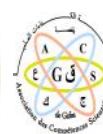
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Abstract:

The docking study on a set of three flavonoids from the plant *Scutellariabaicalensis* was carried out with the aim of understanding the mode of interaction of these compounds with the CB1a protein which belongs to the cannabinoid receptor family, and to select those representing a good affinity with the residues of the active site. This study was assisted by the MOE 2015 program. The analysis of the interaction modes of the five best derivatives of the three flavonoids reveals that Baicalein is the one which gives the best interactions with the CB1a protein, which originally does not possess a reference ligand, while our ligand has three interactions with the amino acid LYS, and only one with GLU. Which confirms to us that Baicalein has a very significant anticancer property compared to the two other flavonoids (chrysin and wogonin).

Keywords: Anticancer, flavonoids, docking, protein, CB1a, Lys, Glu.



Synthesis, *In vitro* and *In silico* Evaluation of New 1,2,3-Triazole Linked Flavonoid Conjugates as Anti-proliferative Agents

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Most of experimental studies demonstrated that flavonoidsexhibited several pharmacological activities including, anti-cancer, antimicrobial, anti-HIV and antiviral [1]. On the other hand, 1,2,3-triazoles have received much attention not only in organic chemistry but also in medicinal chemistry due to their easy synthesis by click reaction catalyzed by copper (I) as well as various pharmacological and biological activities [2]. Based on the fairly significant cytotoxic activity of flavonoids and inspired by the important biological potentials of triazoles, a series of new 1,2,3-triazole linked flavonolshybrids by copper-catalyzed click reaction has been prepared starting from three selected cytotoxic flavonoïds (Fig. 1). The prepared cycloadducts were evaluated for their cytotoxic activity against the human cell lines HCT-116(Human colon carcinoma), MCF-7 (Human breast carcinoma) and OVCAR-3 (human ovarian carcinoma).The results showed that five cycloadducts among a series of twenty-four ones were found to be the highest cytotoxic against HCT-116 and OVCAR- 3 with IC₅₀ values < 3.0 µM. Therefore, they may serve as a promising lead candidate for further investigation. The probable binding modes of the most active compounds were explored and further verified using molecular dynamics simulation.

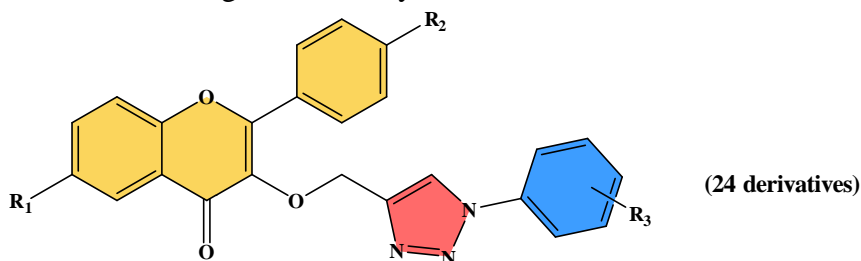


Figure 1. General structure of the target compounds

Keywords: Flavonoids, 1,2,3-triazoles, Cytotoxic activity, Molecular docking.

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Determination of the specific heat of the one-dimensional relativistic Kemmer oscillator

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Abstract:

In this work, we study specific heat which is considered one of the most important thermodynamic properties in the chemistry field, for relativistic and nonrelativistic Harmonic oscillator. First, we study the specific heat of a one-dimensional harmonic oscillator by finding its partition function. Then we did the same for the relativistic harmonic oscillator of spin = 1. The results found show that the introduction of superstatistics for the case of the one-dimensional Kemmer oscillator made it possible to eliminate the existence of a negative specific heat, a problem posed seriously in the literature, for certain value of the universal parameter q .

Keywords: Specific heat, Harmonic oscillator, Kemmer oscillator, Universal parameter.

Synthèse de molécule d'intérêt biologique via la réaction de Biginelli

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Résumé:

Les composés synthétisés, à partir des réactions multicomposants (RMCs) ont suscités beaucoup d'attention ces dernières années, en raison de leurs diverses propriétés environnementales. Parmi les réactions à composants multiples largement exploitées, celle de Biginelli qui produit des dihydropyrimidinones (DHPMs) à partir d'acétoacétate d'éthyle, d'un aldéhyde aromatique et de l'urée en présence d'un acide, est la plus connue. Son intérêt réside dans les propriétés biologique, thérapeutique et pharmacologique (activités antivirales, antibactériennes, anti-inflammatoires et antitumorales) que présentent ces molécules.

Les matériaux préparés ont été calcinés à 500°C pendant 5h puis caractérisés par différentes technique et les principaux résultats sont les suivants :

La diffraction des rayons X (XRD), a révélé la présence des phases ZnO, NiO et Co₃O₄.

La mesure de la surface spécifique par la méthode BET a montré que les deux systèmes possèdent une surface spécifique de l'ordre de 10 m²/g.

Les résultats de la réactivité des catalyseurs dans la réaction de Biginelli pour la production de la dihydropyrimidinone (DHPM) a montré que le Ni-ZnO SG (30 % en poids) préparé par la méthode sol-gel est plus performant avec un rendement en DHPM qui atteint 61% dans les conditions, sans solvant, un temps de réaction de 1 heure et une température de 100°C.

Chemical screening and antioxidant activity of two medicinal plants *Origanum majorana* and *Glycyrrhiza glabra* used in the treatment of infertility

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Abstract:

Medicinal plants are a source of traditional remedies for the treatment of many pathologies, and Algeria is famous for its natural heritage, which includes thousands of plant species. The work was carried out by ethanol extraction, which gave a yield of 19.93% for the *Origanum majorana* L plant, while that of *Glycyrrhiza glabra* L was 24.42%. Phytochemical tests were carried out by colorimetry and precipitation reactions showed the presence of tannins, polyphenols, flavonoids, terpenes, glycosides, steroids and saponosides. Total polyphenol, tannin and flavonoid content were determined using Folin Ciocalteu reagent and aluminum chloride respectively. Values recorded were $63.38 \pm 1.07 \mu\text{g EAG/mg E}$, $15.76 \pm 7.92 \mu\text{g EAG/mg E}$ and $53.89 \pm 1.44 \mu\text{g EQ/mg E}$ in *Origanum majorana* L plant and $46.25 \pm 1.31 \mu\text{g EAG/mg E}$, $24.67 \pm 3.83 \mu\text{g EAG/mg E}$ and $47.66 \pm 1.51 \mu\text{g EQ/mg E}$ in *Glycyrrhiza glabra* L. Three methods were used for the determination of antioxidant activity: DPPH, FRAP, PPM revealed a greater or lesser antioxidant power of the plants studied, depending on the test carried out. These plants may be a significant source of natural antioxidants used in the treatment of infertility.

Keywords: *Origanum majorana*, *Glycyrrhiza glabra*, Phytochemical screening, Polyphenols, Antioxidant activity.

Bioactivation of phenols and flavonoids in an aqueous extract of *Ephedra alata* leaves

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Abstract:

This study aims to investigate the allelopathic influence of *Ephedra alata* extracts on seed germination in *Medicago sativa* L., *Peganum harmala* L., and *Portulaca oleracea* L.

Ephedra alata is a medicinal plant of the genus *Ephedra* that originated in Asia, particularly Saudi Arabia. It is widespread over the Sahara, from Morocco to Libya to Egypt and Arabia.

The aqueous extracts contain saponins, flavonoids, sterols/triterpenes, and tannins, according to the results of the screening phytochemical tests.

Polyphenols and flavonoids were also determined, with values in the studies of 155.41 ± 23.09 g GA E/mg extract and 27.14 ± 15.30 g Q/mg Ext.

While aqueous extracts of *Ephedra alata* inhibited seed germination, the effect was directly related to the rise in extract concentrations. *Medicago sativa* had the highest germination inhibition value, which was estimated to be $60.81 \pm 2.53\%$ at a concentration of 10%.

Keywords: Allopathic, *Ephedra alata* D, Polyphenols, Flavonoids, Germination

Activité antioxydante et étude théorique de quelques arylidènes

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Résumé : Nous avons synthétisé et caractérisé quelques arylidènes à partir des rhodanines substituées et de la para vanilline au reflux dans de l'éthanol. La capacité antioxydante des différents arylidènes a été déterminée à partir de l'IC50 par rapport à la vitamine C comme référence. Nous avons réalisé une étude théorique de l'activité antioxydante des radicaux libres des composés. Cette étude a été effectuée à l'aide de logiciel Gaussian 09 en utilisant la méthode de calcul DFT (Density Functional Theory), avec la base standard de calcul 6-311G (d, p) et la fonctionnelle B3LYP. Afin de corrélérer l'activité anti-oxydante expérimentale d'une molécule avec sa structure chimique, nous avons utilisé plusieurs indices (descripteurs) tels que :

- L'enthalpie de dissociation de la liaison hydrogène (de l'acronyme anglais Bond Dissociation Enthalpy: BDE)

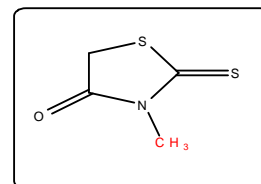
- Le potentiel d'ionisation (Ionisation Potential: IP).
- Affinité protonique (Protonic Affinity: PA).
- L'enthalpie de dissociation du proton (Proton Dissociation Enthalpy: PDE).
- L'enthalpie de transfert de l'électron (Electron Transfer Enthalpy: ETE) [2].

Le choix du descripteur est lié au type de mécanisme. Les composés terpéniques désactivent les radicaux libres via trois mécanismes [3] :

Les calculs théoriques ont été comparés avec les résultats expérimentaux de l'activité antioxydante.

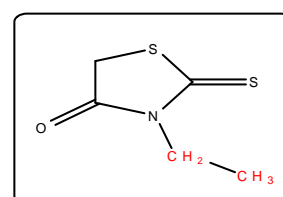
- **3-Méthyl-2-thioxothiazolidin-4-one (2a) :**

Caractéristiques physiques : Aspect : Cristaux jaunes ; Rdt : 70 % ; Pf: 71 °C ;
 RMN¹H (200MHz, CDCl₃/TMS) ppm = 4.03(s, 2H, CH₂); 3.38 (s, 3H, NCH₃);
 RMN¹³C (50MHz, CDCl₃/TMS) ppm = 201.1 (C=S); 173.3(C=O); 35.6(CH₂);
 31.2(NCH₃)



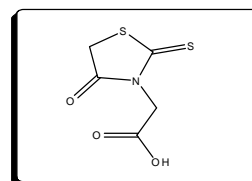
- **3-ethyl-2-thioxothiazolidin-4-one(2b)**

Caractéristiques physiques : Aspect cristaux jaune –orangée ; Rdt : 60 %
 Pf : 38°C ; RMN¹H (300MHz, CDCl₃/TMS) ppm = 4.06 (2H, Me, H-5), 3.95
 (2H, S, H-20), 1.21(3H, t, J = 6.0 Hz, CH₃, H-10) ; RMN¹³C (75MHz,
 CDCl₃/TMS) ppm = 200.9 (C = S, C-2). 173.6 (C = O, C-4), 39.9 (CH₂, C-5),
 35.4(CH₂, N-CH₂), 12.04 (CH₃,CH₂-CH₃).



- **2-(4-oxo-2-thioxothiazolidin-3-yl)acetic acid :**

Caractéristiques physiques : Aspect : poudre jaune orangé ; Rdt : 45.3%
 Pf :146°C; RMN¹H (400MHz, CDCl₃/TMS) ppm = 4.56 (2H, s, N-
 CH₂),4.41(2H, s, H-5) ; RMN¹³C (75MHz, CDCl₃/TMS) ppm = MHz): d =
 202.80C = S, C-2), 173.72 (C = O, COOH), 167.29 (C = O,C-4), 44.77 (CH₂, N-
 CH₂), 35.94 (CH₂, C-5).



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Elimination des métaux lourds des effluents aqueux à l'aide de bio-biomatériaux hybrides à faible coût

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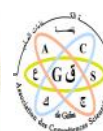
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Résumé:

Activated carbon has long been the most effective adsorbent, thanks to its high adsorption capacity and large specific surface area. However, the cost of treatment is high, making it economically uncompetitive. This study focused on the synthesis and preparation of cationic and anionic biomaterials. These materials were used as adsorbents in waters polluted by various adsorbates likely to be present in the environment. The different materials will be characterized by various techniques (FTIR, XRD, SEM, BET and ATG/DTA). Adsorption studies with these materials will be carried out by controlling various parameters such as pH, mass, concentration and temperature.

Mots-clés: Characterization, Different materials, Water treatment, adsorption.



Elaboration and characterisation of nanomaterial Co-Doped (In/Ta)-BTO/ZW

Ounis Amina¹, Menasra Hayet¹, Ksouri Ahlem¹

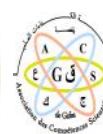
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Abstract:

Bi₄Ti₃O₁₂'s (BTO) Aurivillius phase has drawn a lot of attention for its degradation of organic pollutants and treatment water. In this work the synthesis of 8% (In/Ta)-BTO/ZW nanocomposite was carried out by the molten salt method. X-ray diffraction analysis was performed on the prepared samples using a BRUCKER-AXS D8 ADVANCE instrument with CuK radiation ($\lambda = 1.5406 \text{ \AA}$). Lattice parameters were determined from the XRD data using the cellref program. The Bragg angle (2θ) was scanned from 10° to 80° at a scanning rate of $0.04^\circ/\text{sec}$ at room temperature. Surface morphology and the elemental composition of the sintered pellets were analyzed using a Scanning Electron Microscopy (SEM/EDX), specifically the model TS5136XM, VEGA. To confirm the presence of phases in the prepared samples, Fourier Transform Infrared Spectroscopy (FTIR) was conducted using a PerkinElmer instrument. UV-Vis absorbance measurements were performed using a UV-Vis spectrophotometer (UV-759CRT, Shanghai, China) to assess the UV absorbance. The band gap of the samples was determined using the Tauc plot formula. Photocatalytic study of synthesized catalyst 8%(In/Ta)-BTO/ZW under the influence of ultraviolet radiation UV (364 nm, 6W) to degrade the organic pollutant dye (RhB) demonstrates a photodegradation efficiency of 94% after illumination for 180 min.

Keywords: Aurivillius, nanocomposite, Photocatalytic, photodegradation, catalyst.



Utilisation des carbonates organiques comme réactifs et solvants verts pour la préparation de molécules bioactives

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Résumé :

Les carbonates organiques sont fortement recommandés comme réactifs et solvants verts et durables pour les transformations chimiques. En effet, ces composés sont connus par leur faible toxicité, leur non-corrosivité, leur haute biodégradabilité, leur fabrication économique utilisant des sources abondantes et renouvelables telles que le CO₂.

Dans cette communication, nous présentons quelques exemples de nos travaux de recherche décrivant l'utilisation des carbonates organiques comme réactifs et solvants verts pour la préparation de molécules contenant des groupements fonctionnels pouvant induire des activités biologiques diverses.

Le premier exemple décrit la synthèse de la fonction amide en utilisant le DMC (Carbonate de diméthyle) comme réactif et solvant.^{1,2}

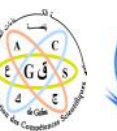
Le deuxième exemple décrit les avantages de l'utilisation des carbonates organiques dans la réaction de Friedel-Crafts sur les plans économique et écologique.

Le troisième exemple décrit l'utilisation du DMC pour la synthèse verte des Sulfonylimines qui sont les précurseurs des sulfonamides.³

Keywords: Chimie verte, Carbonate de diméthyle, Carbonates organiques, solvants verts.

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Theoretical characterization of structural properties and chemical reactivity of an organic material donor of electron-

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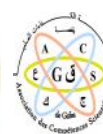
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Abstract:

The present work includes a theoretical study by molecular modeling of an organic material donor of electron- which is a derivative of tetrathiafulvalene; the characterization was carried out using the method of the functional theory of the density (DFT) and the quantum method of Hartree Fock (HF). This study allowed us to adopt the best method to characterize our compounds by identifying the geometric and structural parameters, the energy parameters as well as the descriptors of local and global reactivity.

Keywords: Théorie de la densité fonctionnelle (DFT), Hartree Fock (HF), donor of electron- , chemical reactivity



Evaluation des activités antidiabétiques et hémolytiques des extraits aqueux de *Mentha spicata* L. récoltées en Algérie

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Résumé:

Cette étude vise l'évaluation des activités antidiabétiques et hémolytiques des extraits aqueux de *Mentha spicata* L. récoltées de régions différentes en Algérie. Les régions choisies diffèrent par leur situation géographique et leur étage bioclimatique: El Oued située au Sud-Est d'Algérie (Sahara), caractérisée par un climat aride; El Tarf située à l'extrême du Nord-Est d'Algérie (la côte), caractérisée par un climat tempéré. L'activité antidiabétique des extraits aqueux de *Mentha spicata* L. a été évaluée contre les enzymes -amylase et -glucosidase.

Les résultats obtenus ont révélé que l'extrait aqueux de *Mentha spicata* L. récoltée d'El Oued possède la meilleure activité antidiabétique contre les enzymes -amylase et -glucosidase avec IC₅₀ respectives de 121,4 µg/mL et 216,9 µg/mL, avec des pourcentages d'inhibitions respectives de 71,2 % et 71,5 %. De même, une meilleure activité hémolytique avec un pourcentage d'inhibition de 84,5% est observée pour l'extrait aqueux de *Mentha spicata* L. récoltée d'El Oued. Ces propriétés antidiabétiques et hémolytiques semblent être liées à la richesse des extraits aqueux aux composés phénoliques. Par ailleurs, les propriétés biologiques sont influencées par les conditions environnementales (climat et nature du sol) des régions de récolte de la plante.

Keywords: antidiabétique, hémolytiques, -amylase, -glucosidase, *Mentha spicata* L.



MOLECULAR DOCKING OF DRIMIA MARTIMA COMPONENTS AS ANTI-SARS-COV2

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Resume

Plants and their related phytochemicals play a key role in the treatment of bacterial and viral infections, inspiring scientists to design and develop more effective drugs from the active phytochemical scaffold.

This work aims to characterize the chemical compounds of Drimiamaritima to evaluate its in vitro antibacterial effect, as well as the in silico anti-SARS-CoV-2 activity.

Molecular docking with the aim of studying and rationalizing the possible anti-SARS-CoV-2 of phytochemicals identified and selected from a bibliographic search, SARS-CoV-2 Main protease have also been demonstrated.

We found that both parts Rutine and Naringine have significant anti-SARS-CoV-2 activities, in other words -8.80 and -8.50, respectively. These molecules had interactions with the active site of SARS-CoV-2, with the amino acids GLN189, LEU141, CYS145 and HIS41.

Keywords: Molecular docking, medicinal plant, sar-cov-2



"synthèse, caractérisation et activité antioxydante des dérivés des thiazoloquinazolinones"

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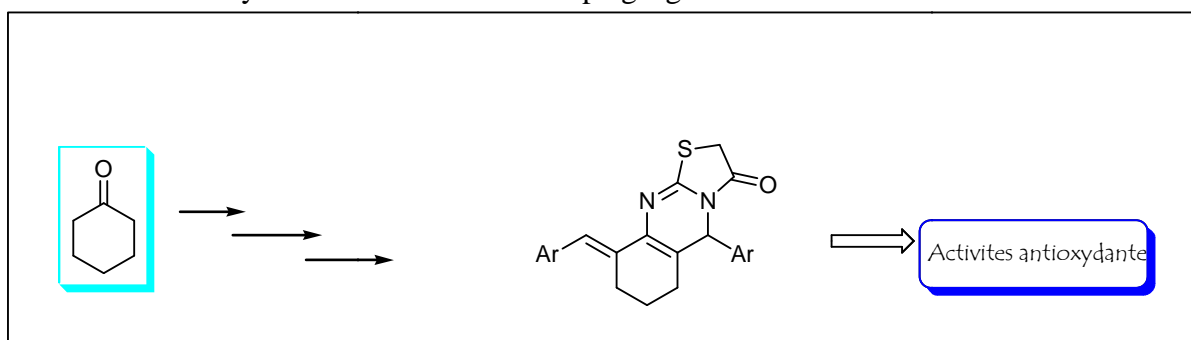
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Résumé

Curcuma longa, encore appelé *Turmeric* par les anglo-saxons, est une plante de la famille des *Zingiberaceae* qui pousse principalement dans les régions tropicales et subtropicales et dont la culture est très répandue en Chine et en Inde. La poudre jaune est régulièrement utilisée, dans ces pays, comme épice. Elle sert également en médecine traditionnelle. La recherche de composants de cette poudre a révélé la présence d'une molécule majoritaire (50-60%) appelée curcumine et d'au moins deux autres molécules : la déméthoxy-curcumine et la bis-déméthoxy-curcumine.

La curcumine est douée d'activités pharmacologiques remarquables : c'est un puissant agent anti-inflammatoire sans effet toxique, anti-HI, antimicrobien et anticancéreux [1-3]. La principale action de la curcumine est son pouvoir antioxydant vis-à-vis de la formation d'espèces oxygénées actives comme le radical hydroxyle et l'anion superoxyde. Dans ce présent travail, les analogues de la curcumine sont obtenus à partir d'une cétone cyclique comme molécule chef de file qui est ensuite engagée dans une série de réaction à multi étapes : condensation avec l'aldéhyde, réaction de Michael pour l'obtention d'une thio-urée cyclique, puis selon la cyclisation de Hantzsch pour conduire au méthylène actif. Tous les produits synthétisés ont été caractérisés par les différentes méthodes spectroscopiques tels que : RMN¹H. RMN¹³C analyse élémentaire Les produits obtenus ont subi des tests antioxydant avec la méthode de piégeage de du radical libre DPPH



Mots clés : Curcumine, thiazolo quinazoline one, , Dibenzylidénecyclohexane, RMN, activités biologiques.

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Phytochemical analysis of components extracted from the heart of date Palm (Heart of Phoenix dactylifera L.) in southeastern Algeria

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Abstract:

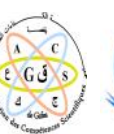
The inner core of the date palm (*Phoenix dactylifera* L.), known as the Heart of Phoenix *dactylifera* L (*Phoenix dactylifera* L.) and is a rich source of dietary fibers, proteins, sugars, healthy fats, and essential minerals. Moreover, it contains phenolic compounds responsible for numerous nutritional and health properties.

In this study, our objectives include examining the chemical composition and identifying the minerals and elements present in samples of Heart of Phoenix *dactylifera* L. (HPd), known as "Al-Jammar," from the southeast region of Algeria. We have selected two date palm cultivars, "DegletNour" and "Talaa Al-Dakar," and will utilize Atomic Absorption Spectrophotometry (AAS) and Scanning Electron Microscopy (SEM) analysis techniques.

The AAS analysis revealed the presence of several minerals in both cultivars, including Mg (Magnesium), Fe (Iron), Ca (Calcium), Si (Silicon), Zn (Zinc), Cd (Cadmium), B (Boron), and K (Potassium). The concentrations of these minerals differ between the "DegletNour" and "Talaa Al-Dakar" cultivars.

Furthermore, the study involves extracting phenolic compounds from HPd and estimating their proportions. In addition to estimating the content of sugars and proteins, using the UV-Vis spectroscopic method (UV-Vis). The biological activity of these compounds will be evaluated and characterized through various techniques, including Gas Chromatography-Mass Spectrometry (GC/MS), contributing to the assessment of their antioxidant and anticancer capabilities.

Keywords: Heart of *Phoenix dactylifera*, phenolic compounds, biological activity, antioxidant, anticancer.



In silico assessment of novel morpholine-containing compounds against human legumain and cholinesterase enzymes

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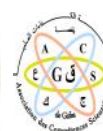
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Abstract:

In the context of our ongoing efforts to synthesize new compounds with the aim of inhibiting enzymes associated with the development of Alzheimer's disease, we conducted an *in silico* evaluation to explore the potential inhibitory activity of a novel family of morpholine-containing compounds against human legumain (AEP) and cholinesterases (AChE and BuChE) enzymes. The molecular docking study suggests that all the compounds interacted with the three enzymes with moderate to high affinity. Furthermore, predicted ADMET properties indicated that most of the compounds exhibited promising pharmacokinetic and drug-like properties.

Keywords: Morpholine, Legumain, Cholinesterase, Molecular docking, ADMET.



Identification of some components of the *Pistacia lentiscus* fatty oil from the north of Tunisia via a GC/MS chemical analysis

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Abstract:

The fatty oil of the *Pistacia lentiscus* tree, of the Anacardiaceae's family, characteristic of the Mediterranean forest (Tunisia, Provence, Morocco, Algeria and Corsica... [1]) is used in the north Tunisian rural and urban zones as medicinal product and forest healthy food to treat the gastric ulcer.

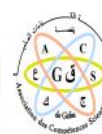
The chemical analysis of a sample of this fatty oil, obtained from the north of Tunisia, using the highly sensitive GC/MS technic, gives interesting results about its composition. Among others, six compounds were identified from the MS spectra, compared to the MS database: the palmitic acid, the linoleic acid, the 3-undecylphenol, the 3-formyl-1,3-cyclohexadiene, the 3-pentadecylphenol and the 2,6,10,14,18,22-tetracosahexane.

An advanced bibliographic study on these compounds, showed their uses as additive in medical and pharmaceutical products [2-4]. But none of them was described as an anti-ulcer. So, a biological evaluation of the potential activity of this mixture of compounds is under imposed.

Keywords: *Pistacia lentiscus*, Fatty oil, anti-gastric ulcer, Healing, GC/MS.

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Green Synthesis of Silver Nanoparticles using six widely available medicinal plants from the southeastern of Tunisia

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Abstract

Silver nanoparticles (SNPs)¹ play an important role in several fields such as medicine, biology, and chemistry, and also as a novel antibacterial agent.

Here, we report a simple and green method for biosynthesis of SNPs using aqueous leaf extract of six medicinal plants well adorned for their therapeutic property and wide availability in the South-Eastern of Tunisia: *Polygonum equisetiforme*, *Atriplex halimus*, *Teucrium polium*, *Moricandia arvensis*, *Deverrator tuosa* and *Haplophyllum tuberculatum*, as a novel bio-source of cost-effective, non-hazardous reducing, and stabilizing agents.

This study investigates an efficient and sustainable route of SNPs biosynthesis by the reaction of 1.0 mM silver nitrate (AgNO_3) and 5% aqueous extract of each type of plant separately. The intense brown colored solution was obtained after heating of mixture which indicated the formation of SNPs. The bioactive compounds present in each plant extract reduced silver ions (Ag^+) to metallic Silver (Ag^0), indicated by a change in color from yellow to bright yellow and then to dark brown after 24 to 48 hours of the reaction. Those reduced metal particles were biosynthesized and stabilized, then monitored by UV-Vis spectrophotometer at 423 nm, which corresponded to their maximum absorbance. That will be increased with the time of incubation of silver nitrate (AgNO_3) with the plant extract. Though detailed mechanisms of characterization are yet to be analyzed.

Results showed that; for decoct extracts, the highest values were detected for *H. tuberculatum*, *T. polium*, and *M. arvensis* by showing 242.60 ± 2.63 ; 149.10 ± 1.39 and 119.18 ± 7.07 $\mu\text{g TE/mg DW}$, respectively. While, in ultrasonic extracts, *P. equisetiforme* (123.35 ± 11.49 $\mu\text{g TE/mg DW}$), *M. arvensis* (119.10 ± 2.12 $\mu\text{g TE/mg DW}$), and *H. tuberculatum* (89.27 ± 5.81 $\mu\text{g TE/mg DW}$) had the highest silver nanoparticles contents.

In totality, the SNPs prepared are safe to be discharged into the environment and possibly utilized in processes medicine. Also, it may be efficiently utilized in plant research to obtain better health products as shown by our study. This synthesis method is nontoxic, eco-friendly, and a low-cost technology for large-scale production. The SNPs can be used also as a new generation of antibacterial agents. This is the first report targeting an aqueous extract of six species that facilitates silver nanoparticle synthesis.

¹SNPs: silver nanoparticles

Valorisation of Zizphus Jujuba

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Abstract:

Activated carbon is one of the oldest absorbent materials that has been manufactured in large quantities. In order to enhance the natural materials of the MILA region and reduce pollution, the waste from the "Jujube kernels" was used as a raw material in the manufacture of biomass charcoal. The chemical activation was carried out by phosphoric acid followed by a carbonization step.

We have studied certain characteristics such as: pH, moisture content, ash content and iodine index. A comparative study with commercial carbon C. Merck with respect to the elimination of a methylene blue dye was produced using the UV-vis technique. The various results showed that the coal prepared is comparable to industrial coal and could then be used in water treatment.

Keywords: Activated carbon, Carbonization, Chemical Activation, Zizphus.

Synthesis of pyrazolone derivatives

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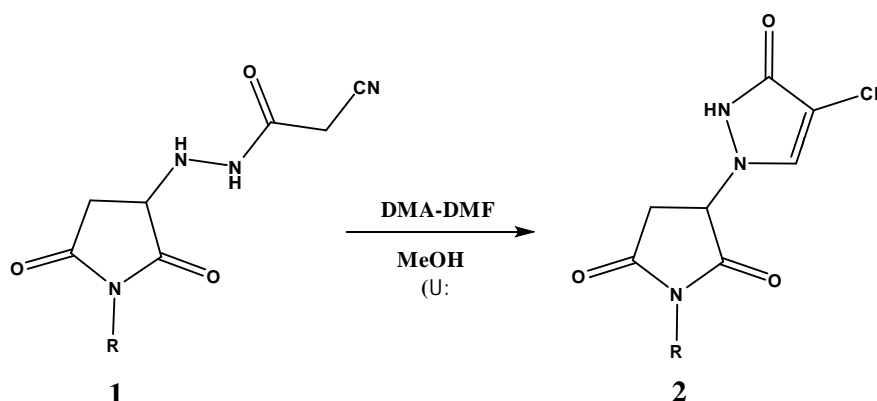
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Abstract:

Pyrazolone and its derivatives constitute an important class of heterocyclic compounds found in many drugs. Their biological effects, such as antimicrobial [1], antidiabetic [2] and anticancer activity[3].

Several methodologies for the synthesis of derivatives incorporating the pyrazolone core, with new biological profiles, have been developed and reported in the literature. In this context, we have developed a synthesis route allowing access to this type of compound **2** by exploiting the reactivity of 2-cyano-N'-(2,5-dioxopyrrolidin-3-yl) acetohydrazide **1** (Scheme 1). The structures of the synthesized products were established on the basis of ¹H NMR, ¹³C NMR, and Mass Spectrometry spectral data.



Scheme 1: Synthesis of 1-(2,5-dioxopyrrolidin-3-yl)-3-oxo-2,3-dihydro-1H-pyrazole-4-carbonitrile derivatives.

Keywords: Pyrazolone, 2-cyano-N'-(2,5-dioxopyrrolidin-3-yl) acetohydrazide.

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Experimental study of the co-digestion of two organic wastes

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Abstract

Currently, wastewater treatment is mainly carried out using an activated sludge process which generates a large quantity of sludge.

Improving the organic matter removal rate and decreasing the volume of sludge formed during treatment are two crucial issues. However, anaerobic digestion, an interesting solution for the problem of sewage sludge management.

The aim of this study is to examine the biodegradability (BMP Test) of the waste used (grenadine peelings and olive pomace and their mixture in different proportions and to improve the volume and quality of the biogas produced. by heat pre-treatment in the mesophilic phase (37°C), for the mixture (50% Grenadine and 50% olive pomace).

Anaerobic digestion was performed in batch using 250 ml glass serum bottles with a working volume of 150 ml. An Inoculum/Substrate ratio of 1:1) is introduced into each reactor. 10 ml of a solution containing varying concentrations of nutrients was added to each reactor. The volume of the reactors was adjusted with distilled water.

The experiment includes the mixture of two substrates in varying proportions which is considered positive tests and blank tests (Inoculum alone). All the reactors are made in triplicate. The test, which includes 50% olive pomace waste and 50% pomegranate peel waste, underwent a series of heat pre-treatments. The heat treatment range chosen is 100°C, 150°C, 180°C for 30 hours, considering the temperature equal to 20°C.

The characterization before incubation of the reaction mixture shows that it is rich in high volatile solids (TVS) varying between 58.33 and 71.58% and a very high COD and which is in its soluble form, we deduce that the biological treatment of this effluent should not pose a problem.

The production of methane from the anaerobic digestion process of the two wastes showed that the production of methane from olive pomace is much higher than that from grenadine waste.

Thermal pretreatment tests revealed that the specific methane production increases with increasing pretreatment temperature.

The improvement is apparent in the lag phase (2 to 3 days) varies between 17 to 19 times per untreated reaction mixture for all temperatures tested.

Modeling with Origin 2021 software gave R2 values between 0.98 and 0.95 for the two models with a better approach to the modified Gompertz model.

ESTERIFICATION OF PRIMARY, SECONDARY AND TERTIARY ALCOHOLS WITH MIXED CARBOXYLIC-PALMITIC ANHYDRIDES USING RESIN AMBERLYST-15 AS HETEROGENEOUS ACID CATALYST

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Abstract:

We describe a novel and efficient method for the synthesis of fatty esters by the esterification reaction of primary, secondary and tertiary alcohols with mixed carboxylic-palmitic anhydrides using resin Amberlyst-15 as heterogeneous acid catalyst. Influence of various reaction parameters such as molar ratio (anhydride/alcohol), catalyst amount, type of alcohol and type of mixed anhydride were studied to optimize the conditions for maximum yield. Among tested anhydrides we quote mainly the 4-chlorobenzoic palmitic anhydride because it was both reactive and selective for the preparation of palmitic acid ester. This anhydride gave a good yield of palmitic ester.

Keywords: fatty acid, mixed anhydride, heterogeneous acid catalyst, resin Amberlyst-15, esterification.

Effect of three extraction methods on in-vitro antioxidant and antimicrobial activities of extracts from pistachio shells

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Abstract:

Natural antimicrobial substances are now again receiving attention because of the current level of antimicrobial resistance to synthesis antimicrobial medications. Plants present a renewable and sustainable source of biomolecules that can be used as antimicrobial substances. Pistachio production in Tunisia has generated a large amount of potentially valuable waste that could be used as a source of bioactive compounds. The present work aims at a characterization of the shell of the pistachio. Different extraction methods have been applied to extract the natural substances from the shell of *Pistacia vera* L. Given the low extraction yields obtained by maceration (6 %), ultrasound assisted extraction and microwaves-assisted extraction were applied. The extraction yield increased up 41 %. The various extracts obtained were examined to determine their antioxidant and antimicrobial activities using agar well diffusion method. The results obtained show that the biological activities depend on the extraction method. The extracts of shells of *Pistacia vera* L. obtained by microwave assisted extraction are the richest in secondary metabolites show high antioxidant power as well as an important antimicrobial activity.

Keywords: *Pistacia vera* L shell.; chemical composition; antioxidant properties; antimicrobial capacities.



Synthesis and antioxidant evaluation of some pyrimidine heterocyclic derivatives

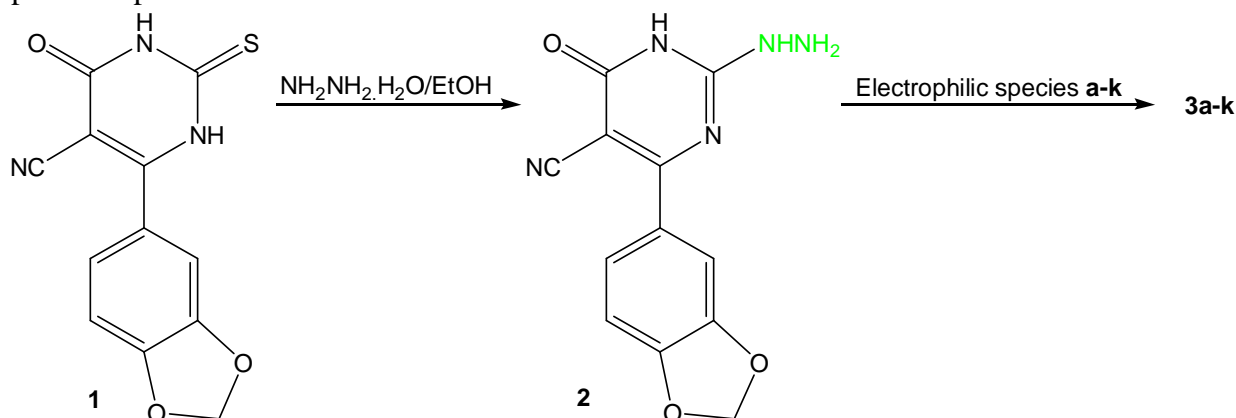
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Abstract:

The 6-Benzo[1,3]dioxol-5-yl-4-oxo-2-thioxo-1,2,3,4-tetrahydro-pyrimidine-5-carbonitrile **1** was reacted with hydrate hydrazine to conduce to the corresponding 2-hydrazinyl pyrimidine derivative **2** [1]. This latter compound acts as a nucleophilic substrate from its new active hydrazinyl group, on the electrophilic side of the awarded electrophilic species to afford a set of the corresponding pyrimidine containing, polyheterocyclic products **3a-k**, (Scheme 1) in good yields. The fully characterization of compounds **3a-k** was realized from the IR, ¹H, ¹³C NMR and MS spectroscopic data.



Electrophilic species: a: Ac₂O or Ac₂O/NaOAc; b: 4-ClC₆H₄CHO; c: 4-CH₃OC₆H₄CHO; d: 3,4-(CH₃O)₂C₆H₃CHO; e: HSCH₂COOH, fusion; f: CH₂(COCH₃)₂/EtOH-piperidine; g: HCO₂H; h: PhCOCl; i: HCONH₂; j: CNCH₂COEt, EtONa; k: CH₂(COOEt)₂, EtONa

Scheme 1.

The study of the total antioxidant capacity [2] and the reducing power antioxidant activity [3] of the new synthesized compounds **3a-k** showed that they are potent compounds. **3b**, **3c** and **3d** showed the most antioxidant activity 824.31, 778.81 and 945.09 respectively, referring to ascorbic acid.

Keywords: tetrahydropyrimidine, pyrimidotriazine, triazolopyrimidine, antioxidant activity

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Composition chimique et variabilité de six huiles essentielles commercialisées en Tunisie

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Abstract:

Actuellement, les huiles essentielles commercialisées ont envahi le marché tunisien. Certaines sont vendues par les pharmacies, d'autres par les parapharmacies sans aucun contrôle, et l'identification botanique ainsi que l'emprunt chromatographique font défaut. Cette ambiguïté peut influencer l'efficacité thérapeutique ou cosmétique de l'huile essentielle et même induire une toxicité. Dans le but d'identifier les chémotypes vendus, nous avons étudié la variabilité de la composition chimique des huiles essentielles commercialisées obtenues à partir de *Thymus vulgaris* L., *Salvia rosmarinus* Spenn., *Cupressus sempervirens* L., *Lavandula angustifolia* Mill., *Laurus nobilis* L. et *Melaleuca alternifolia* Cheel. Les huiles essentielles ont été analysées par CPG/MS et CPG/FID. Les composés majoritaires ont fait l'objet d'une analyse de la variance, d'un classement des moyennes, d'une analyse en composante principale et d'une classification hiérarchique.

L'analyse chromatographique nous a permis d'identifier 146 composés représentant de 83,75% à 99,35% de la totalité des huiles. Ces composés sont classés en 15 classes chimiques. Leurs teneurs varient significativement selon les espèces. Ces classes chimiques sont dominées par les oxydes (0,10%-51,13%), les phénols (0,22%-48,70%) et les alcools terpéniques (6,18%-47,06%), et sont essentiellement représentées, respectivement par le 1,8-cinéole, le terpinène-4-ol et le thymol. L'analyse en composante principale et la classification hiérarchique ont permis l'individualisation de 3 groupes et de 4 sous-groupes, chacun représentant un chémotype distinct.

Keywords: huiles essentielles, Chromatographie en Phase Gazeuse, Analyse en Composante Principale (ACP), Classification Hiérarchique (CH).



TOXICITE *IN VIVO* DE L'EXTRAIT METHANOLIQUE DES TIGES D'*ANTHYLLIS HENONIANA*

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Les plantes médicinales possèdent d'extraordinaires vertus thérapeutiques. Leurs utilisations pour le traitement de plusieurs maladies chez les êtres vivants et en particulier l'homme étaient très anciennes et toujours faites de façon empirique. Vouloir utiliser une plante médicinale en phytothérapie doit commencer tout d'abord par l'étude de sa toxicité.

En raison de son effet antioxydant *in vitro*, l'extrait méthanolique des tiges d'*Anthyllis henoniana* a été testé *in vivo* afin d'évaluer sa toxicité sur les foies et les reins des rattes. Cette évaluation s'appuie sur le dosage des paramètres : hématologiques, biochimiques, du stress oxydatif ainsi que l'histologie des organes récupérés.

En vue de mettre en évidence l'influence de l'extrait étudié sur les poids corporels des rattes, nous leur avons fourni chaque jour différentes doses (300, 600, 1200 et 1800 mg/kg) et on les a pesés pendant les 14 jours de traitement. En surveillant le comportement des rattes, nous avons constaté qu'il ne se déroule aucune privation d'appétit. Par ailleurs, les résultats des dosages des paramètres hématologiques, biochimiques, du stress oxydatif ainsi que l'histologie des organes récupérés a bien confirmé la non toxicité de l'extrait méthanolique d'où la possibilité de son utilisation médicinale.

Mots clés : *Anthyllis henoniana*, toxicité *in vivo*.

Caractérisation structurale de la daphnorétine et évaluation de son potentiel antileishmanien : Etudes *in-vitro* et *in-silico*

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Résumé

Cette étude concerne l'analyse approfondie d'une biscoumarine « la daphnorétine » isolée d'une plante indigène de la région méditerranéenne : *Thymelaea tartonraira*. Notre objectif principal est de déterminer la structure moléculaire de la daphnorétine et d'évaluer son potentiel antileishmanien, en utilisant à la fois des approches *in-vitro* et *in-silico*.

Dans un premier lieu, nous avons réussi à isoler la daphnorétine et à caractériser sa structure chimique à l'aide de techniques spectroscopiques avancées (RMN mono et bidimensionnelle, LCMS, IR, UV) Cette étape cruciale nous a permis de confirmer la pureté du composé, ouvrant ainsi la voie à des investigations plus approfondies.

Dans le cadre de l'étude biologique *in-vitro*, nous avons évalué l'effet de la daphnorétine sur la croissance des parasites *Leishmania*, responsables de la leishmaniose. Les résultats montrent qu'elle exerce une activité significative contre ces parasites, suggérant un potentiel antileishmanien prometteur. Des analyses complémentaires ont été menées pour évaluer la toxicité du composé vis-à-vis des cellules hôtes (macrophages Raw 264,7), avec des résultats encourageants quant à sa sélectivité.

Parallèlement, des études *in-silico* ont été entreprises pour mieux comprendre les mécanismes d'action potentiels de la daphnorétine contre la *Leishmania*. Nous avons choisi la ptéridine réductase, une enzyme clé dans le métabolisme des parasites *Leishmania*, comme cible principale de nos investigations. Ces simulations ont révélé des informations précieuses sur les sites de liaison et les modes d'interaction, jetant ainsi la lumière sur les voies potentielles de traitement de la leishmaniose.

Mots clés : *Activité antileishmanicide, Cytotoxicité, Daphnorétine, Thymelaea tartonraira.*



New Non-centrosymmetric Material (C₅H₉N₃)[ZnBr₄] · H₂O : Molecular structure, characterization, optical properties and biological activities

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The use of 2,3-diaminopyridine as an aromatic organic molecule in the synthesis of a new hybrid halogenometallate compound by the slow evaporation method afforded an unexpected non-centrosymmetric structure type. The obtained material with formula (C₅H₉N₃)[ZnBr₄] · H₂O crystallizes in the triclinic space group (P1). The compound was characterized by UV-visible measurements, differential thermal analysis (TG-DTA), single crystal X-ray diffraction and nonlinear optical activity. The structure consists of isolated tetrahedra [ZnBr₄]²⁻ anions, 2-amino-3-ammoniopyridinium [C₅H₉N₃]²⁺ cations and water molecules, which are connected together via N-H...O/Br and O-H...Br hydrogen bonds leading to the formation and strengthening of a three-dimensional supramolecular assembly. The optical band gap and Urbach energy were obtained through Tauc's equation. The direct and indirect band gap values are found to be 2.23 and 2.11 eV, respectively. The bioassay results showed that the compound exhibits modest antibacterial and antifungal activities.

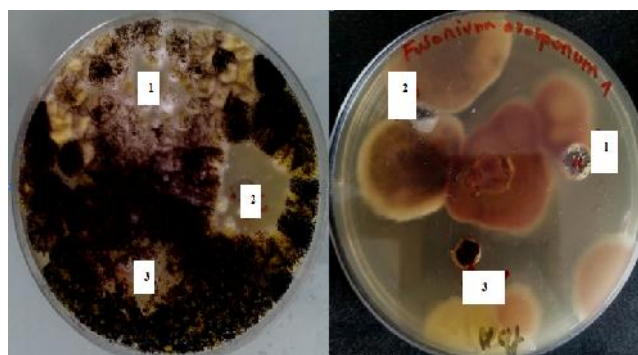


Figure : Zone of inhibition (mm), caused by the compound (1), amine (2) and ZnBr₂ (3) against bacteria: A: *Aspergillus niger* and B: *Fusarium oxysporum*

SYNTHESIS AND CHARACTERIZATION OF PYRAZOLATE METAL ORGANIC FRAMEWORK THIN FILM

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Abstract:

The Surface-Mounted Metal Organic Frameworks (SURMOFs) represent a milestone in the development of future technological breakthroughs. The processability of MOFs as films on surface together with their major features is broadening their range of applications to areas such as gas adsorption and separation, photovoltaics, and medicine [1]. In fact, MOFs are a promising class of porous nanostructured materials constructed from metal ions and organic linkers [2]. In this work, we have studied the effect of metal/ linker molar ratio of the precursor solution on morphology of Zn-NDIP thin film prepared from. Zinc (II) hydroxide nanoparticule via layer by layer growth method. The structural and morphological studies of obtained film were characterized using ATR-FTIR(IR), Fourier X-ray diffraction (XRD), UV/VIS spectroscopy and optical and scanning electron microscopy. We found that particle sizes and shapes of resulting Zn-NDIP materials can be controlled by the amount of NDIP used in the secondry growth step.

Keywords: SURMOFs, Zn-NDIP, Zinc hydroxide.

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Optimizing and assessing gluten-free pasta made from spinach

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Abstract:

Taking into account the nutritional advantages of spinach leaves, this study aimed to create gluten-free pasta utilizing various proportions of spinach flour. The pasta formulations involved the substitution of spinach flour at levels of 5%, 10%, 15%, 20%, 25%, and 30%. The primary objective was to evaluate the impact of these substitutions on the pasta's quality attributes and pinpoint the optimal replacement ratio. Furthermore, a comprehensive analysis compared the nutritional composition, color, and texture of the optimized pasta with that of commercially available durum wheat pasta. The findings of this investigation revealed that the pasta incorporating 20% spinach flour exhibited superior cooking properties and sensory attributes. Notably, the optimized gluten-free pasta demonstrated significant improvements ($p < 0.05$) in protein content, dietary fiber, mineral content, phenolic compounds, and polyunsaturated fatty acids when contrasted with the control, which was durum wheat pasta.

Keywords: Pasta, Spinach leaves, Formulation, Gluten-free, Polyunsaturated fatty acids.

The Impact of Processing Cycle Number on the Performances of Spanish Broom Flour reinforced Recycled Polypropylene Biocomposites

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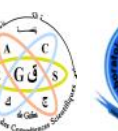
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Abstract:

The recovery and recycling of plastic waste is a new technique worldwide, but remains insufficient because it depends on the awareness of members of the recovery cycle (researchers, citizens, investors). During the recycling process, the plastic undergoes various operations that highlight several modifications in the molecular structure.

The main objective of this work is the recovery of polypropylene waste. The effect of multiple recycling on the performances of polypropylene is due to the thermomechanical stresses experienced during their shaping. Polymers tend to degrade. Polypropylene mainly undergoes chain breaks. This degradation leads to a modification of the morphology, thermophysical, thermomechanical and rheological performances of the recyclate (the reduction of its Melt Flow Index MFI) which makes it of a lower grade. Its application must therefore be modified. Moreover, this study investigates the modification of interfacial adhesion forces between the Spanish Broom flour and the recycled polypropylene to increase their compatibility using vinyltrimethoxysilane (VTMS) treatment. The effective properties of biocomposites prepared with chemically-treated flour will be compared to results obtained from recycled and neat polymer. The biocomposites materials obtained were studied using several analytical techniques, including, TGA, X-Ray Diffraction (XRD), rheological (MFI, DMA) and the thermophysical behavior (HOT DISC).

Keywords: Plastic waste, Recycled Polypropylene, Spanish Broom, Biocomposites, Rheological properties, Thermophysical behaviors.



ETUDE DES PROPRIETES ANTICORROSION DE L'EXTRAIT VEGETAL DE *S. UNDULATA* EN MILIEU ACIDE CHLORHYDRIQUE 1M POUR L'ACIER AU CARBONE (X70)

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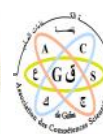
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Ce travail vise à évaluer la plante *scorzonera undulata*, en tant qu'inhibiteur de corrosion. La spectroscopie d'impédance électrochimique (EIS) et la polarisation potentiodynamique sont utilisées pour étudier l'effet anticorrosion de l'extrait d'acétate de *scorzonera undulata*. Les courbes de polarisation montrent que l'extrait est un excellent inhibiteur mixte. L'efficacité d'inhibition maximale de 83% a été obtenue avec 400 mg/l de l'inhibiteur à 298 k. Cette investigation est complétée par des études morphologiques et de chimie de surface utilisant respectivement la microscopie électronique à balayage (MEB). Les résultats confirment la formation d'une couche protectrice à la surface de l'extrait.

Mots-clés: *scorzonera undulata*, extraits, antioxydant, EIS, MEB



Adsorption performance of tartrazine dye from wastewater by raw and modified sawdust: Equilibrium, isotherms, kinetics and regeneration studies

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Abstract

The massive generation of dye waste leads to environmental, social and ecological problems. The use of biomass-derived activated carbon as an adsorbent is a versatile approach that has attracted more attention due to the production of value-added products with lower environmental risk. Application of raw sawdust (SD) and activated sawdust (ASD) for the removal of tartrazine has been investigated. Both materials were characterized via elemental analysis, BET, Thermogravimetry, pH of zero charge, Boehm titration, fourier transform infrared spectroscopy and scanning electron microscopy. The effects of various parameters such as pH, contact time, agitation speed, adsorbent mass, initial dye concentration and temperature on the removal of the dye were studied. The highest removal percentages were found to be 47.88 % for SD and 99.52 % for ASD. Langmuir saturation adsorption capacities were equal to 0.8 mg/g for SD and 127 mg/g for ASD at 298 K. Even if SD shows a more limited efficiency in tartrazine removal, it can be used as it is, without any activation step, therefore it can be a convenient alternative to the activated material. In conclusion, SD and ASD are promising, biodegradable, eco-friendly, cost-effective and efficient adsorbents for the removal of tartrazine from wastewater effluents.

Keywords: Activated sawdust, Biosorption, Tartrazine, Isotherm modelling, Kinetic.

Reactivity of ZnO material in Biginelli Synthesis

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Abstract

The objective of this work is to study the catalytic system based on ZnO in the multicomponent reaction of Biginelli type for the synthesis of 3,4-dihydropyrimidin-2-(1H)-one (DHPM) using benzaldehyde, ethyl acetoacetate and urea as reagents. The zinc oxide was prepared by sol-gel method and the structural and textural properties of the prepared catalysts were studied by thermogravimetric analysis (TGA), X-ray diffraction (XRD), Brunauer-Emmett-Teller (BET) specific surface area measurement, Barrett Joyner and Halenda BJH method, Scanning Electron Microscopy (SEM) coupled to (EDX). The effects of reaction time, reaction temperature, catalyst mass, and solvent effect on DHPM yields were evaluated. Promising results were obtained. Thus, the catalyst system prepared proved to be very active with a yield of 64% in DHPM. This yield in DHPM was obtained in the presence of the ZnO catalyst, tested without solvent with a reaction time of 2h, a temperature of 100°C and catalyst mass of 0.01g. The DHPM product obtained was characterized by NMR method (13C NMR, 1H, DEPT 135, DEPT 90, 2D NMR (HSQC)).

Keywords: Biginelli reaction, Heterogeneous catalysis, Zinc oxide.

EXTRACT PLANT AS AN ECO-FRIENDLY INHIBITOR CORROSION FOR CARBON STEEL

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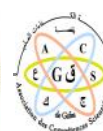
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Abstract

The aim of this study was the extraction of the methylene dichloride extract from all parts of *H.Libanotis* plant, which was used as a corrosion inhibitor for API 5LGr-B carbon steel in a hydrochloric acid solution (1N) using electrochemical techniques. Experimental results show that increasing the concentration of the extract leads to an increase in corrosion inhibition efficiency of carbon steel, which reached 79.16% at 20 °C for a concentration of 1100 ppm. The thermodynamic study demonstrated physical adsorption and follows the Langmuir isotherm.

Keyword: Methylene dichloride extract, corrosion inhibitor, carbon steel, physical adsorption.



A selective detection approach for Hg (II), Cd (II) and Al (III) ions using a pyridine-based colorimetric chemosensor

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Abstract:

Heavy metal ions (HMIs) are non-biodegradable, highly toxic materials and are important pollutants of most of the natural resources mainly water and environment. They accumulate in the biosphere or enter the organism through the digestive tract. Their prevalence even in trace amounts, results in serious health issues in humans. Besides, this warrants the availability of easily affordable, reliable, quick, and sensitive approaches for monitoring of the concentration of HMIs in aqueous environments. This necessitates the exploration for novel and efficient probes for recognition of these toxic agents [1-5].

In this perspective, we report an efficient active molecular architecture based on aza-aromatic ligand known for its ability to detect HMIs. To meet this goal, a new sensor with pyridine ring have been synthesized and characterized. The purpose of this work is to evidence by UV-Visible absorption spectroscopy method the detection effect of the new sensor upon a number of metal ions in view of their molecular recognition performed in organic medium. The evolution of the sensor absorption spectra during the ions addition has been examined and demonstrated a highly selectivity and sensitivity towards Hg²⁺, Cd²⁺ and Al³⁺ ions. The determination of binding stoichiometry of sensor-ion complexes was evaluated using continuous variation method known as the job's plot method.

Keywords: Colorimetric sensor, Heavy metals, Environmental pollutants, Detection.

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Place de l'aromathérapie dans les soins palliatifs des patients cancéreux

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Les patients cancéreux ressentent des complications et des effets indésirables liés à leur traitement par la chimiothérapie. L'objectif de cette revue bibliographique est d'étudier l'intérêt de l'aromathérapie dans les soins palliatifs chez les malades qui souffrent de cancer.

Les bases de données PubMed, Scopus et Google Scholar ont été consultées à la recherche d'articles originaux, en utilisant les mots clés : «aromatherapy, essential oils, chemotherapy, cancer patients ». Les résultats ont été filtrés en anglais et en français.

La recherche a abouti à 85 articles, après une lecture répétée du titre et du résumé afin d'exclure les études inéligibles, 58 articles ont été retenus. 36 articles mentionnent l'utilisation de l'aromathérapie chez les malades de cancer du sein, les effets indésirables les plus courants et traités par l'aromathérapie sont respectivement les nausées et les vomissements, l'anxiété, les troubles du sommeil et les douleurs. Les huiles essentielles les plus utilisées sont l'huile de lavande, l'huile de menthe poivrée, l'huile de camomille, l'huile de citron et l'huile de sauge. 10 articles présentent des essais randomisés contrôlés.

L'aromathérapie peut être utilisée comme un traitement complémentaire approprié pour améliorer les effets indésirables, bien que des études supplémentaires soient nécessaires pour déterminer le protocole et le dosage standard et pour assurer la sécurité lors de son utilisation.

The Attenuation of Dermal Wounds by Modulating Oxidative Stress and Inflammation in Wistar Albino Rats: Beneficial effects of *Allium subhirsutum* L.

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Abstract

In the present study, *Allium subhirsutum* L. (AS) was investigated to assess its phenolic profile and bioactive molecules including flavonoids and organosulfur compounds. The antioxidant potential of AS and wound healing activity were addressed using skin wound healing and oxidative stress and inflammation marker estimation in rat models. Phytochemical and antiradical activities of AS extract (ASE) and oil (ASO) were studied. The rats were randomly assigned to four groups: group I served as a control and was treated with simple ointment base, group II was treated with ASE ointment, group III was treated with ASO ointment and group IV (reference group; Ref) was treated with a reference drug "Cytolcentella® cream". Phytochemical screening showed that total phenols (215 ± 3.5 mg GAE/g) and flavonoids (172.4 ± 3.1 mg QE/g) were higher in the ASO than the ASE group. The results of the antioxidant properties showed that ASO exhibited the highest DPPH free radical scavenging potential ($IC_{50} = 0.136 \pm 0.07$ mg/mL), FRAP test ($IC_{50} = 0.013 \pm 0.006$ mg/mL), ABTS test ($IC_{50} = 0.52 \pm 0.03$ mg/mL) and total antioxidant capacity ($IC_{50} = 0.34 \pm 0.06$ mg/mL). In the wound healing study, topical application of ASO performed the fastest wound-repairing process estimated by a chromatic study, percentage wound closure, fibrinogen level and oxidative damage status, as compared to ASE, the Cytolcentella reference drug and the untreated rats. The use of AS extract and oil were also associated with the attenuation of oxidative stress damage in the wound-healing treated rats. Overall, the results provided that AS, particularly ASO, has a potential medicinal value to act as effective skin wound healing agent.

Keywords—*Allium subhirsutum* L., wound-healing activity, antioxidant potential, inflammatory marker, oxidative stress

Synthesis of new fluorescent pyrazolines via the NITEC reaction

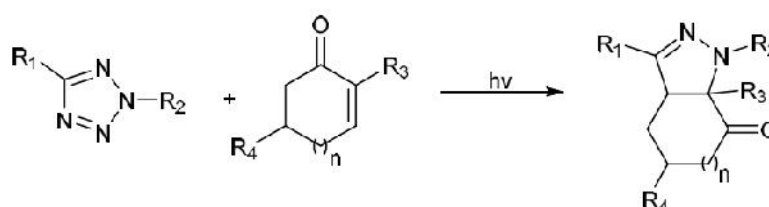
Chiraz Labassi^{a,b}, Nicolas Fournier^b, Mohamed Lotfi Efrif^a, Jean-Luc Fillaut^b, Rafik Gatri^a

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Abstract:

Our interest is to synthesize biologically active molecules, such as pyrazole derivatives, which present a wide variety of compounds with biological, pharmaceutical and physical (fluorescence) applications. On the other hand, we wanted to integrate cyclenones known to be excellent precursors of biologically active compounds. We synthesised pyrazole derivatives via the NITEC (nitrile imine-mediated tetrazole-ene cycloaddition) reaction between tetrazoles and functionalised cyclenones. The latter were used for absorbance and fluorescence measurements, as well as biological activity assessment.



NITEC Reaction

Keywords: NITEC, Cycloaddition, Pyrazole, Cyclénones.

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Optimization of the extraction yield of essential oils of *Myrtus Communis* (*Linnaeus*) by hydro distillation and chemical characterization

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Abstract:

The *Myrtus communis* L. is a plant that grows spontaneously in the Tunisian flora, it is very well known for its many culinary uses, which intensify the demand for food and pharmaceutical industries. In order to optimize the factors affecting the extraction of *Myrtus communis* L. essential oil by hydrodistillation, a study by response surface design type central composite was conducted. After an appropriate choice of three variables, 17 experiments led to a mathematical second degree model relating the response function (yield) to factors and allowing a good control of the extraction process. Later than the realization of the experiments and data analysis, the study has allowed the knowledge of the optimal conditions necessary to obtain a better essential oil yield.

Our study proved the great efficiency to applying the experiments design methodology for optimizing the operational parameters affecting the hydrodistillation of *Myrtus communis* L.. It is about a relevant and economical way which allows to obtain the maximum of information in a short time and, especially, with a minimum of experiments. These operating conditions are: an hydrodistillation time of 90 min, a plant material/water ratio of approximately 1/12 (100g/100 ml) but the variation of the condensate flow rate does not affect the extraction yield. However, the ratio (dry matter/water) and extraction time manifested considerable interaction with each other and consequently influenced the yield. The results of chemical analyzes showed that the acid value of the essential oil of *Myrtus communis* L. is equal to 4.27 which shows that the quality of myrtle is well preserved and the ester value of the E.oil is equal to 53.7 which is explained by its richness in triglycerides. In addition, GC-MS analysis allowed to detect the presence of 16 compounds in the *Myrtus communis* L. E.Oil with the major compound being -pinene accounting 59,58 and limonene accounting 23,18.

Keywords: Optimization, *Myrtus communis* L., hydrodistillation, essential oil yield, response surface design.

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Study of the treatment efficiency of industrial wastewater using low cost ceramic composite microfiltration membrane

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Abstract:

In this work, Zeolite/Sand microfiltration membrane prepared by deposition of a thin layer on a tubular support (active layer/support) was applied for the purification of industrial wastewater. The results were compared to that obtained by Zeolite/Zeolite and Sand/Sand microfiltration membranes. The effect of the membrane support was determined by the estimation of the membrane fouling established during the filtration. Therefore, permeate flux, fouling resistances and treatment efficiencies were thoroughly compared. The utilization of zeolite membrane over sand support (Zeolite/Sand) instead of the membrane totally on zeolite (Zeolite/Zeolite) shows an increase in the stabilized permeate flux from 58 to 180 L/h.m² at 1 bar. Whereas, the membrane totally made from sand (Sand/Sand) displayed a higher stabilized permeate flux of 464 L/h.m². For zeolite membrane the increase of the flux recovery ratio (FRR) from 44.94% to 54.62% and the decrease of flux decay ratio (FDR) from 89.13% to 83.3%, using sand support instead of zeolite, indicate better antifouling properties. The maximum COD rejection of 97 % was achieved using Sand/Sand membrane. For zeolite membranes, an increase in COD rejection from 57% to 73% was obtained when the sand support was used instead of zeolite. Overall, the uses of sand support for the zeolite membrane enhanced permeate flux, antifouling properties and separation efficiencies. Therefore, the sand material appears suitable as support for composite membrane elaboration.

Keywords: Microfiltration, Natural sand, Natural zeolite, Treatment performances, Fouling resistances.

Extraction de sirop et composés phénoliques d'une catégorie de faible valeur marchande de dattes Deglet ENOUR

MOKDED Fatma
ISET Gabès

Résumé:

Dans le présent travail on se propose de valoriser les dattes à faible valeur marchande via sa transformation en sirop à partir d'une catégorie de datte « **Deglet-Nour** » par une extraction par **diffusion à 70°C** pendant 4 heures et un ratio **Liquide/Solide 3 :1**, suivie d'une concentration à deux méthodes différentes : par évaporation sous vide et par chauffage direct. Les sirops obtenus font l'objet des analyses physico-chimiques et microbiologiques.

Les résultats montrent que la concentration par évaporation sous vide permet d'obtenir un sirop de meilleure qualité qui conserve les molécules et la qualité de sucres.

L'extraction de composées phénoliques des dattes par macération se fait dans différents types des solvants : méthanol pur, méthanol 80%, méthanol 60%, acétone 80% et acétone méthanol 50%.

La meilleure teneur en phénols totaux est (**767,94±0,15 mg EAG /100g de MS**) pour le solvant **acétone 80%**.

Les teneurs en flavonoïdes est estimée (**589,14±5,75 mg EQ /100g de MS**) pour le solvant **acétone 80%**.

Keywords: dattes, sirop, extraction, concentration, composés phénoliques, solvant.

