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FEBRUARY 22-23, 2023
EL OUED, ALGERIA

The first international Seminar on Catalysis, Chemical Engineering & Green Chemistry

BOOK OF ABSTRACTS

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Welcome to CaCEG23

Dear Colleagues,

On behalf of the Organizing Committee, we are pleased to invite you to attend The first international Seminar on Catalysis, Chemical Engineering & Green Chemistry (CaCEG-2023) will be held in University of Echahid Hamma Lakhdar El Oued, Algeria, on February 22- 23,2023.

The purpose of the CaCEG-2023 international Seminar is to bring together researchers, practitioners and educators to exchange and share their experiences and research results, as well as practical challenges encountered and solutions adopted in the fields of Catalysis, Chemical Engineering and Green Chemistry, enabling these scientists to share scientific knowledge, and experience in the field of green chemistry and Chemical Engineering and is also to lay the groundwork for multidisciplinary and interdisciplinary studies for the advancement of science and technology. The main topic of the CaCEG-2023 is Green chemistry and Catalysis, but all subtopics are as stated in the "Topics" section.

With a theme of ‘Catalysis, Chemical Engineering, and Green Chemistry’, the CaCEG-2023 international, seminar features two days of scientific sessions, keynote & invited lectures, oral and poster presentations, as well as exceptional networking opportunities and a unique social program.

Yours sincerely,
Organizing Committee of CaCEG-2023

Plenary Presentations

- **Dr. Pierre de Fremont,** *university of Strasbourg* (France)

« NHC Gold(I) POM hybrids: efficient and versatile catalysts »

- **Pr. Malika Berredjem,** *Badji Mokhtar–Annaba University* (Algeria)

« Novel Sulfonamide derivatives: Efficient Synthesis, biological activity, molecular docking, POM analyses and identification of pharmacophores sites »

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

NHC Gold(I) POM hybrids: efficient and versatile catalysts

Pierre de Frémont[a]* and Aurélien Blanc[a]

[a]*CNRS, Université de Strasbourg, Strasbourg, France*

* *Corresponding author.*Tel.: +3333368851087
E-mail address:defremont@unistra.fr

ABSTRACT

A series of supported phosphane and NHC gold(I) acetonitrile polyoxometalate hybridcomplexes were synthesized in high yields,upon reactions between gold(I) methyl- or hydroxyl- precursors and the acidic form of the polyoxometalates.[1] Theywere characterized by NMR, MS-ESI spectroscopy as well as single crystal X-ray diffraction.[2] In a preliminary catalytic study, their activity was assessed under heterogeneous conditions for the ene-yne rearrangement reaction and a cycloisomerization reaction. Additionally, their reactivity and recyclability were tested in the hydration of alkynes under homogeneous conditions. Overall, the complexes were found indefinitely stable in acetonitrile solutions. They displayed similar catalytic activities under homogeneous and homogeneous conditions.

Keywords: Orgonagold chemistry; N-heterocyclic carbene; polyoxometalate; catalysis.

References

1. SirindilF., NolanS. P., DagorneS., PaleP., BlancA., de FrémontP.Synthesis, Characterization and Catalytic Activity of NHC Gold(I) Polyoxometalate Complexes.*Chem. Eur. J.*2018, 24, 12630-12637.
2. BlancA., de Frémont, P. When Gold Cations Meet Polyoxometalates Anions. *Chem. Eur. J.*2019, 25, 9553-9567.

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Novel Sulfonamide derivatives: Efficient Synthesis, biological activity, molecular docking, POM analyses and identification of pharmacophores sites

Malika BERREDJEM

Laboratory of Applied Organic Chemistry, Synthesis of Biomolecules and Molecular Modelling Group, Department of Chemistry, Sciences Faculty, Badji-Mokhtar – Annaba University, Annaba, Algeria

**Corresponding author.*Tel.: 0773875634
E-mail address: mberredjem@yahoo.fr

ABSTRACT

Sulfonamides are attractive molecules with potential application in the field of medical chemistry. It is known that sulfonamide containing derivatives demonstrate promising value in the development of protease inhibitors such as HIV protease, serine protease and metalloprotease [1]. It should also be mentioned that Supuran group's [2] reported the design and in vitro antitumor activity of several classes of sulfonamide CAIs, shown to act as nanomolar inhibitors against the classical isozymes known to possess critical physiological roles, such as CA I, CA II and CA IV [3]. These compounds were also shown to exert potent inhibition of cell growth in several leukemia, non-small cell lung, ovarian, melanoma, colon, CNS, renal, prostate and breast cancer cell lines [4].

Our interest is focused on the preparation of novel derivatives of sulfonamide containing various pharmacophores such as phosphonate, oxazolidinone and nitrogen mustard. Our aim is to explore new selective antitumor agents, less toxic and more stable. Several novel highly functionalized compounds prepared by our group were evaluated for their in vitro antitumor activity against cancer cell lines (Jurkat, K562 and PRI).

In order to evaluate the interactions of new sulfonamide derivatives with human enzyme, molecular docking simulation was performed to explore the binding mode of the prepared compounds in the active site of various target based on binding mode of previously refined structures of sulfonamide complex.

References

[1] J.Y. Winum, A. Scozzafava, J.L. Montero, C.T. Supuran, Therapeutic potential of sulfamides as enzyme inhibitors, Expert, Med. Res. Rev 26 (2006) 767–792, doi: 10.2174/138161208783877848.
[2] C.T. Supuran, Carbonic Anhydrase Inhibition and the Management of Hypoxic Tumors, Metabolites 7 (2017) 48–61, doi: 10.3390/metabo7030048.
[3] M. Franchi, D. Vullo, E. Gallori, J. Pastorek, A. Russo, A. Scozzafava, S. Pa- storekova, C.T. Supuran, Carbonic anhydrase inhibitors. Inhibition of cytosolic isozymes I and and II transmembrane, cancer-associated isozyme IX with lopophilic sulfamides, J. Enzyme Inhib. Med. Chem. 18 (2003) 333–338, doi: 10. 1080/14756360310 0 0138778.
[4] S.T. Supuran, F. Briganti, S. Tilli, W.R. Chegwidden, A. Scozzafava, Carbonic anhydrase inhibitors: sulfonamides as antitumor agents? Bioorg, Med. Chem. 9 (2001) 703–714, doi: 10.1016/s0968-0896(0 0)0 0288-1.

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Al-pillared montmorillonite as effective heterogeneous catalyst for the synthesis of dihydropyrimidinone in solvent and under solvent free conditions

Lamia Bouchenka[a] and Farida Bouremmad [a]*

[a]*Laboratoire de l'Interaction des Matériaux et de l'Environnement LIME, University of Jijel, Algeria*

* *Corresponding author.*
E-mail address: bouremmad_farida@yahoo.com

ABSTRACT

In this work, we are interested in synthesis, characterization and heterogeneous catalytic properties of an Al-Pillared montmorillonite.
The synthesis is based on the direct cation exchange method which consists of the incorporation of an aluminium hydroxyl polycation into the raw montmorillonite-Na.
The structural characterization is performed by X-ray diffraction (XRD) and Fourier Transformed Infra-Red (FTIR).
The prepared Al-Pillared montmorillonite is used as a heterogeneous catalyst for the one-pot Biginelli reaction whose purpose is the synthesis of dihydropyrimidinones which are heterocyclic systems with important biological, pharmaceutical and therapeutic properties. The reaction was carried out by using glycerol as solvent and under solvent-free conditions.
The obtained results are very interesting; first XRD shows that the aluminium hydroxyl polycation was incorporated into the Na-montmorillonite since the basal spacing increased up to 16 Å, then different acid sites (Brönsted and Lewis) were shown by pyridine adsorption in FTIR spectroscopy.
The catalytic tests on dihydropyrimidinone synthesis by Biginelli reaction in the presence of Al-pillared montmorillonite as heterogeneous catalyst show that the reaction is better in solvent free conditions than in presence of glycerol as solvent, indeed the yields in the solvent free conditions is 96% in 4h comparing to 43% in the same time in glycerol as solvent.
In conclusion, this work deals perfecly with green chemistry, since a natural low cost and abundant material is used in heterogeneous catalysis, in addition very interesting results were obtained in solvent free conditions.
Keywords: *Montmorillonite; heterogeneous catalysis; green chemistry; dihydropyrimidinone.*

References

1. Pesquera C, Gonzalez F, Benito I, Mendioroz S, Pajares J.A. Synthesis and characterization of pillared montmorillonite catalysts. Applied Catalysis. 1991, 69;1: 97-104.
2. Baloyi J, Ntho T, Moma J. Synthesis and application of pillared clay heterogeneous catalysts for wastewater treatment: a review. *RSC Adv.* 2018, 8: 5197-5211.
3. Belferdi F, Bouremmad F, Shawuti S, Gulgun M.A. Effect of the Exchanged Cation in an Algerian Montmorillonite Used as a Heterogeneous Catalyst for Biginelli Reaction. Acta Chim. Slov. 2021, 68, 355–36.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Multi-component Synthesis of New Fused Benzo-Heterocyclic Compounds and Evaluation of Their Biological Activity

Ichrak BOUGUESSA[a]*, Mohamed DEHAMCHIA[a] and Zine REGAINIA[b]

[a]*Laboratory of Biodiversity and Application of Biotechnology in Agricultural Domain, Department of Biology, El Oued University, BP 789, 39000, Algeria.*

[b]*Mohamed Cherif Messaadia University, Faculty of Science and Technology, Souk Ahras-41000, Algeria*

* Corresponding author.Tel.:*0675439597*

E-mail address: ichrakbouguessa94@gmail.com

ABSTRACT

In the search for new heterocyclic compounds that are biologically active or may generate an immune response to various infectious and inflammatory diseases, we recommend the Biginelli reaction for the synthesis of novel fused heterocyclic compounds. This reaction is based on acid catalyzed three-component condensation of sodium oxalocetate, aromatic aldehydes and nitrogen nucleophilein ethanol as solvent.All the synthesized products were characterized by the usual spectroscopic methods: FT-IR and NMR (^{1}H and ^{13}C). Allnewlycompounds were screenedfor their *in vitro* antioxidant and antibacterial activities.

Keywords: Nitrogen heterocyclic, multi-component reaction, antibacterial activity, antioxidant activity.

References

1. Marinescu M. *Biginelli Reaction Mediated Synthesis of Antimicrobial Pyrimidine Derivatives and Their Therapeutic Properties*. *Molecules*. 202;26(19):6022.
2. Ali E.M.H., Abdel-Maksoud M.S., Oh C.H. *Thieno[2,3-d]pyrimidine as a promising scaffold in medicinal chemistry: Recent advances. Bioorg Med Chem.* 2019; 27(7):1159-1194.

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In Vitro and In Silico Evaluation of N^6,9-bis(ferrocenylmethyl)adenine as an Anticancer Drug

LANEZ Elhafnaoui[a,b,*] and LANEZ Touhami[b]

[a]*University of El-Oued, Department of Biochemistry, 39000, El-Oued, Algeria*

[b]*University of El Oued, VTRS Laboratory, B.P.789, 39000, El Oued, Algeria*

* *Corresponding author*.Tel.: +2136-61-60-33-23
E-mail address: lanez-elhafnaoui@univ-eloued.dz

ABSTRACT

The in vitro evaluation of the interaction between N^6,9-bis(ferrocenylmethyl)adenine and double-stranded DNA, and bovine serum albumin was carried out using cyclic voltametry and electronic spectroscopy essays to confirm the formation of $(Fc)_2$Ad-DNA and $(Fc)_2$Ad -BSA. The binding constant and the binding free energy of the obtained adduct calculated from voltammetric measurements were in good agreement with those obtained from electronic spectroscopy studies. The computational molecular docking technique was used for the in-silico evaluation using AutoDock 4.2 docking software. The molecular structure of the ligand was built and optimized at the level of density functional theory DFT with DFT/B3LYP method combined with 6-311++G(d,p) basis set using Gaussian 09 program package. The crystal structures of both DNA (PDB ID: 1W0T) and BSA (PDB ID: 3V03) were imported to the AutoDock molecular docking software. The docking analyses confirm the formation of the adducts.

Keywords: cyclic voltametry; electronic spectroscopy; AutoDock 4.2; DFT; N^6,9-bis(ferrocenylmethyl)adenine.

References

1. Honkatukia M, Soderback P, Kulmala J. Technical Note Molecular Biology TN51000-006, Isolation of genomic DNA from chicken blood using QuickPick™ gDNA kit, 2010, 1-2.
2. Shah A, Zaheer M, Qureshi R, Akhter Z, Nazar MF. Voltammetric and spectroscopic investigations of 4-nitrophenylferroceneinteracting with DNA. Spectrochimica Acta Part A. 2010, 75: 1082-1087. https://doi.org/10.1016/j.saa.2009.12.061
3. Sathyadevi P, Krishnamoorthy P, Butorac RR, Cowley AH, Bhuvanesh NSP, Dharmaraj N. Effect of substitution and planarity of the ligand on DNA/BSA interaction, free radical scavenging and cytotoxicity of diamagnetic Ni(II) complexes: a systematic investigation. Dalton Trans. 2011, 40(38): 9690-9702. https://doi.org/10.1039/C1DT10767D
4. Majorek K. A, Porebski PJ, Dayal A, Zimmerman MD, Jablonska K, Stewart AJ, Minor W. Structural and immunologic characterization of bovine, horse, and rabbit serum albumins. Molecular Immunology. 2012, 52(3-4): 174-182. https://doi.org/10.1016/j.molimm.2012.05.011

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Synthesis of functionalized furans via palladium-catalyzed one-pot reaction of 1,3-dicarbonyl compounds with alkyl halides

Kheira Haiouani[a]*, Amar Djemoui[a] and Djamila Djemoui [b]

[a]*Department of Chemistry, Faculty of Exact Sciences and Informatics, Djelfa University, Djelfa, Algeria*

[b]*Department of Material Sciences, Faculty of Science and Technology, Djilali Bounaama University, Khemis Miliana, Algeria*

* *Corresponding author.*Tel.: 0674133399
E-mail address: kirahaiouani@yahoo.fr

ABSTRACT

Functionalized furans are structural features of naturally occurring and biologically active molecules, as well as in various pharmaceutical products [1,2] and flavoring and fragrance compounds [3,4]. Furans also used as building blocks in organic synthesis [5,6]. For these reasons, A new and efficient two-component alkylation-cyclization reaction catalyzed palladium was developed, producing functionalized furans in good yields from readily accessible and low cost starting materials, 1,3-dicarbonyl compounds and allyl bromide. The reaction conditions and the scope of the process were examined, and a possible mechanism is proposed.

Keywords: Furan; Palladium catalyst; One-pot reaction; Allyl bromide; 1,3-dicarbonyl compounds.

References

1. Greve S, Friedrichsen W. Chapter 5.3 Five-membered ring systems furans and benzofurans, in:. Gribble G.W, T.L. Gilchrist (Eds.) Progress in Heterocyclic Chemistry, *Elsevier*. 1999: 144-162.
2. Fraga B M., *Natural Product Reports*. 1992, 9: 217-241.
3. Levisalles J, *Oil Record*. 1958,49: 627.
4. Vernin G, The Chemistry of Heterocyclic Flavoring and Aroma Compounds, Ellis Horwood: Chichester ed., 1982.
5. Lipshutz B H, *Chemical Reviews*. 1986, 86 : 795-819.
6. Martin S F, Zinke P W, *The Journal of Organic Chemistry*. 1991,56: 6600-6606.

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Synthesis and gas adsorption of porous porphyrin polymer

LOUAFI Fadila[1] , NEGHMOUCHE NACER Salah[1,2], BRAHMIA Ouarda[3]

1Unité de Recherche CHEMS, Université des frères Mentouri de Constantine, Constantine, 25000, Algérie

2 Université Hamma Lakhdar Eloued , 39000 Algérie.

3 Laboratoire des Techniques innovantes de préservation de l'Environnement, Université des frères Mentouri de Constantine, Constantine, 25000, Algérie

* *Corresponding author.*Tel.: +213669444009
E-mail address:

ABSTRACT

Advancement of society largely depends on usage of petroleum products and burning of fossil fuels, which emit CO2, one of the major greenhouse gases responsible for global warming. With the advancement of the society, the carbon level in the atmosphere is increasing and the situation is turning worse day by day. Hence, novel strategies for developing highly efficient materials for CON sequestration or separation from flue gases are very demanding and have a direct environmental impact via greenhouse gas remediation. The use of different natural and solid organic materials as adsorbents with interesting environmental and economical properties, has made the adsorption even more attractive and an alternative or complementary to other techniques. The synthesis of nitrogen rich microporous materials has gained significant attention due to their potential as solid adsorbents for CO2 capture. These microporous materials include, but are not limited to, metal–organic frameworks (MOFs), zeolitic imidazolate frameworks (ZIFs), and hypercross-linked microporous polymers (BILPs, POPs, etc.). The key strategy to develop new and efficient POPs mainly relies on the design of nitrogen rich building blocks that possess high surface areas.

Porphyrin based organic polymers are very exciting in this context due to the presence of basic pyrrole containing macrocyclic cavity, which facilitates strong interaction with Lewis acid. This material possesses high surface area and exhibited outstanding adsorption capacity may thus contribute significantly in wide-scale applications in environmental research. In this work, a new microporous polyporphyrin has been synthesized and structurally characterized, and it shows permanent porosity and high CO2 uptake.

Keywords: adsorption; polymer; petroleum products; Porphyrin.

References

1. Mikkelsen M., Jorgensen M., Krebs F.C. The teraton challenge. A review of fixation and transformation of carbon dioxide. Energy Environ. Sci. 2010;3:43–81.
2. Zou L., Sun Y., Che S., Yang X., Wang X., Bosch M., Wang Q., Li H., Smith M., Yuan S., et al. Porous organic polymers for post-combustion carbon capture. Adv. Mater. 2017;29:1700229.
3. Zhuo C., Levendis Y. Upcycling waste plastics into carbon nanomaterials: A review. J. Appl. Polym. Sci. 2014;131:39931.
4.Yaumi A.L., Abu Bakar M.Z., Hameed B.H. Recent advances in functionalized composite solid materials for carbon dioxide capture. Energy. 2017;124:461–480.

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Green Synthesis Of Nanoparticle And Its Photocatalytic Activity Towards Water Soluble Toxic Dyes

Rouiha zohra[a]*

[a]*Department of process engineering, Hamma Lakhdar University, El-Oued, Algeria*

* *Corresponding author.*Tel.: 0657304904
E-mail address: doc.chimie@gmail.com

ABSTRACT

Nowadays, the application of nanotechnology is exponentially increasing in different therapeutic and agricultural activities, such as antibiotics, anticancer, antimicrobial agents, and bio-fertilizers. One of the challenges in modern nanotechnology is the development of reliable, safe protocols for the synthesis of nanoparticles. Therefore, exploring innovative, cost-effective, non-toxic, and eco-friendly sustainable approaches should be of critical interest. So, green nanotechnology has suggested developing cost-effective and environmentally sustainable techniques to fabricate metallic nanoparticles. We report the synthesis of MnO nanoparticles using biological molecules of Ziziphus spina-christi leaf extract. as the reducing agent and characterised by UV Vis spectroscopy, and FTIR techniques.then, the catalytic activity of the assynthesized/ MnO nanoparticles was evaluated by degradation study of water soluble dyes methylene blue using laboratory scattered sunlight as light source.

Keywords: MnO, Nanopartilces, UV Vis Spectroscopy, FTIR, Photocatalytic Activity

References

1. Makvandi P, Wang C, Zare EN, Borzacchiello A, Niu L, Tay FR. Metal-Based Nanomaterials in Biomedical Applications: Antimicrobial Activity and Cytotoxicity Aspects. Adv Funct Mater. 2020;30(22):1910021. doi:10.1002/adfm.201910021.
2. Veeramani, H.; Aruguete, D.; Monsegue, N.; Murayama, M.; Dippon, U.; Kappler, A.; Hochella, M.F. Low-temperature green synthesis of multivalent manganese oxide nanowires.ACS Sustain. Chem. Eng.2013, 1, 1070–1074.
3. C. Santhosh, A. Malathi, E. Daneshvar, P. Kollu, A. Bhatnagar, Photocatalytic degradation of toxic aquatic pollutants by novel magnetic 3D- TiO2@HPGA nanohybrids, Sci. Rep. 8 (2018) 1e15. ---- C. Haw, W. Chiu, S.A. Rahman, P. Khiew, S. Radiman, R.A. Shukor, .A.A. Hamid, N. Ghazali, The design of new magnetic- photocatayst nanohybrids (CoFe2O4-TiO2) as smart nanomaterials for recyclable photocatalysis applications, New J. Chem. 40 (2016) 1124e1136

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Non-Symmetrical Manganese(III) Complex: Organometallic Synthesis, Electrochemistry and Catalytic in the oxidation of cyclohexene

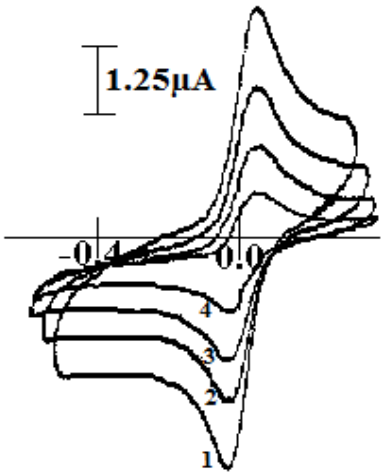
Sabrina BENDIA* and Kamel OUARI

Laboratoire d'Electrochimie, d'Ingénierie Moléculaire et de Catalyse Redox (LEIMCR), Faculté de Technologie, Université Ferhat Abbas Sétif 1, 19000 Algérie

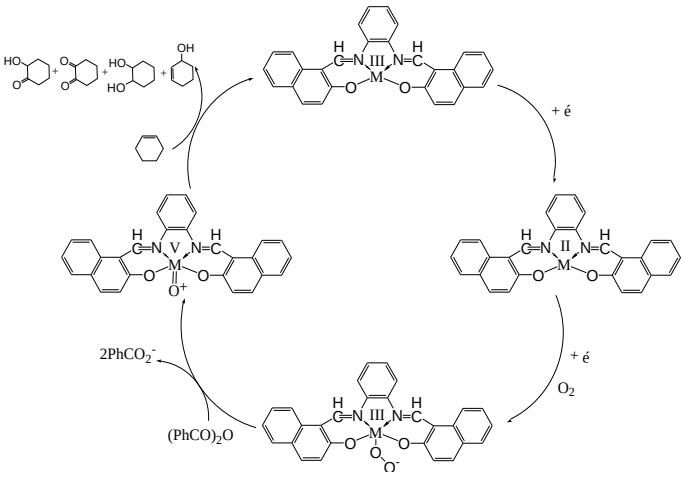
** Corresponding author.Tel.: 0699471579*
E-mail address: *sabrina_bendia@univ-setif.dz*

ABSTRACT

Organometallic-Schiff base complexes are currently of great interest to scientists due to their multiple applications: homogeneous, heterogeneous catalytic oxidation [1,2] or in biological activity [3] and in bio-detection [4] such as biosensors. Hereafter, we report on the synthesis and characterization of manganese(III) complex as well as their applications in the catalytic oxidation of cyclohexene by molecular oxygen. Cyclic voltammetry in dimethylformamide revealed reversible redox processes.



Mn(III)ClL



Catalytic cycle

Keywords: Manganese(III); Non-Symmetrical; Synthesis; Electrochemistry; Catalytic Oxidation.

References

1. N. Deligonul, M. Tumer; *journal of transition metal chemistry* 31 (2006) 920.
2. B. De Clercq, F. Lefebvre, F. Verpoort, *Appl. Catal. A*, 247 (2003) 345.
3. Z. L. Youa and H. L. Z. Zhu*; Anorg. Allg. Chem.* 630 (2004) 2754.
4. S. Zolezzi, E. Spodine, A. Decinti; *Polyhedron* 21 (2002) 55.

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Synthesis and Structural Characterization of Organometallic Chromogen

Benaouida Mohamed amine[a,b*], Benosmane Ali[b,c]

[a]*Department of chemistry, University of 20 août 1955, Skikda, Algeria.*

[b]*Department of chemistry, University of constantine 1, Environmental and molecular structural chemistry research unit (CHEMS), Constantine, Algeria.*

[c]*Department technology, University of larbi ben m'hidi, Oum el-Bouaghi, Algeria.*

* *Corresponding author*.Tel.: 0540 50 65 39
E-mail address: m.benaouida@univ-skikda.dz

ABSTRACT

Recently, 1-phenylazo-2-naphthol derivatives have attracted attention because the phenylazo-naphtholate group can provide N,O-bidentate chelation to stabilize transition or main group metal complexes. The solid structure of [(C_{16} H_{10} N_2 O Cl)$_2$ Cu], involves the preparation of a copper (II) complex dye [Cu-L_2]. This material has been characterized by elemental analyses, IR, NMR, X-ray crystallography. The X-ray study has indicated that the Cu II atom is located on an inversion center and is tetracoordinated by two N and two O atoms from two bidentate 1-[(E)-(2-chlorophenylazo)-2-naphtolate] ligands, forming a square planar geometry. The two N atoms and two O atoms around the metal center are trans to each other, The average distances between the Cu II atom and the coordinated O and N atoms are 1.8990(17) and 1.9634(19) A˚, respectively. In the crystal, molecules are linked via weak C—H----O and C—H----Cl hydrogen bonds, forming chains propagating along [010]. There are also л– л interactions present involving adjacent naphthalene rings [centroid–centroid distance = 3.661 (13) A˚].

Keywords: Crystal structure; Organometallic; Azo ligand; X-ray diffraction; Copper II.

References

1. M A Benaouida, A Benosmane, H Bouguerria, S E Bouaoud, H Merazig. Bis{1-[(E)-(2-chlorophenyl)diazenyl]naphthalen-2-olato}copper(II). *Acta Cryst*. 2013, E69, m405.
2. M A Benaouida, S Chetioui, S , Bouaoud. 1-(4-Hydroxyphenyl)-2-(2-oxidonaphthalen-1-yl)diazen-1-ium methanol hemisolvate. *Acta Cryst*. 2013, E69, o867–o868.
3. H Bougueria, M A Benaouida, S Bouacida, A K Bouchoul. (E)-1-[2-(2-Cyanophenyl)diazen-2-ium-1-yl]naphthalen-2-olate. *Acta Cryst*. 2013, E69, o1175–o1176.
4. S Chetioui, N Hamdouni, G C Bochet, J P Djukic, C Baillye. Crystal structure of bis{-1-[(E)-(3 methoxyphenyl)diazenyl]naphthalen-2-olatoj^{3}N^2,O:O}bis({1-[(E)-(3-methoxyphenyl)diazenyl]naphthalen-2 olatoj^{2}N^2,O}copper(II)). *Acta Cryst*. 2015, E71, m211–m212.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Phyto-Synthesis of Selenium Nanoparticles Using *Sonchus maritimus* Aqueous Extract: Formulation and Characterization Study

Sara Chetehouna[a,b]*, Samir Derouiche[c,d], Yassine Reggami[e,b]

[a] *Department of Microbiology and Biochemistry, Faculty of Sciences, Mohamed Boudiaf-M'sila University, M'sila 28000, Algeria;*

[b] *Laboratory of Biology: Applications in Health and Environment, Department of Microbiology and Biochemistry, Faculty of Sciences, Mohamed Boudiaf-M'sila University, M'sila 28000, Algeria;*

[c] *Department of Cellular and Molecular Biology, Faculty of Natural and Life Sciences, El Oued University, El Oued 39000, Algeria;*

[d] *Laboratory of Biodiversity and application of biotechnology in the agricultural field, Faculty of natural and life sciences, El Oued University, El-Oued 39000, Algeria;*

[e] *Department of Natural and Life Sciences, Faculty of Sciences, University 20 August 1955 - Skikda, SKIKDA 21000, Algeria*;

* *Corresponding author*.Tel.: 0552376743
E-mail address: sara.chetehouna@univ-msila.dz

ABSTRACT

Nanotechnology is a developing branch of pharmaceutical sciences wherein the particles extend in nanosizes and turn out to be more responsive when contrasted with their unique counter parts (1). Metal nanoparticles (MNPs) and metal oxide nanoparticles (MONPs) are used in numerous fields (2). Selenium is essential element for the living beings life (3). Recently, selenium nanoparticles (SeNPs) attracted the interest of many researchers due to their biocompatibility, bioavailability, and low toxicity (4). This study aimed to use the *Sonchus maritimus* aqueous extract in order to prepare selenium nanoparticles by eco-friendly method. The phytochemical analysis of the plant extract was prepared by using standard protocols. The nanoparticles were characterized from structural and morphological point of view by using analytical techniques such as: UV-Vis spectroscopy, Fourier Transform Infrared Spectroscopy (FTIR), Scanning Electron Microscopy (SEM) and Energy Dispersive X-ray Analysis (EDX). The SEM analysis revealed that the particles size registered around 26.48 nm. The success of the formulation of the NPs reflects the potential properties of the hydro-soluble compounds that have been revealed in *Sonchus maritimus* as biocatalyst or natural stabilizers for SeNPs synthesis. This study reports for the first time a green approach for SeNPs biosynthesis using *Sonchus maritimus* aqueous extract.
Keywords : SeNPs ; *Sonchus maritimus* ; SEM ; UV-VIS ; IR.

References

1. Gour A, Jain NK. Advances in green synthesis of nanoparticles. *Artif Cells Nanomed Biotechnol*. 2019; 47(1): 844–851. Doi: 10.1080/21691401.2019.1577878
2. El Shafey AM. Green synthesis of metal and metal oxide nanoparticles from plant leaf extracts and their applications: A review. *Green Process Synth*. 2020; 9: 304–339. Doi: 10.1515/gps-2020-0031
3. Derouiche S, Ahmouda I, Moussaoui R. Effectiveness of a Novel SeNPs synthetized by Aquilaria malaccensis extract compared to selenium acetate on lead induced metabolic disorder and oxidative stress in pregnant rats. *Int j chem biochem sci*. 2021; 19: 50-57.
4. Bisht N, Phalswal P, Khanna PK. Selenium nanoparticles: a review on synthesis and biomedical applications. Mater Adv. 2022; 3:1415-1431. Doi: 10.1039/d1ma00639h

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Green synthesis of manganese oxide nanoparticles prepared by *Ocimum basilicum* L. leaves aqueous extract and their characterization

Boulaares Islam [a,b*] and Derouiche Samir [a,b]

[1]*Department of Cellular and Molecular Biology, Faculty of natural sciences and life, University of El-Oued, El-Oued 39000, Algeria.*

[2]*Laboratory of Biodiversity and Application of Biotechnology in the agricultural Field, Faculty of natural sciences and life, University of El-Oued, El-Oued 39000, Algeria.*

** Corresponding author.*Tel.: 0657726425

E-mail address: boulaares1997@gmail.com

ABSTRACT

Plant-based NP green synthesis is now regarded as a gold standard among these green biological techniques owing to its ease of use and the diversity of plants. However, (MnO NPs) have gained importance in the synthesis and manufacturing processes because of their lower toxicity. The aim of this study was to prepare manganese oxide nanoparticles (MnO NPs) using *Ocimum basilicum* L. leaves aqueous extract. Bioactive molecules extraction and qualitative analysis of some phytochemicals compounds were released by using standard protocols. The characterization of biosynthesized MnO was analyzed by UV–Vis spectroscopy and Fourier transform infrared spectroscopy (FTIR). Results of phytochemical essays showed that aqueous extract of *Ocimum basilicum* L. is very rich on different chemical compounds such as cardio glycoside, anthraquinones, reduced sugar, flavonoids, phenols, catechic tannin, saponins and terpenes. Results appeared that the broad bell-shaped spectrum band was obtained by UV–Vis spectroscopy indicates the formation of MnO. Fourier transform infrared FTIR spectroscopy detected the vibration of the Mn─O bond that indicate the presence of manganese oxide nanoparticles. This study confirmed that aqueous extract of *Ocimum basilicum* L. is rich of important bioactives compounds that have potential properties as biocatalyst for the biosynthesis of manganese oxide nanoparticles (MnO NPs) which can be used in pharmacological and medical field.

Keywords: Manganese oxide nanoparticles; UV–Vis; FTIR; *Ocimum basilicum* L.; phytochemical.

References

1. Hano C, Abbasi BH. Plant-Based Green Synthesis of Nanoparticles: Production, Characterization and Applications. *Biomolecules*, 2022. 12, 31. https://doi.org/10.3390/biom12010031
2. Khan SA, Shahid S, Shahid B, Fatima U, Abbasi SA. Green Synthesis of MnO Nanoparticles Using *Abutilon indicum* Leaf Extract for Biological, Photocatalytic, and Adsorption Activities. *Biomolecules*, 2020. 10(5), 785. doi:10.3390/biom10050785

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Synthesis and antimicrobial activity of novel α-aminophosphonates derived from amino-alcohols

Rania Bahadi[a*], Malika Berredjem[a], Billel Belhani[a], Chahrazed Benzaid[a], Rayenne Redjemia[a], Meriem Boussaker[a]

[a]*Laboratory of Applied Organic Chemistry, Synthesis of Biomolecules and Molecular Modelling Group, Department of Chemistry, Sciences Faculty, Badji-Mokhtar – Annaba University, Annaba, Algeria*

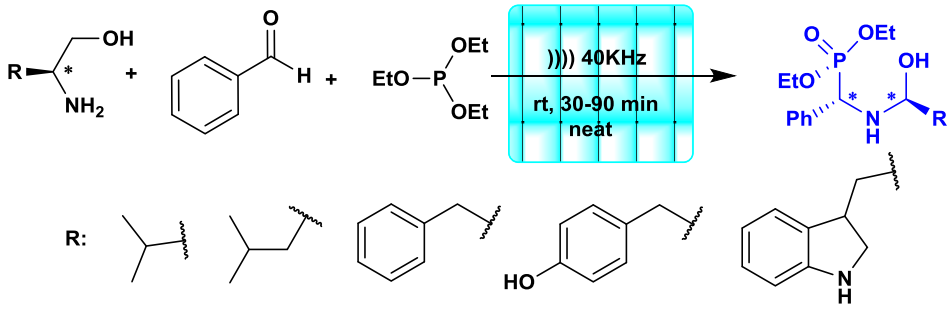
* *Corresponding author.*Tel.: 0791293152
E-mail address: rania.mriam@yahoo.fr

ABSTRACT

α-Aminophosphonates have been used in a wide range of applications such as in the areas of agricultural and medicinal chemistry. They are also employed as antiviral agents, enzyme inhibitors, antibiotics, anticancer and antifungal agents and are extensively used as insecticides and herbicides .

In this work we have prepared a new derivatives of α-aminophosphonates via Kabachnik–Fields reaction by adding a mixture of aldehyde, thriethyl phosphite, and diverse aminoalcools. The reaction studied at room temperature during a time between 10 and 15 min, using ultrasound irradiation. On the other hand, multicomponent reactions are economically viable, high convergence with high bond forming-index.

It was reported that these compounds showed bacteria growth inhibition and results of antimicrobial assays showed high activity against bacteria. These included Escherichia coli, Serratia marcescens, Enterobacter cloacae, Shigella dysenteriae, Salmonella enterica and Proteus vulgaris as Gram-negative bacteria, Bacillus subtilis and Staphylococcus aureus as Gram-positive bacteria. The structure of the obtained compounds was confirmed by ^{1}H, ^{13}C, and ^{31}P NMR spectroscopy, IR spectroscopy, as well as elemental analysis.



Scheme 1. Synthesis of a-aminophosphonates.

Keywords: α-Aminophosphonates, three-component reaction, amino-alcohols, ultrasound.

References

1. Smith W. W, Bartlett P. A. Macrocyclic Inhibitors of Penicillopepsin. J. Am. Chem. Soc. 1998, 120, 4622-4628.
2. Saib A, Berrebbah H, Berredjem M, Djebar M. R. Cytotoxic study of three derivatives amidophosphonates on alternative cellular model: Paramecium tetraurelia. Toxicol. Res. 2014, 3, 395-399.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Synthesis and Antioxidant Activity of Novel Quinoxaline Derivatives

Rabia YOUMBAI[a*], Nawal KHEIR[b], Fetheddine BOKHALLOUT[c] , Samir BAYOU[c], and Mohamed DEHAMCHIA[c]

[a]*Laboratoire de chimie appliquée et environnement, Département de Chimie, Université Hamma Lakhdar – Eloued 39000, Algérie.*
[b]*Laboratory of Bioinformatics, Applied Microbiology and Biomolecules, University of Boumerdès, 35000 Boumerdès, Algeria*
[c] *Laboratory of Biodiversity and Biotechnology Application in Agriculture Domain, Department of Biology, Eloued University, PO Box 789, 39000, Algeria.*
* *Corresponding author*.Tel.: 0698602333
E-mail address: *: youmbai-rabia@univ-eloued.dz*

ABSTRACT

Quinoxalines have attracted attention as an important class of *N*-containing heterocyclic compounds in the field of drugs and pharmaceuticals because of their wide range of biological activities. In this work, we report the synthesis of novel quinoxaline derivatives by the condensation of maleimide with various substituted o-phenylenediamines and nucleobases (cytosine, adenine, and guanine). The synthesized compounds were evaluated for their *in vitro* antioxidant activity against the DPPH and ABTS free radicals. The chemical structures of the newly synthesized compounds were confirmed by infrared spectroscopy (FT-IR), mass spectral analysis, proton (1H), and carbon (^{13}C) nuclear magnetic resonance (NMR).

Keywords: Quinoxaline; Nitrogen heterocycles; o-phenylenediamines; antioxidant activity.

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A Simple and Ecofriendly One-pot Synthesis of New 3-Cyano-2-Pyridone Derivatives.

Asmaa Kebaili*[1,2], Fatima Belhadj[1,3], Zahira Kibou[1,2] and Noureddine Choukchou-Braham[1]

[1]*Laboratoire de Catalyse et Synthèse en Chimie Organique, Faculté des Sciences, Université de Tlemcen, BP 119,13000 Tlemcen, Algérie.*

[2]*Université d'Ain Témouchent, Faculté des Sciences et de technologie, BP 284,46000 Ain Témouchent, Algérie.*

[3]*Université d'Oran 1, Faculté de Médecine, BP 1510,31000 ELMENAOUAR Oran, Algérie*

* *Corresponding author.*Tel.: 0562067343

E-mail address: kebailiasmaa97@gmail.com

ABSTRACT

Heterocyclic compounds represent the largest and most diverse group of organic compounds and function in most scientific fields such as medicinal chemistry, biochemistry and other sciences[1]. Nitrogen heterocycles constitute more than half of organic compounds, which make them of great importance in scientific research for their applications in various fields[2] within this class 2-pyridone[3-4].

The 2-pyridone is one of the most widely used nitrogen-containing heterocyclic derivatives in various fields due to their structural properties and their biological and therapeutic activities[5], such as antibacterial[6], antibacterial[7], anticancer[8], antiviral[9]. The synthesis of 2-pyridone has become the main focus of organic chemists in recent years[10-11].

In this context, we are interested to the synthesis of 3-cyano-2-pyridone and its derivatives. This work describes a new One-pot synthesis to make these structures accessible in a simple and efficient manner under mild and environmentally friendly conditions.

Keywords: Nitrogen heterocycles; Organic synthesis; Multi-component synthesis; One-pot; 3-Cyano-2-Pyridone

References

1. Majumdar, P.; Pati, A.; Patra, M.; Behera, R. K.; Behera, A. K., Acid hydrazides, potent reagents for synthesis of oxygen-, nitrogen-, and/or sulfur-containing heterocyclic rings. *Chem. Rev.* 2014, *114* (5), 2942-2977.

2. Al-Mulla, A., A review: biological importance of heterocyclic compounds. *Der pharma chem.* 2017, *9* (13), 141-147.

3. Heravi, M. M.; Hamidi, H., Recent advances in synthesis of 2-pyridones: a key heterocycle is revisited. *J. Iran. Chem. Soc.* 2013**,** *10* (2), 265-273.

4. Amer, M. M.; Aziz, M. A.; Shehab, W. S.; Abdellattif, M. H.; Mouneir, S. M., Recent advances in chemistry and pharmacological aspects of 2-pyridone scaffolds. *J. Saudi Chem. Soc.* 2021, *25* (6), 101259.

5. Hamama, W. S.; Waly, M.; El-Hawary, I.; Zoorob, H. H., Developments in the chemistry of 2-pyridone. *Synth. Commun.* 2014, *44* (12), 1730-1759.

6. Khalifa, N.; Haiba, M.; Taha, M.; Al-Omar, M., Synthesis and Antibacterial Assay of Some New Pyrenyl Pyridine Candidates. *Russ. J. Gen. Chem.* 2019, *89* (2), 319-323.

7. Hagar, M.; Chaieb, K.; Parveen, S.; Ahmed, H.; Alnoman, R., N-alkyl 2-pyridone versus O-alkyl 2-pyridol: Ultrasonic synthesis, DFT, docking studies and their antimicrobial evaluation. *J. Mol. Struct.* 2020, *1199*, 126926.

8. Si, L.; Zhang, X.; Shin, S. J.; Fan, Y.; Lin, C.-C.; Kim, T. M.; Dechaphunkul, A.; Maneechavakajorn, J.; Wong, C. S.; Ilankumaran, P., Open-label, phase IIa study of dabrafenib plus trametinib in East Asian patients with advanced BRAF V600-mutant cutaneous melanoma. *Eur. J. Cancer* 2020, *135*, 31-38.

9. Campeau, L.-C.; Chen, Q.; Gauvreau, D.; Girardin, M.; Belyk, K.; Maligres, P.; Zhou, G.; Gu, C.; Zhang, W.; Tan, L., A robust kilo-scale synthesis of doravirine. *Org. Process Res. Dev.* **2016,** *20* (8), 1476-1481.

10. Kibou, Z.; Cheikh, N.; Villemin, D.; Choukchou-Braham, N., A rapid synthesis of highly functionalized 2-pyridones and 2-aminopyridines via a microwave-assisted multicomponent reaction. *J. Mater. Environ. Sci* **2016,** *7*, 3061-3067.

11. Mehiaoui, N.; Kibou, Z.; Gallavardin, T.; Leleu, S.; Franck, X.; Mendes, R. F.; Paz, F. A. A.; Silva, A. M.; Choukchou-Braham, N., Novel bis-(3-cyano-2-pyridones) derivatives: synthesis and fluorescent properties. *Rev. Chem. Intermed.* **2021,** *47* (4), 1331-1348.

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Synthesis of new biologically active molecules via Betti reaction

Racha GHODBANE[a*] and Nour Eddine AOUF[a]

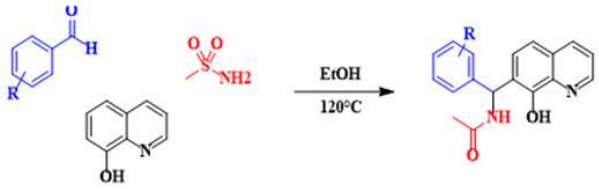
[a] *Laboratory of Applied Organic Chemistry, Bioorganic Chemistry Group, Chemistry Department, Sciences Faculty, Badji Mokhtar-Annaba University, Box 12, 23000 Annaba*

* *Corresponding author.*Tel.: 0667344629
E-mail address: ghodbane.racha@univ-annaba.org

ABSTRACT

Over the next decade, pharmaceutical companies will need to increase their productivity by a factor of ten to meet growing demand for new drugs. Running multiple reactions in parallel is an obvious way to increase efficiency and maximize productivity. In this context, combinatorial chemistry has established itself as a fundamental source of original molecules. Among them, heterocycles represent more than 90% of the active ingredients [1]. α-Amidoalkyl-β-quinoline-8-ol are present in a multitude of biologically active compounds. They serve as intermediates for the preparation of various active ingredients with a wide range of applications [2]. 1-Aminoalkyl naphthol derivatives, for example, represent a large family of molecules with potential biological and pharmacological activities [3], antidepressants, antiarrhythmics [4], antihypertensives and Ca2+ calcium channel blockers [5].

In our work, the objective is to synthesize a new series of N-((7-hydroxyquinolin-6-yl)(m-tolyl)methyl)methanesulfonamide via the Betti reaction; It is carried out in the presence of 1 equivalent of quinoline-8-ol, 1.2 equivalent of sulfonamide and 1.2 equivalent of aromatic aldehyde in Ethanol. The nature of the aromatic aldehyde, of the substituent and its position on the aromatic ring significantly influences the speed and therefore the duration of the reaction. The reaction is illustrated in Scheme I, N-((7-hydroxyquinolin-6-yl)(m-tolyl)methyl)methanesulfonamide derivatives were synthesized in good to excellent yields.



Keywords: pharmaceutical, Betti, Quinoline-8-ol, heterocycles.

References

1. Dua, R., Shrivastava, S., Sonwane, S. K., Srivastava, S. K. (2011), Advan. Biol. Res, 5, 120–144.Ogata K, Yang Y. Modern control engineering. India: Prentice hall; 2002.
2. Singha, R. K., Balaa, R., Duvedia, R., Kumarb, S. (2015), Iran. J. Catal,5, 187-205
3. Szatmari, I., Fulop, F., (2004), Curr. Org. Synthesis, 1, 155- 165.Title of the website, URL in full, (date accessed)
4. (a) Szatmari, I., Fulop, F. (2004), Curr. Org. Synth, 1, 155–165. (b) Shen, A. Y., Tsai, C. T., Chen, C. L. (1999),Eur. J. Med. Chem, 341, 877–882.
5. Atwal, K. S., Reilly, B. C. O., Ruby, E. P., Turk, C. F., Aberg, G., Asaad, M. M., Bergey, J. L., Moreland, S., Powell, J. R. (1987), J. Med. Chem, 30, 627–635.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Synthesis and Characterization of Novel Fused-Pyrrole Derivatives as Potent Antibacterial and Antioxidant Agents

Chaima ADAIKA[a]*, Ichrak BOUGUESSA[b], Fathddine BOUKHALLOUT[c] and Mohamed DEHAMCHIA[d]

[a, b, c, d] *Laboratory of Biodiversity and Biotechnology Application in Algriculture Domain Department of Biology, El oued University, PO Box 789, 39000, Algeria.*

* *Corresponding author.*Tel.: 0794426981

E-mail address: *adaikac3@gmail.com*

ABSTRACT

In medicinal chemistry, nitrogen-containing heterocycles have biological interest as anticancer, antibacterial and antifungal agents. In the current study, a new series of pyrrole derivatives were synthesized by Hantzsch multicomponents reaction. The targeted products were obtained by condensation of sodium diethyloxalocetate, α-bromoacetophenone and nitrogen nucleophile such as arylamine or nucleobases (adenine, guanine and cytosine), in different solvent EtOH or AcOH. The structures of newly synthesized compounds were elucidated by usual spectroscopic methods (IR, NMR and elemental analysis). In addition, all products were screened for their antibacterial activity by well plate method (zone of inhibition) and antioxidant activity against free radical DPPH.

Keywords: Pyrrole, Hantzsch reaction, Antibacterial activity, Antioxidant activity.

References

1. Trautwein, Axel W., Roderich D. Süßmuth, and Günther Jung. "Hantzsch pyrrole synthesis on solid support." *Bioorganic & medicinal chemistry letters* 8.17 (1998): 2381-2384.
2. Leonardi, Marco, et al. "The Hantzsch pyrrole synthesis: non-conventional variations and applications of a neglected classical reaction." *Synthesis* 51.04 (2019): 816-828.
3. IRANI, SHARMIN, and MALEK TAHER MAGHSOODLOU. "SYNTHESIS, CHARACTERIZATION, DFT CALCULATION AND ANTIBACTERIAL ACTIVITIES OF NOVEL PYRROLE DERIVATIVE USING THE THREE-COMPONENT HANTZSCH PYRROLE SYNTHESIS CATALYZED BY A VITAMIN B 12." (2015).

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Investigation of industrial impregnated Y Zeolite acidity. Effect of metal loading.

Mahdi Roufaida[a]* and Izza Hidaya[b]

[a]*Department of Process Engineering, Kasdi Merbah University, Ouargla, Algeria*

[b]*Department of Process Engineering, Kasd iMerbah University, Ouargla, Algeria*

* *Corresponding author*.Tel.: +213676520201
E-mail address: mahdi.roufaida@univ-ouargla.dz

ABSTRACT

Zeolites are widely used as acid catalysts due to their Brønsted acid properties. In addition; their structure, ion exchange and adsorption ability give zeolite materials an efficient role in heterogeneous catalysis processes. Thus, it could be used as support for bi-functional supported catalysts where the metals impregnation on acidic support provides cracking and dehydrogenation-hydrogenation functions for the hydrocracking process. The effect of metal loading on industrial Y Zeolite acidity was investigated in this paper. The catalyst was prepared using the wet impregnation method in which various weights of Co and Mo metal salts were loaded onto an industrial Y Zeolite catalyst. The catalyst acidity was determined using the gravimetric method of pyridine adsorption. The obtained results showed that different metal concentration loading increases catalyst acidity, demonstrating a rise in the number of Brønsted and Lewis acid sites in the zeolite.

Keywords: Zeolite; Catalyst; Metal loading; Acidity.

References

1. Boronat, M, Avelino C. What Is Measured When Measuring Acidity in Zeolites with Probe Molecules?. *ACS Catalysis*. 2019, 9(2): 1539–48.
2. SandovalD, Luís E, Jhon A, and Carlos A. General Aspects of Zeolite Acidity Characterization. *Microporous and Mesoporous Materials*. 2015. 215: 229–43.
3. Saab, Roba et al.Synthesis and Performance Evaluation of Hydrocracking Catalysts: A Review. *Journal of Industrial and Engineering Chemistry*. 2020. 89: 83–103.
4. Sugiarti, S., Septian, D. D., Maigita, H., Khoerunnisa, N. A., Hasanah, S., Wukirsari, T., Hanif, N., & Apriliyanto, Y. B. Investigation of H-zeolite and metal-impregnated zeolites as transformation catalysts of glucose to hydroxymethylfurfural. *AIP Conference Proceedings*. 2020, 2243(June).

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Synthesis of a new complex derived from (E)-4-((2-hydroxybenzylidene) amino)benzenesulfonamide

Mansouri Achraf[a, b*], Berredjem Malika[a], Ali Dekir[a], Bouchareb Fouzia[a, b].

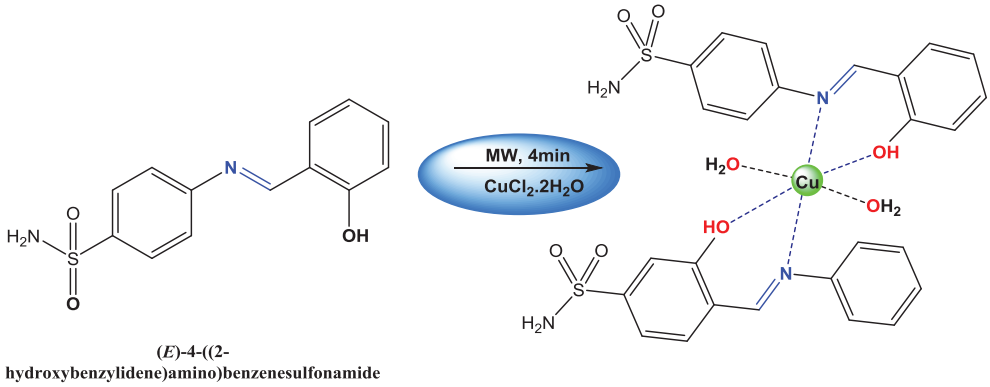
Laboratory of Applied Organic Chemistry LCOA, Synthesis of biomolecules and molecular modelling Group, Badji-Mokhtar - Annaba University, Box 12, 23000 Annaba, Algeria.

[b]*Department of Chemistry. Faculty of Science and Technology. Chadli Bendjedid University. BP: 73, El Tarf 36000 Algeria*

* *Corresponding author.*Tel.: *0667922229*
E-mail address: *mansouriachraf96@gmail.com*

ABSTRACT

The chemistry of complexes has been the subject of several researches. Among them, that concerning the complexation of metal ions by organic molecules; Schiff bases. These ligands can be in the form of different types having coordinated sites of varying nature and defined as a set of chemical products comprising one or more imine groups. They are widely used in medicine for the treatment of several diseases, [1-2] in biology and industry in the fight against corrosion [3-4].
In this work, we have prepared a new complex by a green method from ligand complexation of (E)-4-((2-hydroxybenzylidene) amino)benzenesulfonamide and a transition metal (CuII), the complex was synthesized by the reaction of $CuCl_2.2H_2O$ and the basis of schiff in the EtoH, the mixture was then brought under microwave irradiation for 4 minutes. The complex obtained in the form of a black powder with a good yield.
Keywords: schiff base, complex, $CuCl_2$, microwave irradiation.



(*E*)-4-((2-hydroxybenzylidene)amino)benzenesulfonamide

Schema 1. Complexation of (E)-4-((2-hydroxybenzylidene) amino)benzenesulfonamide

References

1. Procetto M, Liu W, Hagenbach A, Abram U, Gust R. Eur. J. Med. Chem.2012.
2. Nath M, Kumar Saini P, Kumar, A. J. Organomet. Chem.2010.
3. Mohammedi MQ. Bas. J. Sci.2011.
4. Emregul K.C, Kurtaran, R., Atakol, O. Corros. Sci.2003.

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Reactivity of ZnO material in Biginelli Synthesis

Hassiba MESSAOUDI[1,2,*], Ouzna KHEFFACHE[1,2], Samira SLYEMI[1], Meriem BOUDJLOUD[1]

[a]*Laboratoire de Chimie du Gaz Naturel, Faculté de Chimie, Université des Sciences et de la Technologie Houari Boumediène, USTHB, PB 32, 16111, El Alia, Bab-Ezzouar, Alger,Algérie*

[b]*Faculté des Sciences, Université d'Alger 1, 2 Rue Didouche Mourad, Alger centre 16000, Alger, Algérie*

* *messaoudihassiba@gmail.com*

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 prepare 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 solvant effect on DHPM yields were evaluated. Promising results were obtained. Thus, the catalyst system prepared proved to be very active with yield 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.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Volumetric properties of binary and quaternary mixtures of 2,2,2-trifluoroethanol, 2-propanol, methanol, ethanol, acetone and water at Temperature 298.15K and Pressure 0.1 MPa

Khalil Guelifet[1], Kherraz Khaled[1], Zadjia Atik[2]

*1- Ecole Normale Supérieure (ENS), P.o. Box 92, Vieux-Kouba, 16308, Alger, Algérie. * Corresponding author.*
2-University of Sciences and Technology Houari Boumediene,Faculty of Chemistry, Crystallography –Thermodynamics Laboratory, Bab-Ezzouar, Algiers

** Corresponding author.*Tel.: 0698839409
E-mail address: *khalil.guelifet@g.ens-kouba.dz*

ABSTRACT

The present work is dealing with the measurement and prediction of excess molar volumes V_m^E of twelve binary and four quaternary systems containing of acetone, water, methanol, 1-hexanol, toluene, ethanol, 2-propanol and 2,2,2-trifluoroethanol at pressure 101 kPa and temperature 298.15 K.The mixtures used in this work were chosen because of their importance in the petroleum, safe new energy, perfume, and pharmaceutical industries [1].

The fluoro-hydrocarbons are also non-flammable and non-explosive and have low toxicity and short environmental life times [2]..The experimental excess molar volume of binary and quaternary system well fitted and predicted by various empirical equations.The experimental excess molar volume is a source of information about interactions between molecules [4-5]..The quaternary excess molar volumes are estimated from the binary excess molar volumes, and using the Colinet., Kohler and Muggianu's equation [6-8].for prediction from experimental binary data.

Keywords: excess molar, quaternary system, binary, water, aceton

References

1. J.A. Riddick, W.B. Bunger, T.K. Sakano Organic solvents: Physical properties and methods of purification John Wiley, 4th ed., 1986, 2
2. T. Minamihonoki, H. Ogawa, H. Nomura, S.Murakamib Thermodynamic properties of binary mixtures of 2,2,2-trifluoroethanol with water or alkanols at T = 298.15K
Thermochim. Acta, , 459, 80-86
3. . G. Conti, P. Gianni, L. Lepori, E. Matteoli Volumetric study of (2-methoxyethanol + tetrahydrofuran + cyclohexane) at T=298.15 K.J. Chem. Thermodyn., 2003, 35, 503-518
4. J. George, N.V. Sastry Measurements of densities, viscosities, speeds of sound and relative permittivities and excess molar volumes, excess isentropic compressibilities and deviations in relative permittivities and molar polarisations for dibutyl ether + benzene, + toluene and + p-xylene at different temperetures J. Chem. Thermodyn., 2003, 35, 1837-1853
5. Z. Atik Densities and excess molar volumes of binary and ternary mixtures of aqueous solutions of 2,2,2-trifluoethanol with acetone and alcohols at the temperature of 298.15 K and pressure of 101 kPa J. Solution Chem., 2004, 33, 1447-1466

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Evaluated of catalytical and antibacterial activities of Pd(II)- acetaminophen complex-based drug

O. HAMRANI*[1,2], A.ZERROUK[1], S. BOUTAMINE[1], S.KELLOU-TAIRI[3] and Z. HANK-KERKOUCHE[1]

[1] *Faculté de Chimie, Université des Sciences et de la Technologie Houari Boumediene- Laboratoire d'Electrochimie-Corrosion, Métallurgie et Chimie Minérale, BP 32 El Alia, 16111 Bab Ezzouar, Algérie. BP32 El Alia 16111 Bab-Ezzouar, Algérie.*

[2] *Département SNV, Université d'Alger1- Faculté des Science, Alger, Algérie.*

[3] *Faculté de Chimie, Université des Sciences et de la Technologie Houari Boumediene- Laboratoire de Physico-Chimie Théorique et de Chimie Informatique, BP 32 El Alia 16111 Bab-Ezzouar, Alger, Algérie*

* *Corresponding author.*Tel.: 05 52 47 96 71
E-mail address: *hamraniouiza@yahoo.fr*

ABSTRACT:

Nowadays, the bioorganometallic chemistry of metal complexes and their medical applications have become a formidable field of investigation with promising results both in vitro and in vivo. In fact, research conducted in the living world has shown the important role that metal ions play in cellular machinery.

The complexation offers the metal ion a multitude of coordination possibilities and a wide range of geometries. In this work a complex of Pd(II) with acetaminophen drug was synthesized and characterized by elemental analysis, conductivity, UV–Vis, IR, ^{1}HNMR and ^{13}CNMR spectroscopy and thermal analysis. On the basis of all the data, the structure describing the chelate has been proposed. The Density Functional Theory (DFT) calculations were used to optimize the geometric structure of the ligand it metal complex in order to confirm the experimental results.

The metal complex has been tested for catalase-like activity in order to assess its catalytic properties. In vitro biological activity of the free ligand and its metal complex were screened against both of anti- bacterial and fungicidal activities.

The results are encouraged.

Keywords: Palladium (II), acetaminophen, Complex, catalytic properties, Antimicrobial activity.

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Synthesis of Tetrahydrobenzo(a)Xanthen-11-ones with PPh3

BADAOUI Kawther[a]* Menana Imene[b] , ADAIKA Chaima* [c] , SEHOUT Imene

[a] *Departement of Chemistry, University of Constantine -1-,Constantine, Algeria*

[b] *Departement of Chemistry, University of Constantine -1-,Constantine, Algeria*

[c] Departement of Chemistry, University of Echahid Hamma Lakhdar, El Oued, Algeria

[d] *Departement of Chemistry, University of Constantine -1-,Constantine, Algeria*

* *BADAOUI Kawther*.Tel.: 05.57.26.45.65
E-mail address: badaoui.kaouther7@gmail.com

ABSTRACT

The multicomponent reactions have a great importance in the field of chemistry due to its various advantages. In fact, they help the researcher in gaining time, increasing the yield of reaction, respecting the environment …

Xanthene are produced with multicomponent reaction (MCR). Xanthene can be synthesised via many reactions and may have different biological activities.

In this study have synthesised the 12–aryl–8, 9, 10,12–tetrahydrobenzo[a]xanthene–11–one in the presence of PPh3 as a basic catalyst. The product was characterised with 1H and 13C NMR.

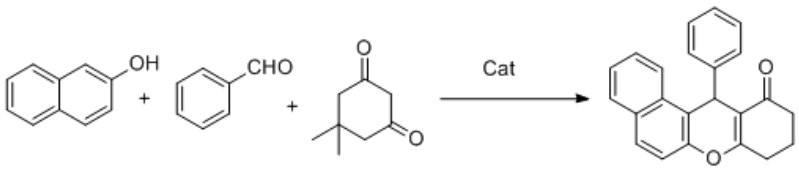

Schéma-1-

Keywords: 12–aryl–8, 9, 10, 12–tetrahydrobenzo[a] xanthene–11–one, xanthenes, Multi-coponent reaction, one pot reaction, basic catalyst PPh3

References

1. Kidwai M, Jahan A, Mishra N.K. **2012**. A novel method for the synthesis of tetrahydrobenzo[a]-xanthen-11-one Derivatives using cerium (III) chloride as a highly efficient catalyst. ComptesRendusChimie. 15: 324–330.
2. Tabatabaeian K, Khorshidi A, Mamaghani M, Dadashi A, Jalali M.K.**2011**. One-pot synthesis of tetrahydrobenzo[a]xanthen- 11-one derivatives catalyzed by ruthenium chloride hydrate as a homogeneous catalyst .Canadian Journal of Chemistry. 89:(6) 623-627.
3. Kumara P.S, Sunil Kumara B, Rajithaa B , NarsimhaReddya P, Sreenivasulua N, ThirupathiReddyb Y.**2006**. A novel one pot synthesis of 14-aryl-14*H*-dibenzo[a,j]xanthenes catalyzed by SelectfluorTM under solvent free conditions.General Papers. (xii): 46-50.
4. Mousavi S.R, Nodeh H.N, Afshari E.Z, Foroumadi A.**2019**. Graphene Oxide Incorporated Strontium Nanoparticles as HighlyEfficient and Green Acid Catalyst for One-Pot Synthesis of Tetramethyl- 9-aryl-hexahydroxanthenes and 13-Aryl 5*H*dibenzo[*b*,*i*]xanthene-5,7,12,14(13*H*)-tetraones Under Solvent-Free Conditions. Catalysis Letters.mechanics and foundation engineering, San Francisco, 12-16 AUGUST 1985. Publication of: Balkema (AA). 1985.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Synthesis of fused heterocyclic systems based on maleimide

Yamina Bentarzi[a*] and Bellara Nedjar-Kolli[a]

[a]*Laboratoire de Chimie Organique Appliquée, Université des Sciences et de la Technologie Houari Boumediene, BP 3, El-Alia, Bab-Ezzouar, 16111, Alger, Algérie*

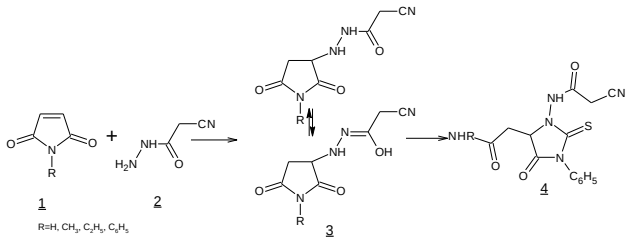
** Yamina Bentarzi.Tel.: 0776408310*

E-mail address:bentarzi2015@gmail.com

ABSTRACT

Maleimide 1 is a five-membered oxygen and nitrogen heterocycle, it is known to be a substrate for many heterocyclic syntheses and enters into the structure of a large number of biologically active molecules.

synthesis of new products from structure 3 and 4 starting from maleimide and cyanoacetic acid hydrazide 2 as an intermediate 3. The structural study of the latter revealed a keto-enol tautomeric. These functional derivatives then served us as very effective reaction intermediates in the synthesis of products of 2-thioxo-imidazolidin-4-one 4.



Keywords: Maleimide; Cyanoacetic acid hydrazid;Thioxoimidazolidinone .

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Synthesis of new sulfonamide derivatives under microwave and ultrasonic irradiation

Boussaker_Meriem[a*], Bahadi Rania[a], Dekir Ali[a], Redjemia Rayenne[a], Berredjem Malika[a]

[a] *Laboratoire de Chimie Organique Appliquée, Groupe de Synthèse de Biomolécules et Modélisation Moléculaire, Université Badji-Mokhtar. Annaba. BP 12, 23000 Annaba*

* *Corresponding author.*Tel.: 0541843533
E-mail address:boussaker.m@gmail.com

ABSTRACT

Compounds containing the sulfonamide motif are extremely useful compounds in medicine, due to their antibacterial properties 1, carbon dioxide inhibitors 2, as diuretics. Indeed, the preparation of these compounds by green and environmentally friendly methods is a major challenge for organic chemistry research.

Within this framework, we apply the principles of green chemistry in the synthesis of new sulfonamide derivatives in order to prepare new molecules with biological activity.

The reaction was carried out in two successive stages, the first being the preparation of sulfonamide 3 by reacting tosyl chloride TS-Cl 1 and amine 2 in the microwave in the absence of the solvent and catalyst.

In the second stage, under ultrasonic irradiation, the prepared sulfonamide 3 will be condensed with two aldehydes 5 in order to obtain the desired products 6 with a good yield.

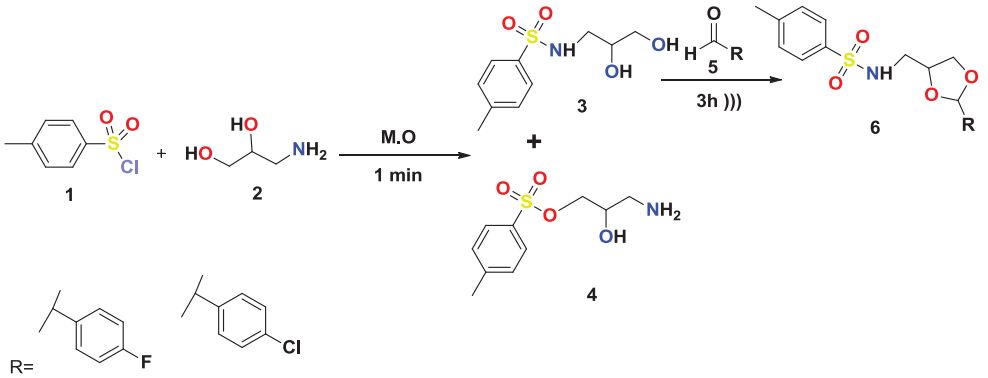

Schéma 1 Synthèse de *N*-((2-aryl-1,3-dioxolan-4-yl) méthyl)-4méthylbenzènesulfonamide.

Keywords: *sulfamide , antibactériennes , ultrasonic , microwave*

References:

1. A. R. Massah H. Adibi, R. Khodarahmi, R. Abiri, M. B. Majnooni, S. Shahidi, B. Asadi, M. Mehrabi, M. A. Zolfigol, **Bioorg. Med. Chem.** 2008,3,8.

2. J. Y. Winum, A. Innocenti, J. Nasr, J. L. Montéro, A. Scozzafava, Bioorg. **Med. Chem. Lett**. 2005, 15, 91. [3] T. H. Maren. **Physiol.J. Rev**. 1967, 47, 595.

3. S. Levitus, J. I. Anthonovtimothy, P. Boyer, C. Stephens. **Science.** 2000, 25, 287.

Algerian Journal of Engineering and Technology

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Anti-inflammatory Activity of ferrocene derivative Using a Spectroscopic Approach and Molecular Docking

SAADA Zahra [a,b,*] ,BECHKI Lazhar[a] , LANEZ Elhafnaoui[b] and LANEZ Touhami[b]

[a]*University of Ouargla , Department of chemistry, 30000, Ouargla, Algeria*

[b]*University of El Oued, VTRS Laboratory, B.P.789, 39000, El Oued, Algeria*

* *Corresponding author*.Tel.: +2136-62-19-92-95
E-mail address: saada.zahra@univ-ouargla.dz

ABSTRACT

Inflammation is a complex, dynamic response to cell injury, infection, trauma, or toxins that can last for a few days (acute inflammation) or for a longer duration (chronic inflammation). However, uncontrolled inflammatory processes are the root cause of a wide range of human illnesses, including cancer, diabetes, arthritis, bowel, cardiovascular, and brain disorders. Ferrocene derivatives has attracted significant interest as potent biological activities against several diseases. The objective of the current study is to understand and establish the role of Ferrocene derivative in the treatment of inflammatory condition, through in-silico and in-vitro studies. The specificity and binding affinity of FCMA were evaluated using molecular docking. Through in-silico and in-vitro studies, the current study aims to comprehend and establish the role of Ferrocene derivative in the treatment of inflammatory conditions. In silico docking method, the research was conducted using chemical compound FcMA and model of protein BSA downloaded via Protein Data Bank (PDB), then performed docking process using the AutoDock Tools 1.5.7 program. and Prediction done of the physicochemical, pharmacokinetic, and toxicological property of the FcMA compound. In vitro method, synthesis of FcMA compound, and a study of the Interactions between him and bovine serum albumin (BSA) was carried out. He results show that these ferrocene derivatives have an electrostatic interaction with the BSA, the IC50 value showed a very significant activity by comparing them with Diclofenac. Overall results suggest that Ferrocene derivative mediates its anti-inflammatory activity by its direct effect on BSA. FcMA can be a potent molecule in treatment of various diseases associated with inflammation.

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Keywords: Ferrocenylmethyl aniline, BSA, anti-inflammatory activity, Docking

References

1. Venkata, M., R. Sripathy, D. Anjana, N. Somashekara, and all. American Journal of Infectious Diseases ISSN 1553-6203. *In Silico*, *In Vitro* and *In Vivo* Assessment of Safety and Anti-inflammatory Activity of Curcumin. 26-33, 2012
2. Tanveer A.Wani, Ahmed H. Bakheit , Abdul-Rahman A. Al-Majed , Mashooq A. Bhat and Seema Zargar . Molecules, 22, 1258. Study of the Interactions of Bovine Serum Albumin with the New Anti-Inflammatory Agent 4-(1,3-Dioxo- 1,3-dihydro-2H-isoindol-2-yl)-N0-[(4-ethoxy-phenyl) methylidene]benzohydrazide Using a Multi Spectroscopic Approach and Molecular Docking.2017
3. Nur Aziz , Mi-Yeon Kimb, Jae Youl Cho. Journal of Ethnopharmacology. Anti-inflammatory effects of luteolin:

Algerian Journal of Engineering and Technology

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DFT studies on Geometric, vibrational and electronic spectra, HOMO–LUMO of N-ferrocenylmethylaniline.

Marwa DJARALLAH[a,b*], Touhami LANEZ[a], Lazhar BECHKI[b], Elhafnaoui LANEZ[a]

[a]*University of El-Oued, VTRS Laboratory, B.P.789, 39000, El Oued, Algeria*

[b]*University of El Ouargla, VPRS Laboratory, B.P.511, 30000, El Ouargla, Algeria*

* *Corresponding author.*Tel.: 0675436037
E-mail address: djarallah.marwa@univ-ouargla.dz

ABSTRACT

Quantum chemistry methods play an important role in obtaining molecular geometries and predicting various properties, To obtain highly accurate geometrical and physical properties for molecules, in this work, Density functional theory (DFT) calculations using Becke-3-Parameter-Lee-Yang-Parr (B3LYP) in 6-311G++(d,p) basis set, using Gaussian 09 program package were performed to obtain optimized geometries of a Ferrocenic derivative. Geometrical properties such as Mulliken atomic charges, the molecular electrostatic potential (MEP), bond angles and bound lengths of the optimized crystal structure were carried out by mentioned method in the gas phase

In addition, the vibrational and electronic spectra have been carried out, and these spectra results obtained were compared with the obtained from the experimental methods. Moreover, the lowest occupied molecular orbital energies (HOMO), lowest unoccupied molecular orbital energies (LUMO), and "gap HOMO-LUMO" characterizes molecular chemical stability energies are calculated to study the molecular chemical stability. s built and optimized at the level of density functional theory DFT with DFT/B3LYP method combined with 6-311++G(d,p) basis set using Gaussian 09 program package. The crystal structures of both DNA (PDB ID: 1W0T) and BSA (PDB ID: 3V03) were imported to the AutoDock molecular docking software. The docking analyses confirm the formation of the adducts.

Keywords: Density functional theory; HOMO; LUMO; Ferrocenique derivative.

References

1. Adaika, A., Lanez, T., & Lanez, E. Journal of Fundamental and Applied Sciences ISSN 1112-9867, VITRO AND IN SILICO EVALUATION OF ANTICANCER ACTIVITY OF N, N DIMETHYL AMINO METHYL FERROCENE, 2019, 11(2), https://doi.org/10.4314/jfas.v11i2.14.
2. Mumit, M. A., Pal, T. K., Alam, M. A., Islam., M. A. A. A. A., Paul, S., & Sheikh, M. C. molecular structure 1220-128715, DFT studies on vibrational and electronic spectra, HOMO–LUMO, MEP, HOMA, NBO and molecular docking analysis of benzyl-3-N-(2, 4, 5-trimethoxyphenylmethylene) hydrazinecarbodithioate, 2020, https://doi.org/10.1016/j.molstruc.2020.128715.
3. Belaidi, S., Mazri, R., Belaidi, H., Lanez, T., & Bouzidi, D. *Journal of Chemistry* 9241, Electronic structure and physico-chemical property relationship for thiazole derivatives, 2013, *25*(16), http://dx.doi.org/10.14233/ajchem.2013.15199.
4. Didaoui, A., Amara, K., Zemouli, M., Benhalima, N., & Elkeurti, M. *Canadian Journal of Physics* 297-307, Etude de la structure moléculaire, la polarisabilité, l'hyper-polarisabilité et l'analyse HOMO–LUMO des structures monomères et dimères du N-(3-méthylphényl)-2-nitrobenzènesulfonamide C13H12N2O4S , 2019, *97*(3), https://doi.org/10.1139/cjp-2018-0120.

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Étude *in* vitro et in silico de l'activité antidiabétique d'un dérivé ferrocénique 'FMA'

AIDA BENINE ,LANEZ Touhami[b] and LANEZ Elhafnaoui[a,b,]

[a]*University of El-Oued, Department of chemistry, 39000, El-Oued, Algeria*

[b]*University of El Oued, VTRS Laboratory, B.P.789, 39000, El Oued, Algeria*

* *Corresponding author*.Tel.: +2136-68-19-07-98

E-mail address: aidabenine@gmail.com

Résumé

Le diabète est un trouble métabolique chronique causé par des carences en insuline, Ce trouble est associé à des complications graves et à long terme y compris les maladies rénales. pour gérer efficacement le diabète, il est recommandé de maintenir un mode de vie sain avec une alimentation saine et l'activité physique ainsi que d'utiliser des médicaments lorsque nécessaire. Il a été démontré que l'inhibition de l' α-amylase peut retarder l'absorption des glucides et ainsi réduire la glycémie, l'utilisation de l'inhibiteur de α amylase sera bénéfique pour les personnes à risque accru de développer des symptômes d'hyperglycémie, toutefois, d'autres recherches sont nécessaires pour déterminer l'innocuité et l'efficacité de ce traitement.le but de cette étude était d'étudier le dérivé ferrocénique possibles du composé FMA sur l'inhibition de α-amylase Sur la méthode d'amarrage dans le in-silico, la recherche a été menée en utilisant le composé chimique FMA et un modèle de α-amylase protéine téléchargée via la banque de données de protéines (code PDB : 4GQR) puis effectué l'amarrage en utilisant programme AutoDock 1.5.7 instruments. Installation in vitro de composés FMA et évaluation de l'efficacité pour inhiber l'α-amylase. les résultats obtenus ont montré que les dérivés ferrocénique avaient une réaction électrostatique avec l'enzyme, et donc la valeur de la CI50 a montré une activité inhibitrice très importante en les comparant à l'acarbose. L'analyse de l'arrimage in-silico contre α-amylase a révélé que les scores d'arrimage correspondent étroitement aux valeurs IC50 des inhibiteurs obtenus en laboratoire.

Les résultats obtenus pour le composé FMA étudié ont indiqué une excellente activité inhibitrice à la fois en laboratoire et dans les in-silico indiquant son rôle important dans l'inhibition α-amylase.

Mots clés : dérivé ferrocénique, in-silico, α-amylase, anti-diabétique, l'enzyme .

Références :

1. C G Kato-Schwartza, R C G Corrêa, D S Lima, A B Sá-Nakanishi, G A Gonçalves,and all . Potential anti-diabetic properties of Merlot grape pomace extract: An in vitro, in silico and in vivo study of α-amylase and α-glucosidase inhibition. Food Research International 137 (2020).

2. K Wang , Yong-Xi Ge , Jie Zhang , Y Chen , N Zhang , J Gu , L Fang , X Zhang , J Zhang , C Jiang. New cycloalkyl[*b*]thiophenylnicotinamide-based α-glucosidase inhibitors as promising anti-diabetic agents: Synthesis, in silico study, *in vitro* and *in vivo* evaluations. Bioorg. Med. Chem. Lett. 79 (2023).

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Electrochemical experiments and superoxide anion scavenging assays were used to examine the antioxidant capacity of Moringa Oleifera flowers collected from the Algerian Sahara.

Djemoui Amar[a*] Djemoui Djamila[b], Souli lahcene[a], Haiouani Kheira[a],Souadia Ahmed[a]

[a]*Department of Chemistry, Faculty of Exact Sciences and informatics, ZIANE Achour University of Djelfa, Algeria.*
[b]*Department, of material sciences, faculty of science and technology, Djilali Bounaama University of Khemis Miliana, Algeria*

* *Corresponding author.*Tel.: 0699602765
E-mail address:djamarchimie@yahoo.fr

ABSTRACT

Tropical plant belonging to the family Moringaceae named *Moringa Oleifera*, *also known as the* "Tree of Life" grows in tropical and subtropical country. Is among the most commonly cultivated plant all over the world, it has high economic impact due to the medicinal and nutritional values[1,2].

This study aimed to extract of phenolic compounds and to evaluate antioxidant propriety of *Moringa Oleifera* flowers extracts grown in Algeria, and to find the correlation of antioxidant propriety by electrochemical assays with antioxidant propriety by superoxide anion scavenging assays. The dried powdered Flowers of *Moringa Oleifera* was macerated with hydro-alcoholic solution and partitioned successively with Chloroform, Ethyl acetate and n-Butanol[3]. Total phenolics (TP) and total flavonoids (TF) content were determined by spectrophotometric method[3,4], the plant extracts were also examined for its antioxidant propriety by using cyclic voltammetry[5] assay and superoxide anion scavenging assays[6]. These results showed that ethyl acetate extract had the highest inhibition value for superoxide anion scavenging assays and showed the best IC_{50} value for antioxidant activity by cyclic voltammetry assay the results also showed that there are positive correlations.

As a summary of this study, the Flowers of *Moringa Oleifera* are the rich source of phenolic compounds that can play an important role in preventing the progression of many diseases.

Keywords: *Moringa Oleifera;* phenolic content*;* flavonoïd content*;* cyclic voltammetry*;* superoxide anion.

References

1. Leone, A., Spada, A., Battezzati, A., Schiraldi, A., Aristil, J., and Bertoli, S.International journal of molecular sciences 16, 12791-12835.
2. Kantilata Thapa*, Mousami Poudel and Prabin Adhikari, ACTA SCIENTIFIC AGRICULTURE (ISSN: 2581-365X),2019
3. Belguidoum, M., Dendougui, H., Kendour, Z., Assia, B., Cheyma, B., and Hadjadj.Der PharmaChemica 7, 312-317.
4. Al-Owaisi, M., Al-Hadiwi, N., and Khan, S.A.Asian Pacific Journal of Tropical Biomedicine 4, 964-970.
5. C Bensaci, Z Ghiaba, M Dakmouche, A Belfar… - Korean Chemical Engineering Research, 2021
6. Xu, M.-S., et al., Antioxidative activity of hen egg ovalbumin hydrolysates. Asia Pacific journal of clinical nutrition, 2007. 16(S1): p. 178-182.

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The effect of Citrus Paradisi Essential Oil in HeLa and MCF-7 tumor cells

Bochra Gargouri[1], Ichrak Ben Amor[1] and Hammadi Attia[1]

1Unit of Biotechnology and Pathologies, Higher Institute of Biotechnology of Sfax, University of Sfax, Sfax 3029, Tunisia.

* *Corresponding author.*Tel.: 93285593
E-mail address: *bochragargouri@yahoo.fr*

ABSTRACT

The present study was focused on the study of essential oil extraction from the zest of grapefruit (Citrus paradisi) and the determination of antioxidant and antitumor activities in HeLa and MCF-7 tumor cells. Grapefruit essential oil was extracted by hydro distillation. The cytotoxicity study of grapefruit essential oil was assessed using MTT assay against HeLa and MCF-7 tumor cells. Grapefruit essential oil was analyzed for antioxidant potential. Lipid peroxidation was determined in a biological system (cell culture), by measuring the levels of MDA and DC in HeLa and MCF7 cell line after H_2O_2 treatment.

The extraction yield obtained after optimization was 1.32 %. In addition, a significant antitumor effect of grapefruit essential oil was observed in HeLa and MCF-7 tumor cells. An antioxidant activity was observed in both HeLa and MCF-7 tumor cells. The data serve as the basis for the consumption of Citrus paradisi essential oil, with significant antioxidant activity and with antitumor potential.

Keywords: Citrus Paradisi; Essential Oil; Antioxidant Activity; Antitumor Activity; MTT; HeLa; MCF-7.

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Nigella Sativa Paste extract as green corrosion inhibitor for aluminum in 1M HCl

ABDERRAHMANE Sihem*; MOUSSAOUI Kamilia and LARKEM Hamama

Surface Engineering Laboratory (L.I.S); Department of chemistry; Faculty of Sciences; BADJI MOKHTAR -ANNABA University.

*Tel.: 0670.05.67.20
E-mail address: abderrahmanesihem@yahoo.fr

Abstract

The Nigella Sativa Paste (NSP) brought from Istanbul (Turkey), was the subject of our study. The aim is to highlight its triple action, namely: its inhibiting efficiency on the corrosion of aluminum in 1M HCl, its biocide effect and its valorization as waste. The Nigella Sativa Paste Extract (NSPE) was obtained by maceration of the NSP for 24 h in 1N HCl.This study was conducted by Weight Loss (WL), Electrochemical studies (Potentiodynamic Polarization (PPD)), Electrochemical Impedance Spectroscopy (EIS) and Linear Polarization Resistance (LPR). The characterization of the inhibitor was performed by FTIR, UV-visible and photochemical screening. Microscopic characterizations of the surface state of aluminum by SEM-EDS and AFM. The biocidal effect of NSP was tested on E.coli bacteria. The WL results obtained at concentrations (1.10^{-2}, 2.10^{-2}, 3.10^{-2} and 4.10^{-2}) v/v NSP show that increasing the concentration increases the inhibitory efficiency up to 99.2% at 4.10^{-2} v/v NSP, after 2h immersion time. The results obtained by PDP, EIS and LRP, gave maximum inhibitory efficiencies of 99.88%, 98.94% and 95.99% at 4.10^{-2} v/v NSP respectively. The latter acts as a mixed inhibitor with predominantly cathodic. Nyquists are characterized by a high frequency charge transfer phenomenon, followed by a low frequency induction phenomenon. SEM-EDS and AFM characterizations of the aluminum surface condition confirm the results obtained by the study methods. The results obtained by the biocide effect show that NSP is an effective biocide against Escherichia coli. We can therefore conclude that Nigella Sativa Paste is a good inhibitor of aluminum corrosion in 1M HCl and a good biocide agent.

Keywords: Nigella Sativa paste; Corrosion; Inhibitor; Aluminum; E.coli; Biocide.

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Study of the influence of temperature on the inhibitory effect of Borago officinalis against the corrosion of an mild steel

YOUBI Asma[1] , ABDERRAHMANE Sihem[1] , MESSAST Sarah [1,2] , MOUSSAOUI Kamilia [1].

1-Surface Engineering Laboratory (L.I.S), department of chemistry; Faculty of Sciences; BADJI Mokhtar -Annaba University.
2-Materials physicochemical laboratory, Sciences and Technology faculty, Department of physic, ChadliBendjedid University36000,ELTarfAlgeria.

*Tel.: 0670082577
*E-mail address:asmahamoud8@gmail.com

ABSTRACT

Corrosion of materials is done by physico-chemical interactions with their environment, resulting in changes to the properties of the metal often accompanied by a functional degradation of the latter.[1] Synthetic inhibitors are used to reduce the rate of corrosion, but they are harmful and too expensive.[2] Green inhibitors have been able to replace them[3], several parts of plants have been used: grains, leaves, flowers, stems, roots.[4] The objectif of our work is to study the inhibitory effectiveness of the Borago officinalis (B.O) plant on the corrosion of the mild steel A9M in sulphuric acid at 1M, at different temperatures 25 ; 35 ; 45 and 55°C, by weight loss method . Borago officinalis is an annual herb native to the Mediterranean and cultivated for medicinal and culinary purposes. [5] The research has shown its wealth in linoleic acid and gamma-linoleic acid, which help to prevent and treat various diseases mainly diabetes and cancer. [6] The extract from the leaves of Borago officinalis was obtained by decoction and then extraction by soxhlet in the presence of ethanol as a solvent. The spectroscopic characterisation of the leaves of Borago officinalis was done by FTIR and UV-vis spectroscopy. The maximum inhibitory effectiveness of (B.O) is 91% to 8.10-1 (v/v) obtained after 24 hours of immersion at 55°C. We can therefore conclude that the leaves of Borago officinalis is a good corrosion inhibitor of A9M steel.

Keywords: corrosion; inhibitor; Borago officinalis; A9M steel; H_2SO_4.

References

1. Boulmerka, R., &Abderrahmane, S. Grated Agave Americana Green corrosion inhibitor for stainless steel in 0.5M H2SO4 International Journal of Chemical and Biochemical Sciences 2021.
2. Nayem Hossain and Mohamman Asaduzzaman Terminalia Arjuna Leaves extract as green corrosion inhibitor for mild steel in HCl solution 2022.
3. Walid Daoudi and Abdel malik el Aatiaoui,Essential oil of Dysphania ambrosioides as green corrosion inhibitor for mild steel in HCl solution-journal of molecular liquids 2022.
4. A.Berrisoul and A.ouarhach Exploitation of new green inhibitor against mild steel corrosion in HCl : Expermental, DFT and MD simulation approach journal of Molecular liquids 2022.
5. Cristina Moliner and Guillermo Cásedas , Neuroprotective Profile of Edible Flowers of Borage (Borago officinalis L.) in Two Different Models: Caenorhabditis elegans and Neuro-2a Cells, Antioxidants 2022.
6. Lourdes Casas-Cardoso and Casimiro Mantell , Health-Promoting Properties of Borage Seed Oil Fractionated by Supercritical Carbon Dioxide Extraction Foods 2021,.

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Molecular Design Based on ab-initio Calculations of an Organic Molecule for Corrosion Protection

Rachid Belkada[a]*, Ikram Hadj Said[b], Rahma TIBIGUI[b], and Dalila HAMMOUTENE[b]

[a]*Centre de Recherche en Technologie des Semi-conducteurs pour l'Energétique (CRTSE), Algiers, Algeria*

[b]*USTHB, Laboratoire de Thérmodynamiques et Modélisation Moléculaire, Faculté de Chimie, Algiers, Algeria.*

* *Corresponding author.*Tel.: +213-21433511
E-mail address: rbelkada@crtse.dz, rachidudts@gmail.com

ABSTRACT

Recently, the protection of vulnerable industrial and strategic structures against corrosion by chemical means uses organic inhibitors to avoid the use of harmful inhibitors based on non-organic substances that can harm the environment. Corrosion protection in energy transport is facing various challenges due to its multidimensional basic's phenomenon, which make it, on various aspects very demanding to control. The experimental approaches used for the synthesis and the development of novel inhibitors is time consuming and needs a considerable budget till reaching the objective. Recent advances in robust numerical calculations can be used to reduce time and cost for the development of various corrosion inhibitors [1,2]. The use of quantum mechanical method based on the Density Functional Theory (DFT) aided numerical simulations techniques as a support approach for organic corrosion inhibitors synthesis is a complementary and a reliable way to strongly connect the experimental and theoretical research work. Indeed, methods based on DFT have a significant predictive potential for the design at the molecular level of target functionalities as a support, for the development and synthesis of inhibitors by an experimental route at a lower cost [3,4]. Among the inhibitors used in industry, there are organophosphorus compounds; phosphonates characterized by the presence of a -C-PO3-H2 group. Our interest in this study concerns molecules derived from phosphonates, to set up a calculation method based on the DFT to describe the energy parameters (HOMO, LUMO, energy gap ΔE, ionization potential P, electronic affinity A, electronegativity χ, hardness η and the number of transferred electrons Δn, in order to find the suitable parameters to model the experimental inhibitory efficiency.

Keywords: *Organic Inhibitors, Numerical Calculations, Corrosion Inhibition Efficiency.*

References

1. A. Kokal. (2021). Molecular modeling of organic corrosion inhibitors: Calculations, pitfalls, and conceptualization of molecule–surface bonding. Corros. Sci, 193, 109650.
2. S.A. Umoren, M.M. Solomon. (2019). Protective polymeric films for industrial substrates: a critical review on past and recent applications with conducting polymers and polymer composites/nanocomposites. Prog. Mater. Sci., 104 : 380–450.
3. I. Obot, B.K. Haruna, T.A. Saleh. (2018). Atomistic Simulation: A Unique and Powerful Computational Tool for Corrosion Inhibition Research. Arab. J. Sci. Eng, 44 :1–32.
4. B. Hou, X. Li, Ma X, C. Du, D. Zhang, M. Zheng M., et al. (2017). The cost of corrosion in China. npj Mater Degrad, 1(4).

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The study of the corrosion of a Polyaniline-based coating doped in a 3.5% NaCl solution

N. MOUNIR[(a*)], M. NAZEF[(b)], H. YOUSFI[(a)].

(a) Materials Science and Engineering Laboratory. Department of Metallurgy. National Polytechnic School of Algiers, ALGERIA.

(b) SONATRACH Laboratories Division (Ex CRD), Boumerdes ALGERIA

** Corresponding author.Tel.: 0796285622*

E-mail address: nacer.mounir@g.enp.edu.dz

ABSTRACT

In the concern encountered in the oil storage tanks in the southern basin of Algeria (Hassi Messaoud), in order to ensure a long lifespan under exposure to the aggressiveness of saline and acidic environments, we proceeded to the preparation and development of new paints that can improve anti-corrosion behaviour by spraying epoxy with semi-conducting polymer anti-corrosion agent.

In our study, we proceeded to the development of an epoxy coating with an acid-doped Polyaniline type anti-corrosion agent. Deposits of the order of a micro-meter (40 to 80 µm) were made, projected onto metallic substrates (carbon steel). Thanks to this surface treatment (coating), we bring to the surface, which is in contact with saline environments, a power to resist the activity of corrosive substances (Cl- and H3O+ ions) and ensure better protection sought [**1**].

The acid-doped PANI polymer is of the same family as polypyrrole (PPy), polythiophene (PTh), polyacetylene (PA), it is also considered as an N-type semiconductor polymer [**3**].

In order to understand the behavior of our new paint in saline environments, we tried to stimulate a study of the phenomenon of corrosion in a medium of 3.5% NaCl with different pH such as 6.5 [**1, 2**] and pH 4.5.

Finally, to understand the fundamental mechanisms of our coating compared to another coating already developed and marketed [**1, 2**], we use a few characterizations such as:

• Electrochemistry (OCP, LPR, EIS and Tafel curve)
• FTIR-ATR
• SEM

From the results of its physic-chemical characterizations, we can see that our coating based on acid-doped Polyaniline represents a strong resistance to corrosion [**2**].

Keywords: Polymer coating Polyaniline, Anti-corrosion paints, Conductive, epoxy

References

[1] Yanhua Lei, Zhichao Qiu, Ning Tan, Hailiang Du, Dongdong Li, Jingrong Liu, Tao Liu, Weiguo Zhang, Xueting Chang, *Progress in Organic Coatings* **Vol 139** (2020).

[2] J. Xu, Y. Zhang, D. Zhang, Y. Tang, H. Cang, Progress in Organic Coatings vol 88 84–91 (2015)

[**3**] Dharmesh Mishra, Shammi Kumar Singh, Arindam Adhikari, Somak Chatterjee, *Journal of Environmental Chemical Engineering*, **Vol 10**, October 2022.

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Characterization and Electrocatalytic Properties of Ni doped Perovskite Oxide

Kherief yahia[a]* Makhloufi Sofiane[a,b] Omari Mahmoud[a]

University Mohamed khider , Biskra;, Algeria

[a]*Laboratory of Molecular Chemistry and Environment, University of Biskra,*
[b]*Faculty of Science and Technology., Ziane Achour University of Djelfa B. P. 3117- Algeria*

* *Corresponding author.*Tel.: 0770006155
E-mail address:yahiakhreif@gmail.com

ABSTRACT

Perovskite-type rare earth compound oxides such as ABO_3 are very important inorganic functional materials to solve the questions of energy shortage and environment pollution.

In this study, the perovskite $NdFe_{1-x}Ni_xO_3$ was synthetized through the sol-gel method and their electro -catalytic activity towards O_2 -evolution reaction by doping the B-site by nickel was investigated. X-ray diffraction (XRD), thermogravimetric and differential thermal analysis (TG/DTA), Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM) and electrochemical measurements, were used to characterize the structure, morphology and electrocatalytic activity of the prepared catalysts. According XRD characterization, the formation of pure perovskite was obtained at 800°C in the range $0 \leq x \leq 0.3$. The FTIR spectra confirm the presence of metal oxygen bond of Fe-O in the FeO_6 octahedra. Scanning electron microscopy show that the particles are nearly spherical in shape and the powders are partially agglomerated. Electro chemical measurement indicate that the catalytic activity is influenced by nickel substitution.

Keywords: electro -catalytic activity; O_2 -evolution reaction; perovskite.

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Synthesis, Characterization and photocatalytic activity of ZnO thin films under UV and Solar Light

Roumaissa DJAFAROU[1]*, Soumia HAYA[2] , Ouarda BRAHMIA [1]

[1]*Chemistry Department, University of Mentouri Brothers, Constantine 1, ALGERIA*
[2] *Physics Department, University of Mentouri Brothers, Constantine 1, ALGERIA*

* *Corresponding author.*Tel.: 213792036963
E-mail address: roumaissa.djafarou@student.umc.edu.dz

ABSTRACT

Photocatalysis stands as part of the advanced oxidation techniques [1]. It is based on the light-enhanced generation of highly reactive hydroxyl radicals, which oxidize organic matter in solution and convert it completely into water andinorganic compounds. ZnO is one of the most important transition metal oxides used in the photocatalytic processes to remove organic pollutants from the environment thanks to its low cost and good catalytic properties [2]. In the present study, ZnO thin films on glass substrate were successfully synthesized via sol-gel dip coating technique. It is noteworthy to mention that these nanoparticles were heated via an optical annealing using (UV lamp, 24 W) at different time intervals of UV irradiation (2, 4, 6 and 8 hours). Results showed that the band gap of ZnO thin films increases from 3.19 to 3.23 eV for films irradiated within 2 to 8h. This outcome proved that the optical band gap of the ZnO thin films strongly depends on the optical annealing time. The synthesized ZnO thin films that undergo 2 hours of optical annealing present the smallest crystallite size, the smallest band gap energy and the greater surface area compared to the others thin films. These arguments make these films the best candidate for our study. The estimation of the photocatalytic activity of the prepared films was investigated using Methylene Blue dye as an organic pollutant model under UV light and solar irradiation. The excellent photocatalytic efficiency of the elaborated nanoparticles was well interpreted via the MB disappearance kinetic that clearly demonstrates the complete MB degradation after only 50 min in the presence of Solar light against 125 min under UV light.

Keywords: photocatalytic, ZnO, films, Photocatalytic Activity

References

1. Kansal SK; Singh M; Sud D; Studies on photodegradation of two commercial dyes in aqueous phase using different photocatalysts. J. Hazard. Mater. 141, 581–590 (2007).
2. Aal, A; Mahmoud, S; Aboul-Gheit, A; Sol–Gel and Thermally Evaporated Nanostructured Thin ZnO Films for Photocatalytic Degradation of Trichlorophenol. Nanoscale Res Lett 4, 627–634 (2009).

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Traditional Applications of Plant Latex in The Genus *Euphorbia* in Medicinal and Therapeutic uses. A mini Review

SEGUENI Khaoula[a,c]*, CHOUIKH Atef [a,b] and TLILI Mohammed Laid[c]

[a]*Laboratory Biology, Environment and Health (LBEH), El oued University, Algeria.*

[a]*Department of Biology, Faculty of Natural Science and Life, El oued University, Algeria.*

[c]*Department of Cellular and Molecular Biology, Faculty of Natural Science and Life, El oued University, Algeria.*
**Corresponding author.*Tel.: 0791358539
E-mail address: khaoula-segueni@univ-eloued.dz

ABSTRACT

The valorization of natural resources, especially the medicinal plant wealth, and their inclusion in the therapeutic field and its applications is still an urgent necessity, in light of the challenges the world faces today in finding alternative methods for manufacturing chemical medicines. Medicinal plants have been used since the beginning of human activity in treating various diseases and ailments in their daily practices. Among these plants, the genus *Euphorbia* is one of the richest in medicinal plants, especially the milk of the plant "milk juice", which is widely known as latex as a medicine for many diseases.

Traditional folk medicine used plant latex to treat a number of ailments, including skin diseases such as warts, eczema, skin infections, chronic wounds, intestinal parasites, treatment of infections, arthritis, stomach pain and diabetes.

This mini-review aims to provide an update on the traditional medicinal uses of latex. Thus, it can be said that latex may constitute a natural resource with interesting pharmacological properties, and qualitative properties in the treatment of many human diseases (including inflammatory diseases, bacterial infections and skin diseases); It can also be introduced into pharmacology, mainly in the synthesis of new drugs with a natural essence for the treatment of many diseases and the development of some drugs and medicines for the same effect.

Therefore, more prospective studies are needed to improve the therapeutic use of latex extracts in a more precise manner to achieve the desired therapeutic efficacy.

Keywords: Plant Latex; *Euphorbia*; Traditional Applications; Therapeutic uses.

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Photocatalytic study of synthesized TiO_2 by sol-gel process

Dalila Ikermoud[a]*, Nourhane Ziad[b], Amel Yacoub[b], Mouna Hecini[a], Ouahiba Bouchelaghem[a], Baya Palahouane[a] and Fadila Djouadi-Belkada[a]

[a]*Centre de Recherche en Technologie des Semi-conducteurs pour l'Energétique, N°2, B[d] Frantz Fanon, Alger, Algérie*
[b]*Laboratoire de Génie des procédés, Université de Blida 1, Route de Soumâa, Blida, Algérie*

* *Corresponding author*.Tel.: 0555 81 24 40
E-mail address: ikermoud.dalila@gmail.com

ABSTRACT

In the photovoltaic industry, the evacuation of water specifically used in wafers production, which include silicon crystal growth, cutting, metallization, photolithography, washing and cleaning [1-3] generates huge quantities of wastewater with considerable concentrations of heavy metals such as hexavalent chromium TiO_2 that is considered as a metallic element released in significant quantities in the effluents of this industry, which has harmful consequences on human health and environment [4,5]. Heterogeneous photocatalysis is one of the innovative advanced oxidation processes used in the reduction of most of these metallic pollutants. Due to its different structural properties and low cost, titanium dioxide is the most widely used photochemical catalyst in wastewater treatment processes [6,7]. During this study, we synthesized TiO_2 by the sol-gel process. The obtained TiO_2 powder was characterized by various characterization techniques. The photocatalytic activity of the synthesized photocatalyst was tested by studying the reduction of hexavalent chromium Cr(VI) under UV light.

Keywords: Photocatalysis; wastewater; TiO_2; hexavalent chromium; sol-gel.

References

1. Fan Y, Arevalo A, Li H, Foulds IG, Low-cost silicon wafer dicing using a craft cutter, *Microsysten Technologies*, 2015, 21, 1411-1414.
2. Kao I, Chang C, Wafer Manufacturing: Shaping of single Crystal silicon wafers; *ed. John Wiley & Sons*, 2021, ISBN 0470061219, 9780470061213, p. 304. (book).
3. Cai Y, Yang L, Zhang H, Wang Y, Laser cutting silicon-glass double layer wafer with laser induced thermal-crack propagation, *Optics and Lasers in Engineering*, 2016, 82, 173-185.
4. Chen F, Ma J, Akhtar S, Ahmad K, Assessment of chromium toxicity and potential health implications of agriculturally diversely irrigated food crops in the semi-arid regions of South Asia, *Agricultural Water Management*, 2022, 272, 107833.
5. Monga A, Abhay B, Fulke AB, Dasgupta D, Recent developments in essentiality of trivalent chromium and toxicity of hexavalent chromium: Implications on human health and remediation strategies, *Journal of Hazardous Materials Advances*, 2022, 7, 100113.
6. Zerjava G, Zizek K, Zavasnik J, Pintar A, Brookite vs. rutile vs. anatase: What`s behind their various photocatalytic activities?, *Journal of Environmental Chemical Engineering*, 2022, 10, 107722-107739.
7. Cipta Dharma HN, Jaafar J, Widiastuti N, Matsuyama H, Rajabsadeh Dzarfan Othman MH, A Review of Titanium Dioxide (TiO_2)-Based Photocatalyst for Oilfield-Produced Water Treatment, *Membranes*, 2022, 12, 345-366.

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Investigation of the antioxidant and anti-diabetic activity in vitro of Moringa Oleifera flowers extracts from Algerian Saharan .

Djemoui Amar[a*] Djemoui Djamila[b], Souli lahcene[a], Haiouani Kheira[a],Souadia Ahmed[a]

[a]*Department of Chemistry, Faculty of Exact Sciences and informatics, ZIANE Achour University of Djelfa, Algeria.*

[b]*Department, of material sciences, faculty of science and technology, Djilali Bounaama University of Khemis Miliana, Algeria*

* *Corresponding author.*Tel.: 0699602765
E-mail address:djamarchimie@yahoo.fr

ABSTRACT

Moringa Oleifera tree described as among the most amazing plants is a rich of proteins, vitamins and minerals including potassium, calcium, phosphorus, iron, folic acid in addition to carotene. Its flowers include nectar and are a good source of pollen. They also contain sucrose, d-glucose and some flavonoids inclusive of quercetin, in addition to nine amino acids and some alkaloids and are wealthy in calcium and potassium [1,2].

The aim of the present study was to extract of phenolic compounds from *Moringa Oleifera* Flowers grown in Algerian Sahara were optimized using different solvents[3]. Total phenolics (TP), total tannins (TT) and total flavonoids (TF) content were determined by spectrophotometric method[4,5,6]. Standard antioxidant methods including DPPH scavenging, Phosphomolybdenum assay (PM) and Ferric reducing power assay (FRAP) were used to evaluate the activity of each extract[7].while the anti-diabetic activity was studied for α -Amylase inhibition using an in vitro model. Results demonstrated that total phenolics varied between 95,50 ± 0,42 and 10, 49 ± 0,053 mg GAE/g WE, while total flavonoids was between 17,00 ± 0, 011 and 2,47 ± 0,014 mg GAE/g WE, In this study total tannins ranged between 2,96± 0,016 and 1,30± 0, 014 mg GAE/g WE. All capacities of DPPH radical scavenging, Phosphomolybdenum (PM) and Ferric reducing power (FRAP) were found best in ethyl acetate extract (IC_{50}= 0,159± 0,004mg/ml, AEAC = 42.37 ± 0.28 mM and AEAC =104.05±0.41 mM respectively). Add to this extract showed the highest α-amylase inhibitory activity (I= 38, 92 %).

***Keywords*:** *Moringa Oleifera;* flowers*;* phenolic compounds*;* Antioxidant*;* α-amylase enzyme.

References

1. Fuglie, L.J., The miracle tree: Moringa oleifera, natural nutrition for the tropics. 1999.
2. Sutalangka, C., and al., Moringa oleifera mitigates memory impairment and neurodegeneration in animal model of age-related dementia. Oxidative medicine and cellular longevity, 2013. 2013.
3. Herborne, J., Phytochemical methods. A guide to modern techniques of plant analysis, 1973: p. 5-11
4. Al-Owaisi, M., N. Al-Hadiwi, and S.A. Khan, GC-MS analysis, determination of total phenolics, flavonoid content and free radical scavenging activities of various crude extracts of Moringa peregrina (Forssk.) Fiori leaves. Asian Pacific Journal of Tropical Biomedicine. 2014. 4(12): p. 964-970.
5. Wang, H., and al., In vitro and in vivo antioxidant activity of aqueous extract from Choerospondias axillaris fruit. Food Chemistry. 2008. 106(3): p. 888-895
6. Preeti Tiwari. Phenolics and Flavonoids and Antioxidant Potential of Balarishta Prepared by Traditional and Modern Methods. Asian J. Pharm. Ana. 4(1): Jan.-Mar. 2014; Page 05-10.
7. M Belguidoum, H Dendougui, Z Kendour, B Assia, B Cheyma, M Hadjadj Der Pharma Chemica 7, 312-31

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Antioxidant and Antibacterial Capacity Assessment of *Helianthemum lippii* Extract and silver nanoparticles

LAIB Ibtissam[1, 2]*, DJAHRA ALI Boutlelis[1, 2]

1) Department of Cellular and Molecular Biology, Faculty of Natural and Life Sciences, University of El Oued. 39000, El Oued, Algeria

2) Laboratory of Biology, Environment and Health, Faculty of natural and life sciences, University of El Oued. 39000, El Oued, Algeria

* *Corresponding author*.Tel.: 0665020679

E-mail address: ibtissambiochimie95@gmail.com

ABSTRACT

Medicinal plants are both a finished product intended for consumption and raw material for obtaining the bioactive substances which are at the origin of several modern medicines thanks to their richness in secondary metabolites, in particular in phenolic compounds endowed with beneficial biological. The synthesis and characterization of noble metal nanoparticles such as silver, gold and platinum is an emerging field of research due to their important applications in the fields of biotechnology, bioengineering, textile engineering, water treatment, metal-based consumer products and other areas, electronic, magnetic, optoelectronics, and information storage.

This study was designed to determine the antioxidant and antibacterial capacity of *H.lippii* plant and silver nanoparticles in vitro. Has been used The DPPH, Reduction Power (RP) tests and the effectiveness of AgNPs and *H.lippi*i against three bacterial strains was also tested. The results indicated an efficient antibacterial action and *H.lippii* and AgNPs demonstrated strong efficiency as antioxidant. Hence Biosynthesized silver nanoparticles and *H.lippii* have strong antioxidant capacity which may be used to treat a range of oxidative stress-related diseases and in other hand may be employed in the treatment of other illnesses brought on by bacteria.

Keywords: Medicinal plants; *Helianthemum lippii* L; Silver nanoparticles; antioxidant activity; antibacterial activity

References

1. Abbasi, A. R., Kalantary, H., Yousefi, M., Ramazani, A., & Morsali, A. (2012). Synthesis and characterization of Ag nanoparticles@ polyethylene fibers under ultrasound irradiation. *Ultrasonics sonochemistry*, *19*(4), 853-857.

2. Abdel-Aziz, M. S., Shaheen, M. S., El-Nekeety, A. A., & Abdel-Wahhab, M. A. (2014). Antioxidant and antibacterial activity of silver nanoparticles biosynthesized using Chenopodium murale leaf extract. *Journal of Saudi Chemical Society*, *18*(4), 356-363.

3. Adebayo, A. E., Oke, A. M., Lateef, A., Oyatokun, A. A., Abisoye, O. D., Adiji, I. P., Fagbenro, D. O., Amusan, T. V., Badmus, J., & Asafa, T. (2019). Biosynthesis of silver, gold and silver–gold alloy nanoparticles using Persea americana fruit peel aqueous extract for their biomedical properties. *Nanotechnology for Environmental Engineering*, *4*(1), 1-15.

4. Adi, P. J., Burra, S. P., Vataparti, A. R., & Matcha, B. (2016). Calcium, zinc and vitamin E ameliorate cadmium-induced renal oxidative damage in albino Wistar rats. *Toxicology reports*, *3*, 591-597.

5. Aebi, H. (1984). [13] Catalase in vitro. In *Methods in enzymology* (Vol. 105, pp. 121-126). Elsevier.

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Butanolic Extract of *Moringa Oleifera* leaves from Algerian Sahara as Corrosion Inhibitor of 6063 Aluminium Alloy in 1 M Hydrochloric Acid Medium

Djemoui Djamila [a*] Djemoui Amar [b]

[a]*Department, of material sciences, faculty of science and technology, Djilali Bounaama University of Khemis Miliana, Algeria*

[b]*Department of Chemistry, Faculty of Exact Sciences and informatics, ZIANE Achour University of Djelfa, Algeria.*

* *Corresponding author*.Tel.: 0.6.60. .07.66.06
E-mail address: d.djemoui@univ-dbkm.dz

ABSTRACT

This paper presents an evaluation of inhibitory action of Butanolic extract of *Moringa Oleifera* leaves (n-But Feu) from Algerian Sahara on the corrosion of 6063 aluminum alloy in 1 M HCl solution has been investigated by weight loss [1,2], potentiodynamic polarization[3] and electrical impedance spectroscopy technique[4].The efficiency was found to increase with increasing concentration of the plant extract in weight loss method. The results obtained showed the Butanolic extract of *Moringa Oleifera* leaves (n-But Feu) could serve as an effective inhibitor for the corrosion of 6063 aluminum alloy in hydrochloric acid solution, 84.13% is the maximum inhibition efficiency obtained from potentiodynamic polarization technique and 75.33% is the maximum inhibition efficiency obtained from electrical impedance spectroscopy with 150 ppm of the this extract at 25°C. As a summary of this study, the butanolic extract of *Moringa Oleifera* leaves (n-But Feu) was found to inhibit the corrosion of aluminum alloy 6063 in 1 M hydrochloric acid solution. The inhibition efficiency increases with the increase in the concentration of the butanolic extract.

Keywords: *Moringa Oleifera;* Butanolic extract*;* 6063 aluminum; corrosion.

References

1. R Kanojia; G Singh. Surf Eng, 21, 2005, 180.
2. G Ji; SK Shukla; P Dwivedi; S Sundaram; EE Ebenso; R Prakash. Int J Electrochem Sci, 7, 2012, 9933-9945.
3. Zakvi; GN Mehta. Trans SAEST, 23, 1988, 407
4. Messaouda Allaoui[1] ,Oumelkheir Rahim1* and LakhdarSekhri[2].ORIENTAL JOURNAL OF CHEMISTRY 2017, Vol. 33, No. (2)

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Antimicrobial activity of MeOH extract of *Bassia Muricata* against pathogenic bacteria

Noura Gheraissa[1,2*], Ahmed Elkhalifa Chemsa[2,3], Nezar Cherrada[1,2]

[1]*El Oued University, Faculty of Life and Natural Sciences, Department of Cellular and Molecular Biology, Algeria*

[2]*El Oued University, Laboratory of Biodiversity and Application of Biotechnology in Agriculture, Algeria*

[3]*El Oued University, Faculty of Life and Natural Sciences, Department of Biology, Algeriab*

* *Corresponding author.*Tel.: 0669000583
E-mail address: :nouragherr@gmail.com

ABSTRACT

Description of the subject: The present study verifies the biological efficiency of *Bassia muricata* (Chenopodiaceae vent), a wild plant in the Algerian desert.
Objectives: The MeOH extract (70%) of the aerial parts of *B. muricata* was tested for antibacterial activities, in addition to verifying its phenolic content by quantitative determination and FT-IR analysis.
Methods: The antibacterial activity of MeOH extract (70%) from aerial parts of *B. muricata* was tested against six bacterial strains including three gram-negative and three gram-positive strains. The test was done by determining the inhibition diameter using the disc diffusion method, and the MIC value was also determined using the broth dilution method.
Results and discussion: The MeOH extract of *B. muricata* showed significantly antibacterial activity against *B. subtilis* and *L. innocua*, *S. aureus*, *E. coli*, and *P. aeruginosa*. It has not given efficacy against *S. typhimurium.*
Conclusion: These results demonstrated that *B. muricata* could be useful as a source of bioactive compounds for the food, pharmaceutical and cosmetic industry.

Keywords: MeOH extract, *Bassia muricata*, Antibacterial activity.

References

1. Turki, Z., El-Shayeb, F., & Shehata, F. (2008). Acta Bot. Hung., 50, 181-201.
2. Bouaziz, M., Dhouib, A., Loukil, S., Boukhris, M., & Sayadi, S. (2009). Afr. J. Biotechnol., 8(24).

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Synthesis and characterization of graphene by electrochemical exfoliation of rod graphite

Siham Tei [1,2] *, Abdelkrim Rebiai[1,2,3], Hadia Hemmami[3,4]

[1]Laboratory Applied Chemistry and Environment, University of El Oued, El Oued 39000, Algeria
[2] Chemistry Department, Faculty of Exact Sciences, University of El Oued, P.O. Box 789, El Oued 39000, Algeria
[3] Renewable Energy Development unit in Arid Zones (UDERZA), University of El Oued, El Oued 39000, Algeria
[4] Department of Process Engineering and Petrochemical, Faculty of Technology, University of El Oued, El Oued 39000, Algeria

* *Corresponding author.*Tel.: 0665393433
E-mail address: *teisi2022@gmail.com*

ABSTRACT

Electrochemical exfoliation is a promising method for producing graphene from graphite. This study explains how to make graphene from battery graphite rods that have been electrically exfoliated. While electrochemical exfoliation of graphite can now be used to produce reduced graphene oxide (RGO) with ease. In the electrochemical reaction, graphite served as the working electrode and platinum served as the counter electrode. The two electrodes were then exposed to a Na2SO4 solution. The electrochemical exfoliation procedure started when a positive voltage of 10 V was applied to the system. Purified graphene was examined using SEM, Fourier transform infrared spectroscopy, and X-ray diffraction. This is the recently advertised process for creating materials for power sources that use graphite rods for batteries.

Keywords: Electrochemical exfoliation; graphite rods; graphene; working electrode; counter electrode.

References

1. Amri, A., Rahmana, H., Utami, S. P., Iriyanti, R. S., Jiang, Z. T., & Rahman, M. M. (2018). *Conductive composites of tapioca based bioplastic and electrochemical-mechanical liquid exfoliation (emle) graphene. IOP Conference Series: Materials Science and Engineering, 345, 012026*.
2. Achee, T. C., Sun, W., Hope, J. T., Quitzau, S. G., Sweeney, C. B., Shah, S. A., … Green, M. J. (2018). *High-yield scalable graphene nanosheet production from compressed graphite using electrochemical exfoliation. Scientific Reports, 8(1).*
3. Wu, J., Wang, H., Qiu, J., Shao, J., Zhang, K., & Yan, L. (2020). *Electrochemical exfoliation for few-layer graphene in molybdate aqueous solution and its application for fast electrothermal film. Progress in Natural Science: Materials International.*
4. Wang, H., Wei, C., Zhu, K., Zhang, Y., Gong, C., Guo, J., … Zhang, J. (2017). *Preparation of Graphene Sheets by Electrochemical Exfoliation of Graphite in Confined Space and Their Application in Transparent Conductive Films. ACS Applied Materials & Interfaces, 9(39), 34456–34466.*
5. Liu, F., Wang, C., Sui, X., Riaz, M. A., Xu, M., Wei, L., & Chen, Y. (2019). *Synthesis of graphene materials by electrochemical exfoliation: Recent progress and future potential. Carbon Energy.*

Algerian Journal of Engineering and Technology

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The biological activity of the ethanolic extract of Neurreada procumbens L.

Kherraz Khaled[1,2*,] Laoudj Hacen[2] ., Ghemam Amara Djilani[2]., Saliha zebiri[1], Soumia Bahri[2]

1. *Laboratoire d'Ethnobotanique et Substances Naturelles, Ecole Normale Supérieur- kouba, Algeria*

2. *Department of biology, Faculty of Nature and Life Sciences, University Echahid Hamma lakhdar El-oued, Algeria*

* *Corresponding author.*
E-mail address: : khaled.kherraz@g.ens-kouba.dz.

ABSTRACT

This study aimed to examine the antioxidant effect of Neurada procumbens L ethanolic extract. The chemical screening revealed the presence of tannins, flavonoids, sterols and terpenes compounds. The extract yield was 12.33 and 8.10% for the leaves and fruits respectively, the polyphenols was 3.25 ± 0.0127 and 3.66 ± 0.286 (mg AGE / g EX) and the flavonoids was 0.27±0.011 and 0.30 ± 0.025 (mg AGE / g EX), concerning the condensed tannin was 28.43 ± 13.412 29.34 ± 2.502 (mg AGE / g EX) for the leaves and fruits respectively.

The antioxidant activity using the DPPH, the results showed that the inhibition reached to 90% at the concentration 100 µg/ ml leaves and fruits. The IC50 was 19.389 and 19.380 µg/ ml for the leaves and fruits respectively. The Human erythrocytes were exposed in a dose dependent manner to various ethanolic plant extracts, the blood hemolysis protect reached to was 82% and 70% for the leaves and fruits respectively .

Keywords: Neurada procumbens L, polyphenols, flavonoids, tannins, DPPH , Hemolysis test

References

1. Abirami a., gunasekaran n., & perumal s., 2014- In vitroantioxidant, anti-diabetic, cholinesterase and tyrosine inhibitory potential of fresh juice from *Citrus hystrix* and *C. maxima* fruits. Food Science and Human Wellness,(03)18-22
2. Albrechtd.e, barker r.m, barker w.r, GAVINJ.,2002-Neurada procumbens L.(Neuradaceae): a new record for australia's sandy deserts, journalplant protection quarterly,17(4):158-161.
3. Borzattia, garbari F.,2002-karyological aspects of the genus Neurada L.(Neuradaceae j.g agardh,caryologia (international journal of cytology cytosystimatique and cytogenetics),55(4):361-365.
4. Chelalba i,. Benchikha N,. Begga s,. Messaoudi m,. debbeche h,. Rebiai a,..,2020- Phytochemical composition and biological activity of Neurada procumbens L. growing in southern Algeria, Journal of Food Processing and Preservation,

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Electrochemical elaboration and characterization of polybithiophene/ZnO composite material for solar cells application

Leila LAMIRI *[1,2], Assia TOUNSI[2], Ouafia BELGHERBI[1], Boussaha BOUCHOUL[1]

1Research Center in Industrial Technologies CRTI, P.O.Box 64, 16014 Cheraga, Algiers, Algeria

2Laboratoire d'Electrochimie et Matériaux, Université Ferhat Abbas Sétif-1, Algeria

* *Corresponding author*.Tel.: 0.6.55.26.46.92
E-mail address: lamirilaila12@gmail.com/ l.lamiri@crti.dz

ABSTRACT

Polybithiophen/ZnO composite thin films were prepared via an electrochemical synthesis route on ITO coated glass substrates. ZnO particles were uniformly dispersed in to the polybithiophene matrix. Interaction between ZnO particle and polybithiophene has been studied using cyclic voltammetry and electrochemical impedance spectroscopy (EIS) as well as photoelectrochemical in an organic solution without monomer.

The resulting hybrid films PBTh/ZnO particles are verified by scanning electron microscopy (SEM), X-ray energy dispersive spectroscopy (EDS), X-ray diffraction (XRD) and UV spectrometry (Uv-Vis), and I-V characteristics.

In this letter, we propose that this prepared film is effective for solar cells application.

Keywords: polybithiophene, ZnO particles, electrodeposition, electrochemical, solar cells

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Antioxidant activity and phenolic compounds of Algerian *Teucriumpolium* L. Medicinal plant used traditionally for treatment of digestive system disorders

Mohammed Messaoudi[1,2] , Hamza Ouakouak[2] , MokhtarBenmohamed[3] , Mohamed AmineFerhat[4] , Abdelkrim Rebiai[2] , NaimaBenchikha[2*].

1Nuclear Research Centre of Birine, P.o. Box 180, Ain Oussera, 17200 Djelfa, Algeria.
2Chemistry department, University of HammaLakhdar El-Oued, B.P.789, 39000, Algeria.
3Laboratory of Fundamental Sciences, University Amar Telidji of Laghouat, 03000 Laghouat, Algeria
*4 EcoleNormaleSupérieure (ENS), P.o. Box 92, Vieux-Kouba, 16308, Alger, Algérie. * Corresponding author.*
Tel.:
E-mail address*: naima_chem@yahoo.fr*

ABSTRACT
This work aims to characterize antioxidant activity of Algerian *Teucriumpolium*L., traditional medicinal plant, where this research is part of the study of aromatic medicinal plants in Algeria and their effectiveness [1–3]. We extracted the essentialoils and the crude extract of T. polium. The samples were collected from High Plains of Algeria in April 2019.We usedhydro-distillation (HD) to extract essential oils (EO) from air part of T. polium. The yield was 0.05% (v / w). The crudecompounds were extracted by soaking (methanol / water (8 / 2)) and the yield was 20.45% (w / w). The amount of phenol(TPC) and flavonoids (TFC) of the crude extract was estimated. We found TPC = 38 (mg EAG/g EX) and TFC = 23.7 (mgRuE/g EX), respectively. The antioxidant activity of EO (HD) was evaluated by DPPH method, we found IC50 = 54.91(mg / ml) with IC50 = 27 (µg / ml) for Vit-E reference compound. Also found IC50 = 373,45 (µg / ml) in ABTS methodwith IC50 = 37.79 (µg / ml) for Vit-E reference compound. As for the crude extract, we have found IC50 = 8.68 (µg / ml)in DPPH method with IC50 = 15.81 (µg / ml) of the Vit-E reference compound. From experimental results, we canconsider the Teucriumpolium L., a source of potent natural antioxidants[4].

Keywords: antioxidant activity; phenol; flavonoids; ABTS; DPPH; medicinal plant.

References

1. Raphael EC (2011) Traditional medicine in Nigeria: Current status and the future. Res J Pharmacol 5:
2. Bnouham M, Mekhfi H, Legssyer A, Ziyyat A (2002) Ethnopharmacology Forum Medicinal plants used in the treatment of diabetes in Morocco. Int J Diabetes Metab 10:33–50
3. Uritu CM, Mihai CT, Stanciu G-D, et al (2018) Medicinal plants of the family Lamiaceae in pain therapy: A review. Pain Res Manag 2018:
4. Pokorny J, Yanishlieva N, Gordon MH (2001) Antioxidants in food: practical applications. CRC press

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Development, characterization and application of efficient electrocatalysts in fuel cells

Benaissa Asmaa [b*], Gabouze Noureddine[b], Hamitouche Houria[a] and Issaadi Rachid[a]

[1] *Department of Process Engineering, University of Blida 1, Blida –Algeria*
[2] *Semiconductor Technology Research Center for Energy (CRTSE), Algiers, Algeria.*

* *Corresponding author.*Tel.: +213 779 630 230
E-mail address: benaissa.esmaa@gmail.com

ABSTRACT

It is well-known that fossil fuel reserves are rapidly depleted with the progressive demand for energy. At the same time, the environmental impacts related to their use, which are directly linked to the problem of climate change and the emission of greenhouse gases, make the task of searching for a viable alternative fuel and develop new energy conversion devices both essential and urgent. In fact, one of the promising alternatives envisaged is biodiesel, a biodegradable, green and non-toxic fuel. Currently, biodiesel is mainly produced through the transesterification of animal fats or vegetable oils, yielding 10% by weight of crude glycerol as a by-product. Although glycerol is used as a feedstock in the food, polymer, cosmetic and pharmaceutical industries, its production is still much higher than its global demand. Clean electrochemical technologies have proven to be a very interesting way to diversify the uses of surplus glycerol in the biodiesel industry due to their versatility, simplicity and low cost. Among the electrochemical configurations used for the valorization of glycerol, there is the "fuel cell" which can generate both high value compounds and electrical energy by the oxidation of glycerol at the anode and the reduction of oxygen at the cathode. In this context, we are interested in developing efficient, low cost and naturally available non-noble metal based electrocatalysts for application in fuel cells using glycerol as fuel. Different experimental techniques are used: electrochemical (cyclic voltammetry, chronoamperometry, etc.), and physicochemical such as Scanning Electron Microscopy, X-ray Diffraction, Energy Dispersive X-ray Spectroscopy, etc.

Keywords: valorisation; glycerol; electro-oxidation; electrocatalysis.

References

1.L.M. Palma,T.S. Almeida, A.R. De Andrade, High catalytic activity for glycerol electrooxidation by binary Pd-based Nanoparticles in alkaline media, the electrochemicalsociety, 58 (1) (2013)651-661.
2. A.Zalineeva, S.Baranton, C.Coutanceau, How do Bi-modified palladium nanoparticles work towards glycerol electrooxidation? An in situ FTIR study.Electrochimica Acta 176 (2015) 705–717.
3. RegianiM.L.M. Sandrini, Juliane Renata Sempionatto, Enrique Herrero, Juan M. Feliu,Janaina Souza-Garcia, Camilo A. Angelucci, Mechanistic aspects of glycerol electrooxidation on Pt(111) electrode in alkaline media, Electrochemistry Communications 86 (2018) 149–152

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Total phenolic content, antioxidant and anti-Inflammatory of Unripe Fruit of *Pistacia atlantica* aqueous extract

Mokhtar Benmohamed [1]*, Sihem Boubekeur [2], Mohammed Messaoudi [3,4], Wafa Zahnit [5], Mohamed Harrat[1],Hamza Oukouak[4], Naima Benchikha [4], Mohamed Yousfi [1].

1.Laboratory of Fundamental Sciences, University Amar Télidji of Laghouat, Po. Box. 37G, Road of Ghardaïa, (03000) Laghouat, Algeria; msbm1447@gmail.com
2.Research and Development Centre RDC-SAIDAL, 35 Benyoucef Khattab Avenue, P.o. Box 16000, Mohammadi, El-Harrah, Algiers, Algeria
3.Nuclear Research Centre of Birine, P.o. Box 180, Ain Oussera, 17200 Djelfa, Algeria
4.Chemistry Department, University of Hamma Lakhdar El-Oued, B.P.789, 39000, Algeria
5.Laboratoire de Valorisation et Promotion des Ressources Sahariennes (VPRS), Département de Chimie, Faculté des Mathématiques et des Sciences de la Matière, Université de Ouargla, Algeria
* *Corresponding author.*Tel.: 0661915115
E-mail address : *msbm1447@gmail.com*

ABSTRACT
Pistacia Atlantica in folk medicine is used by traditional healers from Algeria for treating a wide variety of diseases and conditions including dyspepsia, digestive problems, peptic ulcer, and especially inflammatory diseases [1, 2]. The aim of the present study was to assess the phytochemical composition, in vitro antioxidant activities (using a method, 2,2-diphenyl-1-picrylhydrazyl (DPPH•)), and in vivo anti-inflammatory of the unripe fruit extracts of Pistacia atlantica from different parts of Djelfa regions of Algeria. According to the findings, various aqueous extracts exhibited significant antioxidant . the result obtained, revealed significant anti-inflammatory activities. Data generated would be a valuable source of information for the pharmaceutical industry and medical research. These results suggest that unripe fruit of Pistacia atlantica extracts have the potential to be utilized across a wide range of contexts as an agent with multifunctional uses, as well as a natural remedy for other physiological diseases[3, 4]

Keywords: Pistacia atlantica**;** Unripe fruit; Antioxidant activity **;** total phenol**;** anti inflammatory

References

1. Topçu G, Ay M, Bilici A, et al (2007) A new flavone from antioxidant extracts of Pistacia terebinthus. Food Chem 103:816–822
2. Ahmed Z Ben, Yousfi M, Viaene J, et al (2021) Four Pistacia atlantica subspecies (atlantica, cabulica, kurdica and mutica): A review of their botany, ethnobotany, phytochemistry and pharmacology. J Ethnopharmacol 265:113329
3. Begaa S, Messaoudi M (2019) Toxicological Aspect of Some Selected Medicinal Plant Samples Collected from Djelfa, Algeria Region. Biol Trace Elem Res 187:301–306. https://doi.org/10.1007/s12011-018-1365-3
4. Belyagoubi L, Belyagoubi-Benhammou N, Atik-Bekkara F, Coustard JM (2016) Effects of extraction solvents on phenolic content and antioxidant properties of Pistacia atlantica Desf fruits from Algeria. Int Food Res J 23:

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Electrodeposition of ZnO/FTO layers from solutions with different concentrations of zinc precursor: Characterization and photocatalytic tests.

Foudil Rahal[1,2,*], Djamila Abdi[2], Belgassim Boutra[3], Wassila Yazid[3], A.arrahmane Berchi[2], Nacer Chaabia[2,4]

[1]*Département de chimie, Faculté des sciences, Université Mouloud Mammeri, Tizi-Ouzou, Algérie*

[2]*Laboratoire d'énergétique et d'électrochimie du solide, U.F.A. Sétif 1, 19000, Algérie*

[3]*Unité de Développement des Equipements Solaires, UDES/CDER, Bou Ismail, Tipaza 42415, Algérie.*

[4]*Département de chimie, Faculté des sciences, Université Hamma Lakhdar, Eloued, Algérie*

* *Corresponding author*.Tel.: 0662 08 00 43

E-mail address: *foudil.rahal@ummto.dz*

ABSTRACT:

ZnO films from solutions with different concentration of zinc precursor were deposited on fluorine-doped tin oxide (FTO) substrates, electrochemically using the chronoamperometry technique at a temperature of 70°C.

Characterization by the X-ray diffraction (XRD) method revealed the hexagonal crystal structure of Würtzite type for all the films with a preferential orientation along the (002) axis [1]. The morphology of the deposits was studied by the scanning electron microscope; there we can see nanometric rods of hexagonal shape perpendicular to the c axis, which confirmed the result obtained by the XRD method. The photoelectrochemical performance was evaluated in a three-electrode electrochemical cell driven by a potentiostat-galvanostat using K_2SO_4 0.1M as supporting electrolyte, this method showed the photo-active character of an n-type semiconductor for all films.

Solar photocatalysis tests on brilliant blue have given encouraging results for certain films.

Keywords: zinc oxide, precursor solution, electrodeposition, photocatalysis.

References

1. O. GARCIAMARTINEZ, R. ROJAS, E. VILA, J. DEVIDALES, "Microstructural characterization of nanocrystals of ZnO and CuO obtained from basic salts", https://doi.org/10.1016/0167-2738(93)90142-P, Solid State Ionics. 63–65 (1993) 442–449.

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Phytochemistry and antibacterial activity of essential oils from the leaves of Juniperus oxycedrus ssp, at the fruiting stage, growing in Oum El Bouaghi (semi-arid zone).

Bassa Nora *, Abdelaziz Ouided, Senoussi Mohamed Mourad, and Zellagui Amar

Laboratory of Biomolecules and Plant Amelioration, Larbi-Ben-M'hidi, University of Oum El Bouaghi, BP 358, Constantine Road, 04000, Algeria

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* *Corresponding author.*Tel.: 0664845145
E-mail address: *norbassa@yahoo.fr*

ABSTRACT

Leaf essential oils (EOs) of *Juniperus oxycedrus* (Cupressaceae) wild grown in the region of Oum El Bouaghi (semi- arid area) in Algeria have been analysed by GC-MS. Fifty seven compounds were identified in the leave oils. The leaf oils were mainly composed of 5-Tetradecen-1-ol, acetate, (Z) - (12.9%) ç-Murolene (9.1%), α-Cadinol (5.1%) (ñ)-Cadinene (3.9 %) and some other compounds which were only present in minor amounts. The antimicrobial activity of the essential oils were evaluated by the disc diffusion method and tested against Gram-negative Escherichia coli, Pseudomonas aerogenosa and Gram-positive Staphylococcus aureus bacteria. Results showed that Staphylococcus aureus was the highly resistant to the essential oil.

Keywords: Antibacterial activity; Chemical composition; Essential oil; GC/MS; *Juniperus oxycedrus* ssp. macrocarpa L; Oum El bouaghi.

References

1. Rubiolo P., Sgorbini B., Liberto E., Cordero C., Bicchi C. (2010). Essential oils and volatiles: sample preparation and analysis. *Flavour & Fragrance J., 25*, 282-290.
2. Burt S. (2004). Essential oils: their antibacterial properties and potential applications in foods – a review. *Int. J. Food Microbiol., 94*,223-253.
3. Elhoussine D., Rachida C. (2011). Identification of the volatile constituents of the essential oil of *Juniperus oxycedrus* (Cupressaceae) from the north centre region of Morocco. Asian Journal of Pharmaceutical and Clinical Research, 4:50-54.
4. Fadel H., Benayache F., Chalchat J.-C., Figueredo G., Chalard P., Hazmoune H., Benayache S. (2019). Essential oil constituents of *Juniperus oxycedrus* L. and *Cupressus sempervirens* L. (Cupressaceae) growing in Aures region of Algeria. Natural Product Research, 1–5.
5. Nejia H., Séverine C., Jalloul B., Mehrez R., Stéphane C. J. (2013). Extraction of essential oil from *Cupressus sempervirens*: comparison of global yields, chemical composition and antioxidant activity obtained by hydrodistillation and supercritical extraction. Nat Prod Res. 27(19): 1795–1799.

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Modeling of the adsorption kinetics of a continuous process for the elimination of fluorides by electrocoagulation

Tounsi Hanane[a]*, Chaabane Toufik[b] ,Hecini Mouna[a], Darchen André[c], Sivasankar Venkataraman[d]

[a]*Research Center in Semiconductor Technology for Energy (CRTSE), 2 Boulevard Frantz Fanon, BP 140, Alger – 7 Merveilles, 16038, Algeria*

[b]*University of Science and Technology Houari Boumediene (USTHB), BP 32 El-Alia, 16111, Bab Ezzouar, Algiers, Algeria*

[c]*Institute of chemical Sciences of Rennes, ENSCR, 11 Allee de Beaulieu, CS 50837, 35708 RENNES Cedex 7, France*

[d]*Post Graduate and Research Department of Chemistry, Pachaiyappa's College (Affiliated to University of Madras), Chennai 6000 030, Tamil Nadu, India.*

* *Corresponding author.*Tel.: 00213 554736205
E-mail address: tounsi_hanane@hotmail.fr

ABSTRACT

Batch electrocoagulation experiments (BEC) are always treated as batch adsorption experiments, with the notable difference that the adsorbent is added continuously as soon as it is formed by dissolution of the anode [1].
The objective of a continuous EC is to work under steady-state operating conditions. Thus, the behavior of a continuous EC treatment cannot be modeled as an ECB. Depending on the experimental conditions, the steady state is reached more or less quickly, which creates two situations with different modeling treatments.

A set of rate constant results have been obtained for the elimination of fluoride, assuming that these eliminations follow second-order kinetics. The results are between 0.94 and 2.29 $L.g^{-1}$ min^{-1}. For BEC, the elimination of fluoride anions, alone and in the presence of arsenic, follows a pseudo-second-order model with rate constants of 0.014 and 0.006 $L \cdot mg^{-1}$. min^{-1} (where 14 and 6 L. g^{-1}. min^{-1}) respectively. Synthetic groundwater fluoride removal yields decaying rate constants between 62.9 and 5.3 $L.g^{-1}$. min^{-1} when the fluoride anion concentration increases from 3 to 12 mg. L^{-1} .

Keywords: Modelization; Fluoride; Continuous electrocoagulation; adsorption kinetic.

References

1. Tounsi H, Chaabane T, Omine K, Sivasankar V, Sano H, Hecini M, Darchen A. Electrocoagulation in the dual application on the simultaneous removal of fluoride and nitrate anions through respective adsorption/reduction processes and modelling of continuous process. Journal of *Water Process Engineering*. 2022. http://dx.doi.org/10.1016/j.jwpe.2022.102584

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Ultrasound- promoted green synthesis under $Cs_5HP_2W_{18}O_{62}$ catalysis of a series of *N*-cyclic imides substituted benzenesulfonamide

Bougheloum Chafika [a]* Belghiche Robila [b] and Messalhi Abdelrani [a]

[a] *Advanced Materials Laboratory, Chemistry Department, Badji Mokhtar University, Annaba, Algeria*
[b] *Chemistry Inorganic Materials Laboratory, Chemistry Department, Badji Mokhtar University, Annaba, Algeria*

* *Corresponding author.*Tel.: 0773683286
E-mail address: c_bougheloum@yahoo.fr

ABSTRACT

In the last few decades, the chemistry of cyclic imide substituted systems has received attention owing to their pharmacological and biological activities. These compounds have been described to exhibit a wide range of biological activities such as antibacterial, antifungal, analgesic, anti-stress agents [1-3] among others.
Moreover, the incorporation of benzenesulfonamide moiety into organic molecules has a potential to modify the bioactivities [4].
Also, a considerable interest in the use of solid acids as heterogeneous catalysts in organic synthesis. Heteropolyacids type Dawson are certainly one of these solids that have been effectively used as catalysts in various organic transformations, because of their easy work-up procedures, easy filtration, minimization of cost and recycling of these catalysts [5,6].
Indeed, in this work we describe the condensation of some arylsulfonyl chloride derivatives, diamine and various substituted cyclic anhydrides in one step in the presence of a catalytic amount of heteropolyacid $Cs_5HP_2W_{18}O_{62}$ under ultrasound irradiation.
The reaction leads to the substituted-benzenesulfonamide derivatives containing cyclic imide moiety with good yields, after examining the model reaction in different conditions.

Keywords: $Cs_5HP_2W_{18}O_{62}$; Catalyst; Cyclic imides; Benzenesulfonamides; Ultrasound.

References

1. López S, Sortino M, Escalante A, de Campos F, Corre R, Cechinel Filho V, Zacchino S. Antifungal properties of novel N-and α, β-substituted succinimides against dermatophytes. Arzneimittelforschung, 2003; 53;4: 280-288.
2. Sortino M, Garibotto F, Cechinel V, Gupta M, Zacchino S. Antifungal, cytotoxic and SAR studies of a series of N-alkyl, N-aryl and N-alkylphenyl-1, 4-pyrrolediones and related compounds. Bioorganic & medicinal chemistry, 2011; 19; 9: 2823-2834.
3. Badru R, Anand P, Singh B. Synthesis and evaluation of hexahydropyrrolo [3, 4-d] isoxazole-4, 6-diones as anti-stress agents. European journal of medicinal chemistry, 2012; 1;48: 81-91.
4. Supuran C, Casini A, Scozzafava A. Protease inhibitors of the sulfonamide type: anticancer, antiinflammatory, and antiviral agents. Medicinal Research Reviews, 2003 ; 23;5: 535-558.
5. Arabi M, Amini M, Abedini M, Nemati A, Alizadeh M, Esterification of phthalic anhydride with 1-butanol and 2-ethylhexanol catalyzed by heteropolyacids. Journal of Molecular Catalysis A: Chemical, 2003; 200;2: 105-110.
6. Romanelli G, Bennardi D, Autino J, Baronetti G, Thomas H. A simple and mild acylation of alcohols, phenols, amines, and thiols with a reusable heteropoly acid catalyst ($H_6P_2W_{18}O_{62}$). E-Journal of Chemistry, 2008; 5:3: 641-647.

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Adsorption of 2,4-dichlorophenol on Mg2-Al Lamellar double hydroxide Kinetic and thermodynamic study

Noureddine Rouahna[1*], Abdelkader Ouakouak [1,2], Mariem Merah [1], Nassira Ammari [1]

1- Faculty of Science and Technology, University of El Oued, PO Box 789, El Oued, 39000, Algeria .
2- Research Laboratory in Subterranean and Surface Hydraulics, University of Biskra, PO Box 145 RP, Biskra, 07000, Algeria

* *Corresponding author.*Tel.: 0549828175
E-mail address: rouahna2003@yahoo.fr

ABSTRACT

The work deals with the preparation of Mg2-Al-LDH anionic clay by co-precipitation method with Mg/Al ratio equal to 2. Subsequently, the synthesized LDH phases was employed as adsorbent to remove 2,4-dichlorophenol (2-4 DCP) ions in aqueous solutions. The prepared LDHs were characterized by various analyses including N2 adsorption/desorption, Fourier transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), and pH of point zero charge (pHPZC). The effect of stirring time, initial pH, initial concentration of adsorbate and temperature was studied in batch adsorption system.

Results show that the prepared material corresponds to typical Mg-Al-CO3 phase with a single crystalline phase. Kinetic data are well described by the pseudo-second order model and indicate that the studied LDHs are efficient in removing 2-4 DCP. It was also found that the adsorption mechanism is significantly affected by the pH value and temperature. The isotherm study reveals that the Dubinin-Radushkevich model best fit the equilibrium data.

Keywords: Mg2-Al-LDH, adsorption, 2,4-dichlorophenol, kinetic, isotherm

References

1. Bo Z., Wenwen L., Dejun S., Yujiang L.,Tao W. Hollow nanoshell of layered double oxides for removal of 2,4- dichlorophenol from aqueous solution: Synthesis, characterization, and adsorption performance study. Colloids and Surfaces A 561 244–253(2019).
2. Kahina B. , Zohra B. , Kheira C. , Abdelouahab N. , Ulrich M. Enhanced adsorption of 2,4-dichlorophenol from aqueous solution using modified low cost Algerian geomaterial. Journal of the Taiwan Institute of Chemical Engineers 80 578–588 (2017).
3. Milad G., Jahan Bakhsh R., Saeed M. Template-directed synthesis of zeolitic imidazolate framework-8 derived Zn–Al layered double oxides decorated on the electrochemically anodized nanoporous aluminum substrate for thin film microextraction of chlorophenols followed by determination with high-performance liquid chromatography. Journal of Chromatography A 1656 462550(2021).

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Sensitive detection of bisphenol A in water, based on an electrochemical aptasensor

Imen Kazane [a,b] , Karine Gorgy[a],Chantal Gondran[a], Nicolas Spinelli[a], Ali Zazoua[b], E. Defrancq[a], Serge Cosnier[a]

[a]*Département de Chimie Moléculaire, UMR CNRS 5250, Université Grenoble Alpes, B. P. 53, 38041 Grenoble cedex 9, France*

[b]*Université de Jijel, Laboratoire d'énergétique appliquée et de matériaux, BP 98, Ouled Aissa, 18000 Jijel, Algeria.*

** KAZANE Imen.Tel.: 213556792710*

E-mail address: kazaneimen@univ-jijel.dz

ABSTRACT

Bisphenol A (2,2-bis(4-hydroxyphenyl)propane, BPA)[1] is a monomer used in the industry for the production of polycarbonate and epoxy and polystyrene resins[2]. Due to the ability of BPA to mimic both the structure and function of the 17-β estradiol hormone,[3-4]it has been identified as an endocrine disruptor. As a consequence, due to its toxicity, it is really important to develop sensitive and easy methods to quantify this organic compound. Aptasensors are analytical devices that answer very well to these challenges. We designed an electrochemical highly sensitive aptasensor based on electropolymerized poly(pyrrole-nitrilotriacetic) acid film , onto vitreous carbon, which is the first step of the design of the aptasensor. The second stage is the immobilisation of a new aptamer functionalized by a pentahistidine peptide which is followed by the bisphenol A recognition step. Each step was successfully characterized by electrochemical methods as square wave voltammetry (SWV) and electrochemical impedance spectroscopy measurements (EIS). The designed label-free impedimetricaptasensor displayed a linear range from 10^{-11} to 10^{-6}mol L^{-1} with a sensitivity of 372 Ω per unit of log of concentration[5]. Besides the aptasensor has an excellent specificity towards interfering species as 4,4'-dihydroxybiphenyl and bisphenol P.

Keywords: Aptamer, aptasensor, bisphenol A, EIS, SWV.

References

1. Staples, C. A.; Dome, P. B.; Klecka, G. M., Oblock, S. T.; Harris, L. R. *Chemosphere*1998, *36*, 2149-2173.
2. Le, H.H.; Carlson, E.M.; Chua, J.P.; Belcher, S.M. *Toxicol Lett*. 2008, *176*, 149-156.
3. Miyakoshi, T.; Miyajima, K.; Takekoshi, S.; Osamura, R. Y. *ActaHistochem. Cytochem.*2009, *42*, 23–28.
4. Olea, N.; Pulgar, R.; Perez, P.; Olea-Serrano, F.; Travis, A.; Novillo-Fertrell, A.; Pedraza, V.; Soto, A. M.; Sonnenchein, C. *Environ. Health Perspect*.1996, *104*, 298-305.
5. Hiroi, H.; Tsutumi, O.; Momoeda, M.; Takai, Y.; Osuga, Y.; Takeni, Y. *Endocr. J*.1999, *46*, 773-778.

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Adsorption of strontium (II) ions from aqueous solution by bottom ash of expired drug incineration: Parametric, kinetics and thermodynamic studies

Abdelkarim BRAHIMI [a]*, Nabila BOUCHERIT [b] Abdelkader OUANEZAR[a], Rahima LAMOURI[a] and Nabila KACI[a]

[a] *Nuclear Research Center of Birine (CRNB), COMENA ,BP180 Ain Oussera , Djelfa, Algeria.*

[b] *Laboratoire de BioMateriaux et de Phénomènes de Transport, Université de Médéa. Pôle Urbain 26000. Medea.*

* *Corresponding author*.Tel.: +213659738437
E-mail address:abdelkarim.brahimi@crnb.dz / ak.brahimi72@gmail.com

ABSTRACT

Bottom Ash of Expired Drug Incineration (BAEDI) is used in this study for the removal of Sr (II). Batch adsorption experiments are carried out to study the effect of various parameters on the adsorption efficiency of strontium ions on BAEDI. Parameters such as pH of solution, dose of the adsorbent(r), initial concentration of Sr^{2+}, temperature of the solution, contact time and stirring speed are studied. The kinetic data obtained for the adsorption process are analyzed through the different models. Two models are tested on the results obtained: the pseudo-first order and pseudo-second order model. The calculation of thermodynamic parameters (ΔG^0), (ΔH^0), and (ΔS^0) is essential in determining the nature of the adsorption process. The optimum values of elimination are obtained at: (pH = 6, r = 2 g l^{-1}, agitation speed=300 rpm) and equilibrium is established during 30 min under an ambient temperature of 293 K.
Statistical analysis and parameters obtained in the kinetic study show that the model of pseudo-second order fit the data.
The values of the thermodynamic parameters obtained suggest that the process is endothermic, spontaneous and with a raised affinity for Sr^{2+}. Adsorption on BAEDI is physical and limited by diffusion.
The adsorption of Sr^{2+} on BAEDI is proposed by two successive steps. Each of these steps can control the phenomenon of binding of Sr^{2+} to the active sites of BAEDI. The first step (External diffusion) which corresponds to the transfer of Sr^{2+} from the liquid phase to the external surface of the BAEDI. In the second step (Internal diffusion) the Sr^{2+} moves from the external surface to the active sites of the BAEDI. In this step an electrostatic attraction can take place between the active sites of BAEDI (The main species expected to form anions such as: Cl, S, P) and the Sr^{2+} ions.
Keywords: BAEDI, Strontium, Parametric, kinetics model

References

1. Brahimi A, Mellah A, Hanini, S .Adsorption of strontium (II) ions from aqueous solution onto bottom ash of expired drug incineration. Journal of Radioanalytical and Nuclear Chemistry (2021), 330,929-940.
2. Benzaoui T, Selatnia A, Djabali D. Adsorption of copper (II) ions from aqueous solution using bottom ash of expired drugs incineration. Adsorpt Sci Technol (2018), 36: 114-129.
3. Brahimi A. (2021). Etude expérimentale et identification du processus de sorption des métaux toxiques issus des effluents liquides. Thèse de doctorat .Université Yahia Farés de Médéa.

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Comparison of the inhibitory effect of three water on the oxalo-calcic crystallization in vitro study

Bencheikh Wahiba[a]* and Bensatal Ahmed[b]

[a]*Department of Biology, Badji-Mokhtar University, Annaba, Algeria*

[b]*Department of Chemistry, Ziane Achour University, Djelfa, Algeria*

* *Corresponding author*.Tel.: +213664049915
E-mail address: siencedevie@yahoo.fr

ABSTRACT

The purpose of this paper is to investigate the inhibitory effect of three waters: water from hammam El-Charef, water from hammam Zelfana, and Zamzam water, on the crystallization of calcium oxalate using a spectrophotometric method. Following an assessment of water physiochemical analyses, we initiated crystallization by combining sodium oxalate and calcium chloride solutions, then monitor crystallization stages with a UV/VIS spectrophotometer. In the second part, induce crystallization and add inhibitors in varying concentrations (10, 50 & 100%). This allows us to compare the turbidimetric slopes without and with inhibitors, and it has been demonstrated that Zamzam water is the most effective inhibitor by 70.47%. Also, by comparing the photographs without and with inhibitors, we can conclude that Zamzam water acts at the growth stage, whereas the other two water act at the aggregation stage. The remarkable effect of these waters on the formation of oxalo-calcic crystals is due to their high concentration of mineral salts that act as crystallization inhibitors, such as magnesium (14.6 mg/L) iron (0.11 mg/L) and, sulfates (518.4 mg/L). The findings of our pilot study could help us reduce the formation and recurrence of oxalo-calcic stones using alkaline Zamzam water.

Keywords: Calcium-Oxalate; Hydrotherapy; Kidney Stones; Spectrophotometer; Urolithiasis.

References

1. Al-Ghamdi S. Inhibition of calcium oxalate nephrotoxicity with Zamzam water. *Open Journal of Preventive Medicine*. 2012, 2, 67-71. DOI: 10.4236/ojpm.2012.21010
2. Bensatal A., Ouahrani MR. Inhibition of crystallization of calcium oxalate by the extraction of *Tamarix gallica* L. *Urol Res*. 2008, 36:283–287. DOI: 10.1007/s00240-008-0157-1
3. Butterweck V, Khan SR. Herbal medicines in the management of urolithiasis: alternative or complementary? planta Med. 2009, 75: 1095–1103. DOI: 10.1055/s-0029-1185719
4. Grases F, Costa-Bauza A, Prieto MR. Renal lithiasis and nutrition. *Nutrition Journal*. 2006, 5:23. DOI: 10.1186/1475-2891-5-23
5. KAVANAGH JP, JONES L, RAO PN. Calcium oxalate crystallization kinetics studied by oxalate-induced turbidity in fresh human urine and artificial urine. Clinical Science. 2000, 98, 151–158.
6. Munoz J A, Valiente M. Effects of trace metals on the inhibition of the calcium oxalate crystallization, *Uro Res*. 2005, 33: 267-272. DOI: 10.1007/s00240-005-0468-4
7. Safa El-dean S.Nema. Co-incidental urolithiasis in patients with gall stones, *Thi-Qar Medical Journal TQMJ*. 2008, 2; (1): 51-62.
8. Siener R, Hesse A. Fluid intake and epidemiology of urolithiasis, European Journal of Clinical Nutrition 57, Suppl 2. 2003, S47–S51. DOI: 10.1038/sj.ejcn.1601901
9. Siener R, Jahnen A, Hesse A. Influence of a mineral water rich in calcium, magnesium and bicarbonate on urine composition and the risk of calcium oxalate crystallization. *European Journal of Clinical Nutrition*. 2004, 58, 270–276. DOI: 10.1038/sj.ejcn.1601778

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Treatment of water polluted by methylene blue using the method of adsorption by activated carbon prepared from the nucleus of the olive

khiouani adel [a]*

[a] *chemistry department, University Batna 1, Laboratory Materials Chemistry and Living: Activity & Reactivity (LCMVAR)*

* *Corresponding author khiouani adel.*Tel.: 0663915195
E-mail address: adel.khiouani@univ-batna.dz

ABSTRACT

pollution is one of the problems that humans face, and by entering the industry advanced stages, pollution in the ocean has increased, and we mention water pollution by some of the colorants used by some factories, and in this work we will treat the water from pollution by using methylene blue[1-3].

This treatment is done by activated carbon prepared from nucleus of the olive. The activated carbon previously prepared performs the adsorption process for methylene blue . We will also study the factors affecting the treatment process and begin to study the effect of methylene blue concentration (the concentration of the adsorbent material)[4-6].

We study the effect of the amount of activated carbon (the amount of adsorbent), after we study the effect of the type of middle in which the treatment takes place(the pH value on the treatment process) . After studying all these effects, we choose the best results and conditions in which the water is treated from this polluant.

Keywords: pollution; activated carbon; methylene blue; olive; adsorbent.

References

1. Chakraborty A, Deva D, Sharma A, Verma N. Adsorbents based on carbon microfibers and carbon nanofibers for the removal phenol and lead from water" J Colloid Interface Sci. 2011, 359, (1):228-39.
2. Sulaymon, A.H., Ahmed, K.W., 2008. Competitive adsorption of furfural and phenolic compounds onto activated carbon in fixed bed column. Environ. Sci. Technol. 42, 392– 397.
3. Medina, F. M. O.; Aguiar, M. B.; Parolo, M. E.; Avena, M. J. Insights of Competitive Adsorption on Activated Carbon of Binary Caffeine and Diclofenac Solutions. J. Environ. Manage. 2021, 278, 111523 DOI: 10.1016/j.jenvman.2020.111523.
4. Langmuir, I., J. Am. Chem. Soc., 40, 1361(1918).
5. Freundlich, H. M. F., Z. Phys. Chem., 57, 385(1906)
6. Temkin, M. I. and Pyzhev, V., Acta Physiochim., 12, 327(1940).

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Box–Behnken optimization of anionic azo dye biosorption by chitosan/illite kaolinite composites from aqueous solutions: Kinetic and equilibrium investigations

Ammar ZOBEIDI [a, b]* Salah NEGHMOUCHE NACER[a], Djamal ATIA [a], Abasse KAMARCHOU[b]and Salem ATIA [b]

[a]*Department of Chemistry, Faculty of Exact Sciences, EchahidHammaLakhdar University El Oued, P.O. Box 789,El Oued, 39000, Algeria.*

[b]*Pollution& Waste Treatment Laboratory (PWTL), Kasdi Merbah University Ouargla, P.O. Box 511, Ouargla, 30000, Algeria.*

* *Corresponding author.*Tel.: +213660153939
E-mail address:zobeidi.aa@gmail.com

ABSTRACT

Response surface methodology (RSM)based on a three-variable and three-level Box–Behnken design was employed to interpret the adsorption characteristics of Congo Red (CR) anionic azo dye onto illite kaolinite/Chitosan (Ika/CTS) composites were prepared by a microemulsion process and characterized by FTIR, SEM, and EDS. Many pores and wrinkles were visible on the surface of the composites and provided a good condition for dye adsorption. The obtained results show that the fast CR removal (97.3%) may be achieved by loading 25% CTS into a matrix of (IKa/CTS-25) and at optimal adsorption operating settings (adsorbent dose of 0.04 g, solution of pH 7, temperature of 45°C, and contact duration of 120 min). At optimum conditions, the adsorption capacity was 90.09 mg/g. Freundlich isotherm and pseudo-second-order kinetic model were best. The results will be helpful for future up-scaling using novel materials as a low-cost adsorbent for removing anionic azo dyes.

Keywords: Illite kaolinite, Chitosan,Anionic dye, Response surface methodology, Adsorption.

References

1. Mabrouk S, Bebba AA, Kamarchou A, Zobeidi A, Adsorption capacity of pollutants by using local clay mineral from urban wastewater Touggourt (South-East Algeria). Asian Journal of Research in Chemistry. 2020;13(2):85-90.
2. Kamarchou A, Atia S, Zobeidi A, Chettah H, Benhamida S, Abdi D, et al. Study of zinc salt concentration effect on thegrowth of znonanostructured oxides obtained by direct electrodeposition. Chalcogenide Letters. 2022;19(7).
3. Y.-L. Liu, H. W. Walker, and J. J. Lenhart, The effect of natural organic matter on the adsorption of microcystin-LR onto clay minerals, Colloids and Surfaces A: Physicochemical and Engineering Aspects 583 (2019) 123964.
4. Tripathi, P., Srivastava, V. C., & Kumar, A. (2009). Optimization of an azo dye batch adsorption parameters using Box–Behnken design. *Desalination*, *249*(3), 1273-1279.
5. JAWAD, Ali H. et ABDULHAMEED, Ahmed Saud. Mesoporous Iraqi red kaolin clay as an efficient adsorbent for methylene blue dye: adsorption kinetic, isotherm and mechanism study. *Surfaces and Interfaces*, 2020, vol. 18, p. 100422.
6. MUBARAK, NurShazwani Abdul, JAWAD, Ali H., et NAWAWI, W. I. Equilibrium, kinetic and thermodynamic studies of Reactive Red 120 dye adsorption by chitosan beads from aqueous solution. *Energy, Ecology and Environment*, 2017, vol. 2, no 1, p. 85-93.
7. Zobeidi A, Bebba AA, Daouidi A, The Effects of Hydraulic Retention Time on Organic Loading Rate in Efficiency of Aerated Lagoons in Treating Rural Domestic Wastewater at El-Oued (South-East Algeria). Oriental Journal of Chemistry. 2017;33(4):1890-8.

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Determination of metals carried by TSPs in a suburban site of Algiers by nuclear techniques

Iazzourene Ghania [a]* and Hamioud Leila [b]

[a] Department of Agronomy, Faculty of Nature & Life Sciences and Earth Sciences,

University Akli Mohand Oulhadj, Bouira, Algeria

[2]Department of Physic, Faculty of Science and Applied Science, University Akli Mohand Oulhadj,Bouira, Algeria

* Iazzourene Ghania.Tel.: 0778086980

E-mail address:g.iazzourene@univ-bouira.dz

ABSTRACT

This study shows the levels of air pollution concerning the Total atmospheric Suspended Particles (TSP) and the mineral fraction which is conveyed by the latter in a suburban site, west of Algiers. The particulate sampling is performed by a low-flow sampler. The study shows that this suburban site, the air pollution by the TSP reached relatively low levels. We note that 76% of the levels found do not exceed the quality objective set by the Algerian regulations and the WHO (50µg/m3), therefore, the TSP pollution is tolerable, with an average of (40µg/m3). The analysis of metals associated with TSP by nuclear methods: Instrumental Neutron Activation Analysis (INAA) and the Energy Dispersive X-Ray Fluorescence (EDXRF) technique. INAA shows the presence of Cr, Pb, As, Ni, Fe, V, Zn, Mn, Se, Co, Sb, Ba, Br, Sc, Hf, Ce, Ca and Cu accusing relatively low values compared with limit values that regulate this form of pollution and the values published in the same line of research, but the inhalation of certain metals such as lead, chromium, nickel, arsenic, vanadium, manganese, cobalt and antimony even in small amounts may lead to toxic concentrations by accumulation effect in the body.

Keywords: Air pollution; TSPs; Metal; Nuclear techniques; suburban site.

References

1. Almeida SM, Pio CA, Freitas MC, Reis MA, Trancoso MA. Approaching PM2.5 and PM2.5-10 source apportionment by mass balance analysis, principal component analysis and particle size distribution. *Sci. Total. Environ*. 2006. 368**,** 663-674
2. Al-Merey R, Karajou J, Issa H. X-ray fluorescence analysis of geological samples: exploring the effect of sample thickness on the accuracy of results. *Appl. Radiat*. 2005, Isot 62-501.
3. Bernasconi G, Tajani A, Kregsamer P. Manual for QXAS/AXIL Version 3.5. Vienna, IAEA; 2000.
4. Hueglin C, Gehrig R, Baltensperger U. Chemical characterisation of PM2.5, PM10 and coarse particles at urban, near-city and rural sites in Switzerland. *Atmos. Environ. 2005.* **39,** 637-651
5. Viana M, Kuhlbusch TAJ, Querol X, Alastuey A, Harrison RM, Hopke PK. Source apportionment of particulate matter in Europe: a review of methods and results. *J. Aerosol Sci*. 2008. **10,** 827-849.

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Black Cumin Cake extract as an eco-friendly Corrosion Inhibitor on A9M Ordinary Steel in 0.5M H_2SO_4

Badreddine MAALEM[1,2], Sihem ABDERRAHMANE[1] and Kamilia MOUSSAOUI[1]

1 Surface Engineering Laboratory (L.I.S), Faculty of Sciences, BADJI Mokhtar -Annaba University.
2 Research Center in Industrial Technologies CRTI P.O.Box 64, Chéraga 16014 Algiers, Algeria.

* *Corresponding author.*Tel.: 00000000000000
E-mail address: bmaalem@gmail.com

ABSTRACT

Plant extracts are considered a source of green and environmental inhibitors due to their high efficacy, low cost, and non-toxicity to humans and the environment [1-4]. In this work, we used the black cumin cake (BCC) obtained, after cold mechanical extraction of its oil, as a corrosion inhibitor for ordinary steel A9M, in an acid medium 0.5M H_2SO_4. The cake powder (5 g) was dissolved with 50 ml of 0.5 M H_2SO_4 by maceration for 24 h. after centrifugation for 20 min at 4500 rpm. Then the filtrate obtained is collected and stored for later use. The methods used are Weight Loss Measurement (WLM); Electrochemical Impedance Spectroscopy (EIS); Potentiodynamic Polarization (PDP), UV-Vis spectroscopy, FTIR, and screening phytochemistry, and the caracterization of the surface with scanning electron microscopy (SEM). The maximum inhibitory efficiency is 95 % at 6.10-2 (v/v) BCCE and the micrographs obtained confirm the presence of an inhibitory film [5-7]. BCCE is an effective corrosion inhibitor. This allows us to conclude that the BCCE has a double effect, a good corrosion inhibitor of A9M steel in 0.5 M H_2SO_4, and a good agent of protection environment by recovering this waste.

Keywords: Black Cumin Cake; A9M; Inhibitor; Corrosion; H_2SO_4; EIS

References

1. R BOULMERKA and S ABDERRAHMANE; Opuntia ficus-indica as a durable and eco-friendly corrosion inhibitor on AISI 410 stainless steel in 0.5 M H2SO4, Bull. Mater. Sci. (2020) 43:242, https://doi.org/10.1007/s12034-020-02132-4.
2. Sameh. Athmani and Sihem. Abderrahmane, The synergistic inhibitive effect of Agave americana and iodide ions on the sulfuric acid corrosion of mild steel, IJCBS, 17(2020):-97-104
3. Khaled A. et al. , Vicia faba peel extracts bearing fatty acids moieties as a cost‑efective and green corrosion inhibitor for mild steel in marine water: computational and electrochemical studies, Scientifc Reports | (2022) 12:20611 | https://doi.org/10.1038/s41598-022-24793-3.
4. S. Belkaid et al., Garlic Extract as an Environmentally Corrosion Inhibitor of API X60 Carbon Steel and 316L Stainless Steel in Sulphuric Acid, https://doi.org/10.4152/pea.2022400403,
5. Yasemin _I C, Biosorption of Copper by a Natural By-product Material: Pressed Black Cumin Cakes, ANALYTICAL LETTERS https://doi.org/10.1080/00032719.2019.1700993.
6. Chandra Shekhar et al. , Ethanol extract of waste potato peels for corrosion inhibition of low carbon steel in chloride medium, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2020.12.368
7. Marwa Ben Harb et al. , Olive leaf extract as a green corrosion inhibitor of reinforced concrete contaminated with seawater, Arabian Journal of Chemistry, https://doi.org/10.1016/j.arabjc.2020.01.016.

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The Kinetic of biogas Production by an anaerobic co-digestion process : effect of ultrasonic pre-treatment in thermophilic phase

Bani.Kheiredine[a]*, Ghozlane Doha[b], Abderrezzak Somia[b]

[a] Laboratoire ReMeDD, University Constantine 3-Salah Boubnider, Constantine 25000, Faculty of Process Engineering, University Constantine 3-Salah Boubnider, Constantine 25000, Algeri

[b] University Constantine 3-Salah Boubnider, Constantine 25000, Faculty of Process Engineering, University Constantine 3-Salah Boubnider, Constantine 25000, Algeri

* *Corresponding author*.Tel.:00213662584890

E-mail address :bani.kheiredine@univ-constantine3.dz

ABSTRACT

In the current study, the biochemical methane potential test was carried out to estimate the biogas production from Olive mill waste by using an anaerobic digestion process in the thermophilic phase (T =55°C).
two kinetic models, including the modified Gompertz model, and Logistic (L) models.were used to simulate the methane yield results.These equations allow to represent curves of sigmoidal shape using three parameters Pot∞ , Rm and λ. The kinetic of methane production was calculated by performing a series of ultrasonic pretreatment out along the following exposure times: 2, 7, 12 and 17 min .
The cumulative methane production curves according to the regression of GM and LM of the ultrasound treatment test correspond exactly to the experimental values. The two Gompertz and Logistic1 models best represent the experimental results of the cumulative volume of methane produced from the incubation of vegetable water in the thermophilic phase over nearly the entire incubation interval for ultrasonic testing.Constants in both models were found out by using Modeling with Origin 2018 software gave values of R2≤ 0.98 in both Gompertz and logistic1 models. the latency time is more important in the logistic model.
The maximum production rate is higher for the logistic model with a value of 1.97 ml/gTVS.d for the S1 test (t=2min), but for the S0 test almost identical in both models.

Keywords: Methanisation; Ultrasonic pretreatment; Biodegradability; Olive mill was

References

1. Carrère, H., Valo, A., Bougrier, C., Loisel, D., Puyarena, J. et Garcia Bernet, D. Augmentation de la production de biogaz lors de la méthanisation de boues industrielles et urbaines : mise en œuvre d'un prétraitement de thermolyse, rapport de projet ADEME, convention n° 0275025, 71 p. (2004)

2. BarnabéS., Brar S.K., Tyagi R.D., Beauchesnel., SurampalliR.Y., .Pre-treatmentand bioconversionof wastewatersludgeto value addedproducts- Fateof endocrinedisrupting compounds.Scienceof theTotal Environment407,1,47T-88.2009.

3 Chen C., Wu P., Chung Y.-C., Coupled biological and photo Fentonpretreatment system for the removal of di-(2-ethylhexyl) phthalate (DEHP) from water. BioresourceTechnologyI 00, 4531-4534. https://doi.org/10.1016/j.biortech.2009.04.020.2009

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Removal of cationic dye from aqueous solution by adsorption process using local agricultural waste

Abdelali GHERBIA[a]* and Abdelmalek CHERGUI[b]

[a] *Department of Technical Sciences, University of Laghouat, Laghouat, ALGERIA*

[b] *Department of Environmental Engineering, National Polytechnic School, Algiers, ALGERIA*

* *Corresponding author.*Tel.: *+213 29 93 21 32*
E-mail address: abdelali98111@yahoo.fr

ABSTRACT

The objective of this study is to evaluate the adsorbent capacity of local agricultural waste (date stones: DS), to eliminate a cationic dye (methylene blue) as a pollutant from aqueous solution. The surface characteristics of DS such as surface morphology, (PZC) Point of Zero Charge and functional groups were characterized by (SEM) scanning electron microscope, (PT) acid-base potentiometric and (FTIR) Fourier transform infrared spectroscopy, respectively. Physical and chemical factors affecting adsorption such as contact time, mass of adsorbent, pH value and initial concentration of the solution were studied in batch system. Isotherm equilibrium data are well described by the Langmuir model. The maximal adsorption capacity was found to be 63.59 mgg^{-1}. The kinetic study indicates that the adsorption process of methylene blue follows the pseudo second order model. The results showed that date stones could be used as a low-cost material for the removal of cationic organic pollutants from aqueous solutions.

Keywords: wastewater; cationic dye; Adsorption; Isotherm; agricultural waste.

References

1. Rafatullah M, Sulaiman O, Hashim R., and Ahmad A. Adsorption of methylene blue on low-cost adsorbents: A review. J. Hazard. Mater., vol. 177, no. 1–3, pp. 70–80, 2010, doi: 10.1016/j.jhazmat.2009.12.047.
2. Utomo H D, Phoon R Y N, Shen Z, Ng L H and Lim Z B. Removal of Methylene Blue Using Chemically Modified Sugarcane Bagasse. Nat. Resour., vol. 06, no. 04, pp. 209–220, 2015, doi: 10.4236/nr.2015.64019.
3. Saha N, Volpe M, Fiori L, Volpe R, Messineo A and Reza M T. Cationic dye adsorption on hydrochars of winery and citrus juice industries residues: Performance, mechanism, and thermodynamics. Energies, vol. 13, no. 18, pp. 1–16, 2020, doi: 10.3390/en13184686.
4. Mosaa Z A, Bader A T, Aljeboree A M and Alkaim A. F. Adsorption and removal of textile dye (methylene blue mb) from aqueous solution by activated carbon as a model (apricot stone source waste) of plant role in environmental enhancement. Plant Arch., vol. 19, pp. 910–914, 2019.
5. Mashkoor F, Nasar A, Inamuddin, and Asiri A M. Exploring the reusability of synthetically contaminated wastewater containing crystal violet dye using tectona grandis sawdust as a very low-cost adsorbent. Sci. Rep., vol. 8, no. 1, pp. 1–16, 2018, doi: 10.1038/s41598-018-26655-3.
6. Savcı S, Yalvaç M, Kayaalp H, and Coşkun R. Adsorption of Methylene Blue From Aqueous Solution with Vermicompost Produced Using Banana Peel. Int. J. Mod. Eng. Res., vol. 7, no. July, 2017.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

The exploitation of the Peanut Shells wastes and converting into sustainable materials as low cost adsorbent that contributes to water pollutant sequestration.

Abdallah Reghioua [a]*, Mahmod A. Abdulqader [b], ALIA. Khaoula [c].

[a]*Fac. Technology, University of El Oued ,39000 El Oued, Algeria.*
[b]*Ministry of Oil, Oil Products Distribution Company(OPDC),Salahuldeen Branch, Tikrit, Iraq*
[c] *Department of Process and Petrochemical Engineering, Faculty of Technology, University of Echahide Hama Lakhder El Oued, Algeria..*

* *Corresponding author.*Tel.: (+ 213) 662 34 48 05
E-mail address: reghioua-abdallah@univ-eloued.dz

ABSTRACT

The removal of toxic organic pollutants like synthetic dyes are considered from industrial wastewater is very crucial for maintaining mankind as well as environmental safety. In this regard, this participation aims to the exploitation of the wastes of Peanut Shells (PS) disturbingly dispersed particularly in EL OUED's region (ALGERIA), and convert them into a renewable and sustainable product as a low-cost adsorbent that contributes to methylene blue (MB) dye uptake from aqueous solution. The adsorbent was characterized using BET, FTIR, SEM, and proximate analysis respectively. The equilibrium data were more consistent with the pseudo-second-order kinetic and Freundlich isotherm models, meanwhile, the Utmost monolayer capacity estimated from the Langmuir model was 291.5 for MB dye at 45 °C. Thus, the PS converted can candidate itself as a promising adsorbent for the uptake of the toxic cationic dye from the aqueous environment.

Keywords: Peanut Shells; Adsorption; Industrial wastewater; Methylene blue dye.

References

1. B. Acemio ̆glu, “Removal of a reactive dye using naoh-activated biochar prepared from peanut shell by pyrolysis process,International Journal of Coal Preparation and Utilization, vol. 42, no. 3, pp. 671–693, 2022.
2. A. Kausar, S. U. Rehman, F. Khalid, A. Bonilla-Petriciolet, D. I. Mendoza-Castillo, H. N. Bhatti, S. M. Ibrahim, and M. Iqbal, “Cellulose, clay and sodium alginate composites for the removal of methylene blue dye: Experimental and dft studies,” International Journal of Biological Macromolecules, vol. 209, pp. 576–585, 2022.
3. P. Ganguly and P. Das, “Integral approach for second-generation bio-ethanol production and wastewater treatment using peanut shell waste: yield, removal, and ann studies,” Biomass Conversion and Biorefinery, pp. 1–11, 2022
4. P. Du, L. Xu, Z. Ke, J. Liu, T. Wang, S. Chen, M. Mei, J. Li, and S. Zhu, “A highly efficient biomass-based adsorbent fabricated by graft copolymerization: Kinetics, isotherms, mechanism and coadsorption investigations for cationic dye and heavy metal,” Journal of Colloid and Interface Science, vol. 616, pp. 12–22, 2022.

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Adsorption of methylene blue from aqueous solution onto NaOH- modified date palm fibers

Laid Zeghoud[ab]*, Bachir Ben Seghir[ab], Hadia Hemmami[ab]

[a] *Department of Process Engineering, Faculty of Technology, University Hamma Lakhdar El Oued, 39000, Algeria.*

[b] *Renewable Energy Development unit in Arid Zones (UDERZA), University of El Oued, El Oued 39000, Algeria*.
* Corresponding author.Tel.: 06 66 46 10 16

E-mail address:elaid_zrd@yahoo.fr

ABSTRACT

In the present study, a new adsorbent based on hydroxylated date palm (DP) fibers was developed for the adsorption of methylene blue (MB) from aqueous solution. The prepared adsorbent material was characterized by infrared spectroscopy (FTIR) and scanning electron microscopy (SEM). The favorable adsorption conditions were selected by studying the contact time, initial concentration and temperature. The results indicated that the Langmuir isotherm model agrees very well with experimental adsorption data (R^2=0.983) with a maximum adsorption capacity 83.33 mg/g of (MB) at 25 ^{0}C. Additionally, Data of the adsorption kinetics follow the pseudo-second-order kinetics (R^2=0.998). On the other hand, the thermodynamics studies show that the adsorption process is spontaneous and endothermic.
Keywords: adsorption, methylene blue, palm date, kinetics, thermodynamics.

References

1. S.N. Jain, P.R. Gogate, Efficient removal of Acid Green 25 dye from wastewater using activated Prunus Dulcis as biosorbent: batch and column studies, J. Environ. Manag. 210 (2018) 226–238,
2. W. Zhang, H. Li, X. Kan, L. Dong, H. Yan, Z. Jiang, H. Yang, Bioresource technology adsorption of anionic dyes from aqueous solutions using chemically modified straw, Bioresour. Technol. 117 (2012) 40–47
3. J. Guo, B. Li, L. Liu, K. Lv, Removal of methylene blue from aqueous solutions by chemically modified bamboo, Chemosphere 111 (2014) 225–231
4. S.N. Jain, P.R. Gogate, Acid Blue 113 removal from aqueous solution using novel biosorbent based on NaOH treated and surfactant modified fallen leaves of Prunus Dulcis, J. Environ. Chem. Eng. 5 (2017) 3384–3394,
5. J. Yang, G. Hong, Adsorption behavior of modified Glossogyne tenuifolia leaves as a potential biosorbent for the removal of dyes, J. Mol. Liq. 252 (2017) 289–295
6. s.A.M. ˇ Memi´c, E.S.J. ˇ Sulejmanovi´c, Adsorptive removal of eight heavy metals from aqueous solution by unmodified and modified agricultural waste: tangerine peel, Int. J. Environ. Sci. Technol. 15 (2018) 2511–2518

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Extraction and characterization the cellulose from peanut shells and application in adsorption of Methylene Blue Dye from Aqueous Solutions.

TEREA Hafidha [a]* , SELLOUM Djamel[b] and REBIAI Abdelkrim[c]

[a]*Department of Process Engineering, University of KasdiMerbah, Ouargla 30000, Algeria.*
[b]*Department of Process Engineering, University of KasdiMerbah, Ouargla 30000, Algeria.*
[c]*Department of chemestry, University of El Oued 39000, Algeria.*

* *Corresponding author.*Tel.: 0656777053
E-mail address: terea.hadile88@gmail.com

ABSTRACT

This work revolves around recycling plant waste, extracting cellulose, and using it to remove organic pollutants from aqueous solutions.

In this study, we used peanut shells to extract pure cellulose, as these plant residues belong to the group of lignocellulosic products most abundant in nature. The purpose of its extraction is to reinvest the plant residues of peanut shells and improve their physical and chemical properties to become of high quality and economic value, in addition to applying them to remove methylene blue dye from previously prepared aqueous solutions. In this travel, we extracted cellulose from peanut shells by physical and chemical treatment until we obtained white and pure cellulose fibers with a yield of 31.81%. Then, the properties of the cellulose (Cs) from peanut shells were studied by the following techniques: X-ray diffraction (XRD), Fourier transform infrared (FTIR) spectroscopy, and scanning electron microscopy (SEM). The sorption of methyl bleu dye (BM) onto cellulose fibers (Cs) from aqueous solution were investigated as function of pH, contact time and temperature. The adsorption capacities of BM dye is 107.33 mg/g at (C0= 300 ppm, t= 75 min, pH =7) and room temperature with Qmax= 40.96mg/g. The Langmuir, Freundlich and temkin adsorption models were applied to describe the related isotherms. The pseudo first-order and pseudo second-order models were used to describe the kinetic sorption, the results have clearly showed that the adsorption of BM dye onto Cs followed the pseudo second-order model. The enthalpy (ΔH°), and entropy (ΔS°) changes of adsorption were calculated, the results indicated that the adsorption of BM dye occurs spontaneously as an exothermic process.

Keywords: Cellulose; Peanut shells; Characterization; Adsoption; BM.

References: /

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Extracting cellulose from agricultural waste and using it to remove organic pollutants from water

ALIA. Khaoula[*1,3], ATIA. Djamal[2]

[1] *Department of Process and Petrochemical Engineering, Faculty of Technology, University of Echahide Hama Lakhder El Oued, Algeria*

[2] *Department of Chemistry, Faculty of Exact Sciences, University of Echahide Hama Lakhder El Oued, Algeria*

[3] *Biotechnologie, biomatériaux et matériaux condenses*

* Corresponding author.Tel.: 0696202202

E-mail address: *alia-khaoula@univ-eloued.dz*

ABSTRACT

In recent decades, the technological development of modern life has released many pollutants, so scientists are facing two serious environmental problems, waste management and water pollution.

New methods and applications have been sought to reduce these problems. Efforts have focused on converting agricultural waste, which for decades has been treated as common waste, to generate by-products that show huge potential for use as a source of valuable and usable compounds. This is due to the wide variety of compounds found in organic waste, biopolymers, bioactive molecules, and extracted oils.

These residues are widely applicable in various sectors, such as the production of cellulose as a sustainable absorbent that can be extracted from banana peel, wood straw, bamboo, palm, wheat, flaxseed, peanut shell, potato peel, corn stalk, rice husk, pine nuts and husk. Oranges, garlic peel and many other agricultural wastes. And its use as an adsorbent, because adsorption has become the focus of attention for the removal of heavy metal ions from water and wastewater. Cellulose has been used to absorb some of the hazardous contaminants present at the water level such as chromium, nickel, copper, zinc, dyes, etc.

In this study, cellulose was synthesized from a number of plant residues, by a series of chemical reactions. Through another chemical reaction, the cellulose size becomes nanocellulose, this is to ensure a larger surface area and more absorption. To improve results, we've also infused cellulose with a nanotexture, for optimal absorbency. Finally, we tested the resulting substance on dyes and got good absorption results.

Keywords: Waste recovery, agricultural residues, water depollution, cellulose, adsorption.

References

1. Karić, Nataša, et al. "Bio-waste valorisation: agricultural wastes as biosorbents for removal of (in) organic pollutants in wastewater treatment." Chemical Engineering Journal Advances (2021).
2. Yu, Sujie, et al. "Nanocellulose from various biomass wastes: Its preparation and potential usages towards the high value-added products." Environmental Science and Ecotechnology 5 (2021).
3. Wang, Ruifeng, et al. "Removal of heavy metal ion cobalt (II) from wastewater via adsorption method using microcrystalline cellulose–magnesium hydroxide." International Journal of Biological Macromolecules 189 (2021).
4. Vincent, Sumi, and Balasubramanian Kandasubramanian. "Cellulose nanocrystals from agricultural resources: Extraction and functionalisation." European Polymer Journal 160 (2021).
5. Mohamed, Mohamad Azuwa, et al. "An overview on cellulose-based material in tailoring bio-hybrid nanostructured photocatalysts for water treatment and renewable energy applications." International journal of biological macromolecules 103 (2017).
6. Ganguly, Preetha, et al. "Valorization of food waste: Extraction of cellulose, lignin and their application in energy use and water treatment." Fuel 280 (2020).

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Montmorillonite K10 catalyzed synthesis of new 1-(substituted benzo[d]thiazol-2-yl) cyclic imide derivatives

Messalhi Abdelrani [a]* and Bougheloum Chafika [a]

[a]*Chemistry Department, Badji Mokhtar University, Annaba, Algeria*

* *Corresponding author.*Tel.: 0771622489
E-mail address: messalhi_abdelrani@yahoo.fr

ABSTRACT

Green chemistry is focused to the use of new chemical approaches to reduce waste and toxic effluents. Therefore, it can minimize damage to the environment and helps us to improve the quality of life. Thus the development of methods using montmorillonite K10 (MK10) as solid and green catalyst for fine organic synthetic processes related to fine chemicals, such as flavors, pharmaceuticals and food industries have been under attention in the last decade [1].
Heterocycles containing benzothiazole moiety and/or cyclic imides are of interest because they show some pharmacological and biological activities [2-6]. Considering the importance of these bioactive compounds, herein, we report a convenient procedure to synthesis of novel substituted benzothiazole derivatives, using a catalytic amount of montmorillonite K10 as acidic solid under ultrasound.

Keywords: Montmorillonite K10; Catalyst; Benzothiazoles; Cyclic imides; Ultrasound.

References

1. Okuhara T, Mizuno N, Misono M. Catalytic chemistry of heteropoly compounds. *Advances in catalysis.* 1996, 41; 7: 113-252.
2. Saeed S, Rashid N, Hussain, R, Jones, P. G. Synthesis, spectroscopic characterization, crystal structure and pharmacological properties of some novel thiophene-thiourea core derivatives. *European Journal of Chemistry*, 2010, *1*;3: 221-227.
3. Paramashivappa R, Kumar P, Rao S, Rao, A. S. Design, synthesis and biological evaluation of benzimidazole/benzothiazole and benzoxazole derivatives as cyclooxygenase inhibitors. *Bioorganic & medicinal chemistry letters*, 2003; *13*,4: 657-660.
4. Siddiqui N, Rana A, Khan A, Bhat M, Haque E. Synthesis of benzothiazole semicarbazones as novel anticonvulsants-The role of hydrophobic domain. *Bioorganic & medicinal chemistry letters*, 2007; *17*;15: 4178-4182.
5. Cechinel Filho V, Corrêa R, Yunes, R. Further studies on analgesic activity of cyclic imides. *Il Farmaco*, 1998; *53*; 1: 55-57.
6. Obniska J, Kaminsk, K, Skrzynska D, & Pichor, J. Synthesis and anticonvulsant activity of new N-[(4-arylpiperazin-1-yl)-alkyl] derivatives of 3-phenyl-pyrrolidine-2, 5-dione. *European journal of medicinal chemistry*, 2009; *44*;5: 2224-2233.

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Valorization of Bottom Ash of Expired Drug Incineration as adsorbent to remove strontium (II) ions from aqueous solution: Characterization studies

Abdelkarim BRAHIMI [a]*, Nabila BOUCHERIT [b], Fayçal REBHI [a] and Abderrahim MALKI [a]

[a] *Nuclear Research Center of Birine (CRNB), COMENA ,BP180 Ain Oussera , Djelfa, Algeria.*

[b] *Laboratoire de BioMateriaux et de Phénomènes de Transport, Université de Médéa. Pôle Urbain 26000. Medea*

* *Corresponding author*.Tel.: +213659738437
E-mail address:abdelkarim.brahimi@crnb.dz / ak.brahimi72@gmail.com

ABSTRACT

Bottom Ash of Expired Drug Incineration (BAEDI) is used in this study for the removal of Sr (II).The adsorbent is characterized using several methods of characterization and analysis .BAEDI is synthesized from the incineration (NAR 5000, Company ECFERAL, Algeria) of the expired drug (ELEVIT) under a temperature of around 1123 K. It is washed with deionized water, and then the adsorbent is dried in ambient air for 24 hours. After that BAEDI is ground in a crusher, and sieved to different particle sizes. Finally, it is stored in desiccators.

Several analytical techniques are employed to ascertain the characteristics of BAEDI. IR spectra are obtained by using (IR Affinity-1S Shimadzu) with the Quest ATR accessory. Specific surface area measurements are performed with BET method using (Micromeritics ASAP 2010 at 77 K). The direct observations of the images are obtained with (MEB Quanta 250 from the FEI Company). Elemental analysis is obtained by using (Rigaku XRF (PRIMINI)) spectrometer operating in WDXRF mode. Mineralogical identification is performed by using a Diffractometer (XPERT-PRO MPD of PANALYTICAL (PHILIPS)).
BAEDI has an alkaline character (pH = 10.20), specific surface area is 41.02 (m^2 g^{-1}). Elemental analysis revealed that BAEDI does not contain toxic elements (heavy metals).The images of adsorbent obtained by SEM before adsorption of Sr^{2+} and after adsorption showed the presence of regular areas with a homogeneous porous structure. However, this is not the case after adsorption of strontium a change in structure is observed.The FT-IR spectrum showed the presence of O-H, Si-O / Al-O and Si-O-Si. Mineralogical results indicate that the main crystalline phases are rich in Si and Ca,
BAEDI, selected and characterized, presents an economic and technological advantage (non-toxic, available in large quantities, less expensive and easy to use). It is comparable with other adsorbents, which is interesting for practical applications.

Keywords: BAEDI, structural characterization, Strontium.

References

1. Brahimi A, Mellah A, Hanini, S .Adsorption of strontium (II) ions from aqueous solution onto bottom ash of expired drug incineration. Journal of Radioanalytical and Nuclear Chemistry (2021), 330,929-940.
2. Benzaoui T, Selatnia A, Djabali D. Adsorption of copper (II) ions from aqueous solution using bottom ash of expired drugs incineration. Adsorpt Sci Technol (2018), 36: 114-129.
3. Brahimi A. (2021). Etude expérimentale et identification du processus de sorption des métaux toxiques issus des effluents liquides. Thèse de doctorat .Université Yahia Farés de Médéa.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

The influence of precursor/plant extract concentrations (volume ratio) on the elaborated Zinc oxide nanoparticles photocatalytic activity

Roumaissa DJAFAROU[1]*, Ouarda BRAHMIA [1]

[a]*Chemistry Department, University of Mentouri Brothers, Constantine 1, ALGERIA*

* *Corresponding author.*Tel.: 213792036963
E-mail address: *roumaissa.djafarou@student.umc.edu.dz*

ABSTRACT

The toxicity of the chemicals used to synthesize nanoparticles leads to by-products that can have adverse effects on the environment. Nanoparticles biosynthesis is a promising method, efficient and environmentally friendly technique that uses plant extracts to synthesize metal oxide nanoparticles. In the present work, we aimed to synthesize zinc oxide nanoparticles ZnO-NPs with the most excellent photocatalytic properties from the aqueous extract of the Eucalyptus leaves and the zinc acetate precursor. For this purpose, we firstly biosynthesized ZnO-NPs from different precursor/plant extract concentrations (volume ratio). Then, the kinetics of their photocatalytic degradation were carried out towards methylene blue (MB) dye under UV irradiation (365 nm). The photocatalytic activity was measured by UV-Visible spectrophotometric method. Based on the best MB degradation kinetic, we concluded that the best volume ratio to synthesize the ZnO-NPs with the most outstanding photocatalytic activity was (1:10).

Keywords: ZnO-NPs; Photocatalytic Activity; Volume Ratio ; Eucalyptus leaves.

References

1. H.H Mohamed H.H, Alomair N.A, Akhtar S, Youssef T.E. J. Photochem. Photobiol. A Chem. 2019, 382: 111951.

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In Situ Synthesis of a Polyaniline/ iron oxide Composite materials for Dye Removal by Adsorption

Ouafia BELGHERBI*[1, 2], Lamria SEID[2], Leila LAMIRI[1], Boussaha BOUCHOUL[1], Dalila CHOUDER[2]

1Research Center in Industrial Technologies CRTI, P.O.Box 64, 16014 Cheraga, Algiers, Algeria

2Laboratoire d'Energétique et Electrochimie du Solide (LEES), Université Sétif-1, Sétif, Algeria

* *Corresponding author.*Tel.: 06.55.50.03.90
E-mail address: o.blegherbi@crti.dz/ belgherbiwafia@gmail.com

ABSTRACT

Conductive polymers have become a remarkable candidate for different applications. Polyaniline (PAni) is the most promising contender because of its easy method of synthesis, low cost, and higher choice in the improvement of their properties by the combination of other materials.

In this work, we have chemically synthesized a composite material polyaniline/Fe2O3 by in situ addition of Fe2O3 as fillers in the PAni matrix. These hybrid materials are obtained from an aqueous solution containing the monomer (aniline) and semiconductor particles under ambient temperature. The composites were then characterized X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), and four point method to observe the crystal structure, functional groups, and electrical conductivity of samples, respectively.

X-ray diffraction analysis shows that the polyaniline structure becomes crystalline under the effect of doping, while the FTIR spectroscopy allowed us to confirm the formation of polyaniline/Fe_2O_3 by displacement of certain bands of polyaniline and the appearance of new bands of low intensities indicating the interaction between Fe_2O_3 and polymer chains. Compared with pure PAni, the conductivity of the PAni/Fe_2O_3 composite with a Fe_2O_3 content of 10% increases by 1.44*10-6 to 0.12 S/cm. This can be attributed to the doping effect associated with the Fe_2O_3 particles, which are supposed to contribute to inducing the formation of a more efficient network for the transport of charges, thus improving the conductivity of the composite. The applicability of PAni/Fe_2O_3 in adsorption of dye such as methylene blue were investigated.

Keywords: Polyaniline; iron oxide; chemical elaboration; composite materials, Polyaniline; iron oxide; chemical elaboration; composite materials, dye adsorption

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Synthesis of ZnO Nanoparticles Using Different Sources of Chitosan: Effects on Photocatalytic Degradation of AZO Dye

Hadia Hemmami[a,b],Soumeia Zeghoud[a,b*], Ilham Ben Amor[a,b], Laouini Salah Eddine[a,c]

[a]*Department of Process Engineering and Petrochemistry, Faculty of Technology, University of El Oued, El Oued 39000, Algeria*

[b]*Renewable Energy Development Unit in Arid Zones (UDERZA), University of El Oued, El Oued 39000, Algeria*

[c]*Biomaterials and Condensed Materials Biotechnology Laboratory, Faculty of Technology, University of El Oued, 39000 El Oued, Algeria*

* *Corresponding author.*Tel.: 0698188131
E-mail address:zsoumeia@gmail.com

ABSTRACT

Chitosan has been used in the synthesis of zinc oxide nanoparticles (ZnO NPs) as a capping agent to control size, morphology, optical bandgap, photocatalytic efficiency. Different sources of chitosan have been used for the synthesis of ZnO NPs, namely chitosan from shrimp shells, crab shells and Streptomyces griseus bacteria. The photocatalytic efficiency was studied using the methylene blue (MB) photodegradation test. The particle size of the ZnO NPs varied between 20 and 80 nm, and the band gap energy varied between 2.7 and 3.2 eV. ZnO NPs with lower bandgap values showed better antibacterial results compared to ZnO NPs with higher bandgap values. Removal of MB dye from ZnO (shrimp shells), ZnO (crab shells), and ZnO (Streptomyces griseus) reached 60%, 56%, and 44%, respectively, at a contact time of 60 min, a low initial MB dye con -centration of 6 × 10−5 M, solution temperature of 25 °C and pH = 7.

Keywords: Chitosan, ZnONPs, photocatalyticdegradation, photocatalyticactivity, AZO dye.

References

1. Ben Amor, I., Hemmami, H., Laouini, S. E., Mahboub, M. S., & Barhoum, A. (2022). Sol-Gel Synthesis of ZnO Nanoparticles Using Different Chitosan Sources: Effects on Antibacterial Activity and Photocatalytic Degradation of AZO Dye. Catalysts, 12(12), 1611.
2. Aziz, A., Ali, N., Khan, A., Bilal, M., Malik, S., Ali, N., & Khan, H. (2020). Chitosan‐zinc sulfide nanoparticles, characterization and their photocatalytic degradation efficiency for azo dyes. International journal of biological macromolecules, 153, 502-512.
3. Chen, X., Wu, Z., Liu, D., & Gao, Z. (2017). Preparation of ZnO photocatalyst for the efficient and rapid photocatalytic degradation of azo dyes. Nanoscale research letters, 12(1), 1-10.

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Adsorption of cationic dyes from aqueous solutions using enhanced clay by green algae

Atia djamal[1]* ,Alia khaoula[2] , Zobeidi ammar [3]

[1]*Department of chemistry, Faculty of exact sciences, University of Eloued, Eloued 39000, Algeria*

[2]*Department of Process Engineering, Faculty of Technology, University of Eloued , Eloued 39000, Algeria*

[3]*Department of chemistry, Faculty of exact sciences, University of Eloued, Eloued 39000, Algeria*

* Corresponding author.Tel.: 06 66 48 98 92

E-mail address: atia.sahan1@gmail.com

ABSTRACT

The objective of this work is to improve Algerian clay by using green algae to adsorb methylene blue (BM) dyes from their aqueous solutions. The objective of this work is to improve Algerian clay by using green algae to adsorb methylene blue (BM) dyes from their aqueous solutions. Where various analyzes were conducted to study: the surface shape, the crystallization of the material, and the functional group of clay and algae. The design (Behnken – Box) to improve the loading condition (loading of algae with clay, as well as adsorption agents (adsorbent dose, solution pH, and temperature and contact time). The obtained results show that the fast BM removal (91.34%) can be achieved by loading 50% clay into algae ،and at optimum adsorption operation parameters (adsorbent dosage of 0.05 g, solution of pH 5 temperature of 45°, and contact time of 32.5 min). The adsorption results were well described by pseudo-second-order kinetic, and adsorption isotherm was followed both Freundlich and Temkin models. The maximum adsorption capacity (qmax) of algae /clay for BM dye was found to be113.5 mg/g.

Keywords: Algae; Algerian clay; Methylene blue dye; Adsorption; Isotherm models.

References

1. Hamd, A.;et all, Fabrication and Application of Zeolite/Acanthophora Spicifera Nanoporous Composite for Adsorption of Congo Red Dye from Wastewater. Nanomaterials 2021, 11,2441. https://doi.org/10.3390/nano11092441.

2. Bangaraiah P., Abraham Peele K. , Venkateswarulu· T. C., Removal of lead from aqueous solution using chemically modifed green algae as biosorbent: optimization and kinetics study, International Journal of Environmental Science and Technology (2021) 18:317–326,https://doi.org/10.1007/s13762-020-02810-0.

3. Buhaniet al., Application of modified green algae Nannochloropsissp. as adsorbent in the simultaneous adsorption of Methylene Blue and Cu(II) cations in solution Sustainable Environment Research(2021) 31:17 ,https://doi.org/10.1186/s42834-021-00090-y.

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Green synthesis of Zinc Oxide Nanoparticles: Characterization and Applications

Iman Kir[a]* Laouini Salah Eddine [a] Gamil Gamal Hasan [a]

[a] *Génie des procédés et pétrochimie, University d'El Oued, d'El Oued, Algérie*

[b] *Génie des procédés et pétrochimie, University d'El Oued, d'El Oued, Algérie*

*.Tel.: 00696099910

E-mail address: iman.kir.39@gmail.com

ABSTRACT

Green synthesis of nanoparticles by biological systems and especially plant extracts is becoming an emerging field in nanotechnology. In this study, zinc oxide nanoparticles were synthesized using lemon peel extract. The fabricated ZnO nanoparticles were characterized by ultraviolet-visible (UV-Vis) spectroscopy, Fourier transform infrared (FT-IR), X-ray diffraction (XRD), energy dispersive X-ray (EDX) and electron analysis. scanning electron microscopy (SEM). Due to contamination from organic dyes in wastewater discharged to the aqueous system, we investigated the effectiveness of ZnO nanoparticles to test the photocatalytic activity on some organic dyes.

Keywords: Green synthesis; ZnO NPs; Characterization; photocatalytic activity; dyes.

References

1. Raliya, R., et al., *Synthesis of MgO nanoparticles using Aspergillus tubingensis TFR-3.* 2014. **8**(1): p. 34-38.
2. Abinaya, S., et al., *Green synthesis of magnesium oxide nanoparticles and its applications: A review.* 2021. **19**: p. 100368.
3. Momeni, S.S., et al., *Green synthesis of the Cu/ZnO nanoparticles mediated by Euphorbia prolifera leaf extract and investigation of their catalytic activity.* 2016. **472**: p. 173-179.
4. Ahmed, S., et al., *A review on biogenic synthesis of ZnO nanoparticles using plant extracts and microbes: a prospect towards green chemistry.* 2017. **166**: p. 272-284.
5. Tripathi, R., et al., *ZnO nanoflowers: novel biogenic synthesis and enhanced photocatalytic activity.* 2014. **141**: p. 288-295.
6. Khan, I., K. Saeed, and I.J.A.j.o.c. Khan, *Nanoparticles: Properties, applications and toxicities.* 2019. **12**(7): p. 908-931.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Effect of pyrolysis temperature on removal efficiency of dyes

Khadidja Hamida[*a], Hanane Rehali [a,b], Hayet Menasra[c], Saliha Benaoune[d]

[a]*Laboratory of LARGHYDE, University of Biskra, Algeria*

[b] *industrial chemistry, science and technology, university of Biskra, Algeria*

[c] *Applied chemistry laboratory, material science faculty, university of Biskra, Algeria*

[d]*Scientific and technical research center on arid regions (CRSTRA),biskra, Algeria*

* *Khadidja Hamida* ;Tel.: 0698959910

E-mail address: khadija.hamida@univ-biskra.dz

ABSTRACT

pollutant found often in textile, dyeing, paint, cosmetics, food, leather, paper and pulp industrial wastewater are dye molecules.

The textile industry that uses largest volume of water usually dis- charges effluent containing spent dye into water bodies. As a result of the increase in human needs for clothing and high production level of this industry, the widespread use of dyes especially rhodamine B causes environmental pollution when the spent colored wastewater is released into the ecosystem.

agricultural waste was used for the preparation of sustainable and eco-friendly adsorbent through chemical activation, followed by pyrolysis at 400 oC and 500 c° and 600 c° for adsorption of Rhodamine B dye from aqueous solution. Zinc chloride was used to activate the carbon and studies the performance of different parameters such as contact time, initial solution concentration and adsorbent mass. The characterized using Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), pH point zero charge (pH pzc) techniques. The influence of various adsorption parameters was investigated for determination of optimum conditions for sequestration of RhB dye. Equilibrium adsorption isotherm and kinetic models were equally assessed.

Keywords: adsorption; pyrolysis temperature; RhB; kinetic;

References

1. J.M. Jabar, Y.A. Odusote, Utilization of prepared activated biochar from water lily (Nymphaea lotus) stem for adsorption of malachite green dye from aqueous solution, Biomass Convers. Biorefin. (2021) 1–12.

2. J.M. Jabar, I.A. Owokotomo, Y.T. Ayinde, A.M. Alafabusuyi, G.O. Olagunju, V. O. Mobolaji, Characterization of prepared eco-friendly biochar from almond (Terminalia catappa L) leaf for sequestration of bromophenol blue (BPB) from aqueous solution, Carbon Lett. (2021) 1–14.

3. J.M. Jabar, Y.A. Odusote, K.A. Alabi, I.B. Ahmed, Kinetics and mechanisms of Congo-red dye removal from aqueous solution using activated Moringa oleifera seed coat as adsorbent, Appl. Water Sci. 10 (2020) 13.

4. D.T.M. Phuonga, N.X. Loca , T. Miyanishib, Efficiency of dye adsorption by biochars produced from residues of two rice varieties, Japanese Koshihikari and Vietnamese IR50404, Desalination and Water Treatment, 165 (2019) 333–351

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Comparative study on the adsorption of anionic and cationic dyes by using Palm-Date trunks as adsorbent

Ahmed Mehellou[a,b]*, Larbi Haddad[a], Lamia Allat[b] and Zahia Benredjem[b]

[a]*Department of Chemistry, Faculty of Exact Sciences, Echahid Hamma-Lakhdar University, El-Oued, Algeria.*

[b]*Laboratory of Water Treatment and Valorization of Industrial Wastes, Badji-Mokhtar University, Annaba, Algeria.*

* *Corresponding author.*
E-mail address: a.mehellou@yahoo.fr / mehellou-ahmed@univ-eloued.dz

ABSTRACT

This work is a comparative study of adsorption of two different organic dyes (anionic: Methyl Orange (MO) and cationic: Crystal Violet (CV)) on Palm-Date Trunks (PDT) powder. The morphologic and spectroscopic analysis by using of FTIR, XRD, SEM methods shows that this material has an unorganized crystal structure and it has an heterogeneous, porous and charged surface.

The influence of the some factors on the adsorption process chows that the optimal mass of PDT powder is 1g and 3g for the CV and the MO respectively. The adsorbed quantity (Q_{ads}) of studied dyes and for all initial concentrations (C_0=25−150 mg/l) is important from the beginning of the contact time. The equilibrium time is 45min around in all cases. The adsorption of MO is very favored in acidic medium. However, the pH change does not influence on the CV adsorption. The temperature increase from 20C° to 55C° increases slightly the adsorption of CV. The kinetic study shows that the second-order model and Elovich kinetic model are very suitable for explaining the dyes adsorption process. The modeling of adsorption isotherm proved that the adsorption of the dyes follows the Freundlich model, where R^2 it was 0.9815 for MO and 0.9035 for CV. In effect, the results of optimal experiments show that the adsorption rate of CV and MO on PDT are 90.4% and 57.41% respectively.

Keywords: Adsorption; Methyl Orange; Crystal Violet; Date Palm Trunks; Lignocellulosic Material.

References

1. Nouacer S, Hazourli S, Despas Ch, Hébrant M. Sorption of polluting metal ions on a palm tree frond sawdust studied by the means of modified carbon paste electrodes, *Talanta.* 2015, 144: 318-323.
2. Jonoobi M, Shafie M, Shirmohammadli Y, Ashori A, Zarea-Hosseinabadi H, Mekonnen T. A Review on Date Palm Tree: Properties, Characterization and Its Potential Applications, *Journal of Renewable Materials*. 2019, 7;11:1055-1075.
3. Sharma P, Kaur H, Sharma M, Sahore V. A review on applicability of naturally available adsorbents for the removal of hazardous dyes from aqueous waste. *Environmental Monitoring and Assessment*. 2011, 183:151-195.
4. Hachani R, Hazourli S, Nouacer S, Khelaifia FZ, Nait Merzoug N. Performance study of a low-cost adsorbent-raw date pits-for removal of azo dye in aqueous solution, *Water Environment Research.* 2017, 89:827-839.

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Removal of Ca^{2+} cation by membrane S-PES modified with silica functionalized

BENOUMENA Hala[a]* , ZOBEIDI Ammar[b] and ATIA Salem[c]

[a]*Department mathematique and scince of mater, University Kasdi Merbah Ouargla, Ouargla, Algeria*

[b]*Department since of mater, University Echahid Hamma Lakhder, El Ouad, Algeria*

Department mathematique and scince of mater, University Kasdi Merbah Ouargla, Ouargla, Algeria

[a] * *Corresponding author*.Tel.: 0664692921
E-mail address: benoumebahala@gmail.com

ABSTRACT

Present study. Removal of Cd^{2+} cations by modified cation exchange membranes, based on sulfonated polyethersulfone S-PES. The modification of the membranes was carried out by silica functioned with graffring an agent such as APTES and MPTES onto the surface of membranes. The increasing order of the elimination efficiency is presented as follows: S-PES<S-PES-SiO_2<S-PES-SiO_2-$(CH_2)_3$-SH< S-PES-SiO_2-$(CH_2)_3$-NH_2. Modification of S-PES by par SiO_2-$(CH_2)_3$-NH_2 is most favorable for the removal of Cd^{2+} cations. The membranes characterized by FTIR, ATG, MEB-EDX and DRX. The results showed that removal of Cd^{2+} by S-PES-SiO_2-$(CH_2)_3$-NH_2 membrane being more favorable compared to that of S-PES-SiO_2-$(CH_2)_3$-SH for all concentration.

Keywords: silca; membrane; cation; polyethersulfone; sulfonated

References

1. S.Wai Lin, F. J. Lopez-Garcia, S. Perez-Sicairos& R. M. Felix-Navarro (2016): New method of synthesis of sulfonatedpolyethersulfone (SPES) and effect of pH on synthetic gray water filtration performance by negatively charged SPES/PS UF membranes, Desalination and Water Treatment, DOI: 10.1080/19443994.2016.1157041.
2. A.R. Ladhe , P. Frailie , D. Hua , M. Darsillo, D. Bhattacharyya,"Journal of Membrane Science", 326, (2009), 460–471
3. A.Rahimpour, S.SiavashMadaeni, S.Ghorbani, A.Shockravi, Y.Mansourpanah, "The influence of sulfonatedpolyethersulfone (SPES) on surface nano-morphology and performance of polyethersulfone (PES) membrane", Appl. Surf. Sci. 25 (6) (2010) 1825.
4. U.Deschler, P. Kleinschmit, P.Panster, AngevandteChemie, International Edition,1986, 25, 236-252.
5. K. Sriram, G. Arthanareeswaran, A. F. Ismail &Diby Paul , To cite this article: K. Sriram, G. Arthanareeswaran, A. F. Ismail &Diby Paul (2016),"Effects of special nanoparticles on fuel cell properties of sulfonatedpolyethersulfone membrane", International Journal of Polymeric Materials and Polymeric Biomaterials, 65:6, 294-301, DOI: 10.1080/00914037.2015.1119685 To link to this article: http://dx.doi.org/10.1080/00914037.2015.1119685

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Biosynthesis of MgO NPs using Chitosan extracted from *Pimelia payraudi Latreille*

Ilham Ben Amor [a,b*] , Soumeia Zeghoud [a,b], Hadia Hemmami [a,b], Laouini Salah Eddine [a,b,c]

[a] *Department of Process Engineering and Petrochemistry, Faculty of Technology, University of El Oued, El Oued 39000, Algeria*

[b] *Renewable Energy Development Unit in Arid Zones (UDERZA), University of El Oued, El Oued 39000, Algeria*

[c] *Biomaterials and Condensed Materials Biotechnology Laboratory, Faculty of Technology, University of El Oued, 39000 El Oued, Algeria*

* Corresponding author.Tel.: +213675821157

E-mail address: ilham-benamor@univ-eloued.dz

ABSTRACT

One of the most prevalent biopolymers in nature, chitosan (CS) has excellent qualities including biodegradability, biocompatibility, antibacterial activity ,lack of toxicity, speeding up the healing process for wounds, and immune system activation. In this work, chitosan was extracted from the exoskeletons of beetles and utilized to create very pure MgO NPs by a simpler, more environmentally friendly process. The extracted chitosan showed excellent physicochemical properties, including high extraction yield (39 %), low ash content (1 %), an unusual crystallinity index (51%)and high degree of deacetylation (90 %).With crystallite diameters of 17 nm, particle sizes of around 20-70 nm, and bandgap energies of 4.43, the MgO NPs displayed a spherical shape.

Keywords: Chitosan; MgO NPs; Nanotechnology; Pimelia payraudi Latreille.

References

1. I. B. Amor, H. Hemmami, S. E. Laouini, H. B. Temam, H. Zaoui, and A. Barhoum, "Biosynthesis MgO and ZnO nanoparticles using chitosan extracted from Pimelia Payraudi Latreille for antibacterial applications," World Journal of Microbiology and Biotechnology, vol. 39, pp. 1-12, 2023.
2. S. Zeghoud, H. Hemmami, B. B. Seghir, I. B. Amor, I. Kouadri, A. Rebiai, et al., "A review on biogenic green synthesis of ZnO nanoparticles by plant biomass and their applications," Materials Today Communications, p. 104747, 2022.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Reactivity of copper based catalysts in the green organic synthesis of 3,4-dihydropyrimidinone: effect of the combined oxide

Samira SLYEMI[a]*, Ouzna KHEFFACHE[a,b], Hassiba MESSAOUDI[a,c], Ibtissem LOUNAS[a]

[a]Laboratoire de Chimie du Gaz Naturel, Faculté de Chimie, Université des Sciences et de la Technologie Houari Boumediène, USTHB, PB 32, 16111, El Alia, Bab-Ezzouar, Alger,Algérie

[b] Faculté des Sciences, Département Sciences de la Nature et de Vie, Université d'Alger 1, 2 Rue Didouche Mourad, Alger centre 16000, Alger, Algeria

[c]Faculté des Sciences, Département Sciences de la Matière, Université d'Alger 1, 2 Rue Didouche Mourad, Alger centre 16000, Alger, Algeria

* *Corresponding author*.Tel.: +213556598667

E-mail address: slyemisamira@gmail.com, samira.slyemi@usthb.edu.dz

ABSTRACT

This work is focused on the study of the reactivity of heterogeneous catalysts based on copper combined with silica SiO_2 and zinc oxide ZnO, prepared by sol-gel method, in the organic synthesis of the 3,4-dihydropyrimidinone (DHPM) molecule via the Biginelli multicomponent reaction. This reaction is classified in the organic synthesis processes known under the concept of green chemistry. It consists of mixing in one pot three reactants which are: benzaldehyde, ethyl acetoacetate and urea in order to synthesize DHPM which is part of the constitution of various biologically active molecules [1,2]. In our study, this reaction was carried out under reflux at a reaction temperature of 100°C with the respective quantities of reactants: 1 ml/1.25 ml/0.9 g, with free solvent and using a mass of catalyst of 0.01g. After 2 hours of reaction, the obtained results showed for the pure oxides, a practically no activity of the silica (yield less than 5%) unlike the zinc oxide which led to a very high DHPM yield estimated at 64%. The addition of copper has a clearly remarkable effect on the silica such that the yield of the mixed catalyst 30%Cu-70%SiO_2 is 50%. On the other hand, the addition of copper in the case of zinc oxide does not affect its yield in DHPM (stable around 66% for the 30%Cu-70%ZnO catalyst).

Keywords: Organic synthesis, heterogeneous catalysis, copper, zinc oxide, silica

References

1. Kappe, C.O. "Recent Advances in the Biginelli Dihydropyrimidine Synthesis. New Tricks from an Old Dog" Acc. Chem. Res. 33 (12), 879-888 (2000).
2. Kappe, C.O. "100 Years of the Biginelli Dihydropyrimidine Synthesis" Tetrahedron 49 (32) 6937-6963 (1993).

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Experimental study and study of molecular dynamics on the properties of nanoparticles of carbon-based materials

Asma Ben Amor [1,2]*, Bachir BEN SEGHIR [1,2], HEMMAMI Hadia[1,2]

1Department of Process Engineering and Petrochemistry, Faculty of Technology, University of El Oued, El Oued 39000, Algeria
2Renewable Energy Development Unit in Arid Zones (UDERZA), University of El Oued, El Oued 39000, Algeria
* Email: benamor-asma@univ-eloued.dz

ABSTRACT

Recently created carbonaceous material known as carbon dots (C dots) has drawn significant attention across a wide range of research fields. because of their advantages in being water solubleThey could be used in future nanodevices in place of conventional semiconductor quantum dots due to their chemical inertness, low toxicity, and preferable biocompatibility. simple functionalization and beneficial photoluminescence in actuality It has been proven that they can be used in a wide range of fascinating applications, such as bioimaging, biosensors, light-emitting diodes, etc. Several methods have been devised to prepare C-points, including laser ablationpyrolysis, injection heating, microwave irradiation, thermal oxidation, and electrochemical oxidation. In the previously stated processes for creating C-dots, hazardous or high-temperature compounds are frequently utilized, which also have a lot of disadvantages such a low product yield, an inability to adjust size, and a limited spectrum efficiency. Because of this, developing new techniques is essential. which have less environmental impact. The production of C-dots must take into account the maintenance of a green environment, the mitigation of global warming, and the assurance of sustainable and renewable energy sources.

Keywords: carbon quantum dots, green synthesis, molecular dynamic

References

1. Shirin Borna, Reza Emamali Sabzi, and Sajad Pirsa; Synthesis of carbon quantum dots from apple juice and graphite: investigation of fluorescence and structural properties and use as an electrochemical sensor for measuring Letrozole; J Mater Sci: Mater Electron (2021) 32:10866–10879
2. Zahra Ramezani; Maryam Qorbanpour; Nadereh Rahbar; Green synthesis of carbon quantum dots using quince fruit (Cydonia oblonga) powder as carbon precursor: Application in cell imaging and As3+ determination; Colloids and Surfaces A: Physicochemical and Engineering Aspects; Volume 549, 20 July 2018, Pages 58-66
3. Wei Du, Xiaoqian Xu, Han Hao, Rongmei Liu, Di Zhang, Feng Gao & Qingyi Lu; Green synthesis of fluorescent carbon quantum dots and carbon spheres from pericarp; SCIENCE CHINA Chemistry; January 2015 Vol.58 No.1: 1–8
4. E. Gowdini1 & A. A. Ahmad2 & A. Mabudi3 & N. L. Hadipour1 & B. Kharazian; A molecular dynamics study on the thermal properties of carbon-based gold nanoparticles; Journal of Molecular Modeling (2020) 26:307 https://doi.org/10.1007/s00894-020-04559-2.
5. https://pubs.acs.org/doi/10.1021/acscentsci.0c01306 02/12/2022.

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Waste utilization in Water pollution treatment

Dahbia AKROUM-AMROUCHE[*,a,b], Nawal BAYOU-KHIER[a,c]

[a] *Bioinformatics and Applied Microbiology and Biomolecules Laboratory, Faculty of Sciences, M'hamed Bougara University, Avenue de l'Indépendance, 35000- Boumerdes*

[b] *Process engineering department, Faculty of Technology - M'hamed Bougara University, Boumerdes, Independence Avenue, 35000 - Boumerdes, Algeria*

[c] *Chemistry department, Faculty of Sciences, M'hamed Bougara University, Independence Avenue, 35000- Boumerdes, Algeria*

* *Corresponding author*.E-mail address:d.akroum@univ-boumerdes.dz

ABSTRACT

The use of bio-waste, abundant and at low cost, as an adsorbent is a promising application against various environmental pollutants. In addition, the chemical modification of biowaste leads to obtaining an adsorbent with significant removal efficiency against various pollutants. The effects of the dose of biosorbents, pH, contact time and temperature on the efficiency of the removal of organic matter from raw water were studied, in order to define the optimal treatment parameters. The biosorbents presented, under optimized conditions, a good pollutant removal efficiency which is superior or similar to that obtained in the presence of commercial activated carbon.

Keywords: Bio-waste; Adsorbent; Environmental pollutants; Water treatment.

References

1. Alencar WS, Acayanka E, Lima EC, Royer B, De Souza FE and Lameira J. Application of Mangifera indica (mango) seeds as a biosorbent for removal of Victazol Orange 3R dye from aqueous solution and study of the biosorption mechanism. Chem. Eng. J. 2012, 209; 577–588.
2. Gupta, V.K., and Suhas. Application of Low-Cost Adsorbents for Dye Removal – A Review. *Journal of Environmental Management*. 2009, 90; 8: 2313–42. doi: 10.1016/j.jenvman.2008.11.017.
3. Xueyan G, Shuzhen Z and Xiao-Guan S. Adsorption of metal ions on lignin. *J. Hazard. Mater*. 2008, 151; 134–142.
4. Shukla S K, Said Al Mushaiqri N R, Al Subhi HM, Yoo K, Al Sadeq H. Low-cost activated carbon production from organic waste and its utilization for wastewater treatment, Applied Water Science 2020, 10; 62.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Sonochemistry in Transition Metal Catalyzed coupling Reactions using in DMF/water

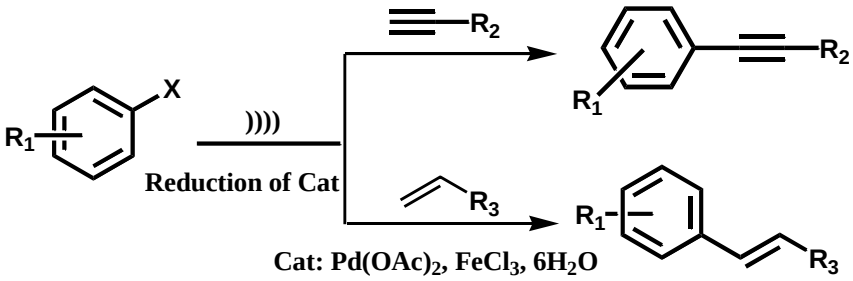
Khemais Said* and Ridha Ben Salem

Organic Chemistry Laboratory (LR17/ES08) Department of Chemistry, Faculty of Sciences of Sfax University of Sfax, 3018, Sfax, Tunisia

*Email Said khemais@yahoo.fr .Tel.:0021674276400

ABSTRACT

Transition metal catalyzed cross-coupling reactions have always been very important in synthetic organic chemistry due to their versatility in forming all sorts of carbon-carbon and carbon-hetero atom bonds. Incorporation of ultrasound assistance to these protocols resulted in milder reaction conditions, faster reaction rates, etc. This review focuses on the contributions made by ultrasound-assisted [1-3] protocols towards transition metal catalyzed cross-coupling reactions. Compare to the previous works, this procedure has advantages such as easy workup, high yields of products, environmentally benign and short reaction times. The novel nickel catalyst prepared and characterized.



Keywords: Cross-coupling reaction; C–C bond formation; Pd catalysts; ultrasound; Sonogashira: Transition metal.

References

1. Said K, Mesni, A, Ben Salem R. Antioxidant Properties of Synthesis Nanometallic Pd-Ni@2-Mercaptoethanol as Effective Catalyst for Suzuki-Miyaura Reactions, *Letters in Organic Chemistry*, 2020, *17*, 36-45.
2. Mhamdi L, Said K, Atoui D, Moussaoui Y, Ben Salem, R. Baylis-Hillman Reaction Assisted by aliquat‑336 and triphenylphosphine Under Ultrasound Radiation. Chemistry Africa 2018.
3. Atoui D, Said K, Ben Salem R. Ultrasonic activation of the arylation reaction of styrene catalyzed by transition Metals. Turkish J. Chem., 2017, 41: 587 -600.
4. Said K, Ben Salem R. Ultrasonic Activation of N-arylation of Amines with Aryl Halides Catalysed by Iron (III) *Letters in Organic Chemistry, 2022, 8, 627-635.*

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Journal homepage: https://jetjournal.org/index.php/ajet

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Improved photocatalytic degradation of Coomassie brilliant blue G-250 dye on the new $CuCo_2O_4$/CdS hetero-system under solar irradiation.

A. Bouaoune[a]*, H. Lahmar[b], S. Douafer[c], M. Trari[d] et M. Benamira[e]

[a]*Department of Chemistry, University UBMA, 23000, Sidi Amma, Annaba*

[b]*Department of Chemistry, University of MSBY, Ouled Aissa 18000, Jijel, Algeria*

[c]*LEND, Mohammed Seddik Benyahia University, B.P. 98, Ouled Aissa, 18000 Jijel, Algeria*

[d]*Laboratory of Storage and Valorization of Renewable Energies, Faculty of Chemistry (USTHB), 16111 Algiers, Algeria*

[e]*Laboratory of Materials Interaction and Environment (LIME), University of (MSBY), Ouled Aissa 18000, Jijel, Algeria*

* *Corresponding author*.Tel.: 00213661677676
E-mail address: a_bouaoune@yahoo.com

ABSTRACT

In this present work, we used a new $CuCo_2O_4$/CdS heterosystem [1] for the photocatalytic degradation of Coomassie brilliant blue G-250 dye (CBB G-250) under solar irradiation. The ratio of $CuCo_2O_4$ and CdS oxide in the heterosystem has been well studied. Similarly, the experimental conditions leading to the total degradation of CBB G-250 were optimized. The physical and optical properties of $CuCo_2O_4$ and CdS were studied and correlated with photoelectrochemical characterization to establish the energy diagram of the $CuCo_2O_4$/CdS heterosystem. The XRD, DR, BET analysis were carried out for the two materials constituting their heterojunction. $CuCo_2O_4$ and CdS have respective gap values (Eg = 1.97 eV and 2.75 eV), their optical transition is direct. Conduction band electron transfer from ($CuCo_2O_4$–C_B) to CdS–CB occurs upon absorption of sunlight, which promotes the separation of charge carriers, thus accelerating the degradation of CBB G-250. Under simple conditions and under solar illumination and a (pH ~ 8, T ~ 25°C and dose of 1 mg/ml of catalyst) the degradation of 10 mg/L of CBB G-250 is complete after 2 hours of irradiation, the photodegradation phenomenon [2] obeys pseudo-first order kinetics with an apparent constant constant of 0.01 min^{-1}.

Keywords: Hetero System $CuCo_2O_4$/CdS; photo catalysis; CBB G-250; solar light.

References

1. Lahmar, H., & Benamira, M. (2017, December). Chromate reduction on the novel hetero-system La_2NiO_4/TiO_2 under solar light. In 2017 International Renewable and Sustainable Energy Conference (IRSEC) (pp. 1-4). IEEE.
2. Telmani, K., Lahmar, H., Benamira, M., Messaadia, L., & Trari, M. (2020). Synthesis, optical and photo-electrochemical properties of $NiBi_2O_4$ and its photocatalytic activity under solar light irradiation. Optik, 207, 163762.

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Modeling and process optimization of renewable energy production

Hamza AKROUM[*,a,b], Dahbia AKROUM-AMROUCHE[c], Abderrezak Aibeche [a]

[a] *Applied Automatic Laboratory. Faculty of Hydrocarbons and Chemistry, M'hamed Bougara University, Avenue de l'Indépendance, 35000- Boumerdès, Algeria.*

[b] *Systems Engineering and Telecommunications Laboratory. Faculty of Technology - M'hamed Bougara University, Boumerdes, 35000 - Boumerdès, Algeria.*

[c] *Bioinformatics and Applied Microbiology and Biomolecules Laboratory, Faculty of Sciences, M'hamed Bougara University, Avenue de l'Indépendance, 35000- Boumerdes*

*Corresponding author.E-mail address: *akroum@univ-boumerdes.dz*

ABSTRACT

The production of energy requires intense engineering processes that lead to direct or indirect emissions of carbon dioxide. Sustainable energy production through biomass conversion has recently found growing interest. However, the complexity of these processes requires the improvement of numerical models that can integrate physical, chemical and biological parameters and simulate the processes. Several designs have been developed to simultaneously model and optimize the process. This work describes the fundamental knowledge needed for modelling, applying the models using experimental data to demonstrate the importance of process-affecting parameters to optimize the efficiency of the expected conversion process.

Keywords: Renewable energy; Modeling; Optimization; Conversion efficiency.

References

1. Bazmi A A, Zahedi G. Sustainable energy systems: Role of optimization modeling techniques in power generation and supply. Renewable and Sustainable Energy Reviews. 2011, 15,8: 3480-3500.
2. Chollom MN, Rathilal S, Swalaha FM, Bakare BF, Tetteh EK. Comparison of response surface methods for the optimization of an upflow anaerobic sludge blanket for the treatment of slaughterhouse wastewater. Environ. Eng. Res. 2020, 25; 1:114-122. https://doi.org/10.4491/eer.2018.366.
3. Dang Q, Zhang X, Zhou Y, Jia X. Prediction and optimization of syngas production from a kinetic based biomass gasification process model. Fuel Processing Technology, 2021,212.
4. Sewsynker-Sukai Y, Faloye F, Kana EBG. Artificial neural networks: an efficient tool for modelling and optimization of biofuel production (a mini review). Biotechnol. Biotechnol. Equipment. 2017, 31;2:221-235. https://doi.org/10.1080/13102818.2016.1269616.
5. Thoai DN, Tongurai C, Prasertsit K, Kumar A. Predictive Capability Evaluation of RSM and ANN in Modeling and Optimization. J. Appl. Eng. Res. 2018, 13;10:7529-7540.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Green Synthesis of copper oxide Nanoparticles using plant extract

Ahlam Hacine Gherbi[1,2], Hadia Hemmami[1,2], Salah Eddine Laouini[1,3]

[1] *Department of Process Engineering and Petrochemistry, Faculty of Technology, University of El Oued, El Oued 39000, Algeria*

[2] *Renewable Energy Development in Arid Zones (UDERZA) University of El Oued, El Oued 39000, Algeria*

[3]*Laboratory of Biotechnology Biomaterials and Condensed Materials, Faculty of Technology, University of El Oued 39000, Algeria*

* *Corresponding author.*Tel.: 0664765052

**E-mail address: ahlam-hacinegharbi@univ-eloued.dz.*

ABSTRACT

Green synthesis of metal and oxide metal nanoparticles (NPs) has attracted considerable attention because of its cheaper protocols and more environmentally friendly than standard synthetic methods .Green synthesized copper oxide nanoparticles have attained significant importance because of their distinctive properties, and their varied range of applications such as, optical, antibacterial activity. Green synthesis of CuO nanoparticles utilizing extracts of purslane was effective in this study. The functional groups involved in the green synthesis of CuO nanoparticles were validated by FT-IR spectra, as well as the powder XRD patterns, and UV-Vis of the CuO nanoparticles.

Keywords: Green synthesize, Nanoparticles, Copper oxide, FTIR, XRD

References

1. K.N.Thakkar,S.SMhatre, Y.Rasesh, R.Y. Parikh,Nanomedicine: Nanotechnology, Biology and Medicine **6**, 257 (2010)
2. Siavash, I. (2011). Green synthesis of metal nanoparticles using plants. Green Chemistry, 13, 2638–2650.
3. Das, S. K., Khan, M. M. R., Guhab, A. K., Naskar, N. (2013). Bioinspired fabrication of silver nanoparticles on nanostructured silica: characterization and application as a highly efficient hydrogenation catalyst. Green Chemistry, 15, 2548–2557. E. Ayoman, S.G. Hosseini, Synthesis of CuO nanopowders by high-energy ballmilling
4. method and investigation of their catalytic activity on thermal decomposition of ammonium perchlorate particles, J. Therm. Anal. Calorim. 123(2016) 1213–1224.
5. S. Vasantharaj, S. Sathiyavimal, P. Senthilkumar, F.L. Oscar, A. Pugazhendhi, Biosynthesis of iron oxide nanoparticles using leaf extract of Ruellia tuberosa: antimicrobial properties and their applications in photocatalytic degradation, J. Photochem. Photobiol. B Biol. 192 (2019) 74–82

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Synthesizing 3,4-dihydropyrimidine-2-(1*H*)-one in the presence of Co-ZnO and Ni-ZnO

Ouzna Kheffache * [a] , Hassiba Messaoudi[a], Samira Slyemi [a], Meriem Boudjeloud [a] et Ouiza CHERIFI [a]

Laboratoire de Chimie du Gaz Naturel, Faculté de Chimie, Université des Sciences et de la Technologie Houari Boumediène, USTHB, PB 32, 16111, El Alia, Bab-Ezzouar, Alger, Algérie epartment, University, City, Country (times new roman 8 italique sans gras)

* *Corresponding author.*
Tel.: 0 552 01 32 66
E-mail address: kheffacheo@yahoo.fr

ABSTRACT

Multicomponent reactions have received special attention due to their economic and ecological advantages known under the concept of "green chemistry". Among the widely exploited multicomponent reactions, the Biginelli reaction produces dihydropirimidinones (DHPMs) using benzaldehyde, ethyl acetoacetate and urea as reactants, this work, we study the Biginelli reaction in heterogeneous media in free solvent in the presence of (30 wt%) Co-ZnO SG and (30 wt%) Ni- ZnO SG us catalysts prepared by sol-gel method and characterized by X-Ray Diffraction (XRD), Fourier Transform Infrared (FTIR) methods. (30 wt%) Ni- ZnO SG sample prepared by the sol-gel method exhibited the highest DHPM yield (61%), in free solvent with a reaction time of 1h

Keywords: Sol gel; heterogeneous media ; catalysts ; Biginelli .

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Study of the Physical and Chemical Quality of Runoff water from Urban Surfaces

F.BENREJDAL[1*], H.HADDAD[1] et H.GHOUALEM[1]

[1] *Laboratory of Electrochemistry-Corrosion, Metallurgy and Inorganic Chemistry.Faculty of Chemistry. University of Sciences and Technology.Houari Boumediene. Box N°32 El-Alia. Bab-Ezzouar. Algiers. Algeria.*

E-mail address:fazia1@live.fr

ABSTRACT

Stormwater is now recognized as a substantial source of pollutants to receiving aquatic environments. Runoff water over surfaces results in contamination with organic and inorganic micropollutants.
The objective of this work is the characterization of the quality of runoff water and the confirmation of their heterogeneous character. To this end, different samples were collected on several sites of the Algerian watershed in order to evaluate the concentration of pollutants. Runoff water is loaded with suspended solids, nutrients and other contaminants [1]. The increase in pollutant concentration depends on multiple factors: rainfall intensity, runoff intensity, nature of the surface material, nature of the activities on or near the surface [2].

The characterization focused on the analysis of physicochemical parameters such as pH, conductivity, COD, BOD, TSS, orthophosphate, sulfate, nitrate, nitrite, ammonium, potassium, calcium, magnesium and sodium ions. The descriptive analysis of the physicochemical parameters showed that the waters have very high concentrations of nitrite and metal ions. The analyses were performed by UV-Visible spectrophotometry, flame spectrophotometry and atomic adsorption.

Keywords: Runoff water, pollutants, pollution parameters, physico-chemical analysis.

References

[1] Patrícia S.M. Santos, Marta Otero, Eduarda B.H. Santos, Armando C. Duarte (2011) Chemical Composition of Rainwater at a Coastal Town on the Southwest of Europe: What Changes In 20 Years, Environment 411.3548-3553
[2] C.C.Lee and S.Dar Lin (2007) *Handbook of Environmental Engineering Calculations*, 2nd Edition, McGraw-Hill Companies.

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Elimination of diclofenac by elaborated bio-composite based on Moringa Oleifera and modified Alginates.

Benamirouche O[a]*,Bensacia N[a] , Taoualite N[a] and Boutemak K[b]

[a] : *Laboratoire des Applications Énergétiques de l'Hydrogène. Université de Blida1, Route de Soumaa, Blida, Algerie*.
[b] : *Laboratoire d'Analyse Fonctionnelle des Procédés Chimiques. Université de Blida1, Route de Soumaa, Blida, Algerie.*

* *Corresponding author*.Tel.: 0666513727
E-mail address:benamirouche.wissem@gmail.com

ABSTRACT

Due to the adverse effects of environmental pollution and its threats to human health and the functioning of ecosystems worldwide, the pollution of aquatic environments in particular is affected by this crucial phenomenon distressing scientists over the years to find effective solutions to eliminate the impact of this pollution and to protect water that is becoming a resource increasingly scarce.
Industrialization is one of the main causes of pollution of these limited resources, as well as the frequent use of a large number of chemicals and drugs in everyday life leading to a dissemination in the environment of various substances called "emerging pollutants", once dissolved in water, their elimination by the conventional treatment steps of water treatment plants becomes difficult.
Our work is part of the treatment of water contaminated by pollutants or emerging pharmaceutical micropollutants using the recovery of waste from the plant of moringa oleifera and modified alginates. A chemical synthesis of a biosorbent based on the bark of the moingua fruit and alginates was carried out. The latter was tested for the removal of the emerging pharmaceutical pollutant sodium diclofenac from the contaminated solutions.
A study of the kinetics of elimination of the pollutant was elaborated as well as the optimal parameters of adsorption and that for the alginate in beads form, Moringa and the composite (alginate/moringua). The characterization was carried out by: Fourier transform infrared spectroscopy FTIR, the pH of zero charge point pHpzc, and the adsorption tests were measured by spectrophotometry. The preliminary results found are very encouraging.
Keywords: biosorbent; emerging polluant; sodium diclofenac; sorption kynetics; Moringa oleifera.

References

1. H. Bouanani, A.Kettab, N.Bensacia, R. Riahi, L. Mandi, M. NacerChabaca, S. Benziada, M. Nakib, Y. Djillali, A. Lisaneddine" The Assessment and Optimization of Agricultural Reuse of Wastewater Treatment By- Products, Desal. Wat. Treat, V.203, 2020, 245-266.
2. N. Taoualit, k.Boutemak, N.Bensacia, S. Chemlal, S. Irriri, D-EHadj-Boussaad« Extraction and Transport of Methylene Blue Dye through a Plasticized Liquid Membrane containing Trioctyl Phosphine Oxide (TOPO) as the Carrier: Parametric Study »,Chemical Engineering Transactions,V.82,2020,349-354.
3. D.Imessaoudene, N.Bensacia, F.Chenoufi,"Removal of cobalt(II) from aqueous solution by spent green tealeaves", Journal of Radioanalytical and Nuclear Chemistry (2020) 324:1245–1253,
4. I.Aroun, N.Bensacia, K.Seffah, S.benyahia, "Kinetic and Equilibrium Studies of Salicylic acid Adsorption from Contaminated Water by (Alginate/ Chitosan/ Cobalt ferrite) Nanocomposites". Algerian Journal of Environmental Science and Technology, 5 (3) 2019 1055-1061.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Environmental Effect of Caracterization of Water Ressources in Algiers Watershed (Bouira area).

Habiba Haddad*, Fazia Benrejdal and Hafida Ghoualem.

Laboratory of Electrochemistry-Corrosion, Metallurgy and Inorganic Chemistry.Faculty of Chemistry. University of Sciences and Technology.Houari Boumediene.Box N°32 El-Alia. Bab-Ezzouar. Algiers. Algeria.

* *Corresponding author.*Tel.: 0541259175

E-mail address: Habou16@hotmail.com

ABSTRACT

Concern for the environment presupposes a certain basic dynamism aimed at safeguarding against all types of pollution. Studies can guide practices and development towards better management and environmental awareness. Groundwater resources are an alternative to rainwater and dam water. The preservation and qualitative and quantitative control of these resources is an economic and social necessity. It allows their direct exploitation and avoids additional treatment costs. The objective of our work is to quantify the water resources of certain sites in the basin hydrographic Algerian Coastal (Bouira area), and to determine and quantify the mineral pollution of these waters. This study envisaged a physicochemical characterization to highlight several parameters that come into play in the determination of the quality of the waters of this basin, such as temperature, pH, conductivity, and Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}, Mn^{2+}, Li^{+}, Zn^{2+}, Cu^{2+}, NH_4^{+}, SO_4^{2-}, NO_3^{-}, NO_2^{-}, Cl^{-}, HCO_3^{-} and PO_4^{3-} ions. The use of the Piper, Stabler and Schöeller-Berkaloff diagrams made it possible to carry out a hydrochemical study of these waters and thus to know their chemical facies, quality and potability. The use of these diagrams was facilitated by its automation thanks to the software (Rolond SIMILER Hydrogeology Laboratory of Avignon). The results showed a difference in the concentration of some physicochemical variables, some of which meet the applicable standards (WHO standards) and some of them exceeded. . It may be due to the quality of the soil or the excessive use of fertilizers,Which made us think of some solutions to treat this water without affecting its properties.

This led us to conclude that the surrounding areas are not contaminated by certain harmful pollutants, namely heavy metals, dyes and organic pollutants. The follow-up of these analyses allows us to promote a sustainable development of the region in terms of drinking water consumption, and to detect all kinds of contamination at the right time.

Keywords: Hydrographic basin, hydrochemistry, pollution, water treatment.

References

1. Chapman. D, Kimstach. V, Selection of water quality variables. Water quality assessments : a guide to the use of biota, sediments and water in environment monitoring, Chapman edition, 2nd ed. E & FN Spon, London, pp. 59-126. (1996).
2. Delisle. C. E, Schmidt. J. W, The effect of sulphur on water and aquatic life in Canada. Sulphur and its inorganic derivatives in the canadian environment. NRCC, n°. 15015, Centre National des recherches du Canada, Ottawa. (1977).
3. Piper A.M, A graphic procedure in the geochemical interpretation of water analyses. Trans. Am. Geophys. Un., Papers, Hydrology, 914-929. (1944).
4. L. Yu et al.: Groundwater impacts on surface water quality and nutrient loads. Hydrol. Earth Syst. Sci., 22, 487–508, 2018

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Synthesis of aluminosilicates type zeolite from natural products from the south west Algerian area by hydrothermal

F.Z. Bettioui[a]* and D. Lahcene[a]

[a] *Laboratory of Chemistry and Environmental Science (LCSE) - University Tahri Mohamed Bechar, 08000, Algeria*

* *Corresponding author.*Tel.: 0699124111
E-mail address: bettioui.fatimazohra@univ-bechar.dz

ABSTRACT

Releases of various micropollutants (anionic dyes, heavy metals...) In The environment is increasing, and these pollutants, toxic and poorly decomposing, are usually the source of many adverse health effects. Aluminosilicate was synthesized by the autoclave method, in an alkaline medium, using clay from the Algerian south-west. The use of kaolin in this study, a systematic investigation was carried out to develop a new hydrothermal alkaline activation route to avoid Acid aluminosilicates are insoluble and synthesize zeolites of high purity. Metakaolin was achieved by calcining the first at 600 °C for 3 hours. This route begins with the hydrothermal reaction of natural kaolin and sand treated with sodium hydroxide to an aqueous composition Sodium aluminosilicate (such as hydroxycancrinite and nepheline hydrate), which are then dissolved dilute hydrochloric acid. The resulting acidic solution, after filtration to remove unreacted metal impurities, is then adjusted in PH. The main advantage of this method is that it allows to use low-cost kaolin and produce high-quality zeolites when raw kaolin is purified. Raw kaolin, metakaolin and synthetic products (zeolites) were distinguished by X-ray diffraction (XRD) and infrared (FTIR).

Keywords: Kaolin; Hydrothermal; Zeolites; Aluminosilicates; Sand; environmental.

References

1. Rebiai A, Lanez T, Belfar ML. In vitro evaluation of antioxidant capacity of algerian propolis by spectrophotometrical and electrochemical assays. *Int J Pharmacol*. 2011, 1;7:113-8.
2. Ogata K, Yang Y. Modern control engineering. India: Prentice hall; 2002.
3. Levenspiel O. Chemical reaction engineering. Industrial & engineering chemistry research. 1999, 1;38(11):4140-3.
4. Idriss IM. Evaluating seismic risk in engineering practice. Proceedings of the eleventh international conference on soil mechanics and foundation engineering, San Francisco, 12-16 AUGUST 1985. Publication of: Balkema (AA). 1985.
5. Brahami A, Fajoui J, Bouchouicha B. Experimental study of exfoliation corrosion-induced mechanical properties degradation of Aluminum alloys: 2024-T3 and 5083-H22. *Algerian Journal of Engineering and Technology*. 2020.http://dx.doi.org/10.5281
6. Title of the website, URL in full, (date accessed)

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Use of glass waste to elaboration of a new ceramic

Lachibi Farid [a]* Aboutaleb Djamila [b] Safi Brahim[b]

[a] *Department of mechanical, University m'hamed Bougara, Boumerdes, Algeria*

[b] *Department of mechanical, University M'hmed Bougara,Boumerdes , Algeria*

* *Corresponding author*.Tel.: 0558767969
E-mail address: f.lachibi@univ-boumerdes.dz

ABSTRACT

The saving of the raw material obliges us to research new methods of replacement by recycled materials (1). And in this case, we do this study which uses glass waste (cullet) to develop a new ceramic and we use clay (local bentonite of maghnia) as a bonding agent and has excellent plasticity (2). to produce ceramic tiles, a base temperature with a variation in the mass percentage of bentonite and two different particle sizes of glass waste. After the characterization of the raw material (ATG / DSC, chemical composition, DRX, granulometric) the tiles obtained are characterized for determines the physical and chemical and mechanical characterizations (density, shrinkage, absorption, porosity, mass loss, humidity, chemical attack, Flexion, breaking force, hardness) the purpose of this work is to recover the large quantity of glass waste (3) and savings in raw materials and energy (4). And uses the tiles instead of the floor slab elaborated by the raw material.
Keywords: clay; waste glass; tiles; proprieties.

References

1. Chen Z, Poor S, Xue Q. Utilization of glass cullet to enhance the preforemence of sub-base. journal of cleaner production :(: 288(2021),125083
2. Silva R,Brito J, Lye C , Dhir R, The role of glass waste in the production of ceramic-based production and other applications a review . journal of cleaner production.167(2017), 346-364.
3. Benhoua F, Ayadi A, Lamri Y, Ratni H. Elaboration and characterization of a cellular glass-based cullet loaded with carbon fibers, materials letters ,160(2015),278-281.
4. Adediran A,Lemougna P,lllikainin M ,Recycling glass wool as a fluxing agent in the production of clay- and waste-based ceramics, journal of cleaner production:289(2021)

Algerian Journal of Engineering and Technology

Journal homepage: https://jetjournal.org/index.php/ajet

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Green synthesis of spherical TiO_2 nanocomposite using *Aspergillus carbonarius* fungus: Excellent photocatalytic water decontamination agent for RR 18 dye

Hadj Daoud Bouras [a,b,*]

[a] *Département d'Automatique et Électromécanique, Faculté des Sciences et Technologies, Université de Ghardaia, Ghardaia 47000, Algeria*

[b] *Laboratoire d'Etude et de Développement des Techniques de Traitement et d'Epuration des Eaux et de Gestion Environnementale (LEDTEGE), Ecole Normale Supérieure de Kouba, Vieux-Kouba, Alger, Algeria*

[*] Corresponding author. Tel.: +213550233576

E-mail address: hadjdaoud_bouras@yahoo.fr (Hadj Daoud Bouras).

ABSTRACT

Heterogeneous photocatalysis is an efficient, economical and environmentally friendly technology for removing organic contaminants from the aqueous environment. In this research work, the semiconductor photocatalyst titanium dioxide (TiO_2) was used to impregnate on *Aspergillus carbonarius* fungus (AC) for photocatalytic oxidation of azo dye solution. The photocatalytic decolorization of textile dye Reactive Red 180 (RR180) was investigated and the impact of catalyst loading as well as initial dye concentration was systematically examined. The synthesized nanocomposite is characterized by using Attenuated Total Reflectance Infrared Spectroscopy (ATR-IR), X-ray diffraction (XRD), scanning electron microscopy (SEM) and energy dispersive X-ray spectroscopy (EDS). The enhanced photocatalytic activity with respect to time and catalyst concentration was examined for RR 180 acting as a model dye which is better than many reported results. Almost 76% dye was degraded within 120 min which shows its excellent photocatalytic efficiency.

Keywords: Dead fungi; Biosorbent; Photocatalysis; Dye decolorization; TiO_2.

References

1. Gosavi, V. D., Sharma, S., (2014). A general review on various treatment methods for textile wastewater. *Journal of Environmental Science, Computer Science and Engineering & Technology*, 3 (1), 29–39.
2. Wang, J.L., Xu, L.J., (2012). Advanced oxidation processes for wastewater treatment: formation of hydroxyl radical and application, *Critical Reviews in Environmental Science and Technology*, 42, 251–325.
3. Zangeneh, H., Zinatizadeh, A.A.L., Habibi, M., Akia, M., Hasnain, I. M., (2015). Photocatalytic oxidation of organic dyes and pollutants in wastewater using different modified titanium dioxides: A comparative review. *journal industrial engineering chemistry*, 26, 1–36
4. Bankole, P.O., Adekunle, A.A., Govindwar, S.P., (2018). Enhanced decolorization and biodegradation of acid red 88 dye by newly isolated fungus, *Achaetomium strumarium*, *Journal environmental chemical engineering*, 6, 1589–1600
5. Priyanka Uddandarao, Raj Mohan B, (2016). ZnS semiconductor quantum dots production by an endophytic fungus *Aspergillus flavus*, *Materials Science and Engineering* B, 207, 26–32
6. Bouras, H.D., Isik, Z., Arikan, E.B., Bouras, N., Chergui, A., Yatmaz, H.C., Dizge, N., (2019). Photocatalytic oxidation of azo dye solutions by impregnation of ZnO on fungi, *Biochemical Engineering Journal*, 146, 150–159
7. Botía, D.C., Rodríguez, M.S., Sarria, V.M., (2012). Evaluation of UV/TiO_2 and UV/ZnO photocatalytic systems coupled to a biological process for the treatment of bleaching pulp mill effluent, *Chemosphere*, 89, 732–736

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The PV Industry Needs and Waste, case of Removal of one Dominant Pollutant Ion by Different Techniques

Fadila Djouadi Belkada[a]*, Ouiza Kitous[b], Salaheddine Aoudj[c], Ouahiba Bouchelaghem[a], Nadjib Drouiche[d], Mouna Hecini[a], and Nabil Mameri[b]

[a]*CRTSE, Centre de Recherche en Technologie des Semi-conducteurs pour l'Energétique, Algiers, Algeria*

[b]*ENP, Ecole Nationale polytechnique, Algiers, Algeria.*

[C]*Université de Blida1, Blida, Algeria*

[d]*Agence Nationale de Valorisation des Résultats de la Recherche et du Développement Technologique, Algiers, Algeria*

** Corresponding author.Tel.: +213-21433511*
E-mail address: djouadifadila@crtse.dz, fdbelkada.udts@gmail.com

ABSTRACT

Energy from fossil fuels has their own advantages, but the damage that they may cause to the environment can affect heavily the ecosystem. In the last few years, the photovoltaic (PV) energy conversion has become an emerging technology, and its demand is increasing rapidly, this technology is gradually viewed as an alternative one which may contribute to the world energy supply. Solar graded silicon is the basic material for solar cells manufacturing. Different production processes steps require a mixture of HF/ HNO_3 and an important amount of water, resulting in industrial effluents characterized by the presence of hydrogen fluorides, suspended solids, mixed acids, SiO_2 and high oxide particles. Industrial waste waters from PV production have high concentrations of fluoride, typically in a range of 500-2000 mg/L. Consequently, the resulting waste waters need to be strictly monitored and regulated because of the very toxic nature of the two dominated pollutants that are the nitrate and the fluoride ions.

In this work, an outline of manufacturing steps of silicon wafers and a classification of effluents are presented. Some results of the elimination of synthesized effluent containing fluoride ions by different techniques are given. Activated alumina as adsorbent removed the fluoride ions at 60%; using electrocoagulation process the ions were removed at 80%; and using the electrodialysis system, the concentrations of the pollutants in treated solutions remain below that recommended by the world health organization (WHO).

Keywords: *PV factory, Fluoride, Activated alumina, Electrocoagulation, Electrodialysis.*

References

1. M.Schleef, D.Worf, R.Bartels, M. Kostieva, Wastewater treatment for crystalline silicon solar cell production, Photovoltaics International (PV-Tech), Vol.11, 2011.
2. Nadjib Drouiche, Fadila Djouadi-Belkada, Tarik Ouslimane, Aissa Kefaifi, Jihane Fathi, Emina Ahmetovic. Photovoltaic solar cells industry wastewater treatment. Desalination and Water Treatment. 1–9, 2013.
3. Fadila Djouadi Belkada, Ouiza Kitous, Nadjib Drouiche, Salaheddine Aoudj, Ouahiba Bouchelaghem, Nadia Abdi, Hocine Grib, Nabil Mameri. Electrodialysis for fluoride and nitrate removal from synthesized photovoltaic industry wastewater: Separation and Purification Technology 204 (2018) 108–115. Available online 25 April 2018. https://doi.org/10.1016/j.seppur.2018.04.068.

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The photocatalytic degradation of methyl blue in the presence of synthesized material ZnWO4

Ounis Amina[a]* Menasra Hayet[b]

[a]*Industriel chemistry department, Mohamed kheider university, Biskra, Algeria*

[b]*Industriel chemistry department, Mohamed kheider University, Biskra, Algeria*

0657433268
ounisamina27@univ-biskra.dz

ABSTRACT

The treatment of water contaminated by dyes has experienced great development in recent years. Indeed, organic dyes are constituents widely used in textiles, paper, food and cosmetics industries and constitute one of the main groups of pollutants in wastewater [1].

It is therefore very important to protect the environment from these contaminants. It is in this context that various methods have been used for the elimination of color from textile effluents such as adsorption, precipitation, air extraction, flocculation, reverse osmosis and ultrafiltration. Among these various treatment methods used to degrade these refractory pollutants, the process of photo-catalysis which is carried out with semiconductor materials such as TiO2, ZnO, Fe2O3, Photo-catalysis is based on the principle of activation of a semiconductor using the energy provided by light. The semiconductor is considered to be a catalyst. Its principle is close to heterogeneous catalysis where the oxidation-reduction reaction takes place on the surface of the catalyst [2].

In this study, the synthesis of ZnWO4 catalyst was carried out by the **molten salt method**. the mixture was prepared and then calcined under a temperature of 700 degrees for 4 hours.
The morphological structure of semiconductor material was explored by X-ray diffraction XRD has a pure monoclinic structure of space group P2/c. and scanning electron microscopy SEM and EDX show as physic-chimiques properties about the material , then by infrared analysis FTIR .We used the analyse BET to calculate the specific surface, , pore diameter of the synthesized material.
Photocatalytic study of synthesized catalyst treated under the influence of ultraviolet radiation UV (364 nm, 6W) and solar radiation to degrade the organic polluant methylene blue. Photo-catalysis of this cationic pollutant follows first-order reaction kinetics. The rate of degradation approximately 66% under influence of ultraviolet and 88% under solar radiation.

Keywords: molten salt; catalyst; photoctalytic; synthesized; kinetics.

References

1. https://www.allergienet.com/conservateurs-allergie/.

2. B.IBTISSEM, Dégradation du colorant AG25 dans l'eau en presence de nano-Ferrite – cobalt par un procédé photocataltique oropre, memoire de master ACADEMIQUE, universities Abdelhamid Ibr Badis Mostaganem, (2019).

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Mn(II) ion elimination study on blast furnace slag: kinetics and thermodynamics

Sabiha CHOUCHANE[a]* and Toufik CHOUCHANE[b]

[a]*Department of chemistry, Badji Mokhtar University, P.O.Box 12 Annaba Algeria*

[b]*Research Center in Industrial Technologies CRTI, P.O.Box 64, Cheraga 16014 Algiers Algeria*

**Corresponding author*.Tel.: 213 (0) 6 96 11 54 60
chouchsam01@yahoo.fr

ABSTRACT

Water pollution by metal ions is one of the most undesirable environmental problems in the world that requires immediate solutions [1-4]. So, in this study, we used blast furnace slag to remove Mn (II) ions from an aqueous medium. The various characterization processes have specified that the blast furnace slag is composed of lime, silica, alumina, and magnesium oxide. Its specific surface area of 328.61 m 2 /g. Experimental results have shown that contact time, agitation, pH, temperature, particle size, and initial solute concentration play a major role in this process. The adsorption kinetics showed that equilibrium is reached after 60 minutes of stirring and that the maximum adsorbed capacity is 59.88 mg/g. According to the adsorption isotherms, the sorption of Mn(II) ions occurred on a monolayer homogeneous surface [5]. The parameters of the Langmuir (R L) and Freundlich (1/n) models demonstrated that this process is favorable. The experimental data showed that the adsorption process follows pseudo-second-order kinetics. Furthermore, internal and intraparticle diffusion control the diffusion of M(II) ions from the solution to the adsorbent. The temperature variation of the solution proved that the manganese sorption on the slag is physical, spontaneous, exothermic, and less entropic at the solid-liquid interface.

Keywords: Slag, Mn(II), adsorption, kinetics, pollution

References

1. . Yan, J. Wang, L. Zhu, J. Wang, S. Li, Y. M. Kim, "Oxidative stress, growth inhibition, and DNA damage in earthworms induced by the combined pollution of typical neonicotinoid insecticides and heavy metals", *Sci. Total Environ.*vol. 754, No141873, 2021.
2. M. Hossain, P. K. Patra. "Water pollution index - A new integrated approach to rank water quality",*Ecological Indicators*, vol. 117, No 106668, 2020.
3. M. Mandich. "Ranked effects of heavy metals on marine bivalves in laboratory mesocosms: A meta-analysis", *Marine Pollution Bulletin*, Part A, vol. 131, pp. 773-781, 2018
4. A. S. Amin; S. S. Hussien; W.A. Hafez, O.A. Desouky, "Biorecovery of Cupper (II) using Klebsiellapneumoniae Isolated from Wastewater", *Egypt. J. Chem.*, vol.64, pp. 6623-6633, 2021.
5. F. M. S. E. El-Dars, M. A. G. Elngar, S. Th. Abdel-Rahim, N. A. El-Hussiny , M. E. H. Shalabi, "Kinetic of nickel (II) removal from aqueous solution using different particle size of water-cooled blast furnace slag", *Desalination Water Treat.*, vol. 54, pp. 769-778, 2015.

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Activation of activated carbon based on date palm waste and application to the environment. Adsorption of a textile dye

Sabah DJABER[1, a *], Abdelbaki REFFAS[1]

1 Inorganic Materials Laboratory, Department of Chemistry, Faculty of Sciences, University Mohamed Boudiaf-M'sila, 28000, Algeria

Tel.: 06.75.25.37.45

E-mail address:djsa5237@gmail.com

ABSTRACT

The evolution of the chemical properties of activated carbon saturated with phosphoric acid has been studied in the literature, but few works take into account the evolution of most of the porous properties of the adsorption phenomenon. This study focuses on the effect of phosphoric acid concentration (60% and 30% by mass) on palm waste.
Activated carbon made from palm trash was characterized using FTIR, phpzc, and ATG. Additionally investigated were the iodine index and the methylene blue index.It was investigated how different variables, including starting dye concentrations of 10–500 ppm and pH (2–10), adsorbent dose (0.005–1 g/L), contact period (20–480 min), and other variables, affected the results. Compounds were evaluated in solution before and after adsorption using FTIR spectroscopy. Application of and experimental results supporting isothermal models of Langmuir and Freundlich. The findings demonstrated that the adsorption phenomenon closely matches the Langmuir isotherms a pseudo-second-order model best captures the sequential adsorption kinetics of methylene blue dye on palm residue. The outcomes demonstrated that phosphoric acid significantly enhanced the aforementioned properties This study also confirmed the nature of the starting material, the rate of impregnation between H3PO4 and the precursor, and the activation temperature. Important factors affecting the properties of finished activated carbon products.

Keywords: Phosphoric acid; palm; adsorption; porosity; chemical activation

References

1. Sahoo D, Remya N (2020) Influence of operating parameterson the microwave pyrolysis of rice husk: biochar yield, energyyield, and property of biochar. Biomass Convers Biorefinery13399.
2. Chahinez HO, Abdelkader O, Leila Y, Tran HN (2020) One-stage preparation of palm petiole-derived biochar: characterization and application for adsorption of crystal violet dye in water. Environ Technol Innov 19:100872.
3. Nguyen VT, Nguyen TB, Chen CW et al (2019) Influence of pyrolysis temperature on polycyclic aromatic hydrocarbons production and tetracycline adsorption behavior of biochar derived from spent coffee ground. Bioresour Technol 284:197–203.
4. Meng RH, Chen T, Liu YT et al (2020) Effects of pyrolysis temperature on ZnCl2 impregnated corn straw-derived biochar properties and vanadium (III, IV, V) adsorption in aqueous solution. DEStech Trans Environ Energy Earth Sci.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Removal of cationic and anionic dyes from aqueous solutions using nitronite clay: isotherm, kinetics and thermodynamic study

Besserni rabia [1]* ,Neghmouche nacer salah [1] , Atia djamal [1] , Alia khaoula[2]

[1] *laboratory of chemistry Applied and the environment, Department of chemistry, Faculty of exact sciences, University of Eloued, Eloued 39000, Algeria*

[2] *Unit for the development of renewable energies in arid regions, Department of Process Engineering, Faculty of Technology, University of Eloued , Eloued 39000, Algeria*

* Corresponding author Tel.: 06 98 44 61 74

E-mail address: *Rabia-besserni@univ-eloued.dz*

ABSTRACT

The objective of this work is to address the removal of pollutants from aqueous solutions by the adsorption process using clay from the Djelfa region as the most abundant and low-cost natural material. First, the clay was purified and separated to obtain clay minerals with a diameter of less than 2µm, to study the physico-chemical properties of the clay by studying the FTIR, XDR, SEM analyses, the possibility of the adsorption by clay of a cationic dye (methylene blue) and another anionic (Congo red) as pollutants in aqueous solutions has been studied. The dependence on surface response modeling (RSM) under the change of the following factors: concentration, temperature and thermodynamic factors such as ΔG, ΔH, ΔS and adsorption kinetics were determined.

Keywords: Congo red ;Nontronite; Methylene blue dye; Adsorption; Isotherm models.

References

1. Rehman, M. U., Manan, A., Uzair, M., Khan, A. S., Ullah, A., Ahmad, A. S., Wazir, A. H., Qazi, I., & Khan, M. A. (2021). Physicochemical characterization of Pakistani clay for adsorption of methylene blue: Kinetic, isotherm and thermodynamic study. *Materials Chemistry and Physics*, *269*, 124722. https://doi.org/10.1016/j.matchemphys.2021.124722
2. Çiftçi, H. (2022). Removal of methylene blue from water by ultrasound-assisted adsorption using low-cost bentonites. Chemical Physics Letters, 802, 139758. https://doi.org/10.1016/j.cplett.2022.139758
3. Ahmad, R., & Ansari, K. (2021). Comparative study for adsorption of congo red and methylene blue dye on chitosan modified hybrid nanocomposite. Process Biochemistry, 108, 90–102. https://doi.org/10.1016/j.procbio.2021.05.013
4. Zhang, Z., Li, J., Zhao, Y., Wen, T., Zhang, T., & Song, S. (2022). Synthetic Fe-rich nontronite as a novel activator of bisulfite for the efficient removal of tetracycline. Journal of Environmental Management, 302, 114002. https://doi.org/10.1016/j.jenvman.2021.114002
5. Akin, K., Ugraskan, V., Isik, B., & Cakar, F. (2022). Adsorptive removal of crystal violet from wastewater using sodium alginate-gelatin-montmorillonite ternary composite microbeads. *International Journal of Biological Macromolecules*, *223*, 543–554. https://doi.org/10.1016/j.ijbiomac.2022.11.002

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Electrochemical degradation of methyl green in aqueous solution by oxidation process

NEGHMOUCHE NACER Salah[1,2],BRAHMIA Ouarda[3],LOUAFI Fadila[2]

1Université Hamma Lakhdar Eloued , 39000 Algérie.

2Unité de Recherche CHEMS, Université des frères Mentouri de Constantine,Constantine, 25000, Algérie

3 Laboratoire des Techniques innovantes de préservation de l'Environnement,Université des frères Mentouri de Constantine, Constantine, 25000, Algéri[e]

* *Corresponding author.*Tel.:0669444009
E-mail address: neghmouchenacer-salah@univ-eloued.dz

ABSTRACT

Wastewaters originated from various industry such as textile contain various polluants including a high content of organic matter and suspended masses and dissolved salts. Moreover, organic dyes used to dye cotton, acrylic, silk and wood are considered as widespread environmental pollutants. [1] In the case of textile industry, up to 50 % of the synthetic dyes with different structural varieties such as; azo, diazo, quinine imine, thiazole and others [2] are lost after the dyeing process and disposal out in the effluents [3]. Therefore, their elimination from wastewaters is an obligation to prevent the ecosystem destruction. Conventional wastewater treatment based on biological process is not suitably enough to remove recalcitrant dyes from effluents [4]. Physical and chemical methods used for eliminating dyes (i.e. adsorption, incineration, electrocoagulation, photocatalysis,ozonation and others) are reasonably effective but relatively cost. That's why; it's necessary to find an effective wastewater method capable of degrading toxic organic compounds from industrial effluents. As alternative, the electrochemical oxidation process is a clean advanced oxidation technology because the main reagent; the electron, is a clean one [5]; it was applied successfully and proved to be convenient and fruitful to destruct bio-refractory organic compounds due to its high effectiveness and environment well-suited.

In this study, the electrochemical degradation of water methyl green on Pt electrodes was assessedin our particular conditions. The degradation rate have been evaluated with and without the redox mediator.The kinetics data shows first-order kinetics in the case of the indirect oxidation. A mechanism wasadvanced to explain the different phenomenon during the electrochemical processin both direct and indirect oxidation.

Keywords: electrochemical; oxidation; Wastewaters; polluants; degradation.

References

[1] B.H.Hameed, T.W. Lee, J. Hazard. Mater, 2009:164:468.
[2] I. M. Banat, Nigam P,: A review, Bioresource. Technology, 1996:58:217.
[3] Zollinger, Color Chemistry: Syntheses, properties and Applications of Organic Dyes and Pigments. VCH Publishers, Weinheim, Germany: 1991.
[4] G.M. Shaul, T.J. Holdsworth, Dempsey C.R, Dostall K.A, , Chemosphere, 1991:22:107.
[5] (a)K. Juttner, U. Galla, H. Schmieder, , Electrochim. Acta, 2000: 45: 2575.(b)O.Brahmia, F. Louafi Sciences& Technologie A- N°42, Décembre 2015, 9-14.(c)Sanroman M.A, Pazos M, Ricart M.T, Cameselle C, Chemosphere, 2004:57:233.

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DFT Calculations for Corrosion Inhibition of heterocyclic compounds

Aicha Kerassa[1]* , DERKI nour-elhouda[1]

[a] *VTRS Laboratory, Faculty of Sciences and Technology, University of El Oued, B.P.789, 39000 El Oued, Algeria*

* Tel.: 0698137070
E-mail address: kerassa-aicha@univ-eloued.dz

ABSTRACT

The corrosion of metals, including mild steel, is a serious problem in many industries, especially during processes such as the pickling of steel, acid washing and etching. One method of protecting it from corrosion is to use organic inhibitors, which are heterocyclic compounds containing P, S, O, or N and have p bonds , These hetero-atomic compounds can be seen as environmentally friendly corrosion inhibitors because of their characteristics of strong chemical activity and low toxicity[1,2] .

in our work, The corrosion inhibition performances of three corrosion inhibitors on mild steel in acidic medium, were theoretically evaluated using quantum chemistry calculations by DFT/ 6-311G (d, p) and 6-31G (d, p) basis set implemented in the GAUSSIAN 09 software [3] in gas phase. The frontier orbital energy, global reactivity parameters.

From the results we can reveal that, The theoretical calculations are in good agreement with the experimental results; where, The fraction of electrons (ΔN) and molecule–metal interaction energy (Δψ) obeying the following order: C2 > C1 > C3.

Moreover, The compound C2 favor its nucleophilic character because the trend of EHOMO : C2 > C1 > C3, which may be attributed to an inductive effect (electron-donating) of laterals methyl groups.

Also, The negative sign of E_(b-d)indicates that back-donation to the inhibitor is energetically favorable[4] .

Keywords: DFT, Corrosion Inhibition **,** heterocyclic compound, HOMO, LUMO

References

[1] Becke, Axel D. "Density-functional thermochemistry. I. The effect of the exchange-only gradient correction." *The Journal of chemical physics* 96.3 (1992): 2155-2160.

[2] Hariharan, Praveen C., and John A. Pople. "The influence of polarization functions on molecular orbital hydrogenation energies." *Theoretica chimica acta* 28.3 (1973): 213-222.

[3] Frisch, M.J.; Trucks, G.W.; Schlegel, H.B.; Scuseria, G.E.; Robb, M.A.; Cheeseman, J.R.; Scalmani, G.; Barone, V.; Petersson, G.A.;Nakatsuji, H.; et al. (Eds.) Gaussian 09, Revision C.01; Gaussian, Inc.: Wallingford, CT, USA, 2009

[4] Aouniti, A. K. K. F., K. F. Khaled, and B. Hammouti. "Correlation between inhibition efficiency and chemical structure of some amino acids on the corrosion of armco iron in molar HCl." *Int. J. Electrochem. Sci* 8 (2013): 5925-5943.

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A DFT and molecular docking investigation of new Au (III) and Fe (III) based complexes as Anti-cancers.

Yassamina ARBIA[a*], Soraya ABTOUCHE[a], Mohamed DAHMANE[b] and Meziane BRAHIMI[a]

[a]*Laboratoire de Physico Chimie Théorique et Chimie informatique (LPCTCI), Faculty of Chemistry, Université des sciences et de la technologie Houari Boumediene (USTHB), BP 32 El-Alia, 16111 Algiers, Algeria*

[b]*Chromatography Laboratory, Faculty of Chemistry, Université des Sciences et de la Technologie Houari Boumediene (USTHB), BP 32 El-Alia, 16111 Algiers, Algeria*

* Corresponding author.Tel.: 0777 33 52 46

E-mail address: yarbia@usthb.dz

ABSTRACT

Many researchers have tried to overcome the limitations of clinical Cis-platin, which has led to several generations of platinum-based drugs that are derived from the Cis-platin matrix with a large number of molecules, but only five complexes have been approved. These latest generations of platinum-based drugs are rather important in chemotherapy, as they are often involved in the treatment of different types of cancer. Their use remains hampered by their severe toxicity, resistance to tumor cells, poor oral bioavailability as well as the repair of the resulting adducts, and the failure of the apoptotic pathways [1-6]. Different strategies are needed. To understand the structural, electronic, and spectroscopic properties of new Au (III) based complexes [7], a theoretical study of the density functional theory (DFT) and docking molecular is undertaken in this work using different functional and basis sets. If a good correlation is found between the various descriptors and the anti-cancer activity, it would probably indicate a better solution to substitute Au (III) with Fe (III), which is also an element commonly used in the manufacturing of drugs.

Keywords: DFT, docking molecular, Au (III) complexes, Fe (III) complexes, and anti-cancer.

References

1. Martinčič A, Cemazar M, Sersa G, Kovač V, Milačič R, Ščančar J (2013) Talanta, 116: 141–148, https://doi.org/10.1016/j.talanta.2013.05.016.
2. Chatelut E (2011) Bulletin du Cancer, 98:1253–1261. https://doi.org/10.1684/bdc.2011.1464
3. Rabik C A,Dolan M E (2007) Cancer Treatment Reviews, 33:9–23. https://doi.org/10.1016/j.ctrv.2006.09.006
4. Galanski M, Jakupec M, Keppler B (2005) Current Medicinal Chemistry, 12:2075–2094, 2005. https://doi.org/10.2174/0929867054637626.
5. Wang D, Lippard S J (2005) Nature Reviews Drug Discovery, 4: 307–320, https://doi.org/10.1038/nrd1691.
6. Rosenberg B., (1977) Noble metal complexes in cancer chemotherapy. Advances in Experimental Medicine and Biology, 91:129–150. https://doi.org/10.1007/978-1-4684-0796-9_10.
7. Casado-Sánchez A, Martín-Santos C, Padrón J M et al. (2017) Journal of Inorganic Biochemistry, 174: 111–118, https://doi.org/10.1016/j.jinorgbio.2017.06.004.

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Prediction of thermal Energy of aliphatic Aldehydes using QSPR approach and MLR technique

Souyei Belgacem[*a, b], Kertiou Noueddine[c,d], Khechekhouche Abderrahmane[e]

[a] *Chemistry Department, Echahid Hamma Lakhdar University, El Oued, Algeria*

[b] *Chemistry and environment laboratory, Echahid Hamma Lakhdar University, El Oued, Algeria*

[c] *Matter science department, Abbes Laghrour University, Khenchela, Algeria*

[d] *E nvironmental and Food Safety Laboratory (08 EFSL), University of Annaba, Algeria*

[e] *Echahid Hamma Lakhdar University, Faculty of Technology, El Oued, Algeria*

** Corresponding author.Tel.: 0699041411*

belgacem3963_alg@yahoo.fr

ABSTRUCT

An attempt has been made for the development of quantitative structure-property relationship (QSPR) models for a series of aliphatic Aldehydes tested for the thermal Energy Using the interpretable descriptors represented in the following blocks(2D frequency fingerprints), (atom centred fragments), (functional group counts), which represent the molecular structure, where it was calculated using Dragon software. The MLR method was employed to explore the correlation between these molecular descriptors, while the thermal Energy Eth(kcal/mol) is the property representation. The thermal Energy values for a set of 24 aliphatic Aldehydes were used for obtaining QSPR analysis and a group of multiple linear regression (MLR) models. The analysis of models building including 70% of computed data and 30% for test validation set compounds shows t hat selected descriptors have a good correlation with thermal Energy (Eth) . The obtained results have shown that the descriptors type for each model could be used successfully for modeling and predicting the thermal Energy of aliphatic Aldehydes not used in this study.

Keywords: Aliphatic aldehydes; Multiple linear regression analysis; Computed molecular descriptors; QSPR; Statistical model.

References

1. J.R. Roede, K.S. Fritz. Hepatotoxicity of Reactive Aldehydes☆. In book: Reference Module in Biomedical Sciences. 2015 DOI:10.1016/B978-0-12-801238-3.02113-9
2. W. Filipiak, ... A. Amann. Volatile Organic Compounds (VOCs) Released by Pathogenic Microorganisms in vitro: Potential Breath Biomarkers for Early-Stage Diagnosis of Disease. Volatile Biomarkers, (2013) 463-512.
3. J. C. Aponte, D. Whitaker, [...], and J. P. Dworkin . Analyses of Aliphatic Aldehydes and Ketones in Carbonaceous Chondrites.ACS Earth space chem, 3(3) (2019) 463-472.
4. R. Schoenotol, S. Gibbard, Carcinogens in Chinese incense smoke (letter). Nature (1967) 216:612.
5. J M Lin L H Wang, Gaseous aliphatic aldehydes in Chinese incense smoke. Pub med, 53(3) (1994) : 374-81. doi: 10.1007/BF00197229
6. T. Has I. Jiricek . The prediction of heat storage properties by the study of structural effect on organic phase change materials .Energy Procedia 46 (2014) 301-309.

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Ibuprofen sodium salt sorption onto strongly basic exchange resin: IRN-78

Mongi Ben Mosbah[a,c,*], Fayrouz Taleb[a,c], Younes Moussaoui[b,c]

[a]*Laboratory for the Application of Materials to the Environment, Water and Energy (LR21ES15, Tunisia.*

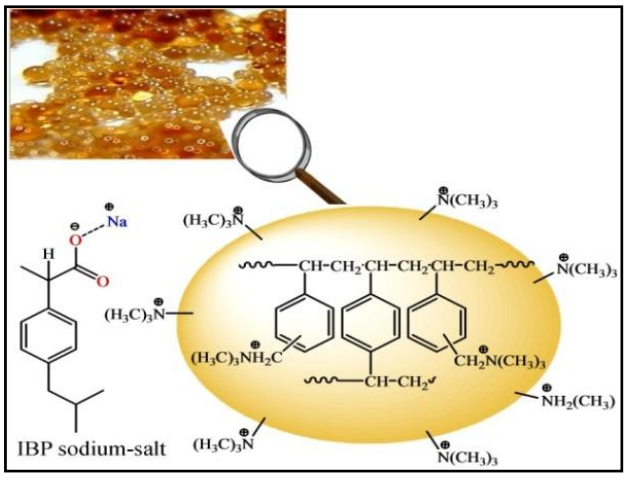
[b]*Organic Chemistry Laboratory (LR17ES08), Faculty of Sciences of Sfax, University of Sfax., Tunisia.*

[c]*Faculty of Sciences of Gafsa, University of Gafsa, Tunisia*.

* *Corresponding author.*Tel.: 21699050453; *E-mail address:mbenmosbah@yahoo.fr*

ABSTRACT

The usefulness of pharmaceuticals remains essential in our daily life. However, these products which are designed to be substances biologically active can also be a source of contamination. Particularly, non-steroidal anti-inflammatory drugs such as Ibuprofen (IBP), exert inhibition of certain functions in vertebrates and invertebrates [1]. Due to the widespread occurrence of this pharmaceutical in aqueous media, its potential for ecological impact has received great attention [2]. This work aims to study the performance of Amberlite resin IRN-78 for the retention of IBP sodium salt. Thus, isotherm, kinetics and thermodynamic investigations were discussed. The maximum adsorption capacity onto the IRN-78 was 1.266 mmol/g. The equilibrium data fit well to the Langmuir model. The thermodynamic study demonstrated that the adsorption of IBP onto IRN-78 was spontaneous and endothermic and the sorption process was controlled by physical mechanism rather than chemical mechanism [3].



Keywords: IRN-78, Ibuprofen, Adsorption, Isotherm modelling.

References

1. Klavarioti M, Mantzavinos D, Kassinos D. *Environ. Int.* 2009, 35; 402-417.
2. Verlicchi P, Galletti A, Petrovic M, Barcelo D. *J. Hydrology*. 2010, 389; 416-428.
3. Taleb F, ben Mosbah M, Elaloui E, Moussaoui Y. *Korean J. Chem. Eng.* 2017, 34; 1141-1148.

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Comparative study by molecular modeling of the structural properties and the reactivity of a donor-π

Rachida Khammar[a*], Amel Bendjeddou[b], Tahar Abbaz[c]

a,b,c :Department of Material Sciences, University of Mohamed Cherif Messaadia, faculty of science and technology, Souk Ahras, Algeria

Organic Chemistry and Interdisciplinary Laboratory, University of Mohamed Cherif Messaadia, Souk Ahras, Algeria

* Corresponding author.Tel.: 07 72 57 6 1

E-mail adress : r.khammar@univ-soukahras.dz

ABSTRACT

The present work includes a coparative molecular modeling study of a derivative of Tetrathiafulvalene (electron-π donor) ; using the method of density functional theory (DFT) and the quantum method of Hartree Fock (HF) with the same 6-31G (d,p) basis. We have identified geometric and structural parameters, energy parameters, and descriptors of local and global reactivity as well as nonlinear optics (NLO). this study allowed us to adopt the best method for the theoretical study of our compounds.

Keywords:Tetrathiafulvalene (TTF), Hartree Fock (HF), Density Functional Theory (DF)

References

[1] Y. Tokura, Current Opinion in Sol, State Materials Sc, **(1998)**, 3, 175.

[2] W.Hehere, Pratical Strategies for Electronic Structure Calculations,Wave functions,Inc,Irvine California **(1995)**.

[3] MJ. Frisch, GW. Trucks, HB. Schlegel, GE. Scuseria, MA. Robb, and DJ. Fox,Gaussian, Inc,Wallingford, CT, (**2009)**.

[4] S .Archer, E. Weir, M. Wilkins, Am. J. Physiol. Heart .Circ. Physiol, **(2007),** 294, 570.

[5] C. Hetényi; U.Maran .M.Karelson, Journal of chemical information and computer sciences. **(2003)** ,43 ,1576.

[6] J.B.Foresman, A. "Frisch. Exploring Chemistry with Electronic Structure Methods:A Guide to Using Gaussian", second ed. Gaussian, Inc. Pittsburg (**1996)**.

[7] L. Boudiba, L.Kaboub, A. Gouasmia, JM. Fabre, Georg Thieme Verlag Stuttgart. NewYork, **(2005)**, 8, 1291

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Non-thermal plasma technology for biodiesel production Mechanisms and reactors configuration.

Abdelghani SEROUTI[a,c,*], Mohammed Fouad FARHAT[a,c,d] and Abdelmonem MILOUDI[b,c]

[a]*Department of Process Engineering & Petrochemistry, Faculty of Technology, University of El Oued, PO Box 789, 39000 El Oued, Algeria*

[b]*Department of hydraulics and civil engineering, Faculty of Technology, University of El Oued, PO Box 789, 39000 El Oued, Algeria*

[c]*Unit of Renewable Energy Development in Arid Zones (UDERZA), El-Oued University, PO Box 789, 39000 El Oued, Algeria*

[d]*Laboratoire des Sciences et Techniques de l'Environnement et de la Valorisation, University Abdelhamid Ibn Badis-Mostaganem, BP 188, Mostaganem, Algeria*

* *Corresponding author.*Tel.: 0670255418
E-mail address: serouti82@gmail.com

ABSTRACT

The necessity for the creation of renewable fuels is rising as a result of the energy problem and the pollution that fossil fuels produce. Diesel fuels may eventually be replaced by biodiesel, which is created when vegetable or animal oils and alcohols undergo a process called transesterification. However, conventional transesterification techniques are time-consuming, ineffective, and costly. The study was focused on finding possible reaction mechanisms and routes during the non-thermal plasma process. The main reactions within the plasma treatment were due to collisions between highly energetic electrons (supplied from a high-voltage power supply through a high-voltage electrode) and the reaction mixtures. High-energy electrons excited, dissociated, or even ionized the electron's pair of covalent bonds at higher energies. As a result, this non-thermal plasma system was promising for biodiesel synthesis from vegetable oils because only a short reaction time was required and, even without the use of a catalyst, no soap formation occurred and no glycerol by-product was produced. This system could produce a fatty acid methyl ester yield of 78.3 percent at 120 seconds and other possible chemicals, such as alkynes, alkanes, esters, carboxylic acids, and aldehydes. However, during the plasma process, the reaction mechanisms were still difficult to control due to the action of the high-energy electrons available.
Keywords: renewable fuels; non-thermal plasma; plasma reactor; Biodiesel production; transesterification.

References

1. Nizah MR, Taufiq-Yap Y, Rashid U, Teo SH, Nur ZS, Islam A. Production of biodiesel from non-edible Jatropha curcas oil via transesterification using Bi2O3–La2O3 catalyst. Energy Convers Manage 2014 ;88 :1257–62.
2. Silitonga A, Masjuki H, Mahlia T, Ong HC, Chong W. Experimental study on performance and exhaust emissions of a diesel engine fuelled with Ceiba pentandra biodiesel blends. Energy Convers Manage 2013 ;76 :828–36.
3. Gebremariam S, Marchetti J. Economics of biodiesel production. Energy Convers Manage 2018; 168:74–84.
4. Macario, A., Giordano, G., Onida, B., Cocina, D., Tagarelli, A., Giuffrè, A.M. (2010). Biodiesel production process by homogeneous/heterogeneous catalytic system using an acid–base catalyst. Appl. Catal. A Gen. 378(2): 160-168.
5. Kouzu, M., Hidaka, J. (2012). Transesterification of vegetable oil into biodiesel catalyzed by CaO: A review. Fuel. 93: 1-12.
6. Lawson JA, Baosman AA. Method of electro-catalytic reaction to produce mono alkyl esters for renewable biodiesel. Google Patents 2010.
7. Istadi I, Yudhistira AD, Anggoro DD, Buchori L. Electro-catalysis system for biodiesel synthesis from palm oil over dielectric-barrier discharge plasma reactor. Bull Chem React Eng Catal 2014; 9:111.
8. Jahanmiri A, Rahimpour M, Shirazi MM, Hooshmand N, Taghvaei H. Naphtha cracking through a pulsed DBD plasma reactor: Effect of applied voltage, pulse repetition frequency and electrode material. Chem Eng J 2012; 191:416–25.
9. Buchori L, Istadi I, Purwanto P. Advanced chemical reactor technologies for biodiesel production from vegetable oils-a review. Bull Chem React Eng Catal 2016; 11:406–30.
10. Lee, D.H., Kim, T. (2013). Plasma-catalyst hybrid methanol-steam reforming for hydrogen production. Int. J. Hydrogen Energy. 38(14): 6039-6043.
11. Nozaki, T., Okazaki, K. (2013). Non-thermal plasma catalysis of methane: Principles, energy efficiency, and applications. Catal. Today. 211: 29-38.

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Theoretical and crystallographic study of a new derivative α-sulfamidophosphonate

Rayenne REDJEMIA[a*], Ali DEKIR[a], Rania BAHADI[a], Meriem BOUSSAKER[a], Malika BERREDJEM[a]

[1]*Laboratory of Applied Organic Chemistry, Synthesis of Biomolecules and Molecular Modelling Group, Department of Chemistry, Sciences Faculty, Badji-Mokhtar – Annaba University, Annaba, Algeria*
* Corresponding author.Tel.: 0663948919
E-mail address: *rayenneredjemia@hotmail.com*

ABSTRACT

A one-pot synthetic strategy was developed for the synthesis of a new sulfamidophosphonate via a three-component Kabachnik-Fields reaction of sulfanilamide, triethyl phosphite and benzaldehyde at using ultrasonic irradiation. The organophosphate derivative was synthesized in high yield by this developed method. The target compounds were characterized by ^{1}H, ^{31}P, ^{13}C NMR and IR. The molecular structure was obtained by X-ray diffraction on the monocrystal. Crystal belongs to the orthorhombic system with space groups Pbca. Insight into the binding mode of the synthesized compound (ligand) in SARS-CoV2 binding sites (PDF code: 5R80) was provided by molecular docking studies, performed using Maestro 9.0 docking software.

Keywords: α-sulfamidophosphonate, X-ray, molecular docking.

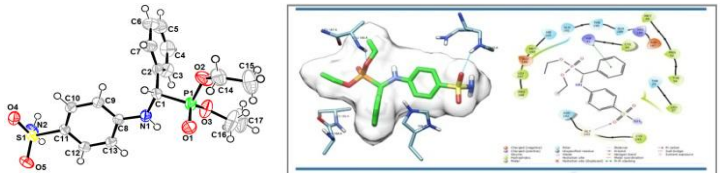

Figure 1: Ortep drawing and molecular docking of the compounds α-sulfamidophosphonate

References

1. Gangu KK, Maddila S., Jonnalagadda SB. Synthesis, Structure, and Properties of New Mg(II)-Metal–Organic Framework and Its Prowess as Catalyst in the Production of 4H-Pyrans. *ACS Ind. Eng. Chem. Res.*, 2017**,** 56, 2917.
2. Moodley V, Maddila S, Jonnalagadda, SB, van Zyl, WE. Retracted Article: Synthesis of triazolidine-3-one derivatives through the nanocellulose/hydroxyapatite-catalyzed reaction of aldehydes and semicarbazide. *New J. Chem.* 2017, 41, 6455.
3. Bhaskaruni SVHS, Maddila S, van Zyl WE, Jonnalagadda SB. RuO_2/ZrO_2 as an efficient reusable catalyst for the facile, green, one-pot synthesis of novel functionalized halopyridine derivatives. Catal. Commun. 2017, 100, 24.
4. Guerfi M, Beredjem M, Bouzina A, Hadda TB, Marminon C, Otmane Rachedi K. Novel α-sulfamidophosphonate analogues of fotemustine: efficient synthesis using ultrasound under solvent-free conditions *Monatshefte für Chemie – Chem. Mon*. 2020, 151, 1859.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Molecular docking on Deguelin analogues as inhibitors of Hsp90 protein

Bouchagra Samah[a,b*]

[a]*Chemistry Department, Faculty of Exact Sciences, University of Hamma lakhdar El-Oued, , B.P. 789, El Oued 39000, Algeria.*
[b]*Applied Organic Chemistry Laboratory, Badji-Mokhtar University, B.P.12 , Annaba 23000, Algeria.*

* Corresponding author.Tel.: 0557001892
E-mail address: bouchagra-samah@univ-eloued.dz

ABSTRACT

Deguelin is a naturally occurring retinoid isolated from the African plant Mundulea sericea (Leguminosae), has been reported as a Heat shock protein 90 (Hsp90) inhibitor with potent apoptotic and antiangiogenic effects. Therefore, inhibition of HSP90 presented a promising therapeutic strategy for the development of new efficacious drugs to treat breast cancer by interrupting ATP binding to the HSP90 C terminus.

In this study, The deguelin analogues were docked within the active site region of Hsp90 using Molegro Virtual Docker. The results of molecular docking studies revealed that some analogues have higher Moldock score than Degelin. Further, in silico predicted ADME properties were investigated for the most promising molecules. The results of this study identified a new possible inhibitors which have the potential to be developed into drugs, thus significantly contributing to the design and optimization of therapeutic strategies against cancer.

***Keywords**: Deguelin; Hsp90; Docking; Cancer; Inhibitor.*

References

1. Nguyen CT, Thanh La M, Ann J, et al. Discovery of a simplified deguelin analog as an HSP90 C-terminal inhibitor for HER-positive breast cancer. Bioorganic & Medicinal Chemistry Letters. 2021, 45:128-134.
2. Oh SH, Woo JK, Yazici YD, et al. Structural basis for depletion of heat shock protein 90 client proteins by deguelin. J. Natl. Cancer Inst. 2007, 99: 949-961.
3. Park JM, Kim YJ, Park S, et al. A novel HSP90 inhibitor targeting the C-terminal domain attenuates trastuzumab resistance in HER2-positive breast cancer. Mol.Cancer. 2020,19:161.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Synthesis, antimicrobial activity, molecular docking and ADMET study of novel *N*-acylsulfonamides

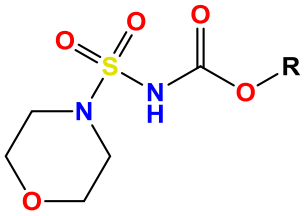
Ali Dekir*, Malika Berredjem, Mansouri Achraf, Chahrazed Benzaid

Laboratory of Applied Organic Chemistry LCOA, Synthesis of biomolecules and molecular modelling Group, Badji-Mokhtar - Annaba University, Box 12, 23000 Annaba, Algeria.

* *Corresponding author*.Tel.: 0555076124
E-mail address: dekir.ali23@gmail.com

ABSTRACT

Microbial resistance to drugs currently traded in the market is a serious problem in modern medicine. In this field of research, we synthesized a novel *N*-acylsulfonamides (**NAS**) derivatives starting from commercially available compounds; morpholine, isocyanate of chlorosulfonyl and alcohols[1]. The *in vitro* antimicrobial potential of synthesized compounds was screened against 04 Gram-negative bacteria; *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, 02 Gram-positive bacteria: *Streptococcus sp*, *Staphylococcus aureus* and 07 yeasts and fungi: *Candida albicans*, *Candida spp*, *Penicillum spp*, *Aspegillus sp*, *Aspergillus flavus*, *Fusarium sp*, and *Cladosporium spp*. The results of inhibition growth were compared with standard antimicrobial drugs with the goal of exploring their potential antimicrobial activity[2]. In addition, the obtained bioactivity results were further validated by in silico ADME and molecular docking studies.



Structure of *N*-acylsulfonamide

Keywords: *N*-acylsulfonamide; molecular docking; antimicrobial activity.

References

1. Berredjem M, Bouasla R, Aouf NE, Barbey C. Crystal structure of 4-phenyl- piperazine-1-sulfonamide, *X-Ray Struct. Anal. Online.* 2010, 26; 13-14.
2. Yaici K, Dahamna S, Moualek I, Belhadj H, Houali K. Evaluation of the Content of Phenolic Compounds, Antioxidant and Antimicrobial Properties of Erica arborea L. (Ericaceae) in Traditional Medicine of Setifian Tell in the East Algerian. *Phytothérapie*. 2021, 19: 226-234.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Investigation of intermolecular in inclusion complexes of Guanosine with hydroxypropyl-beta-cyclodextrin using DFT.

Hayahem Sakina[a], Nouar Leila[b]

[a] *University, Mohamed Cherif Massaidia SoukAhras Algeria*

[b], *University, Université 08 Mai 1945 Guelma Algeria.*

* *0674385303*
s.hayaheme@univ-soukahras.dz

ABSTRACT

In this work, the host-guest inclusion complexes of Guanosine (GuN) with hydroxypropyl-beta-cyclodextrin (HPCD) were investigated by the density functional theory (DFT) method using the following functional, B3LYP and M06-2X with the split valence double zeta 6-31G(d) basis set in both gas and aqueous phases .

The theoretical analyzes carried out by AIMNBO, QAIM and NCI made it possible to count and visualize hydrogen bonds and Vander Waals bonds explaining the stability of the two models.

Charge transfer between host and guest is the most important factor stabilizing the inclusion complex Guanosine/HP-β-CD; this is confirmed by NBO analysis.

Keywords: Guanosine, NBO, QTAIM, NCI and hydroxypropyl-beta-cyclodextrin.

References

1. L. Liu, KS. Song, XS. Li, QX. Guo, Charge-transfer Interaction: A Driving Force for Cyclodextrin Inclusion Complexation, Inclusion Phenomena and Macrocyclic Chemistry, 40, 35-39, **2001.**
2. DJ. Barbiric, EA. Castro, RH. De Rossi, (2000), Molecular Structure: THEOCHEM, 532, 171..
3. GRANCHER, F. KEDZIEREWICZ*, V. VENARD, A. MARSURA, C. FINANCE and A. LE FAOU Physicochemical Study of Ribavirin Complexes with α-, β- and γ-Cyclodextrins *Journal of Inclusion Phenomena and Macrocyclic Chemistry* 51:149-157**,(2005).**
4. Z. Lakbaibi, H. Abou El Makarim, M. Tabyaoui, A. El Hajbi, Theoretical study of the formation of α-chloroglycidic esters in aliphatic series using the quantum DFT method with B3LYP/6-311G (d, p), Innovation and Applied Studies, 7, 606, **2014.**

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Catalytic isomerization of light Naphtha (C5/C6) in the Penex unit of the Skikda refinery.

Boudjema Amir Lehtihet[a*], Tayeb Fakhreddine Boukezoula[a,b], Lahcène Bencheikh[a]

[a]*Laboratoire de Génie des Procédés Chimiques, Département de génie des procédés, Faculté de technologie, université Ferhat Abbas Sétif 1, Sétif19000, Algérie.*

[b]*Département de chimie, Faculté des sciences, université Ferhat Abbas Sétif 1, Sétif19000, Algérie.*

Tel.: 0656130998

E-mail address: amirlehtihet86@gmail.com

ABSTRACT

Global regulations and standards for environmental protection strictly require low use of fuels with low lead and aromatic content. Among all the refining processes that must adapt to these obligations and produce gasolines with low Pb and aromatic product composition, the catalytic isomerization process of light naphtha stands out. To this end, the isomerization process is a fundamental process in refineries that generate clean fuels of simple and profitable technology, whose investment costs are minimized, for this reason, Catalytic isomerization offers a socio-economic and ecological impact around the industrial site. The purpose of isomerization is to convert linear normal paraffins into branched isoparaffins, minimize the aromatic content, as well as limit the lead fraction ,also this process is used to obtain high octane products and increase the efficiency of use [1]. In this work, we aimed to know the different modes of operation of the process and the different types of reactors and catalysts used throughout this operation as well as the conversion chemistry of Naphtha light and the different chemical reactions that occur in isomerization reactors. The low-octane light Naphtha supply is transformed into an isomerate with an octane number with an interval of 80 to 93 RON [2]. The objectif of our work is to study the cut-isomerization process (C5/C6) of the (701) Penex unit (UOP) of the Skikda refinery. This unit consists of two cylindrical fixed bed catalytic reactors, mounted in series. We were interested in selecting the right kinetic model to develop the mathematical model needed for this unit, while optimizing operating conditions to improve the production of gasoline and hydrogen.

Keywords: isomerization, paraffins, light Naphtha, octane number, mathematical model, bi-functional catalyst.

References

[1]. L. Watripont, Isomérisation des paraffines, technique de l'ingénieur J5910.

[2]. D. Sullivan., S. Metro., PR. Pujado, isomérisation dans le traitement du pétrole, dans : S. Treese., PR. Pujado., D. Jones (Eds.), Manuel de traitement du pétrole. Springer, Cham, 2015, https://doi.org/10.1007/978-3-319-14529-7_7 .

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QSAR Modeling And Molecular Docking Of Some Heterocyclic Compounds

Nour Elhouda Derki [1], Aicha Kerassa [2]

[1,2]*Faculty of Exact Sciences, Laboratory of Valorization and Technology of Resource Saharian (VTRS), Department of Chemistry University of Echahid Hamma Lakhdar, 39000, El Oued, Algeria.*

Tel.: 0668607364
nourderki1997@gmail.com

ABSTRACT

Molecular modeling can be considered as a range of computerized techniques based on theoretical chemistry methods and experimental data that can be used either to analyse molecules and molecular systems or to predict molecular, chemical, and biochemical properties [1], [2], [3].

Quantum chemistry methods play an important role in obtaining molecular geometries and predicting various properties [4].

In this study, QSAR models were developed using the MLR method for 23benzimidazoles with activity anti-Alzheimer. The descriptors used were calculated byDFT/ B3LYP/6-31G' method in Gaussian09 program, Hyperchem, swissADME ...The prediction ability of these QSAR models were evaluated by (LOO) method.

The second objective of our study was to use molecular modeling (docking molecular), to study the possible types of interaction between AChE enzymeand 23 benzimidazole derivatives.

Finally, the pharmacokinetics of the compounds were predicted, i.e. the effect ofthe organism on the drug during its movement inside the body through 4 stages known as ADME, and this was done by studying the drug-likeness property, as well as predicting the probability of intestinal absorption (HIA) and Permeability across the blood-brain barrier(BBB).

Keywords: molecular docking, Anti-Alzheimer, QSAR, drug-likeness property, Benzimidazole.

References

1. Höltje, H.-D., and Folkeis, G. Molecular Modeling: Basic Principles and Applications. VCH, New York (1997).
2. Leach, A. R, Molecular Modeling Principles and Applications.Longman, Essex (1996).
3. [Schlecht, M. F. Molecular Modeling on the PC. Wiley-VCH, New York (1998).
4. Ciobanu, M. Preda, L. Savastru, D. Savastru, R. and Carstea, E. M.. Quantum Matter. 2, 60-66 (2013)

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Redox Dry Wet Gel Spinning of PVA HMW High Strength

Farouk Dehmchi [(1)] *, Sihem Abderrahman*[(1)] *, Abdallah Hamel*[(2)]

(1) LIS Laboratory ,Chemistry department , Badji Mokhtar University , Annaba,Algeria

(2) Chemistry department , Badji Mokhtar University , Annaba, Algeria

** Corresponding author :Farouk Dehmchi Tel:0658987612*
oussamelz@yahoo.fr

ABSTRACT

Manufacturing the sustainable, ,green, non hazardous , ecofriendly biomaterials for next decades requires modern biomedical engineering programs also called bio-based design methodologies ,or set-based design (SBD).Two factors strongly determine the properties of PVA as predicted by SBD: polymerization degree and hydrolysis (or saponification) degree. A wide range of PVA saponification degree values, provides access to a wide range of its stable physical forms : solution , slime , sponge, hydrogel ,film, granular form, powder , and fiber. Versatility of PVA mechanical properties , tensile strength (σ) and Young's modulus (E), place the field of use of PVA as a textile fiber respectively in the range [0.3-1.2] GPa and [3-40] GPa , while its stress strain (ε % elongation) cannot exceed 7% , draw ratio from 19 to 26. In this investigation, the use of Gel Permeation Chromatography GPC confirmed the obtaining of high molecular weights HMW, by the redox polymerization technique implemented. As well as the measurement of (σ) , (E) , and (ε%) by Zwick machine drived by TestXpert software showed the compatibility of the results obtained with the standards for the preparation of biomedical fibers that constitute a strategic database to be exploited by engineering design computering. .

Keywords: Biomaterials; Polyvinyl alcohol; GPC; FTIR; Zwick machine.

References

1.Karmaker, N., Karmaker, H. ., & Khan, R. A. (2021). A review on pva based biodegradable films: a new hope for plastic pollution remediation. *Journal of Asian and African Social Science and Humanities*, *7*(1),26–37. https://www.aarcentre.com/ojs3/index.php/jaash/article/view/226

2. S. Vasantha Kumar, V.A. Sajeevkumar*, Johnsy George, and Sunny Kumar, *Enhancing Properties of Polyvinyl Alcohol Film using Sorghum Starch Nanocrystals*
Defence Life Science Journal, Vol. 2, No. 2, April 2017, pp. 169-177,
DOI : 10.14429/dlsj.2.11380. 2017, DESIDOC

3.Jeyaprakash Maheswaran , Maheswaran Chellapandian, Madappa V. R. Sivasubramanian , Gunasekaran Murali and Nikolai Ivanovich Vatin, *Experimental and Numerical Investigation on the Shear Behavior with Hybrid Fibers*, Materials 2022, 15, 5059. https://doi.org/10.3390/ma15145059

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Microstructure and mechanical properties of Fe based alloy prepared by mechanical milling

Mohamed Ali Rekik[a*], Mohamed Khitouni[a].

[a]*Laboratoire de Chimie Inorganique Ur-11-Es-73, Faculté des Sciences Sfax, BP 1171, 3018, Sfax Tunisie.*

* *Corresponding author.*Tel.: 21620350107
E-mail address: rekik _medali@yahoo.fr

ABSTRACT

Textile industries consume a large amount of water and produce a remarkable amount of wastewater containing pigments, dyes, and non-expendable components. The nanomaterials range in size from a few nanometers to less than 100 nm can potentially solve several environmental problems. Nanomaterials come in a variety of forms, including nanowires, nanotubes, films, particles, colloids, and quantum dots. Nanophotocatalysts, nanoreductives, nanomembranes, and nanosorbents are the four main types of nanomaterial that can play a crucial part in the wastewater treatment process. The distinctive attributes of nanomaterials, such as their high surface area, large pores, high reactivity, strong mechanical properties and hydrophobic/hydrophilic characteristics, have been demonstrated by researchers to be suitable candidates for wastewater technology.

Therefore, the purpose of the present work is to preparing Fe based nanocrystalline powders by mechanical milling process (MA) and investegate the improvement of mechanical properties and surface area with the time milling.

Keywords: Milling; Nanostructures Materials, Annealing, DSC, X-ray Diffraction

T5: Biodiversity

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Study of effective products and biological properties of *Bunium mauritanicum*, which grows in the high plains of Algeria.

TAMMA Noureddine * NEGHMOUCHE Nacer Salah

* *Department of Chemistry, Faculty of Exact Sciences,*

Applied Chemistry and Environment Laboratory, University of El Oued, Algeria.

E-mail address: *noureddine.tamma@gmail.com*

ABSTRACT

Bunuim mauritanicum (Talgoda) is a medicinal plant belonging to the Apiacetic family used in traditional medicine. The main objective of this study was to determine the effective products and biological properties of the plant according to the following areas: Om El Bouaghi, Souk Ahras, Bordj Bou Arreridj, and El Beidh.

In this study, we were able to identify the most important natural products through detection, extraction, and then the quantitative estimation of phenolic compounds by UV-Visible. through this study, we found that the tuber of the *Bunuim mauritanicum* plant is rich in secondary metabolites represented in phenols, flavonoids, and alkaloids….in varying proportions. We recorded the yield of phenols in the Om El Bouaghi region estimated at 6.49%, which was the highest value, while for the Souk Ahras region, it was the lowest value estimated at 2.39 %, while the percentage of alkaloids was the highest value at 19.96 % in the egg area, and the antioxidant activity was also determined. The phenolic extract of the Bordj Bou Arreridj region showed great effectiveness in inhibiting the free radical DPPH estimated at IC_{50} = 0.130 mg/ml, and for the cyclic voltammetry test, it was the highest value estimated at 157.4 mg EAG/g for the Om El Bouaghi area.

As the last step, the antibacterial activity of these extracts was tested on two pathogenic bacterial strains, and the results were positive in all phenolic extracts at the highest concentration of 10 mg/ml for the two strains of *E. coli* and *Staphylococcus aureus*, where the largest diameter was 16 mm. For the phenolic extract of Om El Bouaghi region *E. coli* strain *Staphylococcus aureus*, the highest estimated transduction diameter was recorded at 14mm.

Finally, we conclude that there is a direct relationship between yield and biological activity, meaning the higher the yield rate, the greater the antibacterial activity and antioxidant activity (DPPH) .

Keywords: *Bunuim mauritanicum*, effective products (phenols, flavonoids, alkaloids) biological efficacy (anti-oxidant activity, anti-bacterial activity).

References

1. Chentouh, S., Boulahbel, S., Adjal, F., Tolba, M., Alloua, N., MOUMEN, Y., & BENTAYEB, Y. (2018). Effets des extraits organiques de Bunium incrassatum sur quelques paramètres hématologiques chez les lapines de population la race locale. Revue des bio ressources, 8(2), 9-9.
2. Benkhalifa A., et Toumi M., (2019). Talghouda, une ancienne source alimentaire bien évoquée dans les soins traditionnels en Algérie . Laboratoire d'Ethnobotanique et substances Naturelles, Ecole Normale Supérieure, El- lbrahimi , Vieux Kouba , Alger.
3. Bousetla, A., Zellagui, A., Derouiche, K., & Rhouati , S. (2015). Chemical constituents of the roots of Algerian *Bunium incrassatum* and evaluation of itsantimicro bialactivity. Arabian Journal of Chemistry, 8(3), 313-316.
4. Lebouazid , R., Meziani , R. A., & Karouche, S. (2021). Etude des activites antioxydante et anti-inflammatoire de lespece *bunium mauritanicum.*
5. BAKRI Samah, DILMI Fatima zohra .(2020). Etude ethnobotanique de la plante médicinale *Bunium Mauritanium* (Talghouda) dans la région de M'sila .
6. Bruneton, J. (2009), Pharmacognosie - Phytochimie, plantes médicinales, 4e éd., revue et augmentée, Paris, Tec & Doc - Éditions médicales internationales, p.1120, 1288 ISBN 978-2-7430-1188-8) .
7. Hamid.A, Aiyelaagbe.O, Usman.L,Ameen.O, and Lawal.A, Antioxidants: Its medicinal and pharmacological applications. African Journal of Pure and Applied Chemistry, 2010. 4 (8): p. 142-151.
8. Nagmoti, D. M., Khatri, D. K., Juvekar, P. R., & Juvekar, A. R. (2012). Antioxidant activity free radical-scavenging potential of Pithecellobium dulce Benth seed extracts. Free Radicals and Antioxidants, 2(2), 37-43.
9. Al-Daihan, S., Al-Faham, M., Al-shawi, N., Almayman, R., Brnawi, A., &shafi Bhat, R. (2013). Antibacterial activity and phytochemical screening of some medicinal plants commonly used in Saudi Arabia against selected pathogenic microorganisms. Journal of King Saud University-Science, 25(2), 115-120.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Effects of the combination of natural extracts on their antioxidant activity

Bedjou Fatiha, Bousba Nesrine and Hadji Kenza

University of Bejaia, Faculty of Nature and Life Sciences, Laboratory of Plant Biotechnology and Ethnobotany
** Corresponding author*.Tel.:
E-mail address: fatihabedjou2015@gmail.com, fatiha.nasri@univ-bejaia.dz

ABSTRACT

The antioxidant activity of the extracts of 6 medicinal plants was studied by combining extracts 2 to 2. The polyphenols were tested by the folin ciocalteu technique then the evaluation of the antioxidant activity was carried out, with respect to the radical synthetic DPPH, for extracts alone and in combination. The extracts alone exhibited significant antioxidant activities. They approach 80% inhibition of the DPPH radical for the extracts of *Myrtus communis* and *Pistacia lentiscus*, and give values between 60 and 75% for *Urtica dioica*, *Lavandula stoechas*, *Inula viscosa* and *Tocrium polium*. The combinations of extracts resulted in a synergy for the associations: *Pistacia lentiscus* and *Myrtus communis*, Pistacia lentiscus and Tocrium polium, *Urtica dioica* and *Inula viscosa*, *Myrtus communis* and *Inula viscosa*, *Urtica dioica* and *Lavandula stoechas*. However, theassociation *Inula viscosa* and *Tocrium polium* gave an antagonistic effect. Most combinations exhibited a synergistic effect which is sought after in therapy.

Keywords: Medicinal plants, associations, antioxidant effect, polyphenols, synergy

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Lignans from *n*-butanol extract of aerial parts of *helianthemum sessiliflorum*

Imane Benabdelaziz[a*], Hamada Haba[a], Mohammed Benkhaled[a], Catherine Lavaud[b], Dominique Harakat[b], Laurence Marcourt[c], Jean-Luc Wolfender[c]

[a] *Laboratoire de Chimie et Chimie de l'Environnement (L.C.C.E), Département de Chimie, Faculté des Sciences, Université de Batna, Batna 05000, Algérie*

[b] *Laboratoire de pharmacognosie, Institut de Chimie Moléculaire de Reims, CNRS UMR 6229, BP 1039, 51097 Reims Cedex 2, France*

[c] *Phytochemistry and Biactive Natural Products, School of Pharmaceutical Science, EPGL, University og Geneva, Geneva, Switzerland*

* *Corresponding author*.Tel.: 0658719915
E-mail address: i.benabdelaziz@yahoo.fr

ABSTRACT

Large numbers of species of genus *Helianthemum* (Cistaceae family) are widely used in traditional medicine due to their notable pharmacological effects as analgesic, phytoinhibitrice, antioxidant, antimicrobial, antiprotozal, antigiradial and antibacterial. *Helianthemum sessiliflorum* Pers. is one of species of this genus that showed previously anti-inflammatory and analgesic activities. In addition, the aerial parts of this plant are recommended in folk medicine in case of cutaneous lesion.

The *n*-butanol extract of aerial parts of *H. sessiliflorum* afforded nine known phenolic compounds where majority of them were isolated for the first time from the family Cistaceae. The results obtained from the present study, together with our previous investigation of the ethyl acetate extract from the same parts of this plant will be helpful for the chemotaxonomic profile of the *Helianthemum* genus. The structural identification of the isolated compounds was achieved using several spectroscopic methods.

Keywords: *Helianthemum sessiliflorum*, Cistaceae, lignans, *n*-butanol extract, NMR.

References

1. Rivera D, Obon C, Inocencio C, Heinrich M, Verde A, Fajardo J, Llorach R. The ethnobotanical study of local Mediterranean food plants as medicinal resources in southern Spain. J Physiol Pharmacol. 2005, 56:97–114.
2. Barbosa E, Calzada F, Campos R. Antigiardial activity of methanolic extracts from *Helianthemum glomeratum* Lag. and *Rubus coriifolius* Foche in suckling mice CD-1. J Ethnopharmacol. 2006, 108:395–397.
3. Benabdelaziz I, Haba H, Lavaud C, Harakat D, Benkhaled M. Lignans and other constituents from *Helianthemum sessiliflorum* Pers. Rec Nat Prod. 2015, 9:342–348.
4. Ustun O, Ozcelik B, Akyon Y, Abbasoglu U, Yesilada E. Flavonoids with anti-helicobacter pylori activity from *Cistus laurifolius* leaves. J Ethnopharmacol. 2006, 108:457–461.

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A new indole alkaloid of crude extracts from *Saccocalyx satureioides*

Hayat Kherkhache[a]*, Imane Benabdelaziz[b], Artur Manuel Soares Silva[c], Mokhtar Boualem Lahrech[a], Mokhtar Benalia[d] et Hamada Haba[b]

[a]*Laboratoire de Chimie Organique et Substances Naturelles, Universit_e de Djelfa, Djelfa, Algerie;*

[b]*Departement de Chimie, Laboratoire de Chimie et Chimie de l0Environnement (L.C.C.E), Faculté des Sciences de la Matière, Université de Batna-1, Batna, Algérie;*

[c]*Department of Chemistry & QOPNA, University of Aveiro, Aveiro, Portugal;*

[d]*Département de Chimie Industrielle, Laboratoire de Chimie, Universit_e de Laghouat, Laghouat*

* *Corresponding author*.Tel.: 0772564378/ 0556993545
E-mail address: hayat2079@yahoo.fr

ABSTRACT

Saccocalyx satureioides Coss. & Dur., an endemic species of Algeria, is a small aromatic shrub growing in Sahara septentrional and belonging to the family Lamiaceae (1). It has attracted a great attention due to its traditional medicinal usage for gastric disorders and spasms (2). The essential oil of S. satureioides has been extensively investigated and revealed the presence of numerous oil components, which possess interesting biological activities (3). However, a literature survey reveals that there is only one study describing the isolation and structural elucidation of phytochemical components of this plant (4).

The TLC profile of the different extracts (light petroleum, $CHCl_3$, EtOAc and n-BuOH) obtained from S. satureioides revealed the especial richness of EtOAc extract in phytochemicals compared to the other extracts, and this is the reason why our phytochemical study is focused on this extract.

This study led to the isolation and identification of one new acylated indole alkaloid glucoside 1 and eight known compounds, including two indoles 2 and 3, five methylated flavone aglycones 4-8 and one monoterpene glucoside 9.

The structural elucidation of these compounds was accomplished by spectroscopic methods including 1D (1H and 13C) and 2D (COSY, HSQC and HMBC) NMR techniques, and mass spectrometry, and by comparison with literature data.

Keywords: *Saccocalyx satureioides*; Lamiaceae; Indole alkaloids; Terpene; 1D and 2D NMR.

References

1. Quezel P, Santa S. 1963. Nouvelle flore de l'Algérie et des régions désertiques méridionales [New flora of Algeria and the southern desert regions]. Vols. 1–2. Paris: CNRS
2. Biondi DM, Sari M, Ghani ZA, Ruberto G. 2006. Essential oil of Algerian Saccocalyx satureioides Coss. et Durieu. Flavour Fragr J. 21(3):546–548.
3. Laouer H, Akkal S, Debarnot C, Canard B, Meierhenrich UJ, Baldovini N. 2006. Chemical composition and antimicrobial activity of the essential oil of Saccocalyx satureioides Coss. et Dur. Nat Prod Commun. 8:645–650.
4. Mohamadi S, Zhao M, Amrani A, Marchioni E, Zama D, Benayache F, Benayache S. 2015. On-line screening and identification of antioxidant phenolic compounds of Saccocalyx satureioides Coss. et Dur. Ind Crops Prod. 76:910–919.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Analysis of Floristic Biodiversity of the Afghan Djebel Cedar Grove

NOUIOUA Wafa[a*] and GAAMOUNE Sofiane[b]

a:The team: Biodiversity and Plant Genetic Resources (Laboratory of Medicinal Plants Applied to Chronic Diseases Department of Biology and Plant Ecology. Faculty of Natural and Life Sciences. Ferhat Abbas University of Setif 1 .

b: National Institute of Agricultural Research –Setif –Algeria, INRAA, BP 80, route des fermes, Sétif

* *Corresponding author*.Tel.: 0792602995
E-mail address:nouioua.wafa@yahoo.fr

ABSTRACT

The Atlas cedar (*Cedrus atlantica* Manetti), an endemic species in Algeria and Morocco, is of particular interest and important for its resistance to climate variations and its low flammability. Our study of the floristic diversity of the series of vegetations in *Cedrus atlantica* was conducted in Afghan is located in the center of the state forest of Boutaleb on the north side. To obtain a good overview of floristic diversity and the heterogeneity of the plant formations present, 26 phytoecological surveys were carried out on relatively homogeneous surfaces in the study area. The floristic diversity Djebel Afghane shows that the specific richness represents 104 species divided into 29 botanical families and 25 chorological types and 7 biological types.

Keywords: biodiversity, djebel Afghane, floristic succession

References

1. M'HIRIT (O.). — Le Cèdre de l'Atlas (*Cedrus atlantica* Manetti) : présentation générale et état des connaissances à travers le réseau Silva mediterranea «le cèdre ». — Annales de la Recherche forestière Maroc, vol. 27 (spécial), 1994, pp. 3-21.**xx**
2. KROUCHI (F.). — Étude de la diversité de l'organisation reproductive et de la structure génétique du Cèdre de l'Atlas (Cedrus atlantica Manetti) en peuplement naturel (Tala-guilef, Djurdjura nord-ouest, Algérie). — Université Mouloud-Mammeri (Tizi-Ouzou), Algérie, 2010. — 154 p. (Thèse de doctorat d'État,
3. -SBABDJI (M.), OLDACHE (E.H.), HADDAD (M.), KADIK (B.), LAMBS (L.). — Cedar tree growth (Cedrus atlantica Manetti) in Chrea National Park, Algeria, and the influence of defoliation by the pine processionary caterpillar (Thaumetopoea pityocampa Schiff.). — Revue d'Écologie (La Terre et la Vie), vol. 64, n° 4, 2009, pp. 323-332,
4. 4- MOALI (A.). — Déterminisme écologique de la répartition des oiseaux le long d'un transect altitudinal en Kabylie (Algérie). — Université Mouloud-Mammeri (Tizi-Ouzou), Algérie, 1999. — 220 p. (Thèse de doctorat),
5. 5- BELLATRECHE (M.). — Écologie et biogéographie de l'avifaune forestière nicheuse de la Kabylie des Babors (Algérie). — Université de Bourgogne, 1994. — 154 p. (Thèse de doctorat)
6. 6- BOUBAKER (Z.). — Cartographie et prédiction de la répartition de l'avifaune nicheuse du Parc national de Gouraya (Wilaya de Béjaia) : Géostatistique et analyse spatiale. — Alger : École nationale supérieure agronomique, 2012. — 220 p. (Thèse de doctorat d'État)

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Study of the conversion of fermentable sugar from *Balanites aegyptiaca* fruits into bioethanol

BOULAL Ahmed [a]*, HADRI Kamel[b]

[a]*Laboratoire des Ressources Naturelles Sahariennes, Faculté des Sciences et de la Technologie, Université Ahmed Draïa, Adrar, Algéria*
[b]*Unité de Recherche en Energies Renouvelables en Milieu Saharien, URERMS, Centre de Développement des Energies Renouvelables, CDER, 01000, Adrar, Algeria.*
** Corresponding author.Tel.: 069605124*
E-mail address: ahm.boulal@univ-adrar.edu.dz

ABSTRACT

The increase in greenhouse gas emissions caused by global industrial development leads to the search for alternative energy sources to fossil fuels, this is deployed by the progressive concern caused by the reduction of non-renewable energy resources. Biomass energy production is an efficient technique for converting sustainable resources into climate-friendly energy. Furthermore, the Balanites (heglig) or Desert Date Palm referred to in this work is the African species known under the botanical name of *Balanites aegyptiaca*, known in southern Algeria under the name of Tougua. It is a very widespread tree on the African continent. Currently, biotechnological processes make it possible to valorize this fruit of the date palm of the desert and to make available to the citizen a new generation of products with high added values such as bioethanol. Dans ce contexte, différents essais de fermentation alcoolique sont réalisés au niveau du laboratoire pour déterminer le taux de dilution, dans le but d'optimiser le procédé. On compare avon le degré d'alcool brut de quatre dilutions soit la dilution (pulp/water) par (7, 9, 10 et 11 fois) de la masse (110) g de pulpe de fruit de Balanites. The results obtained showed that the 10 times dilution (pulp/water) gave the best yield: the volume of 35 ml at a concentration of 64 degrees of alcohol.
Keywords: Energy recovery, *Balanites aegyptiaca*, alcoholic fermentation, bioethanol.

References

1. Gbohaida, I. Mossi, E.S. Adjou, C.P. Agbangnan, D.V. Woffo, F. Avlessi, C.K. Sohounhloue, 'Evaluation du pouvoir fermentaire de *Saccharomyces cerevisiae* et de *S. carlbergensis* dans la production du bioéthanol à partir du jus de la pomme Cajou', Journal of Applied Biosciences, Vol. 101, pp. 9643 - 9652, 2016..
2. Boulal A., Benali B., Moulai M., Touzi A., 'Transformation des déchets de dates de la région d'Adrar en bioéthanol', Revue des Energies Renouvelables, Vol. 13, N°3, pp. 455 - 463, 2010.
3. Boulal A., Benbrahim Z., Benali B., Ladjel S., 'Etude comparative de rendement de la production d'éthanol de deux variétés de dattes communes de faible valeur commerciale (Tinaceur et Aghmou) de Sud-Ouest de l'Algérie', Revue des Energies Renouvelables, Vol. 16, N°3, pp. 75 - 78, 2013.
4 KNovidzro.M., Agbodan K.A., Koumaglo K.H., 'Etude de la performance de quatre souches de Saccharomyces cerevisiae au cours de la production d'éthanol à partir des moûts de sucrose enrichis', Journal de la Société Ouest Africaine de Chimie, Vol. 35, pp. 1 - 7, 2013.

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Antibacterial activity of *Pulicaria odora* extracts

Touati Naima*, Saidani Karima, Hammiche Hayet, Ouazene Naima and Bedjou Fatiha

[a]Department of food sciences , University of bejaia, Bejaia , Algeria

* *Corresponding author*.Tel.: *0794315204*
E-mail address: naima.touati@univ-bejaia.dz

ABSTRACT

The objective of this work is to highlight the antibacterial activity of extracts from leaves and roots of a plant belonging to the Asteraceae family: *Pulicaria odora*. Three solvents of different polarities (methanol, acetone and chloroform) are used for the extraction of phenolic compounds. Methanol is the best solvent for extracting phenolic compounds. The methanolic leaf extract recorded the highest contents of total polyphenols (90 µg CE/g DM) and flavonoids (11.34 µg QE/g DM). The antibacterial activity of the extracts showed that the bacterial strains tested are sensitive to the extracts of Pulicaria odora. Gram-positive bacteria (*B. subtilis* and *S. aureus*) are more susceptible than Gram-negative bacteria (*E. coli and P. aeruginosa*). The results showed that *S. aureus* is the most sensitive strain, with the largest diameter of inhibition (30.5 mm) obtained by the acetone extract of the root. While *P. aeruginosa* was more resistant, with no zone of inhibition for the leaf chloroform extract. The methanolic leaf extract is more active against *S. aureus* and *P. aeruginosa* with MIC/MBC equal to1/1.4 mg/ml.

Keywords: Antibacterial activity, *Pulicaria odora*, phenolic compounds, *S. aureus, E. coli.*

References

1. El-Kamali, H. H. and Mahjoub, S. A.-T. 2009. Antibacterial activity of Francoeuria crispa, Pulicaria undulata, Ziziphus spinachristi and Cucurbita pepo against seven standard pathogenic bacteria. Ethnobotanical Leaflets 2009(6): 6.
2. Elshiekh, Y. H. and AbdElMoniem, M. A. 2015. Phytochemical, antibacterial screening and antioxidant activity of Pulicaria crispa extracts. The Pharma Innovation Journal 3(12): 12-15
3. Alzoreky, N. and Nakahara, K. 2003. Antibacterial activity of extracts from some edible plants commonly consumed in Asia. International
Journal of Food Microbiology 80(3): 223-230.
4. Bansemir, A., Blume, M., Schröder, S. and Lindequist, U. 2006. Screening of cultivated seaweeds for antibacterial activity against fish pathogenic bacteria. Aquaculture 252(1): 79-84.
5. Nickavar, B. and Mojab, F. 2003. Antibacterial activity of Pulicaria dysenterica extracts. Fitoterapia 74(4): 390-393.
6. Pereira, A. P., Ferreira, I. C., Marcelino, F., Valentão, P., Andrade, P. B., Seabra, R. and Pereira, J. A. 2007. Phenolic compounds and antimicrobial activity of olive (Olea europaea L. Cv. Cobrançosa) leaves. Molecules 12(5): 1153-1162.

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In vitro inhibition of urolithiasis by secondary metabolites extracted from *Quercus ilex* leaves

Bensatal Ahmed [a]* Zaimini Amira Nawal[a] , Khatim Houria[a], Briki Nadjwa Houda[a], Hebbal Chames Elwafa[a]

[a] *Department of Chemistry, Ziane Achour University, Djelfa, Algeria*

* *Corresponding author*.Tel.: +213667318366
E-mail address: matmatidz@gmail.com

ABSTRACT

Medicinal plants are used all over the world to treat different types of human and animal diseases. one of these plants is the specie *Quercus ilex*. the objective of this study is to evaluate in vitro the antiurolithiatic activity of secondary metabolites extracted from *Quercus ilex* leaves by a spectrophotometric method based on the turbidimetric model .the comparison of the turbidimetric slopes without and with inhibitors at different concentrations, indicates that the saponins metabolite fraction is the most effective inhibitor (87.65%) at 100% concentration compared to the alkaloid fraction which gives an equal 79.91% inhibition , on the other hand the positive control (sodium citrate) gives a weak inhibition (44.89%) at a concentration of 0.25mmol/l. FTIR spectra of crystals precipitated without inhibitor indicate formation of calcium oxalate mono and dihydrate crystals in the range of 600 to 4000 $^{cm-1}$. It can be clearly seen that the saponins fraction has introduced high intensity in the range of 1300 to 1650 cm^{-1}.

Keywords: *Quercus ilex*; Saponins; Alkaloids; Urolithiasis, Turbidimetric model.

References

1. Bensatal A, Ouahrani MR. Inhibition of crystallization of calcium oxalate by the extraction of *Tamarix gallica* L. *Urol Res*. 2008, 36:283–287. DOI: 10.1007/s00240-008-0157-1
2. Taib M, Rezzak Y, Bouyazza L, Lyoussi B. Medicinal uses, phytochemistry, and pharmacological activities of *Quercus* species., *Evidence-Based Complementary and Alternative Medicine*, vol. 2020, Article ID 1920683, 20 pages,2020. Doi.org/10.1155/2020/1920683
3. F Philip. Alkaloids from Plants with Antimalarial Activity: A Review of Recent Studies", Evidence-Based Complementary and Alternative Medicine, vol. 2020, Article ID 8749083, 17 pages, 2020. Doi.org/10.1155/2020/8749083
4. Bensatal A, Rahmoun D, Ardja SA. 1**,** and al. In vitro antilithiasic activity of saponins richfraction from the leaves of zizyphus lotus. *International Journal of Green Pharmacy* 2020, *14*, 280–285.Doi.org/10.22377/ijgp. v14i03.2942
5. Kachkoul R, Squalli Houssaini T, Mohim M, El Habbani R, Lahrichi A. Chemical Compounds Identification and Antioxidant and Calcium Oxalate Anticrystallization Activities of Punica granatum L.", Evidence-Based Complementary and Alternative Medicine, vol. 2020, Article ID 9424510, 14 pages, 2020. Doi.org/10.1155/2020/9424510

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Effect of Heat Treatment on the Antioxidant Activity of *Zygophyllum album L* Honey

Mohammed Adel Mesbahi [ab]*,Abdelkrim Rebiai[a],Mohammed Redha Ouahrani[a]

[a] *CAE Laboratory - University of El Oued, BP 789, El Oued 39000, Algeria,*
[b] *VPRS Laboratory - University of Ouargla , BP 511, Ouargla 30000, Algeria,*

* Corresponding author.Tel.: *0662379120*

E-mail address: adel_mesbahi@yahoo.fr

ABSTRACT

We determined how the antioxidant activity and total phenolic content of honey changed after being subjected to a high temperature. Antioxidant activity was determined using two methods – FRAP (ferric reducing antioxidant power) and DPPH (1,1-diphenyl-2-picrylhydrazyl) assays[2].Total phenolic content was determined by modified Folin-Ciocalteu method[3]. The research was conducted on 5 samples of *Zygophyllum album L* honey. All measurements were done at different temperatures (25,50,70,80 and 90°C) on honey samples during of (3–12 h) time range. The obtained results show uneven changes of antioxidant activity and total phenolic content among individual samples, in some samples antioxidant activity decreased after heating, while in others it increased. The same applies to the total phenolic content.
Keywords: Zygophyllum album L; Honey ; High temperature ;Phenolic ; Antioxidant.

References

1. Benzie IF, Strain JJ. The ferric reducing ability of plasma (FRAP) as a measure of "antioxidant power": the FRAP assay. Anal Bio-chem (1996); 239(1): 70
2. Ferreira IC, Aires E, Barreira JC, Estevinho LM. Antioxidant activhoney samples: Different contributions of the en-tire honey and phenolic extract.Chem (2009); 114(4): 1438
3. Singleton VL, Orthofer R, Lamuela-Raventós RM. Analysis of total phenols and other oxidation substrates and antioxidants by means of folin-ciocalteu reagent. Methods Enzymol (1999); 299: 152-178.

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Essential Oils Extracted from Algerian Highlands Medicinal and Aromatic Plants: Yields, Organoleptic Qualities, Chemical Composition and Antibacterial Activities against *E.coli* ATCC 25922 and *Pseudomonas aeruginosa* ATCC 27853

Mansouri Narimene[a]*, Aoun Leila[b], Dalichaouche Nabila[c], Hadri Douniazed[d] , Gueriche Achouak[e] and Khaouni Nadir [f]

[a,b,d] *Department of Veterinary Medicine, Faculty of Natural and Life Sciences, University of Chadli Bendjedid, 36000, El-Tarf, Algeria*

[c] *Regional Veterinary Laboratory of El-Tarf, National Institute of Veterinary Medicine, Minister of Agriculture, 36000, El-Tarf, Algeria*

[e,f] *Kazan State Academy of Veterinary Medicine, Kazan, Russia*

* *Corresponding author.*Tel.: 0557806891
E-mail: avinanou@gmail.com

ABSTRACT

Aiming to research a possible antibacterial activity of some Algerian essential oils, we worked on the essences of Rosemary (*Rosmarinus officinalis* L.), Thyme (*Thymus vulgaris* L.) and Coriander seeds (*Coriandrum sativum* L.). These three aromatic and medicinal plants, belonging to the Djelfa region (Central part of the Algerian highlands), were chosen for their reputation as antimicrobial agents by excellence. Following the extraction of these oils, by using hydrodistillation, the yields and organoleptic qualities of each extract have been determined. After what, the chemical compositions of the essential oils were determined by Gas Chromatography coupled to Mass Spectrometry (GC-MS). Finally, the antibacterial activities were evaluated by carrying out aromatograms against two reference strains, that of *E.coli* ATCC 25922 and that of *Pseudomonas aeruginosa* ATCC 27853. Concerning the results obtained, the essential oil of Thyme presented the best yield (01.22±0.26%). For GC-MS analysis, the principal components were represented by "1.8 Cineole" (39.75%) for Rosemary essence, "Carvacrol" (73.03%) for Thyme essential oil and "Linalol" (60.91%) for Coriander seeds oil. In regard to *E.coli* ATCC 25922, the aromatograms concluded that the essence of Thyme was the most active essential oil (general average of the diameters of the zones of inhibition estimated at 33.16±0.711mm). *Pseudomonas aeruginosa* ATCC 27853, when to her, has proven to be more resistant to the antibacterial action of the three oils mentioned before. Indeed, the most important antibacterial activity, which was only represented by a very weak one (10.93±0.622mm), was that exerted by the essential oil of Thyme. These results would mean that the oils studied, and more precisely that of Thyme, would be more interesting to use during infections caused by *E.coli*, studies carried out, In vivo, should be undertaken to confirm or invalidate this results.

Keywords: Antibacterial activity; Algerian essential oils; Rosemary; Thyme; Coriander seeds.

References

1. Aziz ZAA, Ahmad A, Setapar SHM, Karakucuk A, Azim MM, Lokhat D, Rafatullah M, Ganash M, Kamal MA, Ashraf GM. Essential Oils: Extraction Techniques, Pharmaceutical And Therapeutic Potential - A Review. *Curr Drug Metab*. 2018, 19;13:1100-10.
2. Elyemni M, El Ouadrhiri F, Lahkimi A, Elkamli T, Bouia A, Eloutassi N. Chemical Composition and Antimicrobial Activity of Essential Oil of Wild and Cultivated *Rosmarinus Officinalis* from Two Moroccan Localities. *J. Ecol. Eng*. 2020, 23;3:214-22.
3. Ahmad Khan A, Amjad MS. GC-MS analysis and biological activities of *Thymus vulgaris* and *Mentha arvensis* essential oil. *Turk J Biochem*. 2019, 44;3: 388–96.
4. Gholami-Ahangaran M, Ahmadi-Dastgerdi A, Karimi-Dehkordi M. Thymol and carvacrol; as antibiotic alternative in green healthy poultry production. *Plant Biotechnol Persa*. 2020, 2;1:22-5.

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Systemic immunity in apple is activated by the deployment of sugar against codling moth (*Cydia pomonella* L.) in semi-arid region (Batna, Algeria)

BRAHIM Imene[a]*, ZAABOUBI Siham[b] and BELLOULA Salima[c]

[a]*Institut des sciences vétérinaires et des sciences agronomiques-Département des sciences agronomiques, Université Batna 1, Batna, Algérie*
[b]*Laboratoire d'amélioration des productions agricoles et protection des ressources en zones arides (LAPAPEZA), Département des sciences agronomiques, ISVSA- Université Batna 1, Batna, Algérie*

* Corresponding author.Tel.: 0665670970

E-mail address: imene.brahim@univ-batna.dz

ABSTRACT

The codling moth (*Cydia pomonella* L.) causes considerable damages and fruits are usually unmarketable in apple fruit orchard in Algeria. In order to control this pest, the number of codling moth treatments ranges from 7 to 8 during one growing season in Algeria. Induced resistance in plants against insects and diseases represent a promising alternative to pesticides in crop protection. New concept of "sweet immunity" where sugars are widely accepted as players in plant innate immunity. Our objective here is to show the possibility of using sucrose and fructose, alone or associated, at 100 ppm and 50 ppm, against *C. pomonella* in "Anna" apple variety orchard in the region of Tilatou (Batna, Algeria). The entire experimental plot was treated from the end of flowering stage till the harvest, every 21 days, before 7:00 a.m., on the whole tree. Comparing mean percentages of damaged fruits per tree at harvest, fallen fruits and number of larvae collected in corrugated cardboard placed on tree trunk. The results of this study showed that all tested modalities reduced damaged fruits by *C. pomonella*. At harvest, treatments by sucrose and fructose alone provide percentages of damaged fruits at rate of 09.82±0.74% and 11.17±0.30% respectively, vs. 29.23± 1.16 for untreated trees, and provided the best efficacy with 66.49% and 61.68% respectively. The treatments affected also the number of larvae caught; the application of sucrose alone reduced the number of diapausing larvae per band and provides the best efficacy, with an efficacy up to 77.67%. (Times New Roman,10, sans Gras)

Keywords: *Cydia pomonella*, Apple, Damage, Sugar, Systemic immunity.

References

1. Gomez-Ariza J, Campo S, Rufat M, Estopà M, Messeguer J, San Segundo B, Coca M. Sucrose-mediated priming of plant defense responses and broad-spectrum disease resistance by over expression of the maize pathogenesis-related PRms protein in rice plants. *Molecular Plant Microbe Interactions*. 2007, 20:832-842.
2. Goellner K, Conrath U. Priming: it's all theworld to induced disease resistance. *European Journal Plant Pathology*. 2008, 121: 233-242.
3. Bolouri Moghaddam MR, Van den Ende W. Sugars and plant innate immunity. *Journal of Experimental Botany*. 2012, 63: 3989-3998.
4. Trouvelot S, Héloir MC, Poinssot B, Gauthier A, Paris F, Guillier C, *and al.* Carbohydrates in plant immunity and plant protection: roles and potential application as foliar sprays. *Frontiers in Plant Sciences*. 2014, 5;592:1-14.

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Preliminary analysis of the chemical composition of a hydrau-acetone extract of Algerian propolis

BAMBRA Moussa Abderrazak[a]*, BOUATROUS Yamina[b] and GHORBAL Imene[a]

[a] Laboratory of promotion of agricultural innovation in arid regions (PIARA), Department of Biology, Faculty of Natural and Life Sciences, University Mohamed khider, Biskra, Algeria

[b]*Department of Biologie, faculty of Nature and life sciences, University of Mohamed Khaider, Biskra, Algeria*

* *Corresponding author*.Tel.: 07.78.51.74.92
E-mail address: moussaabdrrazak.bambra@univ-biskra.dz

ABSTRACT

Propolis is a resinous substance produced by bees, containing bioactive compounds that exert pharmacological actions. Few studies are available in the literature concerning the chemical composition of Algerian propolis (AP). In order to study the chemical composition of AP samples, a hydrau-acetone extraction was performed. Then the composition was estimated using HPLC-MS/MS which allowed us to find phenolic compounds such as flavonoids and tannins.

Keywords: Algerian propolis; HPLC-MS/MS; Extraction.

References

1. Anjum, S.I., et al. Composition and functional properties of propolis (bee glue): A review. Saudi Journal of Biological Sciences (2018) Ogata K, Yang Y. Modern control engineering. India: Prentice hall; 2002.
2. Sharifah Nur Amalina Syed Salleh, Nur Ayuni Mohd Hanapiah, Wan Lutfi Wan Johari et al., Analysis of bioactive compounds and chemical composition of Malaysian stingless bee propolis water extracts, Saudi Journal of Biological Sciences, https://doi.org/10.1016/j.sjbs.2021.07.049
3. Anna Lisa Piccinelli et al., Chemical Composition and Antioxidant Activity of Algerian propolis, Journal of Agricultural and Food Chemistry; 2013.

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Neutrophil Extracellular Traps (NETs) modulation using natural bioactive compounds

Riadh Ben Mansour [a*] ,Bochra Gargouri [b] , Mohamed Bouaziz [c] , Saloua Lassoued [b]

[a]*Laboratory of Molecular and Functional Genetics, Department of Life Sciences, Faculty of Sciences of Sfax, University of Sfax, Tunisia,* [b]*Laboratory of Food Analysis, Valorization, and Security, National School of Engineers of Sfax, University of Sfax, Tunisia,* [c] *Department of Food Engineering, Higher Institute of Biotechnology of Sfax, University of Sfax, Tunisia*

* *Corresponding author*.Tel.: 0021697553097
E-mail address: riadh.benmansour@fss.usf.tn

ABSTRACT

Neutrophil Extracellular Traps (NETs) are the newest discovered innate immune response against pathogens. It consists of a DNA backbone decorated with multiple bactericidal proteins/peptides from the nucleus, cytoplasm, and azurophil granules. NETs release occurs after the activation of neutrophils by several physiological and pharmacological stimuli.
Despite this beneficial effect, NETs are believed to play an important role in the pathogenesis of autoimmune and inflammatory disorders such as rheumatoid arthritis, systemic lupus erythematosus, and psoriasis. Accordingly, suppression/modulation of NETosis should be a potential therapeutic strategy. Since the NETs release is mainly dependent on reactive oxygen species production (ROS), due to the activation of NADPH oxidase complex and myeloperoxidase (MPO), using molecules that are able to scavenge ROS or inhibit the enzyme responsible for their synthesis should be considered. The aim of this study is to assess the effect of Oleuropein and Tyrosol on NETs release.
The effects of these molecules were evaluated by fluorometric and cytochemical labeling assays on neutrophils extracted from healthy volunteers.
Our results showed for the first time the inhibition effect of Oleuropein and Tyrosol on NETs release. A decrease in the level of cell-free NETs (DNA in culture supernatant) was observed. Besides, we noted a decrease in the level of anchored NETs formation as determined by fluorescence microscopy. This result may be explained by the ROS scavenging activity of the two tested molecules as determined by chemiluminescence. Taking into consideration these results, antioxidant molecules such as Oleuropein and Tyrosol should be recommended in the therapeutic strategy of autoimmune and inflammatory diseases.

Keywords: *Neutrophil Extracellular Traps (NETs), ROS, Antioxidant molecules, Autoimmune diseases, Oleuropein, Tyrosol.*

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In vitro potential anticancer activity against HeLa and MCF-7 cancer cells lines and lipid peroxidation effect of GC-MS compounds of *Punica granatum* peel essential oil

Kallel Imen1, El-Aguel Asma[1], Gargouri Bochra[2], Ben-Amor Ichrak[2], Gargouri Ahmed[1] and Bayoudh Ahmed[3]

1Toxicology-Environmental Microbiology and Health Research Laboratory (LR17ES06), Faculty of Sciences of Sfax, Po Box 1171, 3000, University of Sfax, Tunisia.

2Unit of Biotechnology and Pathologies, Higher Institute of Biotechnology of Sfax, University of Sfax, Sfax 3029, Tunisia.

3Laboratory of Enzymatic Engineering and Microbiology, National Engineering School of Sfax, University of Sfax, Tunisia.

* *Corresponding author.*Tel.: +216 98645426
E-mail address: *kallel1imen@yahoo.fr*

ABSTRACT

Punica granatum is one of the most common and traditional herbs used among Mediterranean people to prevent and treat certain diseases, is a rich source of bioactive compounds that exhibit various biological effects. The aim of this study is exploring a numerous biological activity of *Punica granatum* peel essential oil. The essential oil from the *Punica granatum* peel (PEO), was extracted by hydrodistillation, was screened for chemical antioxidant activity by the DPPH and NO. free radicals scavenging assay and the Ferric Reducing Power Assay (FRAP). The cytotoxicity activity of PEO was assessed using MTT assay against HeLa and MCF-7 cells lines. The secondary lipid peroxidation products were evaluated by measuring malonaldehyde (MDA) and conjugated dienes (DC) levels in both tumor cell line. Our results show a strong inhibition percentage (77% and 85%) on DPPH and NO scavenging assays respectively, and a high ferric reduction power activity (91%) at 1 mg/mL comparable to standards. A significant increase of the cytotoxicity effect with the P.granatum peel essential oil's concentrations was noted on HeLa and MCF-7 cell lines, with IC50=93µg/ml and IC50=25µg/ml respectively. The H2O2 induction on tumor cells line highlighted a significant rise in the lipid peroxidation level adduct, conversely, our data showed a decline of MDA level ($p < 0.01$) and a significant reduction in DC levels ($p < 0.05$) in the essential oil treated cells. The treatment with the PEO generated a significant decrease in the MDA and DC levels on both cells' lines. A correlation analyses showed a significant positive relationship between the antioxidant power and the cytotoxicity of *P. granatum* essential oil effect. Pomegranate essential oil exhibited a potent antioxidant activity, has a significant antitumor effect and has the interest role of a lipid peroxidation scavenger. *P.granatum* might be used as a natural compound to fight the oxidative stress and as alternative therapeutic agent to prevent cancer.

Keywords: *Punica granatum* essential oil; HeLa; MCF-7 antioxidant; anti-proliferative; lipid peroxidation

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Evaluation of bioactive contents, antioxidant and anti-proliferative activities of acetate extract of *Fagonia longispina*

Radja Djebbari[a*], Soumia Lassed[b], Amina Maya Lahneche[c], Ouidade Ourzzedine[d], Fadila Benayache [d], Samir Benayache [d], Djamila Zama[e]

[a]*Departement de biologie des organisms, universitè Moustafa ben boulaid –Batna2, Algérie*

[b]*Departement de biochimie et microbiologie, universitè Moustafa ben boulaid –Batna2- Algérie*

[c]*Ecole supérieur des enseignants ASSIA DJEBAR Constantine 3, Algérie*

[d]*Unité de Recherche Valorisation des Ressources Naturelles, Molécules Bioactives, Analyses Physicochimiques et Biologiques (VARENBIOMOL), Université Frères Mentouri Constantine1, Route Ain El Bey, 25000 Constantine, Algérie.*

[e]*Département de Biologie Animale , Université Frères Mentouri Constantine1, Route Ain El Bey, 25000 Constantine, Algérie.*

* *Corresponding author.*Tel.: 0790574131
E-mail address: ra.djebbari@univ-batna2.dz

ABSTRACT

Cellular damage caused by reactive oxygen species (ROS) has been implicated in several diseases. Natural antioxidants have significant importance in human health. Recent investigations have shown that the antioxidant properties of plants could be correlated with oxidative stress defense and different human diseases and aging process etc.
The aim of this study was to assess the *in vitro* potential of acetate extract of *Fagonia longispina* as a natural antioxidant. The DPPH scavenging activity of the extract at different concentrations (2.5- 50µg/ml) was increased in a dose dependent manner with an IC50 found to be 37.82 ± 7.83 µg/ml. Also, the extract demonstrated the ability to inhibit the formation of TBARS in a concentration dependent manner and the IC50 was found to be 126.66±2.35 µg/ml, in each of these assays, ascorbic acid was used as a reference substrate. Measurement of total phenolic and total flavonoids contents of acetate extract of *Fagonia longispina* were achieved using Folin-Ciocalteau reagent and $AlCl_3$ respectively. The results showed that this extract containing 377 µg of gallic acid equivalents/mg extract and 87.14 µg of quercetin equivalents/mg extract respectively. The study also was designed to assess the role of *Fagonia longispina* by using xCELLigence Systems in Hela (human cervix carcinoma) and HT29 (human colorectal adenocarcinoma) *in vitro* cells culture model. Therefore, this study confirmed that this acetate extract is a potent source of beneficial antioxidant, also showed antiproliferative activity against HeLa and HT29 cells.

Keywords: *Fagonia longispina*, phenolic compound, anti-proliferative activity, Antioxidant activity, Lipid peroxidation.

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Oxidative stability of soybean oil induced by the essential oils from stems and flowers of *Pituranthos scoparius*

Anis CHIKHOUNE*[a], Aicha GHAZI[b], Chaouki BENSOUICI[c]

[a]*Equipe Procédés Verts Novateurs de Transformation des Aliments (PVNTA), Laboratoire ALIMENTS, Ecole Supérieure des Sciences de l'Aliment et des Industries Agroalimentaires (ESSAIA) Avenue Ahmed Hamidouche Route de Beaulieu, El Harrach, 16200-Alger.*

[b]*Département des Technologies Alimentaires, I.N.A.T.A.A, Université Frères Mentouri Constantine 1, 7e km Route de Sétif, 25000 Constantine, Algérie*

[c]*Centre de Recherche en Biotechnologies (CRBt), Ali Mendjli, Constantine, 25000*

* *Corresponding author*. E-mail address: anis.chikhoune@gmail.com

ABSTRACT

This work aims to utilize the essential oils of the Pituranthos *(Pituranthos scoparius)*. In this regard, an extraction of essential oils by hydrodistillation was carried out on the stems and flowers of the plant. Extraction yields of (1.81 ± 0.01) % for flowers and (1.81 ± 0.01)% for stems were obtained. The antioxidant activity was expressed in terms of inhibition concentrations at 50% (IC50) for the different tests carried out: β-carotene bleaching test (1.40 ± 0.08) and (0.45 ± 0.08) µg/ mL for stems and flowers respectively. $DPPH^{\bullet}$ test (4.37 ± 0.26) (stems) and (5.32 ± 0.86) (flowers) µg/mL and $ABTS^{\bullet+}$ test (4.77 ± 0.36) (stems) and (4.46 ± 0.33) (flowers) µg/mL. The oxidative stability test, by the SHAAL test, was applied to soybean oil alone and soybean oil at different concentrations of essential oils added (50 ppm, 100ppm and 150 ppm). The samples with the concentration of 150 ppm depicted the best resistance to the forced oxidation, while those with the concentration of 50 ppm had less resistance but resisted better than the blank. The essential oil of *P. scoparius* may be an interesting candidate as an antioxidative agent in vegetable oils.

Keywords: essential oils, stems, flowers, antioxidant activity

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Evolution of Phenolic Compounds During Maturation of the Deglet-Nour Variety

Lekbir Adel[a*] et Noui Yassine[a]

[a] *Food Science Laboratory (LSA), Department of Food Engineering, Institute of Agriculture and Veterinary Sciences, University Batna 1 - Hadj Lakhdar, Batna 05000, Algeria*

* *Corresponding author*.Tel.: 0673692966
E-mail address: adel.lekbir@univ-batna.dz

ABSTRACT

Date polyphenols can be used in the food industry as antimicrobial agents and natural antioxidants to replace controversial synthetic antioxidants to extend food shelf life. The objective of this study is the evaluation of the antioxidant potential of methanolic extracts of a variety of Algerian semi-soft dates (Deglet-Nour) during four stages of maturation (Kh'lal, Bser, Martouba and Tamr). In this study, we were interested in the determination of the content of total polyphenols (Folin-Ciocalteu's method), flavonoids ($AlCl_3$ method) and the evaluation of the antioxidant activity of phenolic extracts by the DPPH test. The results obtained show that the Kh'lal stage has the highest total polyphenol content (517.56 mg EAG/100g fresh weight), while the two Bser and Martouba stages have the lowest levels (63.72 to 79.06 mg EAG/100 g fresh weight). The Bser stage has the lowest flavonoid content (3.41 mg EQ/100g fresh weight), while the highest content (21.97 mg EQ/100 g fresh weight) is observed at the Tamr stage. The results obtained also show that the evolution of the antioxidant activity of the methanolic extracts during the maturation of the variety studied follows the same pace as the evolution of the polyphenol content. At the first and last stages (Kh'lal and Tamr), the methanolic extracts rich in phenolic compounds show a higher scavenging capacity for DPPH radicals than those of the poor extracts of two intermediate stages, Bser and Martouba. The correlation matrix shows that there is a highly significant correlation between the content of phenolic compounds (total polyphenols and flavonoids) and the free radical scavenging activity (DPPH•) of the methanolic extracts during maturation of the Deglet- Nour. This strong correlation confirms that polyphenols are powerful antioxidants capable of inhibiting the formation of free radicals and opposing the oxidation of macromolecules.
Keywords: Deglet-Nour, Stages of maturation, Methanolic extract, Polyphenols, Antioxidant activity.

References

1. Juntachote T, Berghofer E, Siebenhandl S, Bauer F. In Antioxidative effect of added dried holy basil and its ethanolic extracts on susceptibility of cooked ground pork to lipid oxidation. Food Chem. 2007, 100, 129-135.
2. Gursoy N, Sarikurkcu C, Cengiz M, Solak M.H. In Antioxidant activities, metal contents, total phenolics and flavonoids of seven Morchella species. Food Chem. Toxicol. 2009, 47, 2381-2388.
3. Mansouri A, Embarek G, Kokkalou E, Kefalas P. In Phenolic profile and antioxidant activity of the Algerian ripe date palm fruit (Phoenix dactylifera). Food chem. 2005, 89, 411-420.
4. Lu M, Yuan B, Zeng M, Chen J. In Antioxidant capacity and major phenolic compounds of spices commonly consumed in China. Food Res. Int. 2011, 44, 530-536.

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Effects of plowing tools on the yield of a durum wheat crop after having their effect on the properties of the soil (region of Timgad Batna).

ZAABOUBI Siham[a]*, BRAHIM Imene [a] and BELLOULA Salima[b]

[a] *Agricultural production improvement and resource protection laboratory in arid zones, Department of Agronomy, ISVSA University Batna 1, Batna, Algeria*

[b] *Agricultural production improvement and resource protection laboratory in arid zones, Department of Agronomy. University of Bordj Bou Arreridj, Algeria*

* *Corresponding author*.Tel.: +213658311935
E-mail address: siham.zaaboubi@univ-batna.dz

ABSTRACT

This study follows in the context of the practice of different types of fallow (cereal stubble, worked fallow and bare fallow) and the type of tool used for plowing (disc plow or cultivator) and the effect of the interaction of these two factors on the evolution of certain physical properties of the soil, as well as the impact of these two factors (previous crop/plowing tools) on the behavior of a cereal (durum wheat variety MBB) under a semi-arid climate in the region of Timgad (W Batna).
The effect of the interaction (previous crop / tool) is measured more particularly from the evolution of the soil structure (Da), of the pore space and the hydrodynamic functioning of the water in the plowed horizon. . This showed differences between the treatments obtained. The improvement of the soil structure leads to favorable consequences for the installation of the root network is observed for all the treatments. Changes in the density of solid particles of the surface horizon (Da) are characterized by the treatments (cereal stubble / disc plow). The best value of the total porosity of the plowed horizon is recorded at the level of treatments (worked fallow/disc plow). These same observations are noted in the study of the water properties of this horizon . Monitoring the growth and yield of the wheat crop explains the role of the combination (tilled fallow / disc plough) in the establishment, growth and grain yield of this crop.
The results obtained can constitute a basis for advice to farmers concerning the practice of fallowing and the type of tool to be used for tillage in semi-arid regions.
Keywords: Crop history, tillage tools :Bulk density ,porosity , Water retention capacity ,wilting point ,durum wheat – yield.

References

1. Afeissa. K, 2000 : Influence des différentes chaînes de matériel de préparation du sol sur la qualité de lit de semence dans la région de K'SAR SBAKHI (W. OUM EL BOUAGHI). Thèse d'ingénieur. INSA. BATNA, 95 P.
2. Ayers .R.S West cote D.W,(1988) Quantité d'eau en agriculture. bulletin FAO d'irrigation et de drainage N°29 FAO, Rome 180 p.
3. Baize. D et JABIOL. B, 1995 : Guide pour la description des sols. Edition : INRA PARIS, 375 P.
4. Bouziane .A (2001) Influence de trois itinéraires techniques sue le rendement d'un blé dur (var.Mexicali) dans le sud de kanchela (roudjel). Thèse Ing pp11-16-17.
5. Candelon. P, 1981 : Matériel de préparation et de fertilisation des sols. Edition : J. B. Baillière. PARIS, 216 P.
6. Chopart et Nicou (1971) Amélioration du profil cultural dans les sols sablo-argileuses de la zone tropicale sèche ouest africain et ces incidences agronomique. L'agronomie tropicale N°209-255 N° 5-565-631. N°9-903. N°11-1184-1247.

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Antioxidants Activities of Extracts of WhiteWormwood (*Artemisia herba alba*)

NOUI Yassine[a*], LEKBIR Adel[a], DJAIT Nour[a] and SAADA Naima[a]

[a]*Department of food technology, University of Batna 1, Avenue of Biskra 05005, Algeria*

* *Corresponding author.*Tel 0551170031
E-mail address: noui.yassine@gmail.com

ABSTRACT

The objective of this study is the quantification of total polyphenols from white wormwood (*Artemisia herba alba*) extract and the determination of their antioxidant power by DPPH and ABTS assay. The extraction of total polyphenols was performed by a methanol/water mixture (80:20), with 1/20 ratio(Weight/Volume). Total polyphenols was determined by colorimetry at 765 nm, using the Folinciocalteu reagent. Flavonoids were mesured by the formation of a yellow complex with aluminum nitrate, the color intensity is measured at 415 nm. The antioxidant activity is evaluated by free radical scavenging methods using both tests: DPPH and ABTS. The antioxidant activity of the extract was compared to a synthetic antioxidant BHT. The kinetics curves allowed to determine the concentrations that correspond to 50 % of inhibition (IC50). The wormwood extract total polyphenol content was about 136.7 µg/1 mg, of which 35.3 µg are flavonoids. The plant extract showed antiradical activity towards DPPH and ABTS, whose IC50 concentration was respectively 33.22± 0.72 µg/1ml and 56.54±0.62µg/1ml. The plant extract is less potent compared to BHT standard, with an IC50 concentration of 12.99±0.41 µg/1ml for DPPH and 1.29± 0.30 µg/1ml for ABTS. From those results, wormwood extract is rich in phenolic compounds. It is endowed with interesting antiradical properties which present wide perspectives in food and pharmaceutical industries.

Keywords: White Wormwood *(Artemisia herba alb*a), total polyphenols, flavonoids, antiradical activity, DPPH, ABTS.

References

1. Houmani M .,Houmani Z ., MelpomeniSkoula.Intérêt de Artemisia herba alba Asso dans l'alimentation du bétail des steppes algériennes. *ActaBotanicaGallica*. 2004, 151;2:165-172.
2. Haddouchi F., Tarik M., Riadh K., Larbat R.,Leafy Stems of Phagnalonsaxatile subsp. saxatile from Algeriaas a Source of Chlorogenic Acids and Flavonoids with Antioxidant Activity: Characterization and Quantification Using UPLC-DAD-ESI-MS. *Preprints*. 2021. https://doi.org/10.20944/preprints. 202104.0603.v2
3. Mohammed M.J., Anand U., Altemimi A.B., Tripathi V., Guo, Y., Pratap-Singh A. Phenolic Composition, AntioxidantCapacity and Antibacterial Activityof White Wormwood (*Artemisia herba-alba).Plants*. 2021. https://doi.org/10.3390/plants10010164
4. Nigam M., Atanassova M., Abhay P., RaffaelePezzaniM ., Prasad Devkota H., Sergey PlygunBahareSalehi., William N.S., Javad S.R.,. Bioactive Compounds and Health Benefits of Artemisia Species. *Natural products communications.* 2019. https://doi.org/10.1177/1934578X19850354

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Cleaning the natural environment from petroleum substances using Green Technology

Barbara Sawicka[a*], Mohammed Messaoudi[b,c], Naima Benchikha[c], Barbara Krochmal-Marczak[d], Viola Vambol[e], Dominika Skiba[a], Piotr Pszczółkowski[f], Piotr Barbaś[g]

[a]*Department of Plant Production Technology and Commodities Science, University of Life Sciences in Lublin, 20-950 Lublin, Poland,*
[b]*Nuclear Research Centre of Birine, P.O. Box 180, Ain Oussera, 17200 Djelfa, Algeria,*
[c]*Chemistry Department, University of Hamma Lakedra El-Oued, B.P.789, 39000 El-Oued, Algeria;*
[d]*Department of Food Production and Safety, Carpathian State College in Krosno, Poland, 38-400 Krosno, Poland;*
[e]*Department of Einvironmental Engineering and Geodesy, University of Life Sciences in Lublin, 20-950 Lublin, Poland,*
[f]*Experimental Station for Cultivar Assessment of Central Crop Research Centre, 21-211 Uhnin, Poland,*
[g]*Department of Potato Agronomy, Plant Breeding and Acclimatization Institute-National Research Institute, Branch of Jadwisin, 05-140 Serock.*

* *Corresponding author: Barbara Sawicka,*.Tel.: +48 609818906
E-mail address:barbara.sawicka@up.lublin.pl

ABSTRACT

In phytoextraction, the key problem is contaminated plant biomass, but also the selection of appropriate plant species that are resistant to pollution, as well as the time needed to completely clean the soil. The aim of the research was to select an appropriate method for the reclamation of soils contaminated with polycyclic aromatic hydrocarbons (PAHs). What is needed is a quick, environmentally friendly, and economical method of removing and minimizing the dangerous impact of crude oil on the natural environment and restoring soils for agricultural use [1,2]. The research was conducted in the period 2018–2019 on the grounds twelve localities, in the area of crude oil extraction, in South-Eastern Poland.Descriptive, experimental, laboratory and comparative methods were used [3,4]. Results: Soil contamination with PAHs, which can cause mutations and cancers, this is of particular dangerous because it affects not only human health, but also vegetation growth and the biological environment. Plant species adapted to soils contaminated with PAHs, characterized by high resistance to these substances, were selected. Species resistant to unfavorable conditions of the soil environment in the area of the former and present oil industry include such species as: white clover, red clover, trefoil, creeping bent., red fescue, French ryegrass. These grades fulfilled their tasks very well, therefore they can be recommended for use as a factor counteracting the degradation of the natural environment. The vegetation cover ensures a positive course of plant succession and intensive development of bioecological processes, and the plants analyzed in the research well prepare post-mining areas unsuitable for agricultural use. Biological treatment methods are cheaper, easier to use, and more effective, and reclaimed soils show properties similar to those of uncontaminated soils. Due to the random selection of soil sample collection areas, the need to conduct further, more precise research and develop an appropriate systematic sampling scheme should be considered.

Keywords: *bioremediation, plants, pollution, phytoremediation, soil contaminated with hydrocarbo*

References

1. Ahmad AA, Muhammad I, Shah T, Kalwar Q, Zhang J, Liang Z, et al. Remediation methods of crude oil contaminated soil. World Journal of Agriculture and Soil Science. 2020; 4: 8.
2. Wojtowicz K, Steliga T, Kapusta P, Brzeszcz J, Skalski T. Evaluation of the Effectiveness of the Biopreparation in Combination with the Polymer γ-PGA for the Biodegradation of Petroleum Contaminants in Soil. Materials. 2022; 15: 400.
3. Krachler M, Zheng J, Fisher D, Shotyk W. Analytical procedures for improved trace element detection limits in polar ice from Arctic Canada using ICP-SMS. Analytica Chimica Acta. 2005; 530: 291–298.
4. Varelis P. Food Chemistry and Analysis. Reference Module in Food Science. 2016.

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In Vitro Anti-inflammatory Activity and chemical composition of Essential Oils from *Smyrnium olusatrum L.* from Algeria

DJELLOULI Soumia[a]*, MEDDAH Boumediene[a] ,BOUHADDA Youcef[c]

[a]*Laboratory of Bioconversion, Microbiology Engineering and Health Safety (LBGMSS), Faculty of Nature and Life Sciences, University Mustapha Stambouli of Mascara.*

[b]*Laboratory of Physical Chemistry of Macromolecules and Biological Interfaces, Faculty of Nature and Life Sciences University Mustapha Stambouli of Mascara.*

* *Corresponding author.*
E-mail address: :soumia.djellouli@univ-mascara.dz

ABSTRACT

Smyrnium olusatrum L. commonly known as wild celery, is a forgotten vegetable that has now been replaced by celery. The present work investigated the chemical composition by GC-MS chromatography of the essential oils of Smyrnium leaves and stems obtained by hydrodistillation and their anti-inflammatory effect against the albumin denaturation. Chromatographic analyzes revealed that diethyl 3-oxopentanedioate eucalyptol, nickel tetracarbonyl were the main components, respectively. The present findings exhibited a concentration dependent inhibition of protein denaturation by the plant essential oils. The effect of diclofenac sodium was found to be less when compared with the test extract at concentration of 1mg/mL. From the present study it can be concluded that Smyrnium olusatrum L. possessed marked in vitro anti-inflammatory effect against the denaturation of protein.

Keywords: *Smyrnium olusatrum* L., essential oils, GC-MS, anti-nflammatory.

References

1. Quassinti, Luana, et al. "In vitro biological activity of essential oils and isolated furanosesquiterpenes from the neglected vegetable *Smyrnium olusatrum L.*(Apiaceae)." Food chemistry 138.2-3 (2013): 808-813.
2. Cespi, Marco, et al. "Microemulsions enhance the shelf-life and processability of Smyrnium olusatrum L. essential oil." Flavour and Fragrance Journal 32.3 (2017): 159-164.
3. Maggi, Filippo, et al. "A forgotten vegetable (Smyrnium olusatrum L., Apiaceae) as a rich source of isofuranodiene." *Food Chemistry* 135.4 (2012): 2852-2862.
4. Benelli, Giovanni, et al. "Isofuranodiene and germacrone from Smyrnium olusatrum essential oil as acaricides and oviposition inhibitors against Tetranychus urticae: Impact of chemical stabilization of isofuranodiene by interaction with silver triflate." *Journal of Pest Science* 90 (2017): 693-699.

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The influence of temperature on the kinetics of antioxidant activity and phenolic compounds in extracts of *Origanum majorana* grown in El Oued (Algeria)

Salah NEGHMOUCHE NACER[1,3], Mohammed Larbi BEN AMOR [2], Fadila LOUAFI[3], Djamal ATIA[1], ZOBEIDI ammar[1], TAMMA Noureddine[1]

[1] *Department of chemistry, Faculty of exact sciences, University of El Oued , El Oued 39000, Algeria*

[2]*Department of Process Engineering, Faculty of Technology, University of El Oued , El Oued 39000, Algeria*

[3]*Unité de Recherche CHEMS, Université des frères Mentouri de Constantine1, Constantine, 25000, Algérie*

* *Corresponding author.*Tel.: 0669444009
E-mail address: *neghmouchenacer-salah@univ-eloued.dz*

ABSTRACT

The aromatic plant that goes by the name Origanum majorana is the source of an essential oil that is later used in the treatment of a broad range of conditions. In this specific piece of study, one of our goals is to investigate the pharmacological effects that are associated with the use of extracts from Origanum majorana. The quantity of phenolic compounds that were present was determined with the use of colorimetric methods. On a microplate with 96 wells, tests for antioxidant and antidiabetic activity were performed. The ethanol extract has the most total phenolic (296.34±5.28µg GAE/mg), followed by the chloroform and hexane extracts. The ethanol extract has the most flavonoids, flavonols, and condensed tannins. In contrast, the Origanum majorana extracts were tested as antioxidants utilizing DPPH and ABTS as artificial radicals. IC50 for the ethanol extract was 19.27±0.68mg/mL. IC50 values for hexane and chloroform extracts were 32.79±1.81mg/mL and 64.65±0.98mg/mL, respectively. IC50 values for ethanol and chloroform extracts were 18.02±3.81 and 22.41±2.1mg/mL, respectively. IC50 for hexane extract was 47.11±0.94mg/mL. The ethanolic extract of the Origanum majorana plant was evaluated in terms of total antioxidant activity by the DPPH test. The kinetics of changes in Origanum majorana samples heated at different temperatures (45, 50, and 60 °C) over one hour were studied. The results showed that increasing the treatment temperature and time increased all factors, including, the antioxidant activity and the variation of the rise in the antioxidant activity depending on the heating temperatures and time. The results showed that all extracts significantly displace the DPPH root, as it was found that heating the marjoram extract to 60 °C for 30 minutes is more effective than heating to 45 or 50°C.

Keywords: Origanum majorana, extracts, DPPH test, antioxidant..

References

1. Ivanišová, E.; Kačániová, M.; Savitskaya, T.A.; Grinshpan, D.D. Medicinal herbs: Important source of bioactive compounds for food industry. Herbs and Spices—New Processing Technologies 2021.

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Polyphenol content and antimicrobial activity of olive oil from semi-arid area in Algeria

Kame ZEMOUR[a et b]* and Kadda Mohamed Amine CHOUHIM [c]

[a] *Laboratory of Agro-industrial Chemistry, LCA, University of Toulouse, INRA, Toulouse,France*

[b]*Laboratory of Agro-Biotechnology and Nutrition in Semi-Arid Zones - Ibn khaldoun University, Tiaret, Algeria*

[c]*Laboratory of plant physiology applied to above-ground crops - Ibn khaldoun University, Tiaret, Algeria*

* *Corresponding author.*Tel.: 0779871137
E-mail address: kadi.ensa@gmail.com

ABSTRACT

Many recent studies show the positive effect of phenolic compounds in olive oil on health. They are known for their biological properties, where they have shown potential activity as antioxidant, anti-inflammatory, and antimicrobial agents. However, this characteristic is rarely studied on olive oil from semi-arid area of Algeria.
Different samples collected from different region in Tissemsilt (Western of Algeria) were evaluated for their polyphenol content and their antimicrobial effect. The obtained results demonstrated that this oil is rich in polyphenols and revealed high antioxidant activity and antimicrobial activity against *Staphylococcus aureus* and *Escherichia Coli.*
This study disclosed the nutritional and pharmaceutical importance of olive oil grown in Algeria specially in the western region.
Keywords: Olive oil; polyphenols; antioxidant activity; antimicrobial activity.

References

1. Ellis L.Z, Liu W, Luo Y, Okamoto M, Qu D, Dunn J.H, Fujita M. Green tea polyphenol epigallocatechin-3-gallate suppresses melanoma growth by inhibiting inflammasome and IL-1β secretion. *Biochem. Biophys. Res. Commun*. 2011, 414:551–556.
2. Malik N.S, Bradford J.M. Changes in oleuropein levels during differentiation and development of floral buds in 'Arbequina'olives. *Sci. Horticult.* 2006, 110:274–278.
3. Zemour K, Labdelli A, Adda A, Dellal A, Talou T, Merah O. Phenol content and antioxidant and antiaging activity of safflower seed oil (*Carthamus Tinctorius* L.). *Cosmetics*. 2019, 6(3):55.

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Artemisinin and Crystal purity Evaluation in Algerian Artemisia *spp* wild plant using HPLC method.

Ahmed-Laloui Hamza *[a] Zaak Hadjer[b] , Rahmani abderrahmen[a] and Cherb Nora[b]

[a] *Biotechnology and Agriculture Division,Biotechnology Research Center (C.R.Bt), Ali Mendjeli, Constantine, 25000, Algeria*

[b]*food Biotechnology division, ,Biotechnology Research Center (C.R.Bt), Ali Mendjeli, Constantine, 25000, Algeria*

* *Corresponding author.*Tel.: 0668079438
E-mail address: hamzavet21@gmail.com

ABSTRACT

Artemisinin, a sesquiterpene lactone from Artemisia, has received considerable attention in the last few decades as a potent antimalarial drug. This study reports the presence of Artemisinin in three Algerian wild Artemisia species (A. herba Alba, A. campestris and A. judaica) quantified by HPLC method. In the selected optimal experimental conditions, HPLC chromatograms of the plant samples showed many resolved peaks. Artemisinin exhibited a well-defined chromatographic peak with a retention time between 7.46-8.15 min for all three Artemisia species. The peaks were identified by comparison of their retention times to that of standard artemisinin. Linear regression was used to establish the calibration curv and the good linearity of artemisinin was found within the range of 0.125 – 2.5 mg/mL (R^2 = 0.99854). The regression equation and correlation coefficient were determined as Formula: y = mx + b.

The HPLC analysis of the hexane extracts showed a difference in artemisinin content in studied species with a yield of 0.64%, 0.34% and 0.04% for AC, AH and AJ, respectively. Moreover, the level of artemisinin obtained in A. campestris was better than that found in A. sieberi and A. annua. This rate has been reported for the first time [1, 2]. It is noted that the efficient ultrasound extraction potential implies extraction of higher amount of co-metabolites so low artemisinin crystal purity is engendered but a combination with a purification step using activated charcoal and celite adsorbents produced crystals with comparable purity for ultrasound samples [3].

Keywords: Ultrasound; Artemisinin; HPLC analysis; Crystallisation.

References

1. Arab, H., et al., Determination of artemisinin in Artemisia sieberi and anticoccidial effects of the plant extract in broiler chickens. Tropical
2. Briars, R. and L. Paniwnyk, Effect of ultrasound on the extraction of artemisinin from Artemisia annua. Industrial Crops and Products, 2013. 42: p. 595-600.
3. Chemat Smain et al. Extraction mechanism of ultrasound assisted extraction and its effect on higher yielding and purity of artemisinin crystals from Artemisia annua L. leaves. Ultrasonics Sonochemistry.

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In vitro and in silico antibacterial tyrosyl-tRNA synthetase activity of the aqueous extract of olive leaves

Elkolli Meriem[a]* and Elkolli Hayet[b]

[a] *FLaboratory of Applied Microbiology. University of Sétif 1, Sétif 19000. Algeria*

[b] *Laboratory of Multiphasic Polymeric Materials, University of Setif 1, 19000, Setif Algeria*

* *Corresponding author.*Tel.: 0558064108
E-mail address: elkollim@yahoo.fr, elkollim@univ-setif.dz

ABSTRACT

The emergence of antibioresistant microbes is considered as a serious public health problem that led to increased morbidity and mortality worldwide[1]. However, antimicrobial agents from medicinal plants have given a new alternative against these microorganisms[2]. Nowadays, ethical issues about use of animals for experiments are of great concern necessitating the quest for alternative procedures such as in vitro and in silico methods thereby reducing animal use. The aim of this study is first to test in vitro, the antibacterial activity of the aqueous extract of olive leaves and then to predict, by molecular docking, the compounds responsible for this activity. The extraction is made by decoction of the leaves and the extract is tested by the diffusion method on three ATCC strains [3]. The main compounds found Olive leaves aqueous extract, were docked via Autodock tools 1.5.7 software to inspect the affinity of the selected phyto-constituents to the binding site of the bacterial tyrosyl-tRNA synthetase [4]. S. aureus and E. coli were susceptible to the extract with inhibition diameters of 14 and 13 mm respectively. However, P. aeruginosa was completely resistant. The data showed that tha main compound named Oleuropein occupy active pockets of the target enzyme with a score of - 4.24 kcal/mol close to that of the standard gentamicin with - 4.60 kcal/mol. These results suggest that the mechanism of action of the main compound can be the same that of the standard but not the same for other compounds. Therefore, each constituent must be tested on other bacterial targets to confirm their mode and place of action.

Keywords: Olive; Decoction; tyrosyl-tRNA synthetase; Binding energy; Phytocompounds.

References

1. Obeizi, Z., Benbouzid, H., Ouchenane, S., Yılmaz, D., Culha, M., Bououdina, M., 2020. Biosynthesis of Zinc oxide nanoparticles from essential oil of Eucalyptus globulus with antimicrobial and anti-biofilm activities. Mater. Today Commun. 25, 101553.
2. Kahla, Y., Zouari-Bouassida, K., Rezgui, F., Trigui, M., Tounsi, S., 2017. Efficacy of Eucalyptus cinerea as a Source of Bioactive Compounds for Curative Biocontrol of Crown Gall Caused by Agrobacterium tumefaciens Strain B6. BioMed Res. Int. 2017, 1–10.
3. Rahal K. Standardisation de L'antibiogramme en Médecine Humaine à l'Echelle Nationale selon les recommandations de l'OMS, fourth ed. Ministère de la Santé, de la Population et de la Réforme Hospitalière, 2005. Algiers.
4. Salaria, D., Rolta, R., Patel, C.N., Dev, K., Sourirajan, A., Kumar, V., 2021. In vitro and in silico analysis of Thymus serpyllum essential oil as bioactivity enhancer of antibacterial and antifungal agents. J. Biomol. Struct. Dyn. 1–20.

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High Antioxidant Capacities and Anti-inflammatory Effects of *Hammada elegans* Botsch. Extracts: An *in vitro* Assessment

BENSAFIDDINE FERIHA [a,b*] , ASSELI IBRAHIM [c] , DJERIDANE AMAR [a, c] et YOUSFI MOHAMED [a, c]

[a]*Laboratoire des sciences fondamentales, Université Amar Telidji. PB 37G, 03000, Laghouat- Algérie.* [b]*Plateau technique d'analyse physico-chimique, Université Amar Telidji. El khneg, 03000, Laghouat- Algérie.* [c] *laboratoire des sciences chimiques et physiques appliquées, ENS de Laghouat, BP 403, Laghouat-Algérie*.

* *Corresponding author*.Tel.: 06 67 39 55 89
E-mail address: farahbensafi@gmail.com

ABSTRACT

Plants supply traditional Algerian medicines for the treatment of antiinflammatory effect. The reasons for the use of traditional treatment were that pure compound obtained were also effective in reducing the toxicities of toxic agents or other drugs. In this study, we explore the phytochemical composition and the phenolic content by indirect method to evaluate the antioxidants and the anti-inflammatory capacities of twelve extracts from three plants.

The total phenolic content ranged from 0.168 ± 0.020 to 4.166 ± 0.124 mg per gram of dry weight. Phytochemical screening revealed that tannins, C-heterosides, O-reduced heterosides and reducing compounds are the most common chemical groups. The highest antiradical activity was achieved with methanolic extract of *Hammada elegans* (EC50 = 0.551 ± 0.171mg/mL). However, the acetonic extract of *Hammada elegans* represents the most important reducing activity (EC_{50} = 0.747 ±0.004 mg/mL). Moreover, this extract also displays the highest chelating ferrous ions effect (EC_{50} = 5.749 ±0.009 mg/mL) while the hydromethanolic extract of *Cleome arabica* has the best antilipoperoxidative effect (EC_{50} = 0.031 ± 0.000 mg/mL). Furthermore, all extracts inhibit the activity of lipooxygenase and cyclooxygenase with IC_{50} values less than 19.210 ± 0.297 mg/mL. Therefore, the acetonic extract of *Hammada elegans* appears to be twice greater than that of standard inhibitors. The fractionation of the acetonic extract of *Hammada elegans* has given a potent bioactive compound which seems to have potential therapeutic possibilities for the prevention of the inflammatory effects.

Keywords: Anti-inflammatory effect, antioxidant capacity, *Hammada elegans*, isolation, phytochemical screening.

References

1. Hill, A. F.Economic Botany A textbook of useful plants and plant products. 2nd ed. McGarw-Hill Book Company Inc., 1952, New York.
2. Jacob, R.A. The integrated antioxidant system. Nutr. Res., 1995, 15, 755 -766.
3. Freidovich, I. Fundamental aspects of reactive oxygen species, or what's the matter with oxygen? N.Y. Acad. Sci., 1999, 893, 13-8.
4. Dubois, R.N.; Abramson, S.B.; Crofford, L.; Gupta, R.A, Simon, L.S.; Van De Putte, L.B.; Lipsky, P.E. Cyclooxygenase in biology and disease. FASEB. J., 1998, 12, 1063-1073.
5. Smith, W. L.; DeWitt, D.L.; Garavito, R.M. Cyclooxygenases: Structural, cellular, and molecular biology. Annu. Rev. Biochem., 2000, 69, 145-182.
6. Rahman, K. Studies on free radicals, antioxidants, and co-factors. Clin. Interv. Aging., 2007, 2, 219-236.

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Anti-inflammatory potential of water-soluble polysaccharides derived from some spontaneous medicinal plants on activated human neutrophils

MAHCENE Salem [a]*, BOUAL Zakaria [b], and HAFIANE Hassiba [b]

[a] Laboratory of Fundamental Sciences, University Amar Telidji of Laghouat, P.O. Box 37G, Road of Ghardaïa, 03000 Laghouat, Algeria
[b] Laboratory for the Protection of Ecosystems in Arid and Semi-Arid Zones, University of Kasdi Merbah of Ouargla, 30000 Ouargla, Algeria.

* *Corresponding author.*Tel.: 0699210160
E-mail address: s.mahcene@lagh-univ.dz

ABSTRACT

The anti-inflammatory activity of polysaccharides extracts derived from the seeds of *Plantago notata* (PSPn) and *Plantago albicans* (PSPc) has been studied. The anti-inflammatory potential of the extracts is evaluated by the investigation of their effects on the activity of NADPH oxidase and myeloperoxidase (MPO) of human neutrophils stimulated by phorbol 12-myristate 13-acetate. NADPH oxidase and MPO are two key enzymes in the inflammatory response, their activities generate reactive oxygen species. These produced species are necessary for the degradation of pathogens. The activity of NADPH oxidase is measured by the reduction of ferricytochrome C to ferrocytochrome C. while the activity of MPO is evaluated by peroxidation of 4-aminoantipyrine, a chromophore, to Quinone imine. The results obtained show that the activity of neutrophils NADPH oxidase is significantly inhibited in a concentration-dependent manner by PSPc and PSPn. This inhibition is 49.39% and 63.08% at 100µg/ml for PSPc and PSPn, respectively. Similarly, these two extracts exerted an important inhibitory effect on the activity of neutrophils MPO, with an average of 41.16% at 100µg/ml for the two extracts PSPc and PSPn. In conclusion, the PSPn and the PSPc, prove their anti-inflammatory potential, via their inhibitory capacities on the functioning of NADPH oxidase and the MPO. Indeed, these two plants for phytomedicinal use can be considered as a natural source of bioactive polysaccharides.

Keywords: Polysaccharides; *Plantago notata*; *Plantago albicans*; Neutrophil; Anti-inflammatory.

References

1. BOUDOUKHA, Chahra. Etude de certaines fonctions du neutrophile humain et leur modulation par les extraits de Santolina chamaecyparissus. 2018. Thèse de doctorat.
2. BOUKEMARA, Hanane, HURTADO-NEDELEC, Margarita, MARZAIOLI, Viviana, et al. Anvillea garcinii extract inhibits the oxidative burst of primary human neutrophils. BMC complementary and alternative medicine, 2016, vol. 16, no 1, p. 1-10.
3. CARLSON, G. P. et JJ, KANEKO. Isolation of leukocytes from bovine peripheral blood. 1973.
4. MEZITI, Asma. Régulation de L'inflammation par les Extraits de Rubus fruticosus et Zizyphus vulgaris. 2018. Thèse de doctorat.

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Antioxidant activity of aqueous extract of *Ajuga iva* grown in Algerian steppe (Djelfa province)

Salah-Eddine RAHMANI[a]*, Mokhtar B. LAHRECH[a] and Mohammed R. OUAHRANI[b]

[a]*Department of Chemistry, Ziane Achour University of Djelfa, Algeria.*

[b]*Department, Department of Process Engineering, Faculty of Technology, Echahid Hamma Lakhdar University of El Oued, Algeria.*

* *Corresponding author*.Tel.: 06 64 46 60 66
E-mail address: rahmanidz@yahoo.fr

ABSTRACT

"Natural antioxidants" have attracted the attention of recent research as natural sources in preventing and scavenging free radicals. The aim of this study was to evaluate antioxidant activity, total phenolic and total flavonoid content of the aqueous extract of *Ajuga iva* ("*Chendgoura*" commonly named) in Djelfa district (Algerian steppe). Total phenols and flavonoids were carried out by Folin-Ciacolteau reagent method and aluminium chloride method respectively. Antioxidant activity was determined using 1,1-diphenyl-2-picrylhydrazyl (DPPH) method. The total phenolic and flavonoid content of the aqueous extract of the aerial parts of *Ajuga iva* was 17.60±0.56 mg GAE/g (DW) and 28.96±0.64 mg QE/g (DW) respectively. The antioxidant activity of *Ajuga i.* aqueous extract, using DPPH assay, was concentration dependant with IC_{50} value of 456.23 µg/ml and a percentage of 71% (at 600 µg/ml) less high than the ascorbic acid 82% (at 200 µg/ml). The results show an antioxidant potential for the aqueous extract of the local *Ajuga iva*, which needs to be confirmed by other methods.

Keywords: *Ajuga iva*; Aqueous extract; Antioxidant; DPPH.

References

1. Rahmani SE, Ouahrani MR, Phytochemical investigation of *Ajuga iva*, *Matricaria chamomilla* and *Ruta chalepensis* from Algerian steppe (Djelfa district), GSC *Biological and Pharmaceutical Sciences*, 2022, 19; 01:193–201.
2. Miara M.D., Bendif H, Ouabed A, Rebbas K, Ait Hammou M, Amirat M, Greene A, Teixidor-Toneu I. Ethnoveterinary remedies used in the Algerian steppe: exploring the relationship with traditional human herbal medicine. *J. Ethnopharmacol*. 2019, 244; 112164.
3. Boudjelal A, Siracusa L, Henchiri C, Sarri M, Abderrahim B, Baali F, Ruberto G. Antidiabetic effects of aqueous infusions of Artemisia herba-alba and *Ajuga iva* in alloxan-induced diabetic rats. *Planta Med*. 2015, 81; 9:696–704.
4. Medjeldi, S., Bouslama, L., Benabdallah, A., Essid, R., Haou, S., Elkahoui, S.,. Biological activities, and phytocompounds of northwest Algeria *Ajuga iva* (L) extracts: partial identifcation of the ntibacterial fraction. *Microb. Pathog*. 2018, 121; 173–178.
5. Bondi ML, Al-Hillo MRY, Lamara K, Ladjel S, Bruno M, Piozzi F, Simmonds MSJ. Occurrence of the antifeedant 14,15-dihydroajugapitin in the aerial parts of *Ajuga iva* from Algeria. *Biochem. Systemat. Ecol.* 2000, 28; 1023 –1025.
6. El-Hilaly J, Amarouch M-Y, Morel N, Lyoussi B, Quetin-Leclercq J. *Ajuga iva* water extract antihypertensive effect on stroke-prone spontaneously hypertensive rats, vasorelaxant effects ex vivo and in vitro activity of fractions. *J. Ethnopharmacol*. 2021, 270; 113791.
7. Boukada F, Meddah B, Flavonoids from aerial part of algerian *Ajuga iva* (l.) schreb.: the HPLC-UV analysis and antioxidant capacity Kragujevac J. Sci. 2021, 43; 23-34.
8. Mouheb Samia,, Khali Mustapha, Rouibi Abdelhak and Saidi Fairouz, Antimicrobial and analgesic activity of aqueous extract of algerian *Ajuga iva* (l.) schreb (lamiaceae), *Revue Agrobiologia* (2018) 8(1): 863-870.

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The antioxidant activity of alkaloids extracted from *Peganum harmala* L.

Mounira. Kadri*[a,b], Aicha.Mouane[a], Nour Elhouda Mekhedmi[a], Ahmed. Elkhalifa Chemsa[c].

[a]*Department of Biology, Faculty of life sciences and Nature, University Elchahid Hamma lakhder,. El-Oued, Algeria*

[b] *Laboratory of Biology, Environment and Health Laboratory, faculty of Nature Sciences and Life, Eloued , Algeria*

[c] *Department of Biology, Faculty of life sciences and Nature ,University of Elchahid Hamma Lakhdar ,Laboratory of Biodiversity and Application of Biotechnology in Agriculture, El-Oued, Algeria*

* *Corresponding author*.Tel.: +213558841710
E-mail address:mounira-kadri@univ-eloued.dz

ABSTRACT

The purpose of this study is to assess the antioxidant activity of alkaloids extracted from *Peganum harmala* L. *Peganum harmala* L. is a species of the Zygophyllaceae family. Because it contains multiple chemicals, it is utilized in traditional medicine. Chemical analysis revealed that *Peganum harmala* L. contains flavonoids, tannins, reductases of sugar, anthocyanins, triterpenes, and sterols, as well as a high concentration of alkaloids. The yield of alkaloids in seeds was calculated to be 2.33%, whereas the yield of alkaloids in the vegetative component was assessed to be 0.78%. TLC, on the other hand, revealed the existence of two types of alkaloids in the alkaloid extract of seeds and the vegetative portion. In terms of antioxidant activity, using DPPH, the alkaloid extract of the seeds demonstrated significant efficacy, with an IC50 of 75.63 µg/mL.

Keywords: *Peganum harmala* L – Alkaloids – TLC (Thin layer chromatography)- Antioxidant activity.

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Characterization and evaluation of some biological activities of produced secondary metabolites of *Penicillium* specie isolated from industrial waste

Chemmam Dounya Achwak[a]* and Bourzama Ghania[b]

[a] *Molecular and Cellular Biology Laboratory, Faculty of Nature and Life Sciences, Mohamed Seddik Benyahia University. Jijel. Algeria.*

[b] *Biochemistry and Environmental Toxicology Laboratory, Faculty of Sciences, Badji Mokhtar University. Annaba. Algeria.*

* *Corresponding author.*Tel.: 06.63.04.28.44
E-mail address: chemmam.dounya@yahoo.com

ABSTRACT

One of the most fascinating species of fungi is *Penicillium*. The study of *Penicillium* species has enhanced far beyond their ability to synthesize antibiotics and a significant number of bioactive substances used in the medical community for the treatment of various infections over the years, and they now play a significant role in the biotechnological and biomedical applications. Compounds from terpenes, fatty acids, carboxylic acids, esters and alcohols as other chemical classes were identified using gas chromatography-mass spectrometry (GC-MS) analysis. Using the agar wells diffusion method, an investigation was conducted to assess the inhibitory potential of fungal ethyl acetate extracts against a variety of multi-resistant bacteria and yeast, we isolated a novel strain of *Penicillium* specie from industrial waste, which was cultivated and subsequently extracted the bioactive compounds, variety of human pathogenic microorganisms were tested for *in vitro* antimicrobial activity. The antimicrobial activity results revealed that the most sensitive strains was *Pseudomonas aeruginosa*, *Enterococcus feacalis*, *Staphylococcus aureus*, , *Methicillin resistant staphylococcus aureus* and *Candida albicans* with diameters ranging from 20,13 mm to 33 mm. In the other hand *Salmonella typhimurium* and *Escherichia coli* were the most resistant, with diameters ranging from 7,02 mm to 10 mm. This result deserves additional research to examine potential uses of this fungi extract as active components of drugs in the medical field.

Keywords: natural products, extraction, *Penicillium*, GC/MS, antimicrobial activity**.**

References

1. Nischitha, R., Shivanna, M.B **(2021)** Metabolite fingerprinting, in vitro antimicrobial and antioxidant activities and in-silico docking in Alloteropsis cimicina and its endophytic fungus *Penicillium pinophilum*, Molecular Biology Reports , 48:4021–4037; https://doi.org/10.1007/s11033-021-06410-0
2. Ashtekar, N., Kunhiraman, C., kumar, R., Yilmaz, N., Visagie, M.C **(2022)** A new Penicillium section Citrina species and series from India, Mycological Progress 21:42 ; 1-13. https://doi.org/10.1007/s11557-022-01802-3
3. Toghueo, R.M.K., Boyom, F.F **(2020)** Endophytic Penicillium species and their agricultural, biotechnological, and pharmaceutical applications.3 Biotechnology ;10(3): 1–35. https://doi.org/10.1007/s13205-020-2081-1
4. Lykholat, Y.V., Khromykh, O.N., Didur, O.O., Drehval, O.A., Sklyar, T.V and Anishchenko, A.O **(2021)** Chaenomeles speciosa fruit endophytic fungi isolation and characterization of their antimicrobial activity and the secondary metabolites composition, Beni-Suef University Journal of Basic and Applied Sciences, 10:83; https://doi.org/10.1186/s43088-021-00171-2

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LC-MS analysis of Centaurea papposa extract

Cheribet Mawahib[a]* , Guetteche Amina[a],Zaabat Nabila[a], Akkal Salah[b]

a Valorization of Natural Resources, Bioactive Molecules and Biological Analysis Unit,Department of Chemistry, University of Mentouri Constantine, Constantine 25000, Algeria.

* Cheribet.mm@gmail.com.

ABSTRACT

This work aimed to ascertain the phenolic compounds of ethyl acetate extract of Centaurea papposa, In order to find new sources of polyphenols. The genus Centaurea L. (Asteraceae, Carduae) is characterized by biosynthesis of flavonoids (Akkal et al.,2003). Phenolic compounds were appraised using LC-MS technique . LC-MS analysis revealed the presence of 21 compounds amongwhich 13 were phenolic acids, 6 flavonoids, 1 phenolic aldehyde and 1 benzo-pyrone..

Keywords: Centaurea L; LC-MS analysis ; polyphenols ; ethyl acetate extract.

References

1. Akkal S, Benayache F, Medjroubi K, Jay M, Tillequin F. SeguinE. flavonoids from Centaurea furfuracea. Biochem SystematicsEcol. 2003; 31: 641-43.

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Antibacterial activity of *Artemisia herba-alba* and *Artemisia campestris* against pathogenic bacteria

Kahina Belbachir[a] and Kamel Bendjeddou[*b]

[a,b] *Applied Microbiology Laboratory, Department of Microbiology, Faculty of Nature and Life Sciences, University of Bejaia*

* *Corresponding author.*Tel.: 0794400458
E-mail address: kamel.bendjeddou@univ-bejaia.dz

ABSTRACT

Contamination of foods with foodborne pathogenic bacteria is worldwide problem that could arise during production or storage of foods. Indeed, these bacteria can be the cause of toxi-infections or food damage, which are a serious health and economic problems. To combat these microorganisms, physical or chemical processes such as heat treatment or preservation with chemical synthetic substances are widely used for food products preservation. However, these processes can cause changes in food organoleptic characteristics, as well they can cause many human health problems. The plants are an inexhaustible source of bioactive molecules that can be used in several fields. Food industry is among the application fields of plants as alternatives to chemicals. The objective of this study is demonstrating the antibacterial activity of two medicinal plant extracts: *Artemisia herba-alba* and A*rtemisia campestris* against to pathogenic bacteria in order to use them as food bioconservatives. Results have shown that the aqueous and alcoholic plants extracts exhibit an antimicrobial effect with inhibition zones ranging from 0 to 29mm in diameter. The inhibition zone diameters are different according to the extraction solvents and the target strains. Indeed, the alcoholic extract of A. campestris gave inhibition zones of: 08, 10, 11, 12, 13, 15, 20, 29 for *Bacillus cereus, Bacillus subtilis, Staphylococcus aureus, Salmonella Enteritidis, Escherichia coli* respectively. However, the aqueous extract of this plant was active only against bacillus cereus with an inhibition zone of 13mm in diameter. however, the alcoholic extract of A. herba-alba, gave zones of inhibition of: 07, 09, 10, 12 and 14 respectively against the pathogenic strains, while the aqueous extract of this plant exhibited no antibacterial activity against the target strains. These results are very interesting and have potential applications in agri-food field, consequently these plants or their extracts may be used as alternatives to chemical preservatives.

Keywords: medicinal plants, antibacterial activity, bioconservation.

References

1. Granato, D. ; Santos, J.n.S. ; Salem, R.D.S. ; Mortazavian, AM ; Rocha, R.S. ; Cruz, A.G. E ects d'extraits à base de plantes sur les caractéristiques de qualité des yogourts, fromages, laits fermentés et crèmes glacées : Une perspective technologique. Curr. Opin. Food Sci. 2018, 19, 1-7.
2. Vazquez, B.I.; Fente, C. ; Franco, C.M. ; Vazquez, M. J. ; Cepeda, A. Inhibitory e ects of eugenol and thymol on Penicillium citrinum strains in culture media and cheese. Int. J. Food Microbiol, 2001, 67, 157-163.
3. Baydar, H.; Sagdic, O.; Özkan, G.; Karadogan, T. Activité antibactérienne et composition des huiles essentielles des espèces Origanum, Thymbra et Satureja ayant une importance commerciale en Turquie. Food Control, 15, 169-172.
4. Fierascu, R.C. ; Ortan, A. ; Fierascu, C.I. ; Fierascu, I. Évaluation in vitro et in vivo des propriétés antioxydantes des plantes sauvages. Bref bilan. Curr. Opin. Food Sci. 2018, 24, 1-8.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Determination of hydrolytic and insecticidal activities and germination activation of durum wheat seeds (*Triticum durum*) by rhizospheric bacteria (PGPR)

Benazzouz Kinza[a]*, Zourdani Souhila[b]

[a,b]*Department of Biochemistry and Microbiology, Mouloud Mammeri University of Tizi-Ouzou, Faculty of Biological and Agricultural Sciences.*

* Corresponding author.Tel: 0796335364
Email*: kinzabenazzouz@gmail.com

ABSTRACT

Rhizobacteria, known as Plant Growth Promoting Rhizobacteria (PGPR), promote plant growth and protect them against attack by plant pathogens. In this present work, we were interested in characterizing PGPRs, isolated from the rhizosphere of durum wheat (*Triticum durum*). Three bacterial strains of the genus Bacillus were isolated. The evaluation of their extracellular hydrolytic capacity allowed the revelation of enzymes: amylase, esterase, lipase, caseinase, cellulase, coagulase as well as their ability to solubilize tricalcium phosphate. They are resistant to oxacillin and penicillin, but sensitive to Gentamicin, Tetracycline, Ampicillin and Cefoxitin. The results of the inoculation of durum wheat seeds with the bacterial suspension of the three isolates (*Bacillus* sp. 1, *Bacillus* sp. 2 and *Bacillus* sp. 3) in comparison with the non-inoculated controls showed an effect on the growth of the root and stem length in durum wheat seeds. Only the Bacillus sp.1 isolate was tested against *Cydia nigricana* lepidopteran larvae. The results showed an insecticidal effect after 72 hours of treatment with a dose of 60µL. The results obtained suggest that the isolates tested have an insecticidal effect on certain lepidopteran larvae and a stimulatory effect on seed germination.

***Keywords*:** PGPR; germination; wheat; enzyme activity; insecticide

References

1. Meddas S-A, Oulebsir-M-k H, Hadjouti R, Reghmit N, Houas Y, Amirat D, Naitbouda L, et Doumandji-Mitiche B. Caractérisation des *bacillus* spp. isolées du sol d'olivier et étude de leurs potentialités de biocontrole contre la mouche de l'olive *dacus oleae* (gmel) au nord de l'Algérie. *Revue Agrobiologia.* 2020, 10(1): 1872-82.
2. Karungu S., Huang D., Atoni E., Waruhiu C., Agwanda B., Hu X., & Yuan Z. Isolation, identification and evaluation of mosquito entomopathogenic *Bacillus* species and related genera from randomly selected sites in Kenya. *African Journal of Microbiology Research*. 2018, 12(12):290-299.
3. Joffin J.N, & Leyral G. Technical microbiology TI-Dictionary of techniques. 4th edition. Bordeaux: CRDP of Aquitaine. 2006, 368 p.
4. Smibert R.M., & Krieg N.R. Phenotypiccharacterization. In: Methods for general and molecularbacteriology. P. Gerhardt, R. G. E. Murray, W. A. Wood, and N. R. Krieg(ed.), American Society forMicrobiology, Washington, D.C. 1994, pp.607–654.

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Study of the antioxidant, anticoagulant, antifungal and antibacterial activity of Ocimum Basilicum.L.

Merzouki Soraya[a,b]* F. Louafi[b], M. Amimour[a], R. Benchekhchoukh[a] and C. Mouats[b]

[a] *Sciences & Technologie Department, University center A.elhafidh Boussouf, Mila, Algeria*

[b] *structural molecular environment chemistry research unit (CHEMS) Constantine university 1,Constantine, Algéria*

* *Corresponding author.*Tel.: 00213774586330
E-mail address:smerzouki@centre-univ-mila.dz

ABSTRACT

A large number of aromatic and medicinal plants have very important biological properties that find many applications in various fields; among these plants we have chosen Ocimum basilicum L. Due to its therapeutic properties. The antioxidant, antifungal, and anticoagulant activity of the arian part of Ocimum Basilicum L. cultivated in the region of Mila (Chalgoum el Aid) has been considered. We first proceeded to the extraction of secondary metabolites by aqueous and hydromethanolic maceration and the liquid-liquid fraction by using solvents of increasing polarity which are: Petroleum ether, Chloroform, Ethyl Acetate and n-Butanol. Chromatography studies showed the presence of several secondary metabolites compounds. Evaluation of the antioxidant activity of O basilicum extracts. L by the DPPH test and electrochemically reveals that the plant has an important antioxidant power with different extracts. But only the extract chloroform of our plant shows a good antifungal activity.The anticoagulant activity was evaluated by the cephalin-kaolin time (TCK) and Quick time (TQ) tests, demonstrating that both extracts exert significant anticoagulant activity vis-à-vis both coagulation pathways. Finally, the results obtained show that the bacterial species studied have different degrees of sensitivity to the fractions tested. It is noted that the bacterial strains E. coli and B. cereus are present as the most sensitive to O. basilicum fractions at any dose. While the bacterial strains S. aureus and P. aeeuginosa are sensitive to fractions (chloroform and ethyl acetate).

***Key words*: Ocimum basilicum L., antioxidant, anticoagulant, antifungal and antibacterial activity**

References

1. Ali A, Akhtar N, Khan BA, Khan MS, Rasul A, Zaman SU, Khalid N, Waseem K, Mahmood T, Ali L,. *Acacia nilotica:* A plant of multipurpose medicinal uses. *J. Med. Plants Res*. 2012, 6 ;9 ; 1492-1496.
2. Khan I, Ahmad K, Kalil AT, khan J, Khan YA, Evaluation of antileishmanial, antibacterial and brineshrimp cytotoxic potential of crude methanolic extract of Herb Ocimum basilicum(Lamiacea). *Journal of Traditional Chinese Medicine*. 2015, 15, 35, 3; 316-322.
3. Erol NT, Sarı F & Velioglu YS. Polyphenols, alkaloids and antioxidant activity of different grades turkish black tea. *GIDA*. 2010, 35, 3 ; 161-168.
4. Rodríguez-Méndez ML, Apetrei C & De Saja, JA. Evaluation of the polyphenolic content of extra virgin olive oils using an array of voltammetric sensors. *Electrochimica Acta.* 2008, 5; 5867-5872.

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Characterization Quantification and Qualitative of the Phenolic compounds and antioxidant activity of *Helianthemum Lippi L*

Fouhma Abir [a]* ,Tamma Noureddine [b] , Rebiai Abdelkrim[c].

[a], *Laboratoire de Chimie Appliquée et Environnement, Faculty of Exact Sciences, Université Echahid Hamma Lakhdar El Oued 39000, Algeria*.

[b]*Department de Chimie , Université Echahid Hamma Lakhdar El Oued 39000, Algeria*.

* *Corresponding author*.Tel.: 0782199129

E-mail address: fouhma1996@gmail.com

ABSTRACT

Medicinal plants have long played important roles in the treatment of diseases all over the world. Among the medicinal plants which locally known is (Samhari) . that is playing a vital role due to its various medicinal properties .Bioactive compounds were extracted by using standard protocols . Antioxidant activity was done by DPPH and FRAP assay .Anti-inflammatory activity was studied by membrane stabilization assay. Results of Phytochemical essays showed that aqueous extract of *Helianthemum Lippi L* is very rich on different chemical compounds such as flavonoids, Phenols, tannins , Saponiside ,steroids and terpene . Total phenolic and flavonoids contents of Helianthemum Lippi L .obtained from water solvent were 254.3± 3,27 mg GAE/g and 85.30± 0,05 mg of QE/g respectively. IC50 values in the DDPH radical scavenging activity assay and FRAP indicate that this plant have a high antioxidant activity ,Infra red (IR) analysis of *Helianthemum Lippi L* .revealed the existence of different peaks that are characteristic of this plant .the results of variability membrane stabilization according to deferent concentrations of aqueous extract of *H.Lippi L* which have a high anti-inflammatory effect .The results conclude that. *Helianthemum Lippi L* rich of bioactive compounds which protects against oxidative stress and inflammatory disease.

Keywords: Phytochemical essays; Antioxidant; DDPH ; FRAP ; bioactive compounds .

References

1. Hallis Y. Encycopedia of plat in Oued Souf: plants in zone of El oued, 2007; 142-220.
2. Kumaran A, Karunakaran R . Anti oxidant and free radical scavenging activity of an aqueous extracts of Coleus aromatius. Food chemistry,2006, 97: 109-14.
3. A.Favier. « le stress oxydant : Intérêt conceptuel et expérimenta dans la compréhension mécanismes des maladies et potentiel thérapeutique .édité par la société française de chimie(SFC), 2003,ISSN0151 9093.

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The *in vitro* antioxidant potential and phytochemical content of aqueous extract of local fenugreek seeds, *Trigonella foenum-graecum L*

Maram Hachouf [a], Ouassila Aouacheri [b], Saad Saka [b]

[a] *Laboratory of Applied Biochemistry and Microbiology, Department of Biochemistry, Faculty of Sciences, Badji Mokhtar University, Annaba, Algeria.*

[b] *Laboratory of Animal Ecophysiology. Department of Biology. Faculty of Sciences, Badji Mokhtar University, Annaba, Algeria.*

E-mail address: *hachoufmaram28@gmail.com*

Tel.: 0660681914

ABSTRACT

Antioxidant activity of medicinal plants is regarded as one attributable factor for their therapeutic potential. Hence this study was carried out to evaluate the antioxidant capacity of local fenugreek seeds using various antioxidant tests, including total antioxidant, free radical scavenging, and reducing power, using ascorbic acid as standard. Quantitative analysis of secondary metabolites was determined as well using colorimetric assays. The phytochemical analysis of fenugreek seeds revealed the presence of several phenolic compounds including polyphenols (196±0,89 µg AGE/gE), flavonoids (104±0.21 µg QE/g E), tannins (881.4±4.75 µg CE/g E), flavones (37±0.05 µg RE/g E) and ortho-diphenols (26.17 ±2.44 µg CAE/g E). Aqueous extract of the seeds exhibited effective reducing power capacity (FRAP =176.98±6.95 µg/ml), free radical scavenging potential (DPPH=133.89±9.04µg/ml) and total antioxidant activity (CAT= 110.29±9.76µg/ml). The results obtained in the present study suggested that fenugreek seed is a potential source of natural bioactive phenolic compounds with high antioxidant properties which emphasize its application biotechnologically as antioxidant agents or for treatments in diseases.

Keywords: Antioxidant activity, *Trigonella foenum-graecum L* ,Phenolic content , DPPH, FRAP

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HPLC analysis and antioxidant activity of methanolic extract *of Cistanche tinctoria* (Desf.) Beck. (Orobanchaceae)

Nezar CHERRADA[1] *, Atef CHOUIKH [2], Ahmed ELkhalifa CHEMSA[3], Noura GHERAISSA[3]

[1,3]*Laboratory of biodiversity and application of biotechnology in agriculture, Echahid Hamma Lakhdar University 39000, El-Oued, Algeria.*

[2] *Laboratory Biology, Environment, and Health (LBEH), Echahid Hamma Lakhdar University 39000, El-Oued, Algeria.*

Tel.: 0662746075
E-mail address: nizarc7@gmail.com

ABSTRACT

For valorizing spontaneous medicinal plants growing in the northeast of the Algerian Sahara, we conducted a phytochemical study and estimated the antioxidant capacity of *Cistanche tinctoria* (Desf.) Beck. This parasitic plant belongs to the Orobanchaceae family, and is widely distributed in hypersaline, semiarid, and arid areas worldwide; It is also distinguished by its wide range of therapeutic uses. The extraction was carried out by cold maceration using methanol. The results showed that the total phenol was estimated to be (150.11 ± 5.12 mg AGE/g Extract) and the total flavonoid content was (18.369 ± 2.3 mg QE /g extract). The evaluation of antioxidant power using the Ferrous Reducing Power method, the DPPPH• assay, and anti-hemolysis activity Concerning the qualitative analysis of phenolic compounds for both extracts using high-performance liquid chromatography (HPLC) has been demonstrated that the presence of Chlorogenic acid, Caffeic acid, and Naringin in an extract with different concentrations.

Keywords: *Cistanche tinctoria; Orobanchaceae; phytochemical analysis; antioxidant activity; HPLC.*

References

1. Bougandoura A, Abrosca B, Ameddah S, Scognamiglio M, Mekkiou R, Fiorentino A, Benayache S, Benayache F.Chemical constituents and in vitro anti-inflammatory activity of *Cistanche violacea* Desf.. (Orobanchaceae) extract.2016. *Journal of Plant Fitoterapia*, 16:1-18.
2. Bouzitouna AK, Ouali S, Djed D,: Protective effects of *cistanche tinctoria* aqueous extract on blood glucose and antioxidant defence system of pancreatic β-cells in experimental diabetes in rats.2015. *International journal of pharmaceutical sciences review and research*, 40, PP: 243-249.
3. Ozenda P. Flore de sahara.1997, 2éme Édition, CNRS, Paris, France,199p.

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Synthesis, Characterization and Antioxidant Activity of Functionalized Graphene Oxide Nanoparticles with 4-(ferrocenylmethylamino) Benzonitrile

Mammadi Nardjess[a*], Ahmedi Ridha[a] and Chenna Adala[b]

[a]*Faculty of exacts Sciences , El Oued University, El Oued, Algeria.*

[b] *Faculty of Natural Sciences and Life, University, El-Oued, Algeria*

* *Corresponding author.*Tel.: 06.98.61.75.70
E-mail address: nardjesmammadi95@gmail.com

ABSTRACT

In this work, graphene oxide (GO) nanoparticles was prepared and functionalized by 4-(ferrocenylmethylamino) benzonitrile via (3-Aminopropyl)triethoxysilane (APTES) as linker (GO@APTES@ FcB4CN). The graphene oxide nanoparticles were synthesized by modified hummer's method[1], and were analyzed with X-ray Diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR).

In vitro the antioxidant activity of the studied nanocomposite was evaluated using 1, 1-diphenyl-2-picrylhydrazyl (DPPH) and 2, 2'-Azinobis 3-Ethyl-benzothiazoline-6-Sulphonate (ABTS) assay[2, 3]. This methods is based on the spectrophotometric measurement of ABTS cation radical ($ABTS^{\bullet+}$) and $DPPH^{\bullet}$ radical concentrations changes resulting from the $ABTS^{\bullet+}$ and $DPPH^{\bullet}$ reaction with nanocomposite and using butylated hydroxytoluene (BHT) and ascorbic acid (ASA) as standard antioxidants. In both methods, the results indicated that nanocomposite exhibited efficient inhibitory activity against ABTS cation radical and $DPPH^{\bullet}$ radical, which was comparable to the standard BHT and ASA

Keywords: Graphene Oxide, GO@APTES@FcB4CN, functionalization, Antioxidant activity, ABTS, DPPH.

References

1. Paulchamy, B., G. Arthi, and B. Lignesh, *A simple approach to stepwise synthesis of graphene oxide nanomaterial.* J Nanomed Nanotechnol, 2015. **6**(1): p. 1.
2. Kaur, I.P. and T. Geetha, *Screening methods for antioxidants-a review.* Mini reviews in medicinal chemistry, 2006. **6**(3): p. 305-312.
3. Moharram, H. and M. Youssef, *Methods for determining the antioxidant activity: a review.* Alexandria Journal of Food Science and Technology, 2014. **11**(1): p. 31-42.

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Chemical composition and characterization of some Tunisia plant oils and investigation of their antioxidant and antibacterial activities

Dorsaf Rekik MOALLA[a*], Zouheir SAHNOUN[a]

[a]Laboratory of pharmacology, Faculty of Medicine of Sfax, Tunisia
* *Corresponding author*.Tel.: 0021623661819
E-mail address: rmdorsaf@gmail.com

ABSTRACT

This study joins in a frame of the valuation of healing plants by the use of their oil in the pharmacology. The interest for these plants is motivated by their use in the traditional pharmacopoeia for their antioxidant and antibacterial properties.The objective of this work was to study the stability of oil of these plants, to determine their chemical compositions and to estimate their antioxidant and antibacterial activity. A study of stability contained the evaluation of the indications of peroxide, saponification and iodine. The evaluation of the antioxidant activity was made through the test DPPH and that of the reducing power. The study of the antibacterial activity was based on the determination of the inhibitive minimal concentration and the realization of the test of Halo. A chromatographic analysis in gas phase was made for 11 samples only among 23 healing plants, object of our study. The analysis of fixed oil by means of the indication of peroxide, the indication of iodine and the indication of saponification showed a stability of the plant supports. Various oil of the studied plants showed an antioxidant power and an antibacterial power on certain bacteria Gram positive and negative Gram which are variable from a sample to another one. Oil of the garlic, the incense, the henna, the onion and the lemon appears to have antioxidant and antibacterial activities more important than the rest of the used products. Qualitatively, the chromatographic analysis of 11 studied oil highlighted profiles comparable to those noticed in the literature for certain healing plants. They contained especially the polyunsaturated fatty acids, the flavonoids, unsaturated fatty acids. Vegetable oil of our study seems to have antioxidant and antibacterial properties which can be exploited in human therapeutics in particular in the treatment of certain cutaneous wounds.

Keywords: Antioxidant; chromatography; antibacterial activity; stability

References

1. Dubois, V., S. Breton, et al. (2008). Proposition de classement des sources végétales d'acides gras en fonction de leur profil nutritionnel.Oléagineux, Corps gras, Lipides15(1): 56-75.
2. Gohari Ardabili, A., R. Farhoosh, et al. (2011). Chemical composition and physicochemical properties of pumpkin seeds (Cucurbita peposubsp. pepo var. Styriaka) grown in Iran. Journal of Agricultural Science and Technology13: 1053-1063.
3. Jean, B. (2009). Pharmacognosie, phytochimie, plantes médicinales (4e éd.), Lavoisier.
4. Joslyn, M. (1970). Analítico: Methods in food analysis. Physical, chemical, and instrumental methods of analysis.
5. Morin, O. and X. Pagès-Xatart-Parès (2012). Huiles et corps gras végétaux: ressources fonctionnelles et intérêt nutritionnel. Oléagineux, Corps gras, Lipides19(2): 63-75.
6. El Hachimi, F., A. El Antari, et al. (2015). Comparison of oils seed and fatty acid content of various Moroccan populations of jujube, grenadier and prickly pear.

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Chemical study of crude turnip extracts (*Brassica rapa subsp. rapa*) grown in the region of El-Oued.

Hanane Debbeche[a]*, Naïma Benchikha[a], Kawthar Barhoum[a], Khouloud El-Hadda Joughi[a], Zeineb Hadhig[a]

[a]*Department of Chemistry, University Hamma Lakhdar of El-Oued, El(Oued, Algeria (times new roman 8 italique sans gras)*

* *Corresponding author :* tel.: 00213775552705
E-mail address: hanane-debbeche@univ-eloued.dz

ABSTRACT

This work aims to study the chemical properties of plant extracts obtained by soaking turnip plants in 100 % water and 100 % methanol. The study, through phytochemical analysis, provides an insight into the active substances and an estimation of aqueous and methanolic extracts yields. This paper also studies the antibacterial and antioxidant properties of the extracts. The phytochemical analysis revealed that the plant is rich in active substances as proved by the presence of phenols, flavonoids, terpenes, saponins, alkaloids, carbohydrates, tannins, and the absence of anthocyanins and starch. The yield of the aqueous extract was estimated at 49,6 % and the methanolic one at 22,8 %. Our study shows that the antibacterial activity of the turnip plant extracts does not have sufficient efficacy to inhibit the tested bacterial strains. As for the antioxidant properties, the methanolic extracts show an inhibiting activity towards DPPH radical in which (IC_{50} = 0,81) was superior to the aqueous extracts with (IC_{50} = 1,50). The aqueous extracts show a significant ability to inhibit CAT oxidation with a value of (90,03 mg EAA / g) higher than the methanolic extracts whose inhibition rate is estimated to inhibit CAT oxidation at a value of (10.98 mg EAA / g).

Keywords : *secondary metabolism, Brassicales, turnip, bacteria, CAT, DPPH, Brassica rapa subsp rapa.*

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Synthesis and spectroscopic study of benzodiazepinones

N.BAYOU-KHIER[1,2], D.AKROUM-AMROUCHE[1,2]

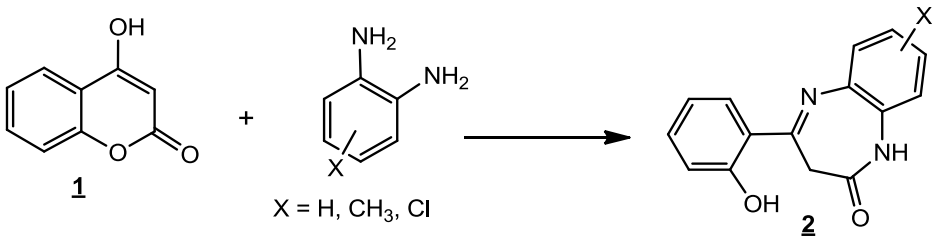
[1] Département de chimie, Faculté des sciences, UMBB, Siège (Ex INIL), 3500 Boumerdes, Algérie

[2] Laboratoire de Bionformatique, Microbiologie Appliquée et Biomolécules, Université M'Hamed Bougara de Boumerdès
E-mail: nawalkhier@yahoo.com

ABSTRACT

4-Hydroxy coumarin 1 is a benzolactone of major interest in therapeutic chemistry[1]. Constituting the starting product in the synthesis of several biologically active compounds [2,3], this product intervenes in the formation of multiple compounds such as the antivitamin K and the antibiotic Novobiocin by various synthetic routes.

In this work, we carried out the synthesis of benzodiazepinones 2 by condensation reaction of hydroxycoumarin on orthophenylenediamine differently substituted under operating conditions not described in the literature.



References:

[1] G. Cravotto, S. Tagaliapietra, R. Cappillo, G. Palmisano, M. Curini and M. Baccalini. Long-chain 3-acyl-4-hydroxycoumarins: Structure and antibacterial activity. Arch. Pharm. (Weinheim). Vol. 339, no. 3, pp. 129-132, 2006.

[2] D. Z. Qiang, J.B. Shi, B. A. Song and X.H.Liu. Novel 2H-chromen derivatives: Design, synthesis and anticancer activity. RSC adv., vol. 4, no. 11, pp5617-2014.

[3] O. M. Abdelhafez, K. M. Amin, R. Z. Batran, T. J. Maher, S. A. Nada and S. Sethumadhavan. Synthesis, anticoagulant and PIVKA-II induced by new 4-hydroxycoumarin derivatives. Bioorganic Med. Chem. Vol. 18, no.10, pp. 3371-3378, 2010

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Green Synthesis: An Eco-friendly Route for the Synthesis of Copper Oxide Nanoparticles

Chaimma BEN CHEIKH[a,b]*

[a] *Department of Chemistry, University of Echahid Hamma Lakhdar El Oued, Algeria*

* *Chaimma BEN CHEIKH.*Tel.: 0657847735
E-mail address: chaimaabencheikh3@gmail.com

ABSTRACT

Copper oxide nanoparticles (CuO NPs) can be synthesized using green synthesize method. Green syntheses provide low cost, high yield production, and easy processing steps. This review focuses on the synthesis of CuO nanoparticles using various plant extracts, such as leaves, flowers, peels, and roots. The CuO nanoparticles were characterized using a variety of techniques, including X-ray diffraction (XRD), Fourier transforms infrared spectroscopy (FTIR), scanning electron microscopy (SEM), and ultraviolet-visible spectroscopy (UV-Vis). The majority of the results of various studies have proven that the green synthesis of CuO is spherical shape. with an average size ranging between 2 and 50 nm.

Keywords: Green synthesis; CuO NPs; Plant extracts; Copper Oxide.

References

1. Hoang NC, Shreyas P, Suresh G, Rajeshwari O, Nguyen TTH, Nguyen MV, Van-Huy N. New frontiers in the plant extract mediated biosynthesis of copper oxide (CuO) nanoparticles and their potential applications: A review. Environmental Research. 2022, 203:111858.
2. Liu H, Zheng SM, Xiong, HF, Alwahibi, MS, Niu X. Biosynthesis of coppe roxide nanoparticles using Abies spectabilis plant extract and analyzing its antinociceptive and anti-inflammatory potency in various mice models. Arabian Journal of Chemistry. 2020. 13:6995–7006.
3. Subashini K, Prakash S, Sujatha V. Anticancer activity of copper oxide nanoparticles synthesized from brassia actinophylla flower extract. Asian J. Chem. 2019. 31:1899–1904.

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Biosynthesis, Characterization, And Evaluation Of The Biological Activities Of Nanoparticles Synthesized From Plant Extract

Maroua Derki[1], Soukaina Tidjani[2], Mohammed Tayeb Oucif Khaled[3]

[1,2]*Faculty of Exact Sciences, Laboratory of Valorization and Technology of Resource Saharian (VTRS), Department of Chemistry University of Echahid Hamma Lakhdar, 39000, El Oued, Algeria.*

0658337137

derkimaroua11@gmail.com

ABSTRACT

The novel and sustainable methodologies under 'Green nanotechnology' have been recently developed for nanoparticle synthesis. Chemical, physical and biological (natural precursors) have been analytically studied for the design and synthesis of nanoparticles with the desired size, shape and functionalities. The green perspective includes sol-vents, reductants or stabilizing agents obtained from a natural resource as they are non-toxic and eco-friendly. [1], [2], [3], [4].

In this study, a sustainable green synthetic strategy to synthesize zinc oxide nanoparticles by employing medicinal plants. mation of zinc oxide nanoparticles was confirmed by comprehensive characterization techniques. The presence of biomolecules and metal oxides were confirmed by UV-Vis and Fourier transform Infrared (FT-IR) spectral data analysis. The X-ray diffraction (XRD) revealed the formation of pure wurtzite ZnO crystalline nanoparticles. the antibacterial activity was tested using the disk diffusion method.

Keywords: Zinc Oxide Nanoparticles, Medicinal Plants, Green Synthetic, Antibacterial Activity

References

[1] J. Singh, et al.'Green' synthesis of metals and their oxide nanoparticles: applications for environmental remediationJ. Nanobiotechnol., 16 (1) (2018), p. 84.

[2] P. Makvandi, et al.Metal-based nanomaterials in biomedical applications: Antimicrobial activity and cytotoxicity aspects Adv. Funct. Mater. (2020), p. 1910021.

[3] C.y. Wang, et al., Advances in antimicrobial organic and inorganic nanocompounds in biomedicine. Adv. Therap.: 2000024.

[4] P. Makvandi, et al.Biofabricated nanostructures and their composites in regenerative medicineACS Appl. Nano Mater., 3 (7) (2020), pp. 6210-6238.

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In *vivo* antimicrobial effect of methanolic extract of *Apium Graveolans* Seeds From Western Algerian Region

IMANE ABDELSADOK[a]* BOUMEDIENE MEDDAH [a]

[a]*Biology Department, Mustapha Stambouli University, Mascara, Algeria*

* *Corresponding author*.Tel.: 0777568478
E-mail address:imane.abdelsadouk@univ-mascara.dz

ABSTRACT

Worldwide, the very high prevalence of microbial intestinal infections and antibiotic resistance have become the major public health problem[1]. Much research has been devoted to finding a natural remedy[2]. Among these plants, *Apium graveolans*, Known as Celery[3], comes from western Algeria and is very widespread in herbal medicine thanks to its therapeutic virtues[4].

The objective of this study is to evaluate the antimicrobial effect of seeds of this plant *in vivo*.

To carry out this work, 18 wistar rats were divided into three groups (-Witness Group-Control Group- Treated Group with seeds extract of *A.graveolans*). After induction of the infection by injection of a bacterial suspension at 10^8 CFU/ml, the antimicrobial potency of the extract was then evaluated by observation and counting of the colonies in blood cultures carried out regularly during the experiment. In addition, histopathological study of the ileum was performed to confirm the blood culture results.

The results of the blood cultures of the experimental groups revealed that the methanolic extract of *Apium graveolans* seeds possesses an antimicrobial power. These results are confirmed by the histological study which showed in the treated group a healthy tissue with a preserved architecture.

Our results show that the seed of the medicinal plant *Apium graveolans* has an antimicrobial power; it can be used to fight against microbial intestinal infections.

Keywords: Microbial intestinal infections-*In vivo*- *Apium graveolans*- Antimicrobial power- Rat.

References

1. OMS. L'Alliance quadripartite inaugure sa Plateforme de partenariat multipartite sur la résistance aux antimicrobiens pour aider à neutraliser cette menace globale qui pèse sur la santé humaine et animale et les écosystèmes; OMS: Suisse, 2022.
2. Bahare Salehi, Alessandro Venditti, Claudio Frezza, Aysun Yücetepe, Ümit Altunta¸s, Sibel Uluata, Monica Butnariu, Ioan Sarac, Shabnum Shaheen, Spyridon A. Petropoulos, Karl R. Matthews, Ceyda Sibel Kılıç, Maria Atanassova, Charles Oluwaseun Adetunji, Adedayo Oluwaseun Ademiluyi, Beraat Özçelik, Patrick Valere Tsouh Fokou, Natália Martins,William C. Cho, and Javad Sharifi-Rad. Apium Plants: Beyond Simple Food and Phytopharmacological Applications. Appl Sci. 2019, 9, 3547.
3. Abdulrahman Khazim AlAsmari, Md. Tanwir Athar, Saeed G. Kadasah. Medicinal Plants of Arab Region: *Apium graveolens* Linn. Pharmacogn. Rev. 2017, 11, 21.
4. M Joyce Nirmala, Latha Durai, Vineet Gopakumar, Ramamurthy Nagarajan. Preparation of Celery Essential Oil-Based Nanoemulsion by Ultrasonication and Evaluation of Its Potential Anticancer and Antibacterial Activity. International Journal of Nanomedicine 2020:15, 7651–7666.

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Antioxidant and anti-mastitis activity of some essential oils

Hafida MERZOUK[a]* Adouda MOUNCI[a] and Souhila SALHI[a]

[a]*Department food sciences, University of A/Mira, Bejaia, Algerie*

* *Corresponding author.*Tel.: 0794665520
E-mail address: hafida.merzouk@univ-bejaia.dz

ABSTRACT

The present study deals with the evaluation of the antioxidant activity and the antimicrobial activity of 12 essential oils of local aromatic plants which are traditionally used in Algeria against 9 microbial strains responsible for dairy animal breast infections in order to select the most interesting oils. Physicochemical properties such as Refractive index and density are determined to assess the quality of the studied oils. Density of Eugenol and clove oil are greater than 1 (1.06 and 1.0019 respectively). Clove oil density is reported to be higher than the density of water.

Antioxidant activity of the extracts was evaluated by three methods: reducing power by TPTZ method, DPPH and ABTS free radical scavenging. Thymol and eugenol displayed remarkable free radical scavenging properties.

The antimicrobial activity of the tested oils was evaluated by biofilm formation inhibition using crystal violet assay.

The crystal violet test revealed that the 5 oils mentioned above have a strong inhibitory activity towards the preliminary formation of biofilm, clove proved to be the most active towards the primary formation of biofilm and its removal once formed. The essential oils of *thymus vulgaricus, origanum vulgare, syzygium aromaticicum*, as well as eugenol and thymol showed significant antioxidant activity compared to other oils tested. Clove oil (*syzygium aromaticicum*) showed the best antibiofilm activity, especially that formed by *Staphylocuccus aureus*.

Keywords: Animal mastitis, *Antioxidant* activity, Antimicrobial activity, Essential oils, Medicinal plants.

References

1. Gupta, D. (2015). Methods for determination of antioxidant capacity: A review. International Journal of Pharmaceutical Sciences and Research, 6(2), 546.
2. Hagos et al., (2022). Chemical Composition and Physicochemical Properties of Essential Oil from Myrtuscommunis. International Journal of Pharmaceutical and Clinical Research ; 9(6): 439-443.
3. Mathur, T., et al.(2006). Detection of biofilm formation among the clinical isolates of staphylococci: an evaluation of three different screening methods. Indian journal of medicalmicrobiology 24.1 : 25-29.
4. Sanaa.L,moustais.Kh ,Ismail.R .(2017).etude de l'activité antioxydantes des huiles essentielles de planttes aromatique et médécinales marocaines .européan scientific journal , ,323p.
5. SantínPérez.,Alemán, A ,E., Bordenave-Juchereau, S., Arnaudin, I., Gómez-Guillén, M. C., &Montero, P. (2011). Squid gelatin hydrolysates with antihypertensive, anticancer and antioxidant activity. Food Research International, 44(4), 1044-1051.
6. Selmi, Slimen, et al.(2022).Essential Oil, Chemical Compositions, and Therapeutic Potential." Essential Oils: Advances in Extractions and Biological Applications: 163.

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Review on biological activities and bioactives compounds of *Artemisia compestris*

CHERFI Inasse* MAHBOUB Nasma[b] TOUMI Ikram[c]

[a]

[1]*Biology Department, Faculty of Natural Science and Life, El Oued University, Algeria*

[2]*Laboratory Biology, Environment and Health (LBEH), El Oued University, Algeria*

* *Corresponding author*.cherfi-inasse@univ-eloued.dz

ABSTRACT

Diverse medicinal plants such as those from the genus Artemisia have been employed globally for centuries by individuals belonging to different cultures. Universally, *Artemisia* species have been used to remedy various maladies. The phytochemical screening of this species revealed the presence of tannins, polyphenols, flavonoids, saponosides, essential oil and minerals. The essential oil of *A. campestris* has been isolated and investigated for its chemical composition and biological activities by several authors in Algeria and other countries. It has been demonstrated that the presence of different chemotypes of essential oil exhibited antioxidant, antibacterial, antifungal, insecticidal and antiviral activities. Different compounds have been isolated from the solvent (chloroform, hexane, and alcohol) extracts of this species such as flavonoids, chromones, and acetophenones that are the origin of different biological activities of this species such as antioxidant, antibacterial, hepatoprotective and antivenin activities.

An in-depth investigation into the literature reveals that divergent species of Artemisia exhibit a vast array of biological activities such as antimalarial, antitumor, and anti-inflammatory activities. There is substantial potential for bioactive compounds from Artemisia to provide significant relief from differing human ailments, but more meticulous research in this field is needed. A bibliographic research of this plant has been carried out by means of scientific databases like Google Scholar, PubMed and Science direct; as a result, it has been found that this herb possesses a rich phytochemical content and a wide range of pharmacological activities such as antioxidant, insecticidal, antibacterial, antimutagenic, antivenom and antitumor effects. In an aim to highlight the importance of *A. campestris* L., this review has been established by discussing its morphological, ecological, phytochemical and pharmacological studies.

Keywords: *Artemisia compestris* ; maladies; biological activities; bioactives compounds

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Development of new biocomposite materials impregnated with plant extract to inhibit the growth of pathogens

Yousfi Fatima Zohra [a]*, Belarbi Lahcen [a], Bennabi Farid[b] and Rahmani Khaled[b]

[a] *Department of sciences of matter, Faculty of sciences and technology, University of Ain temouchent - Belhadj bouchaib, BP 284, Ain Temouchent 4600, Algeria.*

[b]*Department of nature and life sciences, Faculty of sciences and technology, University of Ain temouchent - Belhadj bouchaib, BP 284, Ain Temouchent 4600, Algeria.*

* *Corresponding author.*Tel.: 0658631336
E-mail address: yousfi.fz13@gmail.com

ABSTRACT

Infections with various micro-organisms are a real problem for human health in modern society. They affect different sectors such as medical equipment, water purification systems, packaging, food storage and many other areas from the societal to the domestic and individual level.

The aim of this work is to develop new biocomposite, biodegradable and antimicrobial materials, capable of reducing or destroying the growth of pathogens in the agri-food sector in particular the storage and packaging of food products and the parapharmacy sector by the manufacture of antimicrobial soles. We have elaborated this material by using a biodegradable biopolymer which is the sodium alginate and the extract of algerian medicinal plant called Innula Viscosa. The FTIR and DSC caracterizations confirm a good incorporation of the extract in the biocomposite. The powerful antimicrobial of the material was evaluated by disk diffusion method. The results show a bacterial effect against Gram positive and negative bacteria.The antimicrobial biocomposite elaborated can be microscopic or macroscopic according to their uses.

Keywords: biocomposite; biodegradable; antimicrobial; Algerian medicinal plants; sodium alginate.

References

1. Siti Fadhilah bt Ibrahim, Nur Aisyah Nasuha Mohd Azam, Khairul Anuar Mat Amin. Sodium alginate film: the effect of crosslinker on physical and mechanical properties. IOP Conf. Series: Materials Science and Engineering 509 (2019) 012063.
2. Muzafar Sheikh, Abdul Rashid Malik, M. K. Meghavanshi, Irshad Mahmood. Studies on Some Plant Extracts for Their Antimicrobial Potential against Certain Pathogenic Microorganisms. American Journal of Plant Sciences. 2012, 3, 209-213.

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In vitro Antimicrobial Synergy Of PLGA /Silver Nanocomposites Prepared By Green Chemistry

Henda Daoudi [a]*Laouini Salah Eddine [b]

[a] *Higher Institute of Biotechnology of Monastir, MonastirUniversity, 5000 Monastir, Tunisia*

[b]*Department of Process Engineering and Petrochemistry, Faculty of Technology, University of Echahid HammaLakhdar El Oued, , Algeria*

* *Corresponding author*.Tel.: 0660941125

E-mail address: hinda.daoudi@isbm.u-monastir.tn

ABSTRACT

A green synthesis of silver nanoparticles (Ag-NPs) was carried out by utilizing a biomimetic approach. Herein, Nigella Sativa extract was employed as the precursor excipients, which played a synergistic role in the reduction and capping (stabilization) of Ag+ into zero valent (Ag 0) Ag-NPs. In addition, the research was directed towards the encapsulation of Ag-NPs within biodegradable polymer matrix poly-D,L-lactic-co-glycolic acid (PLGA).
The PLGA/Ag nanocomposite (PLGA-Ag NCs) were characterized using using varied state of microscopic and spectroscopic techniques (UV-VIS ,SEM, FTIR and DRX analyses).
Disc diffusion and time-kill assay were performed on bacterial strains viz. Escherichia coli , Pseudomonas aeruginosa ,Salmonella typhimurium, Staphylococcus aureus and Klebsiella pneumoniae for evaluating the antibacterial activity of Ag-NPs and PLGA-Ag NCs which showed a remarkable response. Both the antibacterial assays highlighted the superiority of PLGA-Ag NCs in inciting an escalated bactericidal effect in comparison to Ag-NPs, respectively. Hence, the present research article thus reports a novel biocompatible approach to tackle the overgrowing problem of antibiotic resistance
Keywords: Nanocomposites, Biomimetic approach,PLGA, Silver nanoparticles, , Antibacterial activity

References

1. Fortunati E, Latterini L, Rinaldi S. PLGA/Ag nanocomposites: in vitro degradation study and silver ion release. *J Mater Sci: Mater Med* (2011) 22:2735–2744
2. Nidhi C, Amaresh K, Arun C. Silver nanoparticle loaded PLGA composite nanoparticles for improving therapeutic efficacy of recombinant IFNγ by targeting cell surface. Electronic Supplementary Material (ESI) for Biomaterials Science; 2014.
3. Mariangela S, Ilaria A, Elena F. Antimicrobial Properties and Cytocompatibility of PLGA/Ag Nanocomposites. *Materials* (2016), *9*, 37
4. Shahab J, Bahareh Z. ynergistic Effect of Silver Nanoparticles with Neomycin or Gentamicin Antibiotics on Mastitis-Causing *Staphylococcus aureus*. *Open Journal of Ecology*, 2016, 6, 452-459
5. Kaining Z, Babatunde R, Anantha N**.** PLGA Nanoparticle-Based Formulations to Cross the Blood–Brain Barrier for Drug Delivery: From R&D to cGMP. *Pharmaceutics* (2021), *13*, 500

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Chemical Composition and Antibacterial activity of Essential Oil of *Marrubium vulgare* from Eastern Algeria

Abderazak Abadi

[1]*Department of chemistry, Faculty of exact sciences, University of Eloued, Eloued 39000, Algeria*

[2]*Laboratoire de chromatographie, faculté de chimie, USTHB, Algiers, Algeria*

* *Corresponding author*.Tel.: 0666374202

E-mail address: Ryadabadi@Gmail.com

ABSTRACT

The essential oil from flowering *Marrubium* (*Marrubium vulgare* L.) an aromatic member of the Lamiaceae family, from Algeria, obtained by hydrodistillation, was analysed by GC/FID and GC/MS. The constituents were identified by their mass spectra and Kovats' indices. Fivety (50) components in the oil of *M. vulgare* were identified. The results demonstrated that the major components of the essential oil were : 4,8,12,16-Tetramethyl heptadecan-4-olid (16.97%), Germacrene D-4-ol(9.61%), α- pinéne(9.37%), Phytol(4.87%), Dehydro-sabina ketone (4.12%), Piperitone(3.27%), δ – Cadinene (3.13%), 1-Octen-3-ol(2.35%) and Benzaldehyde(2.31%) . Essential oil of *M vulgare* was evaluated for its antibacterial activities against Gram-positive and Gram negative pathogenic bacteria: *Bacillus subtilis* , *Micrococcus luteus*, *Escherichia coli* and *Klebsiella pneumoniae*.

Keywords: *Marrubium vulgare*; Essential oil composition; GC/MS; antibacterial activities.

References

1. Barlow SM (1990). Hudson BJF (Ed.). (pp. 23). Elsevier, Amsterdam.Ogata K, Yang Y. Modern control engineering. India: Prentice hall; 2002.
2. B.M. Lawrence, Science. Edits., R.M. Harley and T. Reynolds, pp: 399-436, Royal Botanic Gardens, Kew (1992).
3. M.S.Abu-Asaband RD.Cantlno, In: Advances In Lablate Science. Edits. R,M. Harley and T. Reynolds, pp: 97-112, Royal Botanic Gardens, Kew (1992).
4. V. Schiemper, A. Ribas, M. Nlcolau and V. Cechinel-Fliho,. Phytomedecine, 3,211-216(1996).Brahami A, Fajoui J, Bouchouicha B.

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Antivenom potential of a medicinal plant (Matricaria pubescens) against the venom of (Cerastes cerastes) from the Saharan region of Algeria (Souf)

MOUANE Aicha[a], KADRI Mounira[a], ALAYAT moufida saoucen[a], DAOUDI Nabila[a], BAHEDI Zohra[a], MLIK Randa[b]

a Department of Biology, Faculty of Natural and Life Sciences, University of El Oued, El Oued, Algeria

bLaboratory of biodiversity and application of biotechnology in agriculture filed

c Department of Agronomic sciences, Faculty of Natural and Life Sciences, University of Kasdi-Merbah, Ouargla, Algeria
3
d Laboratoire de Biogéochimie des milieux désertiques, Faculté des mathématiques et des sciences de la matière, Université Kasdi-Merbah, Ouargla.
** Corresponding author.*Tel.: 0696612125
E-mail address: aicha-mouane@univ-eloued.dz

ABSTRACT

The present study was conducted on 16 males of Albino rabbits which were divided into four groups (a control group, a group envenomated by *Cerastes cerastes* venom, an envenomated group treated with venom and flavonoids extracted from medicinal plant *Matricaria pubescens*, and the last envenomated group treated with the anti-venom serum). Metabolic and histopathological changes were examined in different treated groups. The histological sections from tissues of different organs (liver, kidneys, lungs, muscles, heart, and brain) allowed us to observe a normal structure in all the organs of untreated rabbits unlike the treated ones. Our results showed a very highly significant increase in the concentrations of glycemia, urea, and creatinine in treated rabbits compared to the control. statistical analysis showed that there was a very highly significant ($p = 0.0000$) between all the groups in the increase of glucose, urea concentration, TGO and TGP and a highly significant in the creatinine ($p = 0.0002$) and the PTT ($p = 0.0015$). On the other hand, a very highly significant decrease in the total cholesterol, triglyceride, fibrinogen, and Prothrombin time of treated rabbits compared to those of the control. Statistical data confirmed that there was a very highly significant ($p = 0.0000$) between all the groups. According to the PCA analysis, the biological parameters (cholesterol, triglyceride, fibrinogen, and prothrombin time) were very close, a certain similarity was reflected between them which means that these parameters were influenced by each other. Same thing for the glycemia, urea, creatinine, GOT, GPT, and PTT.

Keywords : *Matricaria pubescens*; *Cerastes cerastes*; antivenom; metabolism; histopathology.

References

1. Adaika A, Medila I, Bouali N. Effect of the aqueous crude extract of *Matricaria pubescens*: histopathological and biochemical study on scorpion venom given rats, *Biharean Biologist.* 2021, 15 ;1: 64-68.
2. Abib H. Etude biochimique et histopathologique des effets œdématiques hémorragiques et myonécrotiques causés lors d'une envenimation expérimentale avec le venin natif et détoxifié de la vipère à corne *Cerastes cerastes.* 2002. Thèse de magister, USTHB,129P.
3. Amssayef A, Ajebli M, Eddouks M. Antihyperglycemic Potential of Matricaria pubescens (Desf.) Schultz. in Streptozotocin-induced Diabetic Rats. Cardiovascular and Haematological Disorders-Drug Targets (Formerly Current Drug Targets- Cardiovascular and Hematological Disorders). 2020, 204: 297-304.
4. Barma D, Mohanty PJ, Bhuyan RN.,2014. A review on anti-venom activity of some medicinal plants. *Int. J. Pharm. Sci. Res.*, 2014, 5;5 : 1612-1615

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The First International Seminar on Catalysis, Chemical Engineering & Green Chemistry

Study of the chemical and biological activity of the aerial part *Cyperus Fuscus .L* sedge plant

Senigra Moussa[1], Rahim Omm Al khair[2], Ben Fardjallah Said[3],kadri Mouhammed Lazher[1]

Faculty of Natural and Life Sciences University of El Oued

faculty of hydrocarbons of renewable energies of earth sciences of the univeves

Faculty of mathematics and material sciences

Tel : 06 63 22 43 21

E-mail senigramoussa@yahoo.fr

f

ABSTRACT

In order to assess part of the vegetation cover in the valley area, we studied the biological and chemical activity of the aerial part of the brown plant Saad, *Cyperus fuscus L.*

The study included chemical detection of the presence of saponins, flavonoids, unsaturated sterols and terpenes and the absence of alkaloids.

The quantification of polyphenols was also performed for the ethanol-water extract, where the highest value was 67.49 mg/g, while for the flavonoids, the highest value for ethanol-water extract was 31.55 mg/g at a concentration of 0.5 mg/ml.

And through the results of the estimation of the antioxidant activity of µg/mL, while for the ascorbic acid mixture, it was estimated at 63.87 µg/mL.

The ethanol-water extract of the aerial part of the plant using the DPPH test, the results showed that the IC50 value of the ethanol-water extract was 120.20 And in the Iron FRAP test, where the optical

absorbance value of the extract ethanol-water (8/2) was estimated at 0.64 and the FRAP value was estimated at 52.36 µg/ml.

Keywords: cyperus fuscus.L .Anti oxidant. Extraction. quantification of polyphenols and flavono

References

1. Chaouche TM, Haddouchi F, Ksouri R, Medini F, El-haci, IA, Bouchrit C Z, Sekkal FZ, Bekara FA.,(2013), Antioxidant activity profiling by spectrophtometic methods of phenolic of Prasium majus L., Free Radicals and Antioxidants, V.3(1), p.43-6
2. Dai F,miao Q, Zhou B, Yang l, Liu, ZL, (2006),protective effects offlavonols and their glycosides against free radical -induced oxhdative hemolysis of red blood cells. Life sci., V. 78(21), p. 2488-93
3. Belgin Erdem1 , Eyup Bagci2 , Gulden Dogan2 *, Ekrem Aktoklu1 , Alpaslan Dayangac1 1Department of Biology, Faculty of Arts and Sciences, University of Ahi Evran, 40100, Kırşehir, 2Department of Biology, Faculty of Sciences, University of Firat, Elazig, Turkey. *For correspondence: Email: gdogan@firat.edu.tr Sent for review: 2 December 2017 Revised accepted: 20 July 2018
4. N V Kiyashko1 , S A Berseneva1 , G A Belova1 , and A N Belov2,* 1 Primorsky State Agricultural Academy, 44 Blucher Ave., Ussuriysk, 692500, Primorsky Krai, Russian Federation, 2 Far Eastern Federal University, Russky Island, Ajax Bay. 10, Vladivostok 690922, Russian Federation

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The essential oil of *Origanum majorana L* was extracted from El Oued, and its chemical composition, olfactory evaluation, and antioxidant effects were studied

Mohammed Larbi Ben Amor [a]* and Salah Neghmouche Nacer [b]

[a]*Department of Process Engineering, Faculty of Technology, University of El Oued , El Oued 39000, Algeria*

[b] *Department of chemistry, Faculty of exact sciences, University of El Oued , El Oued 39000, Algeria*

* *Corresponding author.*Tel.: 0662373021
E-mail address: medlarbi1983@gmail.com

ABSTRACT

Using the use of GC/FID and GC/MS, the chemical make-up of marjoram essential oil, which comes from the *Origanum majorana* L. plant, was analyzed. Terpinen-4-ol made up 18.51 % of the oil, whereas trans-sabinene hydrate made up 13.72 %,γ-terpinene made up 12.71 %, and beta-terpinene made up 6.45 %. The aroma profile of *marjoram* essential oil has been analyzed, and its quality has been determined. When tested with DPPH, the antiradical activity of marjoram oil was shown to be higher than that of the phenolic component thymol. The oil exhibited a scavenging effect on the hydroxyl radicals (OH•), as well, which substantially exceeded that towards the DPPH radical – the respective concentrations for 50% inhibition of the radicals (IC_{50}) were 0.24µg/mL for $OH^{\bullet}$ and 289.23µg/mL for DPPH. In other words, the oil was significantly more effective at scavenging the hydroxyl radicals than it was the DPPH radical.
In a linoleic acid emulsion model system, marjoram essential oil demonstrated the ability to exhibit antioxidant activity. At a concentration of 0.08%, it was able to inhibit the formation of conjugated dienes by 50% and the generation of linoleic acid secondary oxidized products by 67.44%. Both of these results were seen when the oil was tested.

Keywords: essential oil; antioxidant; Origanum majorana L; DPPH; GC/MS.

References

1. Mensor LL, Menezes FS, Leitao GG, Reis A S, Santos T S, Coube CS, Leitao SG. (2001) Screening of Brazilian Plant Extracts for Antioxidant Activity by the Use of DPPH Free Radical Method. Phytotherapy Research, 15, 127-130.
2. Baratta TM, Dorman DHJ, Deans SG, Figueiredo CA, Barroso JG, Ruberto G. (1998) Antimicrobial and antioxidant properties of some commercial essential oils. Flavour and Fragrance Journal, 13, 235-244.
3. Hiroe K, Nobuji N. (1993) Antioxidant effects of some ginger constituents. Journal of Food Sciences, 58, 1407-1410.
4. Seidemann J. (2005) Origanum L. Marjoram, Origano-Lamiaceae (Labiatae). In: World Spice Plants, Springer-Verlag, Heidelberg,262-264.

List of participants

Bouremmad Farida	bouremmad_farida@yahoo.com
Lanez Elhafnaoui	lanez-elhafnaoui@univ-eloued.dz
Bouguessa Ichrak	ichrakbouguessa94@gmail.com
Haiouani Kheira	kirahaiouani@yahoo.fr
Amar Djemoui	djamarchimie@gmail.com
Rachid Belkada	rachidudts@gmail.com
Abderrahmane Sihem	abderrahmanesihem@yahoo.fr
Youbi Asma	asmahamoud8@gmail.com
Bochra Gargouri	bochragargouri@yahoo.fr
Rouahna Noureddine	rouahna2003@yahoo.fr
Brahimi Abdelkarim	ak.brahimi72@gmail.com
Maalem Badreddine	bmaalem@gmail.com
Ammar Zobeidi	zobeidi.aa@gmail.com
Bensatal Ahmed	matmatidz@gmail.com
Iazzourene Ghania	g.iazzourene@univ-bouira.dz
Tounsi Hanane	tounsi.hanane@crtse.dz
Kazane Imen	kazaneimen@univ-jijel.dz
Khiouani Adel	adel.khiouani@univ-batna.dz
Bougheloum Chafika	c_bougheloum@yahoo.fr
Arbia Yassamina	yarbia@usthb.dz
Kerassa Aicha	kerassa-aicha@univ-eloued.dz
Benmosbah Mongi	mbenmosbah@yahoo.fr
Souyei Belgacem	belgacem3963_alg@yahoo.fr
Kherkhache Hayat	hayat2079@yahoo.fr
Nouioua Wafa	nouioua.wafa@yahoo.fr
Touati Naima	naima.touati@univ-bejaia.dz
Anis Chikhoune	anis.chikhoune@gmail.com
Noui Yassine	noui.yassine@gmail.com
Sawicka Barbara	barbara.sawicka@up.lublin.pl
Mesbahi Mohammed Adel	adel_mesbahi@yahoo.fr
Zaaboubi Siham	siham.zaaboubi@univ-batna.dz
Bedjou Fatiha	fatihabedjou2015@gmail.com
Mansouri Narimene	n.mansouri@univ-eltarf.dz
Djebbari Radja	ra.djebbari@univ-batna2.dz
Lekbir Adel	adel.lekbir@univ-batna.dz
Djellouli Soumia	omi-master@hotmail.fr
Bensatal Ahmed	matmatidz@gmail.com
Kallel Imen	kallel1imen@yahoo.fr
Benabdelaziz Imane	i.benabdelaziz@yahoo.fr
Ben Mansour Riadh	riadh.benmansour@fss.usf.tn
Bambra Moussa Abderrazak	moussaabdrrazak.bambra@univ-biskra.dz
Tamma Noureddine	noureddine.tamma@gmail.com
Boulal Ahmed	ahm.boulal@univ-adrar.edu.dz
Brahim Imene	imene.brahim@univ-batna.dz
Neghmouche Nacer Salah	neghmouchenacer-salah@univ-eloued.dz

Kebaili Asmaa	kebailiasmaa97@gmail.com
Djaber Sabah	djsa5237@gmail.com
Atia Djamal	atia.sahan1@gmail.com
Zeghoud Laid	elaid_zrd@yahoo.fr
Saada Zahra	saadazahra2014@gmail.com
Mahcene Salem	s.mahcene@lagh-univ.dz
Kahina Belbachir	kahinabelbachir06@gmail.com
Gheraissa Noura	nouragherr@gmail.com
Messaoudi Mohammed	messaoudi2006@yahoo.fr
Rahmani Salah-Eddine	rahmanidz@yahoo.fr
Merzouk Hafida	hafimer@hotmail.com
Laib Ibtissam	ibtissambiochimie95@gmail.com
Neghmouche Nacer Salah	neghmouchenacer-salah@univ-eloued.dz
Ahmed Laloui Hamza	hamzavet21@gmail.com
Ben Amor Ilham	ilham-benamor@univ-eloued.dz
Derki Maroua	derkimaroua11@gmail.com
Djamila Djemoui	d.djemoui@univ-dbkm.dz
Boudjema Amir Lehtihet	Amirlehtihet86@gmail.com
Kherief Yahia	yahiakhreif@gmail.com
Chemmam Dounya Achwak	chemmam.dounya@yahoo.com
Abir Fouhma	fouhma1996@gmail.com
Abadi Abderrezzek	ryadabadi@gmail.com
Moalla Rekik Dorsaf	rmdorsaf@gmail.com
Debbeche Hanane	dhanannaba@yahoo.fr
Khammar Rachida	r.khammar@univ-soukahras.dz
Mehellou Ahmed	ahmedmehel@gmail.com
Benazzouz Kinza	benazzouzkinza@gmail.com
Yousfi Fatima Zohra	yousfi.fz13@gmail.com
Benaissa Asma	benaissa.esmaa@gmail.com
Djarallah Marwa	ghfrane2014@gmail.com
Hamida Khadidja	khadija.hamida@univ-biskra.dz
Neghmouche Nacer Salah	neghmouchenacer-salah@univ-eloued.dz
Lamiri Leila	lamirilaila12@gmail.com
Rahal Foudil	foudilrahal@yahoo.fr
Benamirouche Ouissem	benamirouche.wissem@gmail.com
Haddad Habiba	haddadhab@gmail.com
Benine Aida	aidabenine@gmail.com
Hamrani Ouiza	hamraniouiza@yahoo.fr
Ben Amor Asma	benamor-asma@univ-eloued.dz
Khaoula Alia	alia.khaoula@gmail.com
Terea Hafidha	terea.hadile88@gmail.com
Hacine Gherbi Ahlam	ahlam-hacinegharbi@univ-eloued.dz
Boulaares Islam	boulaares-islam@univ-eloued.dz
Rouiha Zohra	doc.chimie@gmail.com
Bouras Hadj Daoud	hadjdaoud.bouras@univ-ghardaia.dz
Kir Iman	iman.kir.39@gmail.com

Ben Cheikh Chaimma	chaimaabencheikh3@gmail.com
Bensafiddine Feriha	farahbensafi@gmail.com
Cherrada Nezar	nizarc7@gmail.com
Bouaoune Ahmed	a_bouaoune@yahoo.com
Belgherbi Ouafia	wafaayahouda@gmail.com
Elkolli Meriem	elkollim@yahoo.fr
Henda Daoudi	hinda.daoudi@isbm.u-monastir.tn
Abdelsadok Imane	imane.abdelsadouk@univ-mascara.dz
Mahdi Roufaida	Mahdi.roufaida@univ-ouargla.dz
Hayahem Sakina	s.hayaheme@univ-soukahras.dz
Amar Djemoui	djamarchimie@gmail.com
Cheribet Mawahib	cheribet.mm@gmail.com
Rekik Mohamed Ali	rekik_medali@yahoo.fr
Chouchane Sabiha	chouchsam01@yahoo.fr
Akroum Hamza	akroum@yahoo.fr
Bouchagra Samah	bouchagra-samah@univ-eloued.dz
Abdelrani Messalhi	messalhi_abdelrani@yahoo.fr
Bendia Sabrina	sabrina.bendia@umc.edu.dz
Abdelghani Serouti	serouti82@gmail.com
Ikermoud Dalila	ikermoud.dalila@gmail.com
Chetehouna Sara	chetehounasara97@gmail.com
Ghemam Amara Djilani	saiddji@gmail.com
Zemour Kamel	kamel.zemour@ensiacet.fr
Derki Nour Elhouda	nourderki1997@gmail.com
Slyemi Samira	samira.slyemi@usthb.edu.dz
Messaoudi Hassiba	messaoudihassiba@gmail.com
Dehmchi Farouk	oussamelz@yahoo.fr
Benoumena Hala	benoumebahala@gmail.com
Besserni Rabia	Rabia-besserni@univ-eloued.dz
Ga Ab	abdelali98111@yahoo.fr
Cherfi Inasse	cherfi-inasse@univ-eloued.dz
Said Khemais	said_khemais@yahoo.fr
Merzouki Soraya	s.merzouki@centre-univ-mila.dz
Senigra Moussa	senigramoussa@yahoo.fr
Benrejdal Fazia	fazia1@live.fr
Bahadi Rania	bahadirania@yahoo.fr
Youmbai Rabia	youmbai-rabia@univ-eloued.dz
Tei Siham	teisi2022@gmail.com
Adaika Chaima	adaika-chaima@univ-eloued.dz
Khier Nawal	sbayou2022@gmail.com
Benaouida Mohamed Amine	m.benaouida@univ-skikda.dz
Mansouri Achraf	mansouriachraf96@gmail.com
Bettioui Fatima Zohra	bettioui.fatimazohra@univ-bechar.dz
Bentarzi Amine	bentarzi2015@gmail.com
Ghodbane Racha	ghodbane.racha@univ-annaba.org
Boussaker Meriem	boussaker.m@gmail.com

Badaoui Kawther	badaoui.kaouther7@gmail.com
Zeghoud Soumeia	zsoumeia@gmail.com
Dekir Ali	dekir.ali23@gmail.com
Mammadi Nardjess	mammadi-nardjess@univ-eloued.dz
Djafarou Roumeissa	roumeissadjafarou@gmail.com
Kheffache Ouzna	kheffachechimie@gmail.com
Kadri Mounira	mounira-kadri@univ-eloued.dz
Kherraz Khaled	kherrazkha@yahoo.fr
Reghioua Abdallah	reghioua-abdallah@univ-eloued.dz
Hachouf Maram	hachoufmaram28@gmail.com
Djafarou Roumeissa	roumeissadjafarou@gmail.com
Kheiredine Bani	envi_dz@yahoo.fr
Ounis Amina	ounisamina27@univ-biskra.dz
Djouadi-Belkada Fadila	fdbelkada.udts@gmail.com
Mounir Nacer	Nacer.mounir2016@gmail.com
Redjemia Rayenne	rayenneredjemia@hotmail.com
Mokhtar Benmohamed	msbm1447@gmail.com.invalid
Segueni Khaoula	khaoula-segueni@univ-eloued.dz
Lachibi Farid	f.lachibi@univ-boumerdes.dz
Brahimi Abdelkarim	ak.brahimi72@gmail.com
Khalil Guelifet	guelifetkhalil@yahoo.fr
Akroum-Amrouche Dahbia	d.amrouche.umbb@gmail.com

Author Index

ORGANIZER

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