COMITE SÉNÉGALAIS POUR LA CHIMIE

(C.S.C.)

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BOOK OF ABSTRACTS

6th ANNUAL DAYS OF CHEMISTRY OF SENEGAL AND 9th FASC CONGRESSES (FASC|JACS 2024)

Radisson Blu Hotel, Dakar, 19-21 Novembre 2024

CHEMISTRY, A LEVER FOR SUSTAINABLE DEVELOPMENT OF AFRICAN COUNTRIES

Professeur Matar SECK
Département de Chimie, FST/UCAD
Secrétaire général du CSC

Professeur Modou FALL
Département de Chimie, FST/UCAD
Président du CSC

Local Organizing committee

President: Prof. Matar Seck (UCAD, Dakar) matar.seck@ucad.edu.sn
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Mr. Ababacar DIOUF (UCAD, Dakar)

Gala Dinner
Prof. Mbossé Ndiaye GUEYE (UGB, Saint Louis)
Prof. Rokhaya Sylla GUEYE (UCAD, Dakar)
Prof. Ousmane DIOUF (UCAD, Dakar)

Excursion
Prof. Abdoulaye Dramé (UCAD, Dakar)
Dr. Saer DIALLO (LABIEX-CAB, Dakar)

Transport
Prof. Alioune DIOUF (UCAD, Dakar)
Prof. Elhadji Ibrahima THIAM (UCAD, Dakar)
Prof. Mouhamadou FOFANA (UCAD, Dakar)

Dr. Cheikh Tidiane DIONE (UCAD, Dakar)
Dr. Nango GAYE (UCAD, Dakar)
Dr. Ismaïla DIEDHIOU (UCAD, Dakar)
Dr. Balla FALL (UCAD, Dakar)

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Prof. Gorgui Awa SECK (UGB, Saint-Louis)
Mrs Anne Françoise Badji Diawara (UCAD, Dakar)

Scientific committee

President: Prof. Serigne Amadou Ndiaye (Senegal) asndiaye1@yahoo.fr
Vice-president: Prof. Courfia Kéba Diawara (Senegal) ckdiawara@univ-zig.sn
Contact: Prof. Modou Fall (Senegal) modou.fall@ucad.edu.sn

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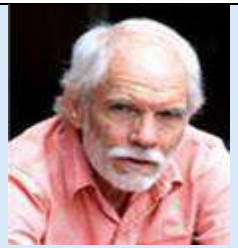
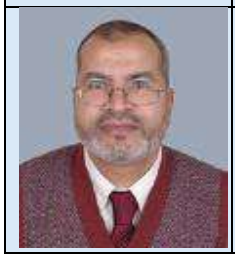
							
Prof Ehud Keinan *IUPAC President*	***Dr Shimaa Heikal*** *Life Sciences Department, Elsevier*	***Prof. Latifa Latrous*** *Tunis El Manar University, Tunis*	**Prof. Neil Coville** *University of the Witswatersrand, South Africa.*	***Prof. Courfia Kéba Diawara*** *Assane Seck University of Ziguinchor - Sénégal*	***Dr Clifford Chuwah*** *Springer Nature, The Netherlands*	***Dr Andrew Shore*** *Royal Society of Chemistry (RSC) UK*	***Dr Sherif Ghazy*** *Elsevier – UAE*
Humanity faces a bright future, and so Chemistry	*Unlocking a sustainable future with green chemistry approaches*	*Valorization of biowaste in analytical sample preparation*	Catalysis or Materials. Carbon Material Interconversions	*Reverse Osmosis and scientific issues for seawater desalination in West Afric*	*Presentation of Chemistry Africa*	*Open Access and Open Science in Publishing*	*Elsevier solutions to help advancing chemistry education and chemistry research*
							
Prof. Aziz Amine *Hassan II University, Faculty of Sciences and Techniques, Casablanca, Morocco*	***Prof. Issa Tapsoba*** *Joseph Ki-Zerbo University, Burkina Faso*	***Dr. Saer Diallo*** *Laboratoire d'investigations et d'expertise CAB, Dakar, Senegal*	***Prof Said Gharby*** *University Ibnou Zohr, Agadir - Morocco*	***Prof. Alpha Ousmane Touré*** *Cheikh Anta Diop University, Senegal*	***Dr Alejandra Palermo*** *Royal Society of Chemistry (RSC) - England*	***Prof Yedilfana Setarge Mekonnen*** *Addis Ababa University and EURAXESS Africa - Ethiopia*	***Dr Veresha Dukhi*** *ACS International, CAS, Durban - South Africa*
Recent Advances in the Development and Application of Nanozymes as novel chemical catalysts	Development of Electrochemical Sensors for Pesticides Detection in Water: an ANEC/IPICS/ISP project	*Serum DHEA formation based on oxidative stress process: a strategy for an ante mortem Alzheimer Disease diagnostic*	*Analytical Chemistry, a lever for the sustainable development of Local Products in Morocco: The Case of Argan Oil (Argania spinosa (L.) Skeels)*	Industrial Waste Materials as Feedstocks to Decarbonize Cement and Concrete Industry	*Inclusion and diversity-focus on gender parity and disability in the chemical sciences*	*Unlocking Research Funding and Networking Opportunities in Horizon Europe through Euraxess Worldwide Africa*	*About CAS and SCIFINDER*

TUESDAY NOVEMBER 19TH, 2024

8:00 - 18:00	REGISTRATION	
8:30 - 9:40	ORAL COMMUNICATIONS - 1ST SESSION ROOM *Adansonia* *Off Topic 1* S1C1 - S1C7	ORAL COMMUNICATIONS - 1ST SESSION ROOM *Digitata 1* *Off Topic 2* S1C8 - S1C14
9:45- 10:00	COFFEE BREAK	
10:05 - 10:50	OPENING CEREMONY ROOM *Adansonia*	
10:55- 11:55	PLENARY CONFERENCE 1 ROOM *Adansonia* *President: Prof. Modou Fall* *Humanity faces a bright future, and so Chemistry* ***Prof Ehud KEINAN*** ***IUPAC President***	
12:00 - 13:15	ORAL COMMUNICATIONS - 2ND SESSION ROOM *Adansonia* *Chemistry and health 1* S2C15 - S2C20	ORAL COMMUNICATIONS - 2ND SESSION ROOM *Digitata 1* *Chemistry of water and environmental 1* S2C21 - S2C26
13:15 - 14:30	LUNCH BREAK	
14:30 - 14:55	PLENARY CONFERENCE 2 ROOM *Adansonia* *President: Prof. Elsie Dineo Moema* *Unlocking a sustainable future with green chemistry approaches* ***Dr Shimaa Heikal*** ***Life Sciences Department, Elsevier***	
15:00 - 16:05	ORAL COMMUNICATIONS - 3RD SESSION ROOM *Adansonia* *Green chemistry* S3C27 - S3C31	ORAL COMMUNICATIONS - 3RD SESSION ROOM *Digitata 1* *Chemistry of water and environmental 2* S3C32 - S3C37
16:05 - 16:35	COFFEE BREAK - POSTERS 1ST SESSION: P1-1 – P1-13	
16:35 - 17:00	TECHNICAL TALK 1 ROOM *Adansonia* *President: Prof. Hatem Ben Rhomdane* *Presentation of Chemistry Africa* ***Dr Clifford Chuwah*** ***Springer, Springer Nature, Dordrecht - The Netherlands***	
17:05 - 18:05	TECHNICAL TALK 2 ROOM *Adansonia* *President: Prof. Vincent Nyamori* *1.Unlocking Research Funding and Networking Opportunities in Horizon Europe through EURAXESS Worldwide Africa* *2. EURAXESS and EU Funding and Tender portals: how to find research funding, collaborators and the steps for submitting proposals* ***Prof Yedilfana Setarge Mekonnen*** ***Addis Ababa University and EURAXESS Africa - Ethiopia***	

WEDNESDAY NOVEMBER 20TH, 2024

8:30 - 9:50	ORAL COMMUNICATIONS-4TH SESSION ROOM *Adansonia* *Chemistry and health 2* S4C38 - S4C42	ORAL COMMUNICATIONS - 4TH SESSION ROOM *Digitata 1* *Chemistry of water and environmental 3* S4C43 - S4C48
9:55 - 10:10	COFFEE BREAK	
10:10 - 10:35	PLENARY CONFERENCE 3 ROOM *Adansonia* *President: President: Prof. Farba Bouyagui Tamboura* *Recent Advances in the Development and Application of Nanozymes as Novel Chemical Catalysts* ***Prof Aziz Amine*** ***FSTM, Hassan 2 University of Casablanca-Morocco***	
10:40 - 12:05	ORAL COMMUNICATIONS - 5TH SESSION ROOM *Adansonia* *Electrochemistry and nanotechnology* S5C49 - S5C55	ORAL COMMUNICATIONS - 5TH SESSION ROOM *Digitata 1* *Chemistry and health 3* S5C56 - S5C62
12:10 - 12:35	PLENARY CONFERENCE 4 ROOM *Adansonia* *President: Prof. Emmanuel Ngameni* *Development of Electrochemical Sensors for Pesticides and their metabolites Detection in Water* ***Prof. Issa Tapsoba*** ***Joseph KI-ZERBO University, Ouagadougou - Burkina Faso***	
13:00 - 14:30	LUNCH BREAK	
14:30 -14:55	TECHNICAL TALK 3 ROOM *Adansonia* *President: Prof. Bice Martincigh* *About CAS and SCIFINDER* ***Dr Veresha Dukhi*** ***ACS International, CAS, Durban - South Africa***	
15:00 - 16:25	ORAL COMMUNICATIONS - 6TH SESSION ROOM *Adansonia* *Chemistry of water and environmental 4/ Chemical safety and Security* S6C63 - S6C69	ORAL COMMUNICATIONS - 6TH SESSION ROOM *Digitata 1* *Sustainable Materials of Chemistry* S6C70 - S6C76
16:25 - 16:55	COFFEE BREAK - POSTERS SESSION P2-14 – P2-27	
17:00 - 17:25	PLENARY CONFERENCE 5 ROOM *Adansonia* *President: Prof. Abdoulaye Dramé* *Analytical Chemistry, a lever for the sustainable development of Local Products in Morocco: The Case of Argan Oil (Argania spinosa (L.) Skeels)* ***Prof Said Gharby*** ***University Ibnou Zohr, Agadir - Morocco***	
17:30 - 19:00	9TH FASC GENERAL ASSEMBLY ROOM *Adansonia*	
20:00-23:00	GALA DINNER (RSC SPONSORED) Cercle de la Rade	

THURSDAY NOVEMBER 21ST, 2024

8:30 – 10 :05	**ORAL COMMUNICATIONS - 7TH SESSION ROOM *Adansonia*** ***Chemistry and health 4*** ***Sustainable Materials of Chemistry*** **S7C78 - S7C83**
10:05 - 10:20	**COFFEE BREAK**
10:20 - 10:50	**PLENARY CONFERENCE 6 ROOM *Adansonia*** *President: Prof. Matar Seck* ***Reverse Osmosis and scientific issues for seawater desalination in west Africa*** ***Prof. Courfia Kéba Diawara*** ***Assane Seck University of Ziguinchor - Sénégal***
10:55-11:35	**TECHNICAL TALK 4 ROOM *Adansonia*** *President Prof. Gloria Obuzor* ***Inclusion and diversity-focus on gender parity and disability in the chemical sciences*** ***Dr Alejandra Palermo*** ***Royal Society of Chemistry (RSC) - England***
11:40 - 12:05	**PLENARY CONFERENCE 7 ROOM *Adansonia*** *President: Prof. Abdou Karim Diagne Diaw* ***Industrial waste materials to decarbonize the cement and concrete industry*** ***Prof. Alpha Ousmane Toure*** ***Cheikh Anta Diop University, Dakar***
12:10 - 12:35	**TECHNICAL TALK 5 ROOM *Adansonia*** *President: Prof. Rokhaya Sylla Guèye* ***Open Access and Open Science in Publishing*** ***Dr Andrew Shore*** ***Royal Society of Chemistry (RSC) - England***
12:40 - 13:05	**PLENARY CONFERENCE 8 ROOM *Adansonia*** ***Carbon interconversions*** ***Prof Neil J Coville*** ***University of the Witwatersrand, Johannesburg 2050, South Africa***
13:05 - 14:30	**LUNCH BREAK**
14:30 - 15:00	**PLENARY CONFERENCE 9 ROOM *Adansonia*** *President Prof. Djibril Fall* ***Valorization of biowaste in analytical sample preparation*** ***Prof. Latifa Latrous*** ***Tunis El Manar University, Tunis***
15:05 - 15:35	**TECHNICAL TALK 6 ROOM *Adansonia*** *President: Prof. Makhtar Guene* ***Elsevier solutions to help advancing chemistry education and chemistry research*** ***Dr Sherif Ghazy*** ***Elsevier - UAE***
	PLENARY CONFERENCE 10 ROOM *Adansonia* *President Prof. Atanasse Coly* ***Serum DHEA formation based on oxidative stress process: a strategy for an ante mortem Alzheimer Disease diagnostic*** ***Dr. Saer Diallo, Laboratoire d'investigations et d'expertise Cheikh Aldiouma BA (Labiex-CAB), Dakar***

16:30 - 18:00	**CLOSING CEREMONY ROOM *Adansonia***



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ORAL COMMUNICATIONS

TUESDAY NOVEMBER 19TH, 2024

ORAL COMMUNICATIONS - 1ST SESSION ROOM *Adansonia* 8:30 - 9:40

OFF TOPIC 1 S1C1 – S1C7

President:

- **Prof. Ibrahima El Hadji Thiam**

S1C1.

Chemoenzymatic synthesis of diaryl ether linked bioactive marine natural products

Abou Moussa SOW*, Mouhamadou FOFANA, Bédié MBOW, Fatou Dieng FAYE

S1C2.

Selective binding of halides and oxyanions with new azacrown calix[4]arenes

Abdelwaheb Hamdi, Lassaad Baklouti, Riadh Ternane

S1C3.

Synthesis of new transition metal complexes with a polydentate organic ligand: Crystallographic studies and antimicrobial activities.

Cheikh Ndoye, Djiby Lo, Ousmane Diouf, Mohamed Lamine Gaye, Mamadou Sidibe, Bruno Faure, Marc Maresca.

S1C4.

Development of atroposelective reactions of hetero-biaryl compounds by desymmetrization of maleimides.

Diop Birane, Sene Aboubacry, Fofana Mouhamadou, Mbow Bédié, Diallo Ibrahima, Constantieux Thierry, Amatore Muriel

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S1C5.

Synthesis and physicochemical characterization of cobalt phthalocyanine octa-substituted.

Ali Sanda Bawa, Adamou Zanguina, Mabinty Bayo-Bangoura Et Ibrahim Natatou

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S1C6.

Redefining Proton Affinity for Heteronuclear Molecular Species: Quantum Chemical Insights

E. E. Etim, J. P. Shinggu, H. S. Samuel, B. Bako, G. O. Ogofotha

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S1C7.

Strandberg-type POM: A Cluster Exhibiting Tunable Photochromism

Aboubacar Soumano, Lamine Yaffa, Balla Fall, Dame Seye, Antoine Blaise Kama, Bocar Traoré, Assane Touré, Guorgui Awa Seck, Cheikh A. K. Diop, Mamadou Sidibé, Florian Massuyeau, Rémi Dessapt, Romain Gautier.

TUESDAY NOVEMBER 19TH, 2024

ORAL COMMUNICATIONS - 1ST SESSION ROOM *Digitata 1*

8:30 - 9:40

OFF TOPIC 2 **S1C8 – S1C14**

President:

- **Prof. Chamekh Mbareck**

S1C8.

Photocatalytic Degradation of Methyl Orange Using Titanium Silicate

Iliya S.F., Kamba, E.A. and Samuel*, H.S.

S1C9.

CaO/SiO_2 catalysts for ultrasonic biolubricants production

Insa Seck, Héla Laajimi, Daria C. Boffito

S1C10.

Synthesis and IR, X-Ray structural characterization of a new single crystal b-octamolybdate $C_3H_7NH_2)_4[MO_8O_{26}]$

Serigne Fallou POUYE, Ibrahima CISSE, Libasse Diop, Mamadou SISDIBE and Sylvain BERNÈS

S1C11.

Synthesis, characterization and antioxidant properties of a Schiff base ligand and its copper II derivative complex

Ngoné Diouf, Ibrahima El hadj Thiam, Rokhaya Sylla-Gueye, Nango Gaye, James Orton, Simon Coles et Mohamed Gaye

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S1C12.

Polynuclear complexes functionalized with carboxylate groups: synthesis, electrochemical studies and photochromic properties

Papa Aly* Gueye, Lamine Yaffa, Dame Seye, Antoine Blaise Kama, Mamadou Sidibe, Cheikh Abdoul Khadir Diop and Romain Gautier

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S1C13.

Extrusion processing of sorghum grain (whole and decorticated) used as ingredients for breads, biscuits and arraw

Cheikh Ndiaye, Aminata Diouf, Abdoulaye Sène, Djibril Traoré, John Taylor, Bruce R. Hamaker

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S1C14.

Synthesis and characterization of six new binuclear complexes of transition metals involving manganese, iron, cobalt, copper, nickel, and zinc with the ligand N'1,N'4-bis(1-(pyridine-2-yl)ethylidene)succinohydrazide

Gorgui Awa Seck, Mbossé Ndiaye Guèye,Farba Bouyagui Tamboura, Ibrahima Elhadji Thiam, Ousmane Diouf, Abdou Salam Sall and Mohamed Gaye

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ORAL COMMUNICATIONS - 2ND SESSION ROOM *Adansonia*

CHEMISTRY AND HEALTH 1 **S2C15 – S2C20** **12:00 - 13:15**

President:

- **Prof. Latifa Latrous**

S2C15.

Physicochemical Analysis, Antifungal, Antimicrobial and Antiplasmodial Activities of Azadirachta indica and Andrographis paniculate Bitters obtained by fermentation

Gloria Ukalina Obuzor And Aniekan Enoh Uyoh

S2C16.

Comparison of two methods for extracting total alkaloids from *Anogeissus leiocarpus* for antibacterial and antioxidant purposes

Alioune Diouf[1] ; Mamadou Latyr Ndour[1] ; Dr. El Hadji Gorgui Diouf[1]

S2C17.

Flavone c-glycoside and a new tannin isolated from the leaves of *Neocarya macrophylla* (Sabine) prance (Chrysobalanaceae)

Diara Diatta, Oumar Sambou, Philomène Akoua Yao-Kouassi, Isabelle Lachaise, Michael Rivard, Guata Yoro SY and Abdoulaye Gassama

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S2C18.

Evaluation of the anti-HIV activity of triazenes

Seynabou Sokhna, Insa Seck, Samba Fama Ndoye, Issa Samb, Marc Presset, Erwan Le Gall, Lionel Berthoux, Isabel Desgagné-Penix, Matar Seck

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S2C19.

Phytochemical screening and evaluation of the antioxidant ethanolic extract of *Vachellia seyal* Del root bark. (Fabaceae)

Abdou Sarr, Serigne Ibra Mbacké Dieng, Cheikh Seye, Sette Badiane, Kady Diatta, William Diatta, Alioune Dior Fall

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S2C20.

Chemical composition and antifungal activity of essential oils of *Cyperus articulatus*, *Cyperus rotundus* and *Lippia alba* against *Aspergillus flavus* isolated from peanut seeds in Senegal

Alioune Diallo, Y. Tine, S. Sabaly, C. Sambou, J. Paolini, J. Costa, S. Ngom, A. Wélé

TUESDAY NOVEMBER 19TH, 2024

ORAL COMMUNICATIONS - 2ND SESSION ROOM *Digitata 1*

CHEMISTRY OF WATER AND ENVIRONMENTAL 1. **S2C21 – S2C26 12:00 - 13:15**

President:

- **Prof. Aliou Hamady Barry**

S2C21.

Removal of the β-blocker bisoprolol fumarate from waters by the electro-Fenton treatment

Coumba Gueye, Lamine Cissé, Pape Abdoulaye Diaw, Olivier Maurice Aly Mbaye, Moussa Mbaye, Mame Diabou Gaye Seye, Jean-Jacques Aaron, Nihal Oturan, Mehmet A.Oturan*

S2C22.

High sensitivity on-site early warning system monitoring of antibiotics by spectrofluorimetric method: Environmental and biological application

Abdourahmane Khonté, Ndèye Arame Diop, Pape Abdoulaye Diaw, Atanasse Coly, Alphonse Tine, Phillipe Giamarchi

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S2C23.

Analysis of soil pollution by lead in automobile garages (mechanical and road) in Dakar

Ababacar Diouf, Mohamed Lamine Sall, Alassane Traoré, Diébel Dado Sall, Balla Fall, Abdou Karim Diagne Diaw, Modou Fall

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S2C24.

Evaluation of organochlorine pesticides (DDT, DDE, Heptachlor, and Aldrin) in oysters of Soumbedioune beach (Dakar/Senegal) by GC/MSMS.

Cheikh Tidiane Dione, Sitor Diouf, Mame Mor Dione, Dame Cissé, Maoudo Hane, Ibrahima Diagne, Birame Ndiaye, Momar Ndiaye, Cheikhna Diébakaté, Maurice Millet, Abdoulaye Diop

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S2C25.

Study of contamination by triazine herbicides in phosphate sludge storage basins, reclaimed as farmland in the Niayes area of Mboro (Senegal)

Mame Mor Dione, Sitor Diouf, Cheikh Tidiane Dione, Birame Ndiaye, Ibrahima Diagne, Dame Cisse, Maoudo Hane, Seydou Ba, Oussmane Ka, Modou Sarr, Momar Ndiaye

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S2C26.

Differential pulse voltammetry ZDV biosensor based on silver nanoclay composites modified glassy carbon.

Sapokazi Timakwe, Mangaka C. Matoetoe1

TUESDAY NOVEMBER 19TH, 2024

ORAL COMMUNICATIONS - 3RD SESSION ROOM *Adansonia*

15:00 - 16:05

GREEN CHEMISTRY **S3C27 – S3C31**

President:

- **Prof. Ousmane Diouf**

S3C27.

Promoting Green chemistry in Africa for more Food Security and sustainable agriculture

Dogo Seck

S3C28.

Supramolecular solvent-based liquid phase microextraction of sulphonamides in tomato juice followed by high performance liquid chromatographic: Assessment of the Greenness Profile Using Analytical Eco-scale, AGREE, and AGREEprep.?

D. Moema, A.P. Jozela, T.A. Makwakwa, B.E. Gebreyohannes

S3C29.

(E)-4-arylidenedihydrofuran-2, 3-diones and (E)-1-benzyl-4-arylidenepyrrolidine-2,3-diones as new electrophiles in enantioselective organocatalyzed Michael additions

Mouhamadou Fofana, Yohan Dudognon, Laura Bertrand, Xavier Bugaut, Damien Bonne, Ibrahima Ndiaye, Jean Rodriguez and Thierry Constantieux

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S3C30.

Application of green adsorbent in the removal of malachite green from wastewater: Isotherm, kinetics, and toxicity studies

***Aderibigbe, D.O., Giwa, A. A. and Bello, I. A.**

S3C31.

Plant Nanofactory: Toward green synthesis of inorganic nanoparticles

Yann Aman

TUESDAY NOVEMBER 19TH, 2024

ORAL COMMUNICATIONS - 3RD SESSION ROOM *Digitata 1*

15:00 - 16:05

CHEMISTRY OF WATER AND ENVIRONMENTAL 2 **S3C32 – S3C36**

President:

- **Prof. Emmanuel Ngameni**

S3C32.

Efficiency of wastewater treatment plants to remove micropollutants in Durban, South Africa

Bice Martincigh

S3C33.

Enhancing Water Resources and Sustainability through Membrane-Based Water Pretreatment using novel flat and tubular microfiltration ceramic membranes made from Moroccan red clay

A. Ezzahi, M. Bouhria and A. Aaddane

S3C34.

Evaluation of the use and management practices of fertilizers and pesticides by farmers in the municipality of Sadio (Senegal)

Dame Cissé, Birame Ndiaye, Momar Ndiaye, Ibrahima Diagne, Cheikh Tidiane Dione, Maoudo Hane. Seydou Ba, Mamadou Sarr

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S3C35.

Studies, characterization of Mauritanian clays for their use as natural membranes for water treatment

Cheikh Ahmed Babe, Ousseynou M'bodj, Mohamed S. Kankou, El Mostapha Lotfi, Mohammed El Mahi

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S3C36.

Direct spectrofluorimetric method for analysis of bifenthrin and resmethrin in Senegalese surface and groundwater

Diène Diégane Thiaré, Philippe Giamarchi, Atanasse Coly

S3C37.

Synthesis, Spectroscopic, Characterization and X-ray Structures of Lanthanide(III) Complexes derived from 1,5-bis (phenyl(pyridin-2-yl)methylene)carbonohydrazide.

Mbossé Ndiaye-Gueye, Amadou Gueye, Papa Samba Camara, Sofia Zazouli**, Farba Bouyagui Tamboura,** Ousmane Diouf, Nathalie Gruber **and Mohamed Gaye,**

WEDNESDAY NOVEMBER 20TH, 2024

ORAL COMMUNICATIONS - 4TH SESSION ROOM *Digitata 1*

CHEMISTRY AND HEALTH 2 S4C38 – S4C42 8:30 - 9:50

President:

- **Prof. Momar Ndiaye**

S4C38.

Isolation and antimicrobial activities of a novel discolornolide and other compounds from *Monanthotaxis discolor*

Dominic P. Sumary, Clarence A. Mgina and Cosam C. Joseph

S4C39.

Optimization of extraction conditions by the dosage of polyphenols and determination of antioxidant activity: case of *Melothria maderaspatana* organs, a plant used in traditional African medicine for the treatment of diabetes

Bédié Mbow, Mame Coumba Diop, Aïssatou Alioune Gaye

S4C40.

Anti-hyperglycemiant effect of Schiff base imine derivatives

Charlot Diatta, Abdoulaye Diatta, Fatimata Seydy Ball, [1]Yancoba Cheikh diedhiou, El Hadji Dione, Mouhamadou Thiam, Faty Keita, Abdoulaye Gassama, Mbaye Sene, Mbaye Diagne, Guata Yoro Sy

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S4C41.

Rapid identification of anti-oxidants in ethanolic and aqueous extracts of mangrove trees from Senegal using UHPLC coupled on-line to nanoESI-HRMS/MS and DPPH-based assay

C. Gaye, Y. Tine, D. Fall, E. Garayev, A. Bousquet-Mélou, & B. Baghdikian

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S4C42.

Physicochemical study of honeys from the southern district of Senegal (Casamance)

Amadou Ibrahima Mbaye*, Kady Diatta Badji, Abdou Sarr, Serigne Ibra Mbacké Dieng, Harouna Tirera, William Diatta, Mady Cissé, Alioune Dior Fall

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CHEMISTRY OF WATER AND ENVIRONMENTAL 3 S4C44 – S4C48 8:30 - 9:50

President:

- **Prof. Courfia Kéba Diawara**

S4C43.

Preparation and characterization of activated carbon using agricultural wastes (corn cobs)

Adeoye F.A*, Ayinla A.A, Odujebe, F.O. and Aderibigbe, S.A.

S4C44.

High-sensitivity on-site early warning system for monitoring deltamethrin and λ-cyhalothrin pesticides by photo-induced fluorescence

Diery Diouf, Khémesse Kital, Amadou Sarr Gning, Pape Adama Ndione, Latyr Ndione, Souleymane Sambou, Jean Pierre Bakhoum, Philippe Giamarchi and Atanasse Coly

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S4C45.

Synthesis of new polyanilines doped with ionic liquids for the elimination of heavy metals by electrodialysis technic

El Hadji Dièye, Alioune Fall, Modou Fall*, Carlos Arthur Ferreira, Mauro R.S. Silveira, Alessandra F. Baldissera

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S4C46.

Effects of Coagulation and Ozonation Pretreatments on Biochemical Treatment of Fluid Catalytic Cracking Wastewater

Ibrah Landi Ali*, Lu Jun

S4C47.

Optimized process for the fabrication of laser-scribed porous graphene electrodes for the simultaneous sensing of heavy metal ions

Ismaila Diédhiou, Amal Raouafi, Sabrine Baachaoui, Modou Fall, Abdulhadi H. Almarri, and Noureddine Raouafi*

S4C48.

Development of a novel trimethoprim vanillin embedded conjugate imprinted polymers for dyes removal from aqueous medium: Equilibrium, kinetics, modeling and thermodynamics study

Kehinde Awokoya*, Vincent Oninla, Tunmise Eugene-Osoikhia Uloma Njionye, Aderonke Okoya, Gbadebo Adeyinka, and Odor Chioma

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ELECTROCHEMISTRY AND NANOTECHNOLOGY **S5C49 – S5C55** **10:40 - 12:05**

President: **Prof. Neil Coville**

S5C49.

Electrocatalysts Based On Conducting Polymers And Metal Oxide: What are the opportunities for the future?

Mama El Rhazi*, Anas El Attar, Ouissal Salhi, Benhiba Saad

S5C50.

Ultra-sensitive electrochemical detection of Caffeic acid at Ionic liquid functionalized halloysite modified glassy carbon electrode

C. D. Mbiagaing,* G. K. Dedzo, E. Ngameni

S5C51.

Facile electrosynthesis of titania nanotubes incorporated binary $NiMn_2O_4$ as supercapacitor electrode for sustainable energy storage.

Muhammad Muhammad Muzakir , Zulkarnain Zainal, Hong Ngee Lim and Abdul Halim Abdullah

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S5C52.

Reversible dimerization of anion radicals of carbonyl compounds and the electrosynthesis of pinacols. The case of 9-fluorenone.

Arona Ngom, Mamadou Dieng, Diariatou Gningue-Sall, Viatcheslav Jouikov, Andrey S. Mendkovich

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S5C53.

Electrochemical sensor based on a CNT/MoS_2/Fe_2O_3 material modified glassy carbon electrode (GCE) and application to the sensitive detection of Hg^{2+} ions in tap water.

Balla Fall, Diébel Dado Sall, Ababacar Diouf, Abdou Karim Diagne Diaw, Modou Fall

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S5C54.

Amperometric nonenzymatic determination of glucose via a glassy carbon electrode supported with carbon nanotubes, molybdenum disulfide nanocomposite and nickel nanoparticle.

Diebel D. Sall, Balla Fall, John S. Lomas, Modou Fall, Abdou Karim D. Diaw, Miryana Hemadi

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S5C55.

Synthesis and characterization of electrochemical properties of a new gel polymer electrolyte for energy storage device applications

Ablaye Soung, Guédj Dione, Modou Fall, Hyacinthe Randriamahazaka

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President:

- **Prof. Cheikh Abdoul Khadir Diop**

S5C56.

Effect of heat treatment on physico-chemical parameters and extractability of free radical scavengers from *Hibiscus sabdarifa* juice

Harouna Tirera, Mamadou Balde, Idrissa Ndoye, Rokhaya Sylla Gueye, Adama Diedhiou, Yoro Tine, Djibril Fall, Bara Ndiaye, Matar Seck, Amadou Diop, Serigne Omar Sarr, Alassane Wele

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S5C57.

Towards total synthesis of amphidinolide U

Ciss Ismaila, Samba Ndoye, Moussa Ndao, Seynabou Sokhna, Insa Seck, Laurent Ferrié, Seck Matar, Figadère Bruno

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S5C58.

Ethnobotanic survey of aids opportunistic infections in the Ziguinchor district, Senegal

Kady Diatta*, William Diatta, Abdou Sarr, Serigne Ibra Mbacké Dieng, Amadou Ibrahima Mbaye, Idrissa Manga, Marie Léa Kabou, Alioune Dior Fall

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S5C59.

Isolation, characterization and evaluation of the antimicrobial activity of three new molecules from *Carapa procera* seeds

Moussa Ndao, Samba Fama Ndoye, Ismaila Ciss, Seynabou Sokhna, Abda Ba, Lalla Aicha Ba, Insa Seck, Mehdi Beniddir and Matar Seck

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S5C60.

Quality assessment of honey samples sold on Dakar market

Rokhaya Gueye, Robert Faomowe Foko, Cheikh Diop, Moustapha Thiam, Aly Samb, Harouna Tirera, Elhadji Ousmane Faye, Amadou Diop, Serigne Omar Sarr, Bara Ndiaye, Yérim Mbagnick Diop

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S5C61.

Physico-chemical characterization, by theoretical methods, of mycolactone A/B, infectious factor of *Mycobacterium ulcerans*, agent of Buruli ulcer

Kadjo François Kassi, Nahossé Ziao

S5C62.

Ibuprofen adsorption using *Discorea bulbifera* derived chars– experimental and DFT study.

Precious C. Nnaji*, Edith C. Unoka, Refilwe Matshitse, Adeyemi A. Oladipupo, Olubanke O. Ogunlana, Nnaemeka Nnaji*.

FEDERATION OF AFRICAN SOCIETIES OF CHEMISTRY (FASC)

OBJECTIVES

1. to promote and maintain effective communication throughout the community of chemists and chemical scientists in Africa.
2. to promote collaborative activity among member societies and among the individual members of these societies.
3. to maintain and promote high professional, educational and ethical standards.
4. to disseminate chemical knowledge.
5. to act in an advisory, consultative and representative capacity in relation to African institutions and regional initiatives.
6. to promote cooperation with other international organizations and similar regional and international networks

WHAT DOES FASC DO?

1. FASC currently produces the African Journal of Chemical Education (Editor: Dr Engida, Ethiopia; temechegne@faschem.org) To submit to the journal is free.
2. FASC is coordinating the Atlantic Basin Conference (ABC) on Chemistry in Morocco (December 2022 (Chair: Prof Mamia el Rhazi, FASC President)
3. FASC has a General Assembly every two years that rotates around the African continent. The next one will be held in collaboration with the ABC event (Organisers: Tunisia)
4. FASC has a web site https://faschem.co.za/ to inform of all FASC activities. Free to members.
5. FASC has recently produced a dedicated volume on chemical research, in Frontiers in Chemistry, to celebrate its 15th Anniversary.
6. FASC is a member of IUPAC
7. FASC produces a monthly newsletter to distribute news and events to all FASC members and societies. Free to members.
8. FASC, with the financial support of the RSC supports young African chemists to attend conferences
9. FASC members work closely with PACN
10. FASC works with the RSC, ACS and IUPAC seeking support for African chemists
11. FASC will be introducing web seminars for members

APPLY FOR MEMBERSHIP

Individual membership in FASC: This is allowed for any individual member of a Chemistry Society operating in Africa. Where no Society is operating in a country, the FASC Executive will evaluate the application. Young affiliate member: Any students studying for a postgraduate degree in Chemistry or an allied area at an African University can become a Young affiliate member. A requirement is that they belong to a Chemical Society in Africa. Where no Society is operating in a country, the FASC Executive will evaluate the application.

https://faschem.co.za/apply-for-membership/

https://faschem.co.za/apply-for-society/

WEDNESDAY NOVEMBER 20TH, 2024 **15:00 - 16:25**

ORAL COMMUNICATIONS - 6TH SESSION ROOM *Adansonia* **S6C63 – S6C69**

CHEMISTRY OF WATER AND ENVIRONMENTAL 4/ CHEMICAL SAFETY AND SECURITY

Presidents:

- **Prof. Ziao Nahossé**

S6C63.

Improved Safety and Security in the Chemistry Labs: Results and Actions implemented at The Faculty of Sciences of Tunis

Hatem Ben Romdhane

S6C64.

Synthesis and Characterization of Composite (Zn0.3Mg0.7Fe2O4@PPy): Use for the elimination of Chromium (VI) in water by the adsorption method

Modou Gningue Diop, Mamadou Gueye, Momath Lo, Pape Mor Cissé, Mouhamadou A Diallo and Makhtar Guène

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S6C65.

Chemical investigation of the marine sponge Diplastrella sp

Mohamet DIOP*, Abou Moussa SOW, Mouhamadou FOFANA

S6C66.

Synthesis of CaO Nanoparticles from Periwinkle Shell and application in adsorption and photocatalysis for the Removal of Tetracycline (TCN) from Water

Nnabuk Okon Eddy

S6C67.

Control of the wetting properties of bio-inspired surfaces by model-free electopolymerisation of benzotrithiophene monomers.

Salif Sow, Abdoulaye Dramé, Thierry Darmanin, Aboubacary Sene, Alioune Diouf, Samba Yandé Dieng and Frédéric Guittard.

S6C68.

Structural features and DNA binding ability of SBA-15 nanostructured silica containing amino acids grafted with vanadocene complexes.

Michael Aondona Iorhemba*, Diana Díaz-García, Victoria García-Almodóvar, Sulaiman Ola Idris, Gideon Adamu Shallangwa, Ibrahim Abdulkadir, José M. Méndez-Arriaga, Sanjiv Prashar, Santiago Gómez-Ruiz*.

S6C69.

Study of the contamination of oysters from the beach of Soumbedioune /Dakar/Senegal by PCBs 123, 167 and 189, by GC-MS/MS

Sitor Diouf, Mame Mor Dione, Cheikh Tidiane Dione, Birame Ndiaye, Ibrahima Diagne, Dame Cisse, Maoudo Hane, Momar Ndiaye, Cheikhna Diebakate, Seydou Ba, Ousmane Ka, Mamadou Saar, Abdoulaye Diop.

WEDNESDAY NOVEMBER 20TH, 2024

ORAL COMMUNICATIONS - 6TH SESSION ROOM *Digitata 1*

SUSTAINABLE MATERIALS OF CHEMISTRY **S6C71 – S6C76** **15:00 - 16:25**

President:

- **Prof. Aziz Amine**

S6C70.

Bioinspired Surfaces Displaying High Hydrophobicity and Strong Water Adhesion

Abdoulaye Dramé, Elhadj Y Thiam, Salif Sow, Omar Thiam, Diawo Diallo, Thierry Darmanin, Frédéric Guittard.

S6C71.

Zinc oxide Nanomaterials: Synthesis and Application to wastewater depollution.

Aichata Kane, Aliou Hamady BARRY.

S6C72.

Soft-template electropolymerization from triphenylamine-based monomers: From vertically aligned nanotubes to nanomembranes.

Alioune Diouf, Khady Diouf, Pape Diène Dione, Frédéric Guittard, and Thierry Darmanin.

S6C73.

Synthesis of highly luminescent N, P co-doped carbon dots: characterization and application in sensitive and selective fluorescence determination of Hg(II) in complex samples.

Amidou Tall, Marília O. Fonseca Goulart, Issa Tapsoba, Josué C. Caldas Santos.

S6C74.

Screening of series of hybrid perovskites for the development of light-emitting diodes.

Antoine Blaise Kama, Mamadou Sidibé, Cheikh A.K. Diop, Romain Gautier

---

S6C75.

Sol gel coating of a new phosphate-nickel-titanium composite material: characterization and application for corrosion protection

Khalidou Ba, Aliou Barry, Moussa Sy

S6C76.

Contribution to the development of attapulgite as a cement substitute in reinforced concrete.

Malang Bodian, Dame Keinde, El-Hadji Dieye, Kinda Hannawi, Modou Fall and Aveline Darquennes.

RÉPUBLIQUE DU SÉNÉGAL
Ministère de la Santé et de l'Action Sociale
Agence sénégalaise de Réglementation pharmaceutique

ARP "Pour une Réglementation Pharmaceutique Stable et Efficace au Sénégal"

Au regard de l'urgence d'un accès amélioré à des produits de santé de qualité, sûrs, efficaces et abordables, ainsi que de l'industrialisation durable du secteur pharmaceutique, notamment pour les vaccins, le Sénégal s'est engagé dans une dynamique de relance de l'industrie pharmaceutique. Cet engagement vise à atteindre une souveraineté pharmaceutique de 50 % d'ici 2035.

L'atteinte de ce résultat est essentielle pour aligner le Sénégal sur les Objectifs de Développement Durable, notamment l'accès à des médicaments et vaccins essentiels, sûrs, de qualité et abordables. Cela nécessite un renforcement significatif du système de réglementation pharmaceutique, à travers l'Agence Sénégalaise de Réglementation Pharmaceutique (ARP).

L'ARP résulte d'une fusion entre deux structures du Ministère de la Santé et de l'action Sociale, la Direction de la Pharmacie et du Médicament (DPM) et le Laboratoire National de Contrôle des Médicaments (LNCM) et ses missions sont dévolues des leurs.

L'ARP a pour missions entre autre de :

- Mettre en œuvre les fonctions réglementaires dans le cadre de la politique pharmaceutique nationale ;
- Contrôler le secteur pharmaceutique ;
- Veiller au respect des lois et règlements dans les domaines relevant de sa compétence ;
- Elaborer les projets de texte ;
- Veiller à l'application des dispositions législatives et règlementaires régissant les domaines suivants : la pharmacie, le médicament et les autres produits de santé, notamment les vaccins, les établissements pharmaceutiques, les laboratoires d'analyse de biologie médicale, les laboratoires d'essai et d'étalonnage et les essais cliniques.

Par ailleurs, l'Agence Sénégalaise de Réglementation Pharmaceutique (ARP) s'engage à atteindre le niveau de maturité 3 (NM3), un jalon clé dans l'harmonisation des normes internationales de régulation.

Le NM3 reconnu par l'Organisation Mondiale de la Santé (OMS) est essentiel pour garantir la qualité, la sécurité et l'efficacité des produits pharmaceutiques.

Le NM3 est aussi crucial pour lutter contre les médicaments de qualité inférieure ou falsifiés, renforcer la confiance des citoyens et assurer la sécurité sanitaire.

ARP UNE INSTITUTION DE SECURITE ET D'INNOVATION

ORAL COMMUNICATIONS - 7TH SESSION ROOM *Adansonia* **8:30 - 9:55**

CHEMISTRY AND HEALTH AND SUSTAINABLE MATERIALS OF CHEMISTRY

President: **S7C77 – S7C83**

- **Mama El Rhazi**

S7C78.

Mineral materials circularity to contribute to the energy transition technologies

Zenixole Tshentu

S7C79.

Enhanced performance by heteroatom-doped reduced graphene oxide-TiO2-based nanocomposites as photoanodes in dye-sensitised solar cells

Nonjabulo P. D. Ngidi, Edigar Muchuweni and Vincent O. Nyamori*

S7C80.

Optimization of operating parameters for the extraction of cellulose from millet husk.

Maryam Khadim Mbacké, Mouhamed Ndoye, Mouhamadou Moustapha Sow.

S7C81.

Preparation of activated carbon from olive stones and modification of its characteristics by acids (H_3PO_4, HNO_3, H_2SO_4).

Seydou Ba, Abdelrani Yaccoubi, Birame Ndiaye, Ibrahima Diagne, Maoudo Hane, Dame Cissé, Cheikh Tidiane Dione, Mame Mor Dione, Sitor Diouf, Momar Ndiaye.

S7C82.

Contribution to the development of attapulgite as a cement substitute in reinforced concrete

Malang Bodian, Dame Keinde, El-Hadji Dieye, Kinda Hannawi, Modou Fall, Aveline Darquennes

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S7C83.

Synthesis and spectroscopic characterization of Cd^{2+}, Hg^{2+} and Sn^{4+} complexes derived from the salophen Schiff base ligands.

Aichetou Diakhate, F.B. Tamboura, M. Diallo, M.A.K. Sanhoury

S7C84.

Modification of low molecular weight chitosan with African Arrow root Lilly starch and characterization of formed blend films as utility product

O. Ofoegbu, D. Ike, M. Iorhemba, and S. Udenyi

POSTERS

TUESDAY NOVEMBER 19TH, 2024 **16:05 - 16:35**

POSTER – 1ST SESSION ROOM *Adansonia* **P1-1 – P1-14**

Presidents

- **Pr. Clarence Mgida**
- **Dr. Amine Ezzahi**

P1-1.

Regioselective Amination of Porphyrins via Ring-Opening of Elec-trogenerated Pyridiniums Precursors

Abdou K. D. Dimé, Asmae Boushima, Julie Echaubard, Mathieu Bethelot, Amelle M. Mankou, Julien Roger , Charles H. Devillers

---

P1-2.

Assessing the quality of food salts consumed in Senegal

Adrienne Ndiolene, Tidiane Diop, Alassane Traore, Maguette Ndiaye, Mamadou Sidibe et Cheikh Abdoul Khadir Diop

---

P1-3.

Reversible dimerization of anion radicals of carbonyl compounds and the electrosynthesis of pinacols. The case of 9-fluorenone

Arona Ngom, Mamadou Dieng, Diariatou Gningue-Sall, Viatcheslav Jouikov, Andrey S. Mendkovich

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P1-4.

Analysis for vitamin a, iron and iodine in commonly consumed foodstuffs in the Gambia

Bilkisu A. Jallow and Anayo Chris Etonihu

P1-5.

Determination of Total Mercury in Biota using Ultrasound assisted Tetramethylammonium Hydroxide digestion

Birame Ndiaye, Sitor Diouf, Mame Mor Dione, Cheikh Tidiane Dione, Ibrahima Diagne, Dame Cissé, Maoudo Hane, Seydou Ba, Momar Ndiaye, Mamadou Sarr, Ousmane Ka, Benita Pérez Cid

---

P1-6.

Modification and Characterization of blend films of African Arrow root Lilly starch and pleurotus tuberregium sclerotia as functional pharmaceutical excipient and tableting product

D. Ike, S. Udenyi, M. Iorhemba and O. Ofoegbu

P1-7.

Evaluation of mineral content and antioxidant activity of Detarium senegalense leaves extracts

Elhadji Ousmane FAYE*, Rokhaya GUEYE, Mamadou FAYE, Pape Issakha DIEYE, Thierno Mouhamed WANE, Harouna TIRERA, Kady DIAŤTA BADJI, Rokhaya SYLLA GUEYE[3], Amadou DIOP, Serigne Omar SARR, Bara NDIAYE, Yérim Mbagnick DIOP

P1-8.

Anti-Hyperglycemic Effect Of Stilbenes Derived From Benzaldehyde And Anthraldehyde

[1]BALL Fatimata Seydy, [1]DIATTA Charlot, [2]MANSALY Malamine, [1]DIATTA Lionel, [2]SAMBOU Oumar, [2]DIALLO Ramata Ousmane, [1]DIONE El Hadji, [1]THIAM Mouhamadou, [1]KEITA Faty, [1]DIEDHIOU Yancoba Cheikh, [3]RIVARD Michael, [2]GASSAMA Abdoulaye, [1]SY Guata Yoro

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P1-9.

Design and total synthesis of photoactivatable latrunculin B

Ismaila Ciss, Antoine Gamet, Benjamin Joyeux, Bastien Nay

P1-10.

Part of melissopalynology in the labeling of Casamance honeys

Kady Diatta[1,2], *, Marie José Battesti[3], William Diatta[1,2], Serigne Ibra Mbacké Dieng[1], Abdou Sarr, Amadou Ibrahima Mbaye[1], Marie Léa Kabou1, Alioune Dior Fall[1,2]

P1-11.

Mechanism of Analgesic Action of Piperidine and Pyrrolidine Derivatives

CAMARA Mamadou Fodé, DIATTA Charlot, SAMBOU Oumar, BALL Fatimata Seydy, THIAM Mouhamadou, DIONE El Hadji, KEITA Faty, DIEDHIOU Yancoba Cheikh, GASSAMA Abdoulaye, SY Guata Yoro

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P1-12.

Comparative study of groundwater potability in the commune of Sinthiou maléme in the Tambacounda region and the industrial zone of Mboro (Senegal)

Maoudo Hane, Mame Mor Dione, Cheikh Tidiane Dione, Birame Ndiaye, Ibrahima Diagne, Dame Cisse, Seydou Ba, Sitor Diouf , Oussmane Ka, Modou Sarr, Momar Ndiaye

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P1-13.

Synthesis, characterization, and identification of five new mononuclear transition metal complexes involving manganese, cobalt, copper, nickel, and zinc with the ligand 1,3-bis-((5-methyl-1H-imidazol-4-yl) methyleneamino)propan-2-ol)

Gorgui Awa Seck, Mbossé Ndiaye Guèye,Farba Bouyagui Tamboura, Ibrahima Elhadji Thiam, Ousmane Diouf, Abdou Salam Sall and Mohamed Gaye

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16:25 - 16:55

POSTER – 2ND SESSION **ROOM *Adansonia*** **P2-14 – P2-27**

Presidents

- Prof. Issa Tapsoba
- D. Shimaa Heikal

P1-14.

Coordination of the N and O atoms (donors) of the Schiff base ligand N, N'-bis (3-Methoxy Salicylidenimino-1, 3-diaminopropane) with Nickel (II), Copper (II) and Zinc (II): Syntheses, Crystal structure

Mbossé Ndiaye Guèye, Moussa Faye, Mariama Sarr, Farba Bouyagui Tamboura, Ibrahima Elhadj Thiam, Simon Coles, James Orton, Moussa Dieng and Mohamed Gaye

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P1-15.

Ladder-like Organostannoxane: Synthesis and Crystal Structure of the Second Polymorph {[$(C_6H_5)2Sn]2[(C_6H_5)2ClSn]2(\mu3\text{-}O)2(\mu2\text{-}OH)2\}\cdot[DMF]2$

SARR Modou, DIASSE-SARR Aminata, DIOP Libasse

P1-16.

Biochar based on date grains for removal of hexavalent chromium in solution

Bouré DIOUF, Mohamed Lamine SALL, Ababacar DIOUF, Abdou Karim Diagne DIAW, Diariatou GNINGUE-SALL

P1-17.

Electrochemical assisted deposition of thin silica film on ITO modified by diazonium salt for conductive polypyrroles sensor of parathion

Momath Lo*, Dame Seye, Mohamed Lamine Sall, Mamadou Gueye, Balla Fall[1], Arvid Kumar Bakta, Sébastien Vivegnis, Zineb Mekhalif, Mohamed M. Chehimi*

P1-18.

12 years of experimentation with the XLE membrane for the partial elimination of fluoride and salinity on a community scale

DIALLO M.A, DIOP S.N, DIEME M. M, DIAWARA C.K

P1-19.

Analgesic and Anti-Inflammatory Properties of Structural Analogs of 4-Aminopiperidine-Phenoxy Derivatives

THIAM Mouhamadou, SECK Rokhaya, DIATTA Charlot, SAMBOU Oumar, CAMARA Mamadou Fodé, DIONE El Hadji, BALL Fatimata Seydy, KEITA Faty, GASSAMA Abdoulaye, SY Guata Yoro

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P1-20.

Synthesis and characterization of thiourea derivatives for the preparation of complexes for therapeutic purposes

Nango Gaye, Ngoné Diouf, Rokhaya Sylla Gueye and Ibrahima El Hadji Thiam

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P1-21.

Study of the distribution of the azadirachtin-A (Aza-A) molecule in neem seed (Azadirachta indica A. Juss)

Ndiak NDIAYE, Virginie HERAN, Jean-Luc PARRAIN, Bocar Sally GALLEDOU

P1-22.

Simultaneous determination of naproxenand ibuprofen by synchronous fluorescence spectroscopy (SFS) in cyclodextrin and micellar media

Jean Marie Diéne Bakhoum, Olivier Maurice Aly Mbaye*, Jean Pierre Bakhoum, Mame Diabou Gaye-Seye, Clément Trellu, Atanasse Coly, Jean-Jacques Aaron[b]

P1-23.

Spectrofluorimetric determination of tyramine in fish products

NDIONE Papa Adama, KITAL Khémesse, MBAYE Moussa, NDIONE Latyr, CISSE Lamine, SARR Serigne Omar, FALL Djibril,COLY Atanasse, TINE Alphonse, Delattre François

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P1-24.

Antimicrobial and anticancer activities of diazenyl compounds

Seynabou SOKHNA, Insa SECK, Eric HUET Samba Fama NDOYE, Issa SAMB, Marc PRESSET, Erwan LE GALL, Matar SECK

P1-25.

Establishment of a reference situation on the contamination of trace metal elements (As, Sb, Cd and Ni) of plants and soils in the vicinity of the tailings pond before the operation of the BIOX plant at the Sabodala-Massawa gold mine.

Yacine Diouf, Tidiane Diop, Rokhaya Mbaye, Nguissaly Diouf et Diomay Yatt

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P1-26.

Synthesis and Characterization Schiff Base Molecules and Antidiabetic, Anti-inflammatory et Antimicrobial Activity Complexes

Abdoulaye Diatta, Charlot Diatta, Ndeye Rokhayatou Diatta , Guata Yoro Sy, Abdoulaye Gassama et Mbaye Diagne Mbaye*

P1-27.

Effects of hydrocolloids (Arabic and Maltodextrin gums) on the production of fast millet rolled flour "Arraw"

Abdoulaye Sène1,3 , Cheikh Ndiaye1, Djibril Traore1 , Bruce Hamaker2, Matar Seck3



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Prof Ehud KEINAN

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Humanity faces a bright future, and so Chemistry

President: Prof. Modou Fall

PLENARY CONFERENCE 2 ROOM *Adansonia*

Dr Shimaa Heikal

Life Sciences Department, Elsevier

Unlocking a sustainable future with green chemistry approaches

President: Prof. Elsie Dineo Moema

Sustainability-focused chemistry research is key to realizing lower pollution levels, less waste, safer chemicals, and greater energy efficiency. In order to create a full, global understanding of the green chemistry topic, as well as the trends and gaps in the field, it is essential to explore the recent information focusing on green chemistry knowledge in practice and the best routes for preparing substances in a greener way. Reaxys is a chemistry platform that provides best-in-class predictive retrosynthesis to find the best routes and choose the greener alternatives. In addition, other disciplines like pharmacology or pharmacy are interested in the bioactivity of compounds and the biological targets they interact with. To apply greener science practices, understanding the toxicity of substances and chemical processes is vital to developing more sustainable alternatives. Reaxys also offers the biggest bioactivity and target database to support these cross-departmental science in Reaxys Academic Edition which facilitates interdisciplinary research in chemistry and related sciences.

TECHNICAL TALK 1 ROOM *Adansonia*

Dr Clifford Chuwah

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Presentation of Chemistry Africa

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EURAXESS and EU Funding and Tender portals: how to find research funding, collaborators and the steps for submitting proposals

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PLENARY CONFERENCE 3 ROOM *Adansonia*

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Recent Advances in the Development and Application of Nanozymes as Novel Chemical Catalysts

President: President: Prof. Farba Bouyagui Tamboura

Nanozymes refer to synthetic nanomaterials that demonstrate catalytic activities akin to enzymes, finding utility across diverse fields. Their distinctive properties make them promising candidates for addressing challenges in medicine, environmental science, and sensing technologies. The rising prominence of nanozymes is attributed to their superior performance in activity, stability, tunable properties, and cost-effectiveness. In this presentation, I will briefly review our latest work on the design, synthesis, and sensing applications of these nanomaterials mimicking natural enzymes. The combination of nanozymes such as peroxidase, oxidase, and laccase activities with molecularly imprinted polymers (MIPs) tailored for enhanced selectivity towards phenols, drugs, metabolites, and contaminants has facilitated the development of advanced biomimetic sensors. These sensors find applications in diverse areas such as environmental monitoring, food safety, and clinical diagnostics. This presentation will further highlight recent advances in the integration of MIPs and nanozymes for the design of innovative biomimetic sensors. Challenges and future perspectives will also be outlined and discussed.

PLENARY CONFERENCE 4 ROOM 1

Issa Tapsoba Joseph

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Development of Electrochemical Sensors for Pesticides and their metabolites Detection in Wate

President: Prof. Emmanuel Ngameni

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Pesticides are organic or inorganic chemicals that are widely used in agriculture to protect crops, and in the home to control disease-carrying insects. These pesticides include thiram, methyl parathion, fenitrothion and diuron. However, most of pesticides are known for their neurotoxicity, genotoxicity, cytotoxicity and immunotoxicity. [1,2]. Depending on their lasting time, pesticide residues or their metabolites are generally found in the environment, namely in soil and water through accumulation, percolation and run-off. [3]. As such, humans and their environment are exposed to the potentially dangerous effects of these pesticides. Therefore, it is mandatory to monitor pesticides and their

metabolites residues in the environment. Several methods have been developed for measuring pesticides in environmental matrices (water, soil, etc.) and food matrices (seafood, vegetables, cereals, etc.), our research team designed several electrochemical sensors based on a carbon paste electrode modified with zinc oxide nanoparticles (ZnONPs) or a carbon fibre electrode modified with nickel(II) tetra-sulphonated phthalocyanine (p-NiTSPc) and/or gold nanoparticles for analysing pesticides and their matabolites in different matrices, with low limits of detection [4-6]. Then, our research results provided various electrochemical sensors dedicated to some pesticides and their metabolites in water.

[1] D. Behrens, J. Rouxel, T. Burgeot, et F. Akcha, , *Aquat. Toxicol.*, vol. 175, p. 249-259, juin 2016, doi: 10.1016/j.aquatox.2016.04.003.
[2] F. Akcha, A. Barranger, et E. Bachère, *Environ. Sci. Pollut. Res.*, vol. 28, nº 7, p. 8266-8280, févr. 2021, doi: 10.1007/s11356-020-11021-6.
[3] C. J. Topping, A. Aldrich, et P. Berny, *Science*, vol. 367, nº 6476, p. 360-363, janv. 2020, doi: 10.1126/science.aay1144.
[4] M. Serge, Bako yibor Fabrice Roland, et Tapsoba Issa, *Int. J. Electrochem. Sci.*, p. ArticleID:210552, mai 2021, doi: 10.20964/2021.05.31.
[5] S. Mbokou Foukmeniok *et al.*, *Int. J. Anal. Chem.*, vol. 2022, p. 1-9, mars 2022, doi: 10.1155/2022/9994639.
[6] B. Ouedraogo, A. Tall, Y. F. R. Bako, et I. Tapsoba, *Electroanalysis*, vol. 35, nº 10, p. e202300101, oct. 2023, doi: 10.1002/elan.202300101.

TECHNICAL TALK 3 ROOM *Adansonia*

Dr Veresha Dukhi

ACS International, CAS, Durban - South Africa

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PLENARY CONFERENCE 5 ROOM *Adansonia*

Prof Said Gharby

University Ibnou Zohr, Agadir – Morocco

Analytical Chemistry, a lever for the sustainable development of Local Products in Morocco: The Case of Argan Oil (Argania spinosa (L.) Skeels)

President: Prof. Abdoulaye Dramé

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Argan oil (AO) has long been traditionally prepared by the Amazigh people in southern Morocco. However, the last twenty years were marked by a shift from traditional AO production to a semi-automated production within cooperatives. Whereas, artisanal oil was only intended to satisfy local, daily, and family consumption. The AO production by cooperatives using mechanical presses has made it possible to supply high quantity of AO at a large scale and of certified quality in terms of health and analysis. This has significantly improved the quality of the oil, enabling it to be marketed well beyond Morocco's borders and establishing its worldwide reputation.

AO marketing is increasing steadily and considerably throughout the world. To maintain and expand its market share, Morocco needs to guarantee optimum conditions for the production of high-quality oils that meet the requirements of international standards.

To accompany and support this strategy, our lab has initiated fundamental and applied research for the development and certification of Moroccan AO. In terms of applied research, we have focused particularly on AO quality. Our efforts have focused on studying the factors impacting on the quality of

this oil, improving its preparation processes, its conservation, identifying fraud detection techniques and the influence of physical refining on AO quality including AO organoleptic properties. These studies have enabled us to identify several essential factors for the production of certified quality oil and have led us to propose methods that can be easily used by the entire AO industry.

Keywords: Argan oil; Quality Control; Analytical Chemistry, Composition, Stability and Adulteration

PLENARY CONFERENCE 6 ROOM *Adansonia*

Reverse Osmosis and scientific issues for seawater desalination in west Africa

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President: Prof. Matar Seck

Reverse Osmosis and scientific issues for seawater desalination in west Africa

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Several countries in west Africa are face to Atlantic Ocean and at the same time their people face to water scarcity and/or a luck of drinking water quality. Seawater desalination has already proven itself all over the world. Reverse osmosis membranes are the heart of a system that requires available energy for high pressure, qualified human resources and is backed by prospective research especially for the future of end-of-life membranes. The water produced is of a remarkable quality both from a physical-chemical and microbiological point of view. The concepts of conversion rate, remineralization and fouling or backwashing are of course integrated into the filtration processes. Often it is the small, neutral and closely related boron element to salinity in terms of concentration that causes real retention difficulties for compliance with standards (0.5 ppm). The known pH of seawater makes it possible to consider the form of boric acid as the majority species whose treatment requires tubes of membranes positioned in cascade.

The desalination of seawater in the coastal countries of west Africa not only allows access to drinking water in sufficient quantities but also constitutes a niche for job creation for young people. The countries concerned must not be satisfied with capacity building of agents in the sector but above all develop serious training programs for desalination technicians.

Faced with sovereignty issues in the water sector, succession must be ensured and secured by the establishment of contracts with operating companies. Also define in the medium term a sub- regional program for the production of reverse osmosis modules and accessories adapted to the desalination of seawater.

It is thanks to these findings that west African countries that engage in seawater desalination should opt for plants of limited size (50,000 m^3/d) instead of larger facilities that are difficult to control scientifically.

Keywords: Desalination – Seawater – West Africa

TECHNICAL TALK 4 ROOM *Adansonia*

Dr Alejandra Palermo

Head of Global Inclusion

Royal Society of Chemistry (RSC) – England

Gender Equality in the Chemical Sciences

President Prof. Gloria Obuzor

It is generally recognised that to get the very best scientific outputs we need a diversity of inputs and talents. However, progress is still slow and yet not well understood or actioned how to truly achieve diversity and how to ensure that those diverse inputs and talents are included, accepted, valued and empowered.
Current evidence shows that a continued challenge for gender equality exists, particularly in retaining and developing women into positions of leadership within the chemical sciences.
Given the global nature of our discipline and the scale of the issues identified, there is no doubt that it is imperative to work collaboratively across the community and increase the voice and representation of the Global South.
During my presentation, I will discuss the challenges and opportunities in making the chemical sciences fully inclusive and diverse. I will cover a broad range of topics including creating a global inclusive research culture, and challenging the traditional measures of career success, and, hopefully, identify next steps together.

PLENARY CONFERENCE 7 ROOM *Adansonia*

Alpha Ousmane Toure

Cheikh Anta Diop University, Dakar

Industrial waste materials to decarbonize the cement and concrete industr

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Cement production alone accounts for roughly 8% of CO_2 global emissions. Emissions stemming from cement production are primarily caused by the decomposition of limestone and the use of fossil fuels or natural gas heating. To circumvent these two issues, proposed here is the manufacturing of cement clinker using a calcium silicate feedstock, instead of limestone, thereby producing a decarbonated cement clinker. The calcium silicate feedstock will be recovered from phosphoric acid, iron, and steel waste materials, which in turn provide environmental benefits from reduced waste. The resulting reactive calcium silicate clinker phases (C_2S, C_3S) will be produced by a wet process using fluosilicic acid waste, lime, fluxer and a mineralizer. The cement clinker will be ground and mixed with sulfate to form cement that can be combined with water to form calcium silicate hydrate through a hydraulic reaction.

The aforementioned approach will permit a substantial substitution of limestone (66% to 68.75%). The calcium silicate waste can be used to produce sustainable and environmentally-friendly

cement by lowering the temperature (<1200 °C instead of 1450 °C), reducing CO_2 emissions by reducing calcination (60%) and saving energy (350 kcal/kg of clinker). The reduction in required temperature makes the process more conducive to using concentrated solar power in place of natural gas. If using Concentrated Solar Power for the burning process of this new raw mixture, the reduction of CO_2 from calcination will exceed 80%.

At the end, it will be demonstrated the resulting cement quality, optimized the formulation, and designed a green cement plant incorporating concept. The design and associated flowsheet will be used to validate economic feasibility through a technoeconomic analysis. If implemented worldwide, this concept has the ability to reduce global CO_2 emissions by 60%. Moreover, the integration of renewable energy such as green hydrogen and biogas will help to reach the net-zero target.

Keywords: Industrial waste; cement industry; decarbonization; net-zero.

TECHNICAL TALK 6 ROOM *Adansonia*

Open Access and Open Science in Publishing

Dr Andrew Shore

Royal Society of Chemistry (RSC) – England

President: Prof. Rokhaya Sylla Guèye

PLENARY CONFERENCE 8 ROOM *Adansonia*

Prof Neil J Coville
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Carbon interconversions

President: Prof. Diariétou Ginigue SALL

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Carbon is a fascinating element and that be found in nature the form of different allotropes. A large number of research articles have been published on the synthesis, characteristics, mechanism, and applications of the many carbon allotropes. What is less known is that these allotropes can be interconverted amongst each other, with the classic example being the conversion of 'coal' into diamonds. In general, the interconversion occurs by "bottom-up" and "top-down" methods, with the "top-down" methods being dominated by the breaking down of carbon allotropes such as fullerene, graphene, carbon black (CB) and carbon nanotubes (CNTs) into carbon dots (CDs). However, CDs can also act as carbon substrates for the synthesis of 1-D carbon nanotubes (CNTs), 2-D/3-D graphene-based nanosheets (GNSs) and 3-D porous carbon frameworks (PCFs). Herein we present a review (and our own studies) of the synthesis strategies used to convert 0-D carbons into higher dimensional carbons as well as the conversion of 'large' carbons to smaller carbons with different morphologies.

PLENARY CONFERENCE 9 ROOM *Adansonia*

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Valorization of biowaste in analytical sample preparation

President Prof. Djibril Fall

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To address the increasing demand for quantifying emerging pollutants in various environmental media, preconcentration methods like solid phase extraction have become vital for enhancing procedural efficiency and analytical sensitivity. The advancement of sample treatment in recent decades has led to the introduction of novel techniques and materials. Traditional waste management practices often involve the disposal or incineration of agricultural and forestry waste, contributing to environmental pollution and underutilizing biowaste, a valuable resource. Agricultural and animal cultivation and harvesting produce substantial waste, such as stones, shells, straw, and animal by-products, which can be repurposed for sample treatments.

This study aims to elucidate the fundamental principles essential for understanding sample preparation while exploring the latest materials, including bio waste, to improve sensitivity and specificity in analysis. The distinctive features of biowaste sorptive extraction techniques are examined comprehensively with the discussion on their future prospects and key challenges.

Key words: Waste valorization, Sample preparation, Emerging contaminants, Circular economy.

ORAL COMMUNICATIONS

S1C1.

Chemoenzymatic synthesis of diaryl ether linked bioactive marine natural poducts

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Chemical investigation of the Mediterranean marine sponge *Hexadella racovitzai* led to the isolation of two bromotyrosine derivatives, psammapline A, previously reported in the literature, and a new derivative, 4-*O*-sulfatocyclobispsammapline A (Figure 1), constituted by a diaryl ether linkage.

The diaryl ether linkage, formed by phenolic coupling of two tyrosine units likely to be catalyzed by oxidative enzymes during the biosynthesis, is present in a wide range of biologically active marine natural products.

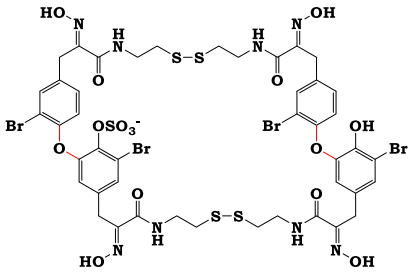

Figure 1: Structure of 4-*O*-sulfatocyclobispsammapline A

Although many synthetic efforts have been made to develop efficient methods for the construction of the isodityrosine skeleton (Ullmann ether synthesis or thallium-(III)-promoted oxidative coupling), the drastic reaction conditions used require extensive protection and deprotection of the sensitive functionalities constitutive of the parent molecule (s). In addition, the final targets are often obtained with modest yields.

Development of alternative mild methodologies for the synthesis of the diaryl ether linkage in high yields is still a challenge.

The aim of this study is to work on an enzyme-based strategy for the coupling of different phenolic substrates. Some methodological work will be also performed on the oxidation of natural molecules by enzymes to explore possible biomimetic pathways.

Keywords: 4-*O*-sulfatocyclobispsammapline A, isodityrosine, marine natural products.

Sfecci, E. (**2018**). Valorisation de biocides d'invertébrés marins méditerranéens. (Thèse de doctorat, Université Côte d'Azur).
Kazlauskas, R.; Lidgard, R. O.; Murphy, P. T.; Wells, R. J. Brominated tyrosine-derived metabolites from the sponge Ianthella basta. Tetrahedron Lett. **1980**, 21, 2277-2280.
Guo, Z-W.; Salamonczyk, G. M.; Han, K.; Machiya, K.; Sih, C. J. Enzymatic Oxidative Phenolic Coupling. J. Org. Chem. **1997,** 62, 6700-6701.
Fry, S. C.; Formation of isodityrosine by peroxidase isozymes. J. Exp. Bot. **1987**, 38, 853-862.

S1C2.

Selective binding of halides and oxyanions with new azacrown calix[4]arenes

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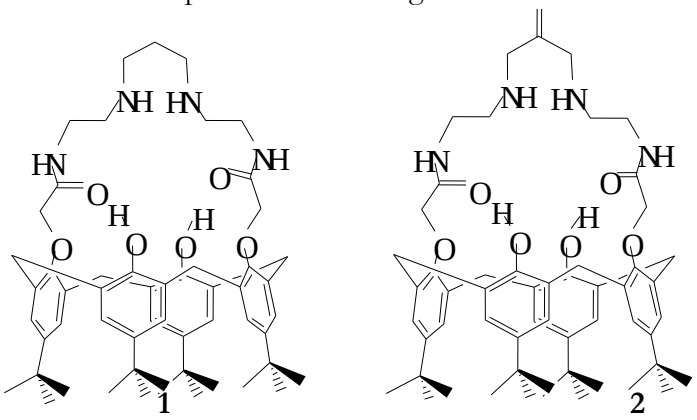
Keywords: Calixarene, Anion complexation, Stability constant, Host-guest chemistry

The chemistry of anions recognition began in the late 60s, in the period when Pedersen reported the synthesis and crown ethers coordination properties and Lehn published the first considerations cation coordination chemistry with cryptands. In the 70s, the metal coordination has attracted special interest. The recognition of cations is well known now and represents a field of supramolecular chemistry. In contrast, anion coordination chemistry has gained limited attention and the inherent problems associated with the coordination of anions have only been illustrated in the recent decades.

In this study, the complexing properties of tetraazacrown calix[4]arenes (**1** and **2**) toward halides (F^-, Cl^-, Br^- and I^-) and oxyanions (HSO_4^-, NO_3^- and OH^-) have been carried out in acetonitrile and monitored by UV spectrophotometry and conductivity.

The stability constants monitored from the spectrophotometric data of compounds **1** and **2** toward halides and oxyanions were evaluated from the Benesi–Hildebrand equation

The data shows that compound **1** forms the most stable complex with F^- among halides and with OH^- among oxyanions. Both anions are the strongest bases in each group. In contrast, compound **2** produces the most selective complex with I^- among halides and with HSO_4^- among oxyanions.



Scheme1. Structure of calix[4]aza crown **1** and **2**

S1C3.

Synthesis of new transition metal complexes with an organic polydentate ligand: Spectroscopic, crystallographic, magnetic, fluorescence and antimicrobial studies

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Schiff bases are known for their importance in the field of coordination chemistry. They have been known since 1864, when Hugo SCHIFF made the first condensation of primary amines with carbonyl compounds[1,2]. The (thio)carbonohydrazones constitute a family of Schiff base ligands widely used in coordination chemistry. These ligands and their complexes with transition metal ions have been well documented in the literature as good therapeutic, antimicrobial, antiviral, antioxidant and pharmacological agents[3-5].

In this work we present a ligand and its complexes with transition metal salts. The ligand is prepared by a direct condensation reaction between thiocarbonohydrazide and 2-acetylpyridine. Infrared spectroscopy, 1H and 13C nuclear magnetic resonance, elemental analysis and X-ray diffraction are used to characterise the ligand. The metal complexes derived from these ligands are characterised by infrared spectroscopy, electron spectroscopy, XRD but also by magnetic susceptibility and molar conductivity measurements. The antimicrobial properties and cytotoxicity of the ligand and metal complexes were also studied.

Keywords: *Schiff bases, thiocarbonohydrazide, cytotoxicity.*

References

[1] Z. Cimerman, S. Miljanić, N. Galić, *Croatica Chemica Acta* **2000**, *73*, 81–95.
[2] T. T. Tidwell, *Angewandte Chemie International Edition* **2008**, *47*, 1016–1020.
[3] A. Shrivastav, N. K. Singh, P. Tripathi, T. George, J. R. Dimmock, R. K. Sharma, *Biochimie* **2006**, *88*, 1209–1216.
[4] Z. H. Chohan, S. Kausar, *Metal-Based Drugs* **2000**, *7*, 17–22.
[5] O. A. El-Gammal, G. M. Abu El-Reash, S. E. Ghazy, A. H. Radwan, *Journal of Molecular Structure* **2012**, *1020*, 6–15

S1C4.

Development of atroposelective reactions of hetero-biaryl compounds by desymmetrization of maleimides

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The atroposelective research field dedicated to the stereoselective synthesis of molecules bearing a stereogenic axis has attracted enormous interest in recent times, due to the large number of applications presented by these compounds (i.e. natural products, chiral ligands/catalysts) [1]. Although access to biaryl atropoisomers has been well documented, examples of molecules with less stable configurations are rare in this class. These include five-membered cyclic atropoisomers with a stereogenic axis around a C-N bond **[2]**. In this study, we developed an enantioselective route to access motifs containing a stereogenic C-N axis. A dissymmetric bis-adduct was obtained instead with the formation of three chirality elements including 2 stereogenic centers and a stereogenic C-N axis. This formation could be explained by a Michael cascade reaction. The efficiency of the process both in terms of yield (rdt = 48 to 69%) and stereoselectivity motivated optimization to study the extent of the reaction in order to obtain a catalog of molecules with excellent enantiomeric excesses (ee = 95 to 100%).

Key words: stereoselectivity, stereogen, enantioselectivity, enantiomeric excess.

Références :

1. Cheng, J. K.; Xiang, S.-H.; Li, S.; Ye, L.; Tan, B. *Chem. Rev.* **2021**, 121, 4805-4902.
2. Kumarasamy, E.; Raghunathan, R.; Sibi, M. P.; Sivaguru, J. *Chem. Rev.* **2015**, 115, 11239-11300

S1C5.

Synthesis and physicochemical characterization of cobalt phthalocyanine octa-substituted

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In this study the synthesis and physicochemical characterization of cobalt phthalocyanine with amides ($CoPc(CONH_2)_8$ and $CoPc(CONHEt)_8$) substituent at peripheral position have been presented. The complexes were characterized by IR, UV-Visible, XRD, ATD/ATG and SEM. Compared to cobalt phthalocyanine CoPc, the IR spectra of the substituted complexes present the vibration bands of the C=O amide bond at 1707 cm^{-1} and 1699 cm^{-1} and that of the N-H bond around 3300 cm^{-1}. The deformation vibration band of the N-H bond is observed at 633 cm^{-1}. In the UV-Visible spectra, the main transition band is slightly shifted to high values of wavelengths. Analysis by ATD/ATG shows that the introduction of peripheral substituent modifies the thermal properties. The residues after decomposition are CoO and Co_3O_4 corresponding to 8% and 24% of the masses of $CoPc(CONH_2)_8$ and $CoPc(CONHEt)_8$ respectively. XRD analysis shows that the substituted complexes are amorphous with a low crystallization rate. SEM images confirm these results by showing an appearance of wet clay. Molecular orbital properties such as HOMO–LUMO energy gap, and molecular electrostatic potential surfaces were calculated for each complexe using DFT.

Key words: Cobalt phthalocyanine, IR, UV-Visible, ATD/ATG, SEM and XRD and DFT.

S1C6.

Redefining Proton Affinity for Heteronuclear Molecular Species: Quantum Chemical Insights

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Experimental techniques for measuring proton affinity (PA) are plagued with the inability to perform site-specific protonation. Thus, for heteronuclear molecular species with two or more protonation sites, the experimental PA measurement only provides a single value of the PA for each molecular species without any information regarding the protonation site. In this study, different heteronuclear molecular species (with known experimental proton affinity values) having two to four protonation sites were subjected to site-specific protonation using different quantum chemical calculation methods with the aim of characterizing the trends of the PA corresponding to the experimentally measured PA values for each heteronuclear molecular species. Beyond the common assumption that during protonation, the proton goes to the site of highest electron density, the results revealed other trends corresponding to the measured PA values; Where the proton goes to the site of the less electron density. The different trends observed strongly suggest the need to redefine proton affinity for heteronuclear molecular species. In addition to these observed trends, we also observed some molecular species with marked deviations between the calculated (with the different methods used) and the experimental PA values pointing to the possibility of errors in the reported experimental values. These observations will be presented and discussed.

S1C7.

Strandberg-type POM: A Cluster Exhibiting Tunable Photochromism

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Polyoxometalates (POM) clusters have recently drawn a lot of attention owing to interesting photochromism properties. The optical properties of these building-blocks are often associated to their intrinsic structures and composition: one POM type leads to one specific photochromic behavior. Herein, we demonstrate how the photochromic behaviors of one POM type can be tuned according to its interactions with the extended hydrogen network. Thus, Strandberg type polyanions built of mixed edge- and corner-sharing MoO_6 octahedra are shown to exhibit absorption bands corresponding to both Mo^{5+}-to-Mo^{6+} intervalence charge-transfer and the photoreduction of Mo^{6+} ($4d^0$) into Mo^{5+} ($4d^1$). The photoresponse of these two absorption bands can be tuned according to the hydrogen bonding interactions between the organic amines and the POM leading to significantly different photochromic behaviors (white to brown *vs.* white to blue). We believe this diversity in photochromic behaviors could be extended to other POM types built of mixed edge- and corner-sharing MO_6 octahedra.

Keywords: Polyoxomolybdate, Strandberg polyanion, Photochromism, Hydrogen bonds

S1C8.

Photocatalytic Degradation of Methyl Orange Using Titanium Silicate

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Photocatalysis, a promising approach for environmental remediation, has gained considerable attention in recent years. The photocatalytic activity of Titanium Silicate was investigated in the degradation of Methyl Orange under Ultraviolet irradiation. Titanium Silicate, known for its unique structural and photocatalytic properties, was synthesized using a sol-gel method and characterized using X-ray diffraction (XRD). The experimental parameters, including catalyst dosage, initial dye concentration, and irradiation time, were systematically varied to understand their influence on the photocatalytic degradation process. UV-Visible spectroscopy was employed to monitor the degradation kinetics by assessing the reduction in methyl orange absorbance. The results indicate that the degradation efficiency of methyl orange increased with increasing Titanium silicate concentration and irradiation time. The mechanism of photocatalytic degradation involved the generation of reactive oxygen species (ROS) by the Titanium silicate under visible light irradiation, which in turn oxidized and degraded the methyl orange molecules. Results indicate that Titanium Silicate exhibits significant photocatalytic activity, showcasing its potential as an effective catalyst for Methyl Orange degradation. The report provides insights into the optimal conditions for enhanced photocatalytic efficiency, contributing to the broader understanding of Titanium Silicate's applicability in the treatment of organic pollutants.

Keywords: Methyl Orange, Photocatalyst, Titanium Silicate, UV, Organic dyes

S1C9.

CaO/SiO_2 catalysts for ultrasonic biolubricants production

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The growth of the machinery and automotive industry drives interest towards the production of bio-lubricants due to their better lubricating properties and their low carbon footprint compared to petroleum-based lubricants. However, their traditional synthesis is long and energy intensive. We intensified the production of biolubricants from canola oil methyl esters by ultrasound. NaOH catalyzed the transesterification of two polyalcohols (propylene and Trimethylene glycols). We varied the ultrasound power, temperature, the type of alcohol and the alcohol: biodiesel molar ratio. Trimethylene glycol produced 90 % ± 1.9 % of biolubricant at 80°C and 62 W with a molar ratio of 0.25. Calcium oxide supported on silica (CaO/SiO_2) also catalyzed the reaction at the optimal conditions. We surveyed the loading of CaO over SiO_2, the catalyst loading in the reactor, and its leaching and reusability. A mass percentage of 50 % CaO to SiO_2 yielded 46 % ± 3.2 % lubricants at 3% by weight of the reactants' total

mass. After three reaction cycles, the ultrasound did not alter the particle size (e.g. mean diameters of fresh and used catalysts were 31 µm and 32 µm, respectively), but it leached the active sites, which reduced the activity of the catalyst for successive uses.

Keywords: Bio lubricant, Biodiesel, Transesterification, Ultrasound, Heterogeneous Sonocatalysis, CaO/SiO_2.

S1C10.

Synthesis and IR, X-ray structural characterization of a new single crystal β-octamolybdate $(C_3H_7NH_2)4[Mo_8O_{26}].2DMF$

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The synthesis of polyoxometallates (POMs) occupies an important place in inorganic materials chemistry. Over the last few decades, POMs have become of increasing interest in inorganic synthetic chemistry, due to their important and varied applications in many fields such as medicine, biology, optics, polycatalytic treatment of emerging pollutants... To extend the field of applications of this variety of materials, we have have been interested on their synthesis.

In our research, we carried out a simultaneous acid-base reaction of dipropylamine with molybdic acid H2MoO4 in water. A clear solution was obtained and stirred for 2 hours. After a week's evaporation in the oven at 60°C, a white powder was formed. This was dissolved in DMF solvent, heated to reflux at 200°C for 2 h, then filtered.

The filtrate obtained was slowly evaporated at room temperature for 6 months, yielding colorless crystals. These crystals, crystallizing in a triclinic system with a P-1 space group, were characterized by IR spectroscopy and X-ray diffraction.

Octamolybdate (C3H7NH2)4[Mo8O26].2DMF is a supramolecule with an infinite layer structure based on NH---O hydrogen bonds. All eight Mo(V) metal centers have an octahedral environment. The POM synthesized here corresponds to the β-isomer of octamolybdate.

This study has enabled us to grasp the importance of POMs with their applications in several fields of science. Our next work will focus on the physicochemical properties of this synthesized POM through application tests in medicine, biology, catalysis among others.

Key words: POM, single crystal, supramolecule, octamolybdate, I R, X-ray.

References:

1-Y. Guo et al., « Microporous Polyoxometalates POMs/SiO2 : Synthesis and Photocatalytic Degradation of Aqueous Organocholorine Pesticides », Chem. Mater., vol. 12, no 11, p. 35013508, 2000.

2-She, S.; Bian, S.; Hao, J.; Zhang, J.; Zhang, J.; Wei, Y. Aliphatic Organoimido Derivatives of Polyoxometalates Containing a Bioactive Ligand. Chem. - Eur. J. 2014, 20, 16987−16994.

3-Ma, P.; Hu, F.; Huo, Y.; Zhang, D.; Zhang, C.; Niu, J.; Wang, J.Magnetoluminescent Bifunctional Dysprosium-Based Phosphotungstates with Synthesis and Correlations between

S1C11.

Synthesis, characterization and antioxidant properties of a Schiff base ligand and its copper II derivative complex

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The study of the behavior of transition metals with biologically active ligands is an active area of research. Copper complexes are of particular interest and are considered good models for studying the reactivity of metal centers in metalloenzymes.

The Schiff's base H2salophen (H2salophen = N,N'-Bis(salicylidene)diaminobenzene), reaction with Chloride copper (II) salt afforded the tetranuclear complex formulated as [Cu(L)]4. The compound has been studied and characterized by elemental analysis, IR and Visible - UV spectroscopies, molar conductivity, and room temperature magnetic measurements. The structure of the complex has been resolved by X-ray diffractometry. The complex crystallized in the monoclinic space group P21/c with the following unit cell parameters a = 11.7571(2) Å, b = 16.8082(2) Å, c = 36.5351(5) Å, β = 94.9540(10) °, V = 7192.94(18) Å3, Z = 16, Z' = 4, R1 = 0.0493 and wR2 = 0.0568. In the complex, the ligand acts in tetradentate fashion, and the coordination environment of the copper atom can be described as distorted square planar geometry.

To assess the antioxidant activity of these compounds, we used the DPPH· radical method, which consists in measuring the antiradical power of the molecules using ascorbic acid as a reference. The IC_{50} values obtained were 2.25 mg/mL for the ligand and 0.36mg/mL for the complex. The results of the comparative study of the antioxidant properties of the ligand and its complex led to the conclusion that the complex is more active than the ligand. Our next step is to investigate the anti-inflammatory properties of this complex.

Keywords: Schiff base; complex; X-ray; Antioxydant; Copper (II)

References

1- Diouf et al., (2023), Synthesis, spectroscopic studies and X-Ray Structure determination of a tetranuclear copper complex derived from the Schiff base ligand N,N'- Bis(Salicylidene)Diaminobenzene, *Journal of Applied Chemistry*, 16, 01-07.
2- Liu et al., (2022), Biomimetic catalytic aerobic oxidation of C–sp(3)–H bonds under mild conditions using galactose oxidase model compound Cu II, *Chemical Science*, 13(33), 9560–9568.
3- Mazzoni et al., (2021), When the metal makes the difference : template synthesis of tridentate and tetradentate Salen-type Schiff base ligands and related complexes. *Crystals*, 11(5).
4- Hu et al., (2018), Synthesis, Structures and antioxidant activities of two new Cu (II) copper complexes with benzimidazole Schiff base ligand, *Inorganic and Nano-Metal chemistry,* doi.org/10.1080/15533174.2013.843562.

S1C12.

Polynuclear complexes functionalized with carboxylate groups: synthesis, electrochemical studies and photochromic properties

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Photochromism properties of inorganic-organic hybrids materials are one of the fields that have recently drawn a lot of attention researchers The optical properties of these building-blocks are often associated to their intrinsic structures and composition. Herein, we demonstrate how the photochromic behaviors of two bimetallic complex type can be tuned according to its interactions with the extended hydrogen network. Thus, polycarboxylates type bimetallic complex built of two dimeric $\{Mo_2O_6\}$ units linked by a central oxygen atom. In each dimer, the Mo(VI) ions form octahedra by sharing a face and are bound to a tridentate carboxylate ligand through C—O—Mo bonds. In both compounds, the Molybdenum metal have the same coordination mode, but differ in their polycarboxylate ligand, composed of maleic acid ($C_4H_4O_4$) for one and citric acid ($C_6H_8O_7$) for the other.

Each dimeric $\{Mo_2O_6\}$units are shown to exhibit absorption bands corresponding to both Mo^{5+}-to-Mo^{6+} intervalence charge-transfer and the photoreduction of Mo^{6+} ($4d^0$) into Mo^{5+} ($4d^1$). The photo response of these two absorption bands can be tuned according to the hydrogen bonding interactions between the organinoammonum groups and the bimetallic anion leading to significantly different photochromic behaviors (white to blue vs white to pinkish-purple).

So we believe this diversity in photochromic behaviors could be extended to other polycarboxylate bimetallic types built.

X-ray diffraction and spectroscopic analyses of both compounds were used for structural characterize these. These complexes also exhibit excellent photochromic and electrochemical properties, allowing them to change colour under the influence of solar or ultraviolet radiation. These fascinating properties open up numerous possibilities in the field of optics.

S1C13.

Extrusion processing of sorghum grain (whole and decorticated) used as ingredients for breads, biscuits and arraw

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Decorticated sorghum grain (DSG) and whole sorghum grain (WSG) are often used as thick and thin porridges. In order to add more value to products made from sorghum grains, extrusion technology was developed using a single-screw extruder designed at Purdue University. Extruded DSG and WSG flours were tested as ingredients in breadmaking (15 to 30% incorporation), fast-cooking arraw (rolled flour) (87 to 93% extruded DSG), and biscuits (20 to 70% extruded WSG). Hydrocolloids were added to arraw formulations. No significant differences were found between the extruded DSG and WSG incorporated flours at 15 to 30% in breadmaking, and were comparable to 100% wheat flour bread. For arraw, extruded DSG with maltodextrin and gum Arabic gave high yield of granule formation (2 and 4 mm sieved) compared to traditional. Cooking time for 4 mm granules was reduced from 37 to 10 min with extruded DSG. For 2 mm granules, reduction was from 25 to 6 min. Sensory data showed WSG-

incorporated bread and fast-cooking arraw were highly acceptable by consumers. Biscuits made with 30% of extruded WSG showed good functional properties and sensory attributes compared to the control 100% wheat flour. Extruded sorghum flours have high potential for new innovative products.

Keywords: Sorghum grain, Extruded decorticated sorghum grain (DSG), Extruded whole sorghum grain (WSG), Fast cooking time, Maltodextrin, Arabic Gum.

S1C14.

Synthesis and characterization of six new binuclear complexes of transition metals involving manganese, iron, cobalt, copper, nickel, and zinc with the ligand N'1,N'4-bis(1-(pyridine-2-yl)ethylidene)succinohydrazide

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The interaction of transition metal ions with functionalized ligands is one of the most attractive and potentially useful areas of coordination chemistry [1]. Coordination chemistry of transition metals has attracted great interest in various fields of science and technology [2]. Ligands containing a hydrazone unit have been particularly studied in recent years, due to their interesting intrinsic properties and their significant chelating capacity [3]. These Schiff bases can chelate different metal ions forming mononuclear, polynuclear or heteropolynuclear complexes. Dihydrazone ligands that are characterized by the presence of two hydrazonic groups linked by a spacer constitute good polydentate chelating agents that can present in several conformations to encapsulate metal ions, generating compounds with particular properties [4].

Our team has already synthesized and studied the structure of several compounds derived from hydrazonic ligands . Therefore, in the continuity of our research work on transition metal complexes, we have synthesized a new dihydrazone ligand whose two arms are connected by a flexible spacer of type –(CH2)4–. This ligand (N'1,N'4-bis(1-(pyridin-2-yl)ethylidene) succinohydrazide), obtained by reacting succinohydrazide and 2-acetylpyridine previously dissolved in methanol, enabled the preparation of six transition metal complexes (Mn, Fe,Co, Ni, Cu, and Zn). The synthetized compounds have been investigated by elemental analysis, FTIR and UV-visible spectroscopies, molar conductance and room temperature magnetic moments measurement. Octahedral geometries are proposed for all the complexes formulated as $[(ML)_2]$. nH2O. The structure of the Ni(II) complex is confirmed by X-ray crystallography study.

Références :

1. Yang Y, Wang Y, Gou Q, Zhang Y, Wu Y, Luo Y. Synthesis of thiophene Schiff base functionalized UiO-66 for enhanced Cu(II) ion adsorption capacity and selectivity. J. Solid State Chem. 2024;332:124599.
2. Shatir TM, Aly KA, Ebrahium MM, Saddeek YB, Kumar ER. Linear and non-linear optical and dielectric properties of transition metals complexes films derived from Azo-Schiff base for photovoltaic applications. J. Mol. Liq. 2024;401:124636
3. Adam MSS, Abdel-Rahman OS, Makhlouf MM. Metal ion induced changes in the structure of Schiff base hydrazone chelates and their reactivity effect on catalytic benzyl alcohol oxidation and biological assays.J. Mol. Struct. 2023;1272:134164
4. Danilescu O, Bourosh P, Kulikova OV, Chumakov YM, Bulhac I, Croitor L. Dihydrazone Schiff base ligands – appropriate chemosensors for Cd(II) detection. Inorg. Chem. Commun. 2022; 146:110199.

S2C14.

Physicochemical Analysis, Antifungal, Antimicrobial and Antiplasmodial Activities of Azadirachta indica and Andrographis paniculate Bitters obtained by fermentation.

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Fermentation of medicinal plants can be used as an effective new route for sustainable drug and medicine production in developing world. Leaves of *Azadirachta indica* (dogoyaro or neem) and *Andrographis paniculate* (vinegar or king of bitter) were fermented using *Saccharomyces cerevisiae* to give 10% alcohol bitters. Two new products called Aza bitters and Aphis bitters were obtained from *Azadirachta indica* and *Andrographis paniculate* leaves respectively. Comparative analysis of Physicochemical concentration, Antifungal, Antimicrobial and Antiplasmodial activities of Aza, Aphis and Alomo bitters (commercial bitters) were carried out. Essential minerals and major secondary metabolites were observed. The bitter level of Aza and Aphis bitters were higher compared with the commercial Alomo bitters. Manganese, copper and selenium were higher in Aza and Aphis bitters than Alomo bitters. Antimicrobial and antifungal activities of the three bitters showed Alomo bitters to exhibit highest positive interaction with *Pseudomonas sp.* and *Staphylococcus sp.* while Aphis bitters exhibited the highest positive interaction with *E. coli.* Similarly, Aphis bitters is the only bitters that exhibited positive activity with the fungi *Candida sp.* while Aza bitters showed the least antifungal and antimicrobial activity against the pathogens (*E. coli., Pseudomonas sp., Staphylococcus sp, and Candida sp).* Antiplasmodial activities are of the order *A. indica* > Alomo bitters > *A. paniculata.* It is worthy of note that this approach is GREEN and inexpensive since no harmful chemicals were used or generated; and no unusable by-product generated during the process.

Key words: Phytochemicals, green, bitters, *Saccharomyces cerevisiae,* antifungal, Antiplasmodial and antimicrobial.

S2C15.

Comparison of two methods for extracting total alkaloids from *Anogeissus leiocarpus* for antibacterial and antioxidant purposes

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The hypersecretion of free radicals causes a number of diseases such as Parkinson's, Alzheimer's and premature ageing. Similarly, the massive and abusive use of synthetic antibiotics leads to the development and appearance of resistance. To find new active ingredients with antioxidant and antibacterial activity, chemists are exploring several avenues and different sources. Plants are a major source of natural products with high pharmacological potential. Among the families of natural substances, alkaloids represent a group with great potential in terms of biological activities.

The aim of this study was to compare two extraction methods for the total alkaloids present in the leaves and bark of *Anogeissus leiocarpus*. This study also assessed the antioxidant and antibacterial activities of total alkaloid extracts. The two extraction methods are carried out in alkaline and aqueous media respectively. Both methods begin by preparing the crude extract with dichloromethane or methanol beforeproceeding with the actual extraction of the total alkaloids.

The antioxidant activity of total alkaloids was assessed using the DPPH method.The sensitivity of strains to alkaloid extracts was determined using the diffusion technique in agar medium. The antibacterial activity of the alkaloid extracts was assessed by determining the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC

In an alkaline medium, the results showed that the leaves were richer than the bark, with extraction rates of 1, 333% and 1% respectively. The same observation was made using the alcoholic extraction method, which showed that the leaves were richer than the bark, with extraction rates of 0.833% and 0.666% respectively. For both methods used, the total alkaloids were extracted in the form of free bases.

In the end, the alkaline extraction method showed the best extraction rate compared with the alcoholic extraction method.

The results of the DPPH antioxidant activity assay of total alkaloid extracts from *Anogeissus leiocarpus* showed that the bark extract was active with an estimated 50% inhibitory concentration (IC50) of $2.2073.10^{8}$ mol/mL. However, the leaf extract was devoid of activity. The reference used (ascorbic acid) showed the best activity with an IC50 of 0.093 mg/mL. For the measurement of antibacterial parameters (MIC and CMB), the alkaloid extracts from the leaves and barks showed the same MIC values (3.125 mg/mL) for the germs tested (*Escherichia coli*, *Staphylococcus aureus*).

The BMC results for the leaf and root extracts were the same for *E. coli*. However, the leaf and root extracts did not give a BMC for *Staphylococcus aureus*. It should be noted that the determination of MIC and BMC revealed a bacteriostatic effect of these extracts on the different strains tested with PA > 4.

Key words: *Anogeissus leiocarpus*, alkaloids, antioxidant activities, antibacterial activities

S2C16.

Flavone c-glycoside and a new tannin isolated from the leaves of *Neocarya macrophylla* (Sabine) prance (Chrysobalanaceae)

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The leaves of *Neocarya macrophylla* are used in the treatment of various diseases. The aim is to isolate these active ingredients. The methodology adopted consists of extractions, purifications and characterizations. The phytochemical study of its leaves led to the isolation of a new tannin, 1-O-galloyl-6-O-luteoyl R-glucose and Isoorientin. Their structures were isolated and characterized using a combination of centrifugal partition chromatography (CPC), NMR spectroscopy (1D and 2D) and mass spectrometry (ESI-MS). This study represents the first phytochemical examination of N. macrophylla leaves. These isolated compounds will be the subject of a biological study.

Keywords: *Neocarya macrophylla*, tannin, flavone C-glycoside.

References

1. Yusuf AJ, Abdullahi MI, Haruna AK, Idris AY, and Musa AM. Preliminary Phytochemical Screening, Toxicological and Antivenin property of the stem bark of Neocarya macrophylla on Naja nigricollis venom. African J. Sci. Technol. Innov. Dev, ***2015****; 7(1): 6–10.*
2. Yusuf AJ, Abdullahi MI, Muhammad A, Ibrahim KG. Neocarya macrophylla (Sabine) Prance: Review on Taxonomy Ethnobotany, Phytochemistry and Biological Activities. Preprints, ***2021****; 1-13.*
3. Mohamed D, Tidjani A, Gbago O, Khamis AO, Xiao QZ and Qing ZJ. Physicochemical properties of refined and unrefined oils of gingerbread plum (Neocarya macrophylla) kernels from Guinea and Niger. Int. J. Adv. Agric. Res, ***2017****; 5: 29-39.*

S2C17.

Evaluation of the anti-HIV activity of triazenes

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The human immunodeficiency virus (HIV) is an RNA virus (like the influenza virus or coronaviruses). To date since the start of the epidemic, 84.2 million people have been infected with HIV and 40.1 million people have died (1). HIV/AIDS remains a major public health problem, especially in African regions (1). Current treatments do not completely eradicate HIV infection but aim to keep people infected with HIV healthy for as long as possible (2). However, in recent years, strong resistance of viruses to antiretroviral drugs has been observed, which making treatment of these infections difficult (3). Thus, the discovery of new innovative molecules with few side effects becomes a health emergency.

The objective of this study is to synthesize triazene derivatives and evaluate their anti-HIV activity.

The triazenes tested were obtained by the diazocopulation method. A screen was performed to measure the anti-HIV activity of the compounds at concentrations of 3.13-100 µM and cytoxicity was measured by flow cytometry using THP-1 cells.

A series of 54 triazenes was obtained, including 40 in aqueous medium and 14 in organic medium with yields ranging from 12 to 97%. An interesting anti-HIV activity was noted for compounds 41, 53 and 37 with EC_{50} of 9.1 µM, 11.8 µM and 13.7 µM respectively and low cytotoxicity with low percentages of necrotic cells (PI+) of 4.76%, 3.93% and 11.7% respectively.

This study made it possible to identify compounds 41, 53 as Lead to access new anti-HIV compounds. These triazenes can also be tested on other RNA viruses such as the Zika Virus.

Keywords: triazene, anti-HIV, EC_{50}

1. Bassandja, Ossinga and al. epidemiological, clinical and therapeutic profile of hiv-infected patients under antiretroviral treatment in kisangani, democratic republic of congo. Mali Medical (2023); 38(2).
2. Ho DD. Outlookseries: host/pathogen interactions. Dynamics of HIV-1 replication in vivo. J Clin Invest. June 1, 1997;99(11):2565-7.
3. Peytavin Get al. Single-daily antiretrovirals: pharmacological development. J Anti-Infect. Sep 1, 2014;16(3):137-43.

S2C18.

Phytochemical screening and evaluation of the antioxidant activity of the hydro-ethanolic extract of *Vachellia seyal* Del root bark. (Fabaceae)

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Vachellia seyal Del., formerly called *Acacia seyal*, is a thorny plant of the Senegalese flora. Infusions of bark from its roots are used to cure dysentery and gastrointestinal pain.

The aim of this study was to determine the main chemical families present in the hydro-ethanolic extract of *Vachellia seyal* trunk bark and to evaluate the antioxidant activity of the extract and its fractions.

Phytochemical screening was carried out using the tests described by Bassène (2012). These are mainly color reactions and precipitation tests carried out on test tubes. As for the evaluation of the antioxidant activity, it was carried out by an anti-radical method called the ABTS test.

The $ABTS^{\bullet+}$(2,2'-azinobis-3-ethylbenzothiazoline-6-sulfonic acid) radical, with a blue-green color, is reduced to ABTS, in the presence of antioxidant compounds. This results in discoloration of the radical and the intensity of which is measured with a spectrophotometer at 734 nm.

The characterization reactions carried out on the hydro-ethanolic extract of *Vachellia seyal* root bark revealed the presence of polyphenols, flavonoids, condensed tannins, saponosides, sterols and triterpenes. The evaluation of the antioxidant activity of the extract and its fractions, by the ABTS test, showed that the ethyl acetate fraction (EAF) was more active than the hydro-ethanolic extract (HEE) with respective IC_{50} of 1.2 ± 0.11 µg/ml and 1.63±0.10 µg/ml. The other fractions (dichloromethanic fraction : DF and methanolic fraction : MF) had IC_{50} of 10.84±0.26 µg/ml and 2.14±0.14 µg/ml.

The bark of Vachellia seyal has good antioxidant activity. This activity could be due to certain chemical groups highlighted in its bark such as polyphenols.

S2C19.

Chemical composition and antifungal activity of essential oils of *Cyperus articulatus*, *Cyperus rotundus* and *Lippia alba* against *Aspergillus flavus* isolated from peanut seeds in Senegal

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Aspergillus flavus is a pathogenic fungus that affects and contaminates several foodstuffs and is associated with cancer in humans. In Senegal, significant losses in peanut production are mainly due to contamination caused by this species. This study evaluated the in vitro antifungal activity of essential oils of *Cyperus articulatus*, *Cyperus rotundus* and *Lippia alba* against *A. flavus* isolated from peanut seeds.

The essential oils obtained by hydrodistillation of the rhizomes of the two *Cyperus* species and the leaves of *L. alba* were analyzed by GC/DIF and GC/MS. For antifungal activity, mycelial growth was monitored in all culture dishes by daily measurements of fungal colony diameter using a graduated ruler. After 7 days of culture, the inhibition rate (IR) of mycelial growth was calculated

The essential oil yields of *C. articulatus*, *C. rotundus* and *L. alba* were 1.1%, 1.3% and 1.7%, respectively. These three samples presented the following chemotypes: (i) Mustakone (21.4%)/eudesma-4(15)-7-dien-1β-ol (8.8%)/caryophyllene oxide (5.9%), (ii) caryophyllene oxide (25.2%)/humulene epoxide 2 (35.0%) and (iii) geranial (46.6%)/neral (34.6%). All three oils tested inhibited the growth of

A. flavus at concentrations between 100 and 1,000 ppm. *L. alba* essential oil was the most effective with total inhibition of *A. flavus* on PDA. For *C. rotundus* (93.65%) and *C. articulatus* (78.11%) essential oils, the highest inhibition rates were obtained with a dose of 1000 ppm.

L. alba essential oil could be safely used as an effective peanut protectant against *A. flavus*.

Keywords: Essential oils, *Aspergillus flavus*, antifungal activity

- **President:**
- **Prof. Aliou Hamady Barry**

S2C21.

Removal of the β-blocker bisoprolol fumarate from waters by the electro-Fenton treatment

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In recent years, the presence of pharmaceutical residues in the environment has raised significant concerns about their potential risks for the ecosystem and human health. Among these compounds, cardiovascular drugs such as β-blockers are increasingly detected in the environment. This is mainly due to their widespread use in the treatment of cardiovascular disorders such as hypertension, cardiac arrhythmias and myocardial infarction. These compounds enter the environment through human excretion from household and hospital wastes and inadequate disposal in wastewater treatment. The β-blockers are ineffectively removed by conventional technologies and can be detected in low concentrations in surface water, groundwater, and even in drinking water. This work focuses on applying a process electro-Fenton (EF) process to the removal of β-blocker bisoprolol fumarate (BF) from water. At first, the main experimental parameters affecting the efficiency of the EF process, namely applied current intensity, Fe^{2+} catalyst concentration and type of anode (Pt and BDD) were evaluated and optimized. It is shown that BF and its products may be effectively degraded by the $^{\bullet}OH$ radicals produced by the reaction between the Fe^{2+} ions and H_2O_2. Oxidative degradation and mineralization kinetics were monitored by chromatographic analysis (HPLC) and total organic carbon (TOC) measurements. The electrochemical degradation of bisoprolol by hydroxyl radicals followed a pseudo-first-order reaction kinetics with an absolute rate constant kabs of 7.25 $x10^9$ $M^{-1}.s^{-1}$. Optimum degradation was obtained at 200 and 500 mA after 15 min of electrolysis, respectively, for Pt and BDD anodes. The optimum mineralization rate (98% TOC) was obtained with BDD anode at 500 mA, after 6 h of electrolysis. A relatively low energy consumption of 7 kWh ($gCOT^{-1}$) is obtained with the BDD anode after 6 h of electrolysis. The EF process with BDD electrode demonstrated promising prospects during this study and will be applied in future work to the treatment of wastewater in WWTPs containing residual β-blockers.

Keywords: Electro-Fenton; Bisoprolol; Hydroxyl radicals; Degradation; Mineralization

S2C22.

High sensitivity on-site early warning system monitoring of antibiotics by spectrofluorimetric method: Environmental and biological application

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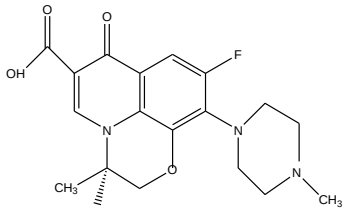
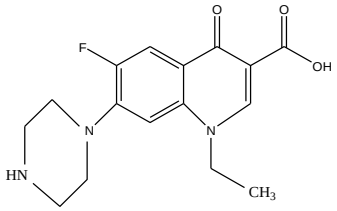
Antibiotics are widely used in agriculture [1], animal husbandry [2], aquaculture [3], pharmaceutical industries [4]. There is therefore a potential risk as an emerging pollutant in soil, water and food quality. Once they are excessively residual, they harm human health and the ecological environment throughout the food chain and ecological cycle [5]. Faced with these threats, compliance with maximum residue limits is essential and requires laboratories to have sensitive analytical methods for the detection and quantification of antibiotics in different matrices. It is this context that justifies our work which consists of developing a new high-sensitivity early warning system (HSEW) for the determination of ofloxacin (OFL) and norfloxacin (NOR) by fluorescence. We obtained a linear calibration range of 0 to 3700 ng.mL^{-1} with detection limits of 22.3 ng.mL^{-1} for ofloxacin and 9.6 ng.mL−1 for norfloxacin. An average recovery of 98.6% for OFL and 101.1% for NOR shows that the method is accurate, furthermore a standard deviation of 1.96% for OFL and 2.49% for NOR shows that the method is reproducible. These results show that HSEW can be used for routine analysis of antibiotics in biological fluids and natural waters.



Norfloxacine



Ofloxacine

Keywords: *fluorescence, antibiotics, dosage, standard addition method.*

References

1. Lipsitch M, Singer R S, Levin B R, Antibiotics in agriculture: when is it time to close the barn door, Proceedings of the National Academy of Sciences of the United States of America, 99 (2002) 5752-5754. *http://dx.doi.org/10.1073/pnas.092142499*.
2. Pitarch A, Gil C, Blanco G, Oral mycoses in avian scavengers exposed to antibiotics from livestock farming, Sci. Total Environ., 605-606 (2017) 139-146.
3. Liu X, Lu S, Meng W, B Zheng, Residues and health risk assessment of typical antibiotics in aquatic products from the Dongting Lake, China "Did you eat "Antibiotics" today?", Environ. Sci. Pollut. Res., (2017) 1-9. *https://doi.org/10.1007/s11356-017-0745-0*.
4. Dixit S, Park J H, Application of antibiotics as chiral selectors for capillary electrophoretic enantioseparation of pharmaceuticals: a review, Biomed. Chromatogr., 28 (2014) 10-26. *https://doi.org/ 10.1002/bmc.2950.*
5. Sungpyo Kim, Aga D, Potential Ecological and Human Health Impacts of Antibiotics and Antibiotic Resistant Bacteria from Wastewater Treatment Plants, J. Toxicol Environ Health B Crit Rev., 10 (2007) 559-573. *https://doi.org/10.1080/15287390600975137*.
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S2C23.

Analysis of soil pollution by lead in automobile garages (mechanical and road) in Dakar

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Heavy metals are a major problem for human health because they are toxic, do not biodegrade and persist for long periods in soils **[1]**. Lead poses a real danger in the current state of soil contamination in automobile garages. The regular handling of chemical substances such as engine oils, brake fluids, solvents, paint, etc. and the intensification of vehicle repair activities are increasing the concentration of lead naturally present in soils. These lead levels can dissolve and seep into groundwater, contaminating water from wells and taps water intended for human consumption. The upper limit for lead content in water is 15µg/L, according to the US Environmental Protection Agency (US EPA) **[2]**. Above this limit, children are the most vulnerable to exposure. Hence the urgent need for rigorous quantification of this metallic trace element in the soil of car garages. Sampling was carried out in eight different garages, including five bus stations and three mechanical workshops. A composite sample was taken from each site and analyzed to quantify lead content using X-ray fluorescence spectrometry (XRF). The XRF apparatus provided the results of the elemental analysis of each sample in ppm. These results highlighted the existence of trace metals such as lead (Pb), copper (Cu), chromium (Cr), zinc (Zn) and arsenic (As), and other less toxic metals such as iron (Fe), molybdenum (Mo), zircon (Zr), sulphur (S) and tin (Sn). A comparative study of the levels found shows a heterogeneous distribution of lead in the soils of the garages, with values ranging from 36.62 to 53.26 ppm. Levels are higher in the soil of mechanical garages than in the soil of bus stations, with a few exceptions. The site of greatest concern (S4) has a maximum lead content of 53.26 ppm, which does not exceed the alert level of 400 ppm allowed for soils by the US EPA. Currently, soils don't pose (present) a significant health risk to adults; however, long-term exposure could adversely affect children living near these areas.

Key words: lead, pollution, soil, garage, X-ray fluorescence.

Reference

[1] G. Qin, Z. Niu, J. Yu, Z. Li, J. Ma, P. Xiang, Soil heavy metal pollution and food safety in China: Effects, sources and removing technology, *Chemosphere*, **267** (2021) 129-205. https://doi.org/10.1016/j.chemosphere.2020.129205.

[2] R. Pitt, S. Clark, K. Parmer, Potential groundwater contamination from intentional and no intentional stromwater infiltration, *Springfiel (USA) : U.S. Environnemental Protection Agency*, (1994) 187.

S2C24.

Evaluation of organochlorine pesticides (DDT, DDE, Heptachlor, and Aldrin) in oysters of Soumbedioune beach (Dakar/Senegal) by GC/MSMS.

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Socio-economic activities have led to the dispersion of polluting agents in all compartments of the environment. The latter largely reach the sea by air, water or land. Thus they can alter the balance of its ecosystems due to their harmful properties. In return, these physical, chic or biological entities can reach humans through the food chain. Hence knowledge of these contaminants is necessary. Indeed, in

Senegal, there is little data relating to fishery products, particularly seafood. Hence such work could contribute to good food security but also would allow us to become better aware of the consequences of the destruction of our environment.

In this work the profile of the contamination of Soumbedioune beach by OCPs was studied using gas chromatography coupled with mass spectrometry. The average values of 30,470 ; 149,983 µg/Kg respectively for heptachlor and aldrin are well above the reference 0.1 µg/Kg and the values 4,255 ; 149,98 µg/Kg respectively for DDE and DDT. This is greater than 50 µg/Kg for the last. This shows that there is a real environmental and health problem that exists on this Dakar coast. Faced with such a situation, it is appropriate to set up wastewater treatment plants and ensure compliance with the ban on these products dangerous to health.

Consequently, awareness on the part of decision-makers, populations and industrialists could probably lead to solutions.

Keywords: Oysters, OCPs, Contamination, Soumbedioune Beach

References

Anastassiades.M, Lehotay.S.J, Stajnbaher.D, Schenck.F.J, Fast and easy multiresidue method employing acetonitrile extraction/partitioning and "dispersive solid-phase extraction" for the determination of pesticide residues in produce, Journal of AOAC international (2003) 86, 412-431.

Cheikh Tidiane Dione, Olivier Delhomme, Ibrahima Diagne, Cheikhna Diebakate, Birame Ndiaye, Dame Cisse, Maoudo Hane, Mame Mor Dione, Sitor Diouf, Abdoulaye Diop, Momar Ndiaye & Maurice Millet (2022) Application of the QuEChERS method for the determination of pesticides, PAHs and PCBs in fish in Senegal, Journal of Environmental Science and Health, Part A, 57:10, 869-879.

EC, 2017. European Commision Directorate General for the Health and Food Safety SANTE/11813/2017, Guidance Document on Analytical Quality Control and Method Validation Procedures for Pesticide Residues and Analysis in Food and Feed. Retrieved from: https://goo.gl/8qC4DY

S2C25.

Study of contamination by triazine herbicides in phosphate sludge storage basins, reclaimed as farmland in the Niayes area of Mboro (Senegal)

Mame Mor Dione, Sitor Diouf , Cheikh Tidiane Dione, Birame Ndiaye, Ibrahima Diagne, Dame Cisse, Maoudo Hane, Seydou Ba, Oussmane Ka, Modou Sarr, Momar Ndiaye

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Herbicides have been widely used in agriculture for many years to control weeds. Triazines are one group of herbicides. Their degradation products are mobile and soluble in water, and can be strongly adsorbed to soil. They are highly toxic and a source of concern in terms of environmental safety. Open-pit mining of the Taïba phosphate mines by Industries Chimiques du Sénégal (ICS) leaves deep basins on the mined sites. Downstream, these basins serve as storage areas for phosphate sludge from the phosphate ore beneficiation process. This highly fertile farmland is used by over 2,000 local farmers of all kinds. In such a context, it is essential to study the evolution of the behavior and fate of herbicides in the soil of the ponds. In this study, levels of three herbicides (atrazine, terbutryne and cybutryne) were determined using the QuEChERS method coupled with GC-MS/MS in soil from four of these basins (B9, B10, B11and B17), as well as in cabbage harvested from basin B11. In the soil and cabbage samples, the mean levels of atrazine and cybutryne were very low, ahead of terbutryne. The order of abundance was the same in both matrices. However, levels were much higher in cabbage. This proves that these three banned pesticides are still being applied in the fields. At the 0.1% significance level, basins B9 and B17, cultivated only during the rainy season, were strongly correlated. The same applies to basins B10 and B11, cultivated in all seasons. The sum of the concentrations of the three herbicides (0.0328 mg/kg) in cabbage is very low compared with the tolerable value for triazine herbicides (0.25 mg/kg) required by the Environmental Protection Agency (EPA) for most agricultural products. This study quantified the

levels of three triazine herbicides in soil and cabbage, and understood their behavior in terms of physico-chemical characteristics and fate in phosphate sludge storage ponds, converted to agricultural land.

Keywords: triazine herbicide, phosphate sludge pond, farmland, QuEChERS method, GC-MS/MS

[1] Q.-X. Zhou et Y.-Y. Gao, « Combination of ionic liquid dispersive liquid-phase microextraction and high performance liquid chromatography for the determination of triazine herbicides in water samples », *Chinese Chemical Letters*, vol. 25, nº 5, p. 745-748, 2014, doi: https://doi.org/10.1016/j.cclet.2014.01.026.
[2] D. J. W. Kathleen A. Lewis John Tzilivakis et A. Green, « An international database for pesticide risk assessments and management », *Human and Ecological Risk Assessment: An International Journal*, vol. 22, nº 4, p. 1050-1064, 2016, doi: 10.1080/10807039.2015.1133242.

S2C26.

Differential pulse voltammetry ZDV biosensor based on silver nanoclay composites modified glassy carbon

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The interest in monitoring of antiretroviral drugs (ARVs) pharmacokinetics in the field of human immunodeficiency virus (HIV) has increased in the past years. Therefore, biosensor for the detection of zidovudine (ZDV) was developed, based on silver nanoclay composites (AgNCs) film on glassy carbon electrode (GCE). The dropcoating of human serum albumin (HSA) on modified GCE was part of the optimum conditions of fabrication, with 15 minutes drying time. Moreover, procedural optimum conditions of GCE/AgNCs/HSA sensor with differential pulse voltammetry (DPV) in 1 M PBS, pH 7.04 were -0.4 V to -1 V potential range, 0.0405 V step potential, 0.075 V modulation amplitude, 0.01 second modulation time and 0.25 second interval time. The redox properties of GCE/AgNCs/HSA were studied with cyclic voltammetry (CV) with varied scan rates using Randles-Sevcik equation, where diffusion coefficient (D) was calculated as 1.55×10^{-11} $cm^2.s^{-1}$ and heterogeneous rate constant (Ks) which was 3.40×10^{-6} $cm.s^{-1}$, with two electron transfer process. Subsequently, linear range from 0.12 to 6.98 µM, low limit of detection (LOD) of 0.3 µM and 1.0 µM limit of quantification (LOQ) was obtained with acceptable %RSD for reproducibility and repeatability through reference standard analysis. The sensor was tested for stability over a period of 10 days and was unaffected by the presence of interferences. In analysis of real sample, the sensor was applied in ZDV commercial tablets and was able to detect ZDV successfully.

Keywords: Zidovudine, human serum albumin, silver nanoclay composites, biosensors

President:

- **Prof. Ousmane Diouf**

S2C27.

Promoting Green chemistry in Africa for more Food Security and sustainable agriculture

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Food, health, clean and clean low-cost energy for sustainable development are among the main challenges of the 21st century. Africa, due to its enormous agricultural, land and demographic potential, its biodiversity and its ability to take on these challenges, both on the continental and world stage, is committed to tackling these major challenges that are often referred to in country programmes as well as those of community organizations and development partners. In this presentation on Senegal's agricultural sector four promising fields of application show the benefit of green chemistry for : (i) the development of natural insecticides from local plant species, (ii) analysis of pesticide residues in water, soil, agricultural products and monitoring of agricultural treatments, (iii) the valorization of agricultural residues and wastewater treatment as bio-fertilizers, (iv) the production of energy from invasive weeds, other endogenous plants and livestock residues. These needs, which are widely shared on the continent, justify the need for elaborating international collaborative priority programs in green chemistry designed to reinforce Africa's capacities in infrastructure and equipment, train of human resources, and build multidisciplinary teams and the mobilization of substantial funding for their execution.

Keywords: Green chemistry, Africa, bio-pesticides, bio-fertilizer, agriculture, food security, pesticide residues, green energy.

S2C28.

Supramolecular solvent-based liquid phase microextraction of sulphonamides in tomato juice followed by high performance liquid chromatographic: Assessment of the Greenness Profile Using Analytical Eco-scale, AGREE, and AGREEprep.?

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A supramolecular solvent-based microextraction procedure was developed for the extraction of four sulphonamides antibiotics (Sulfaguandin, sulfacetamide, sulfadimidin, and sulfadoxin) in tomato juice before detection using high performance liquid chromatography equipped with a diode array detector (HPLC-DAD). In this study, a supramolecular solvent composed of water, tetrahydrofuran, and 1-undecanol was used as the extraction solvent. The supramolecular solvent was added to the sample solution at µL level and the obtained mixture was vortexed. In this step, the analytes moved from the sample solution into the extraction solvent. Parameters such as type and volume of extraction solvent, effect of pH, and effect of sample volume were optimized. The optimal conditions resulted in linearity in the concentration range of 1-10 µg mL^{-1}, with regression coefficients ranging from 0.9983-0.9994. The limit of detection ranged from 0.21-0.31 µg 0.19-0.67 µg mL^{-1} and the limit of quantification ranged from 0.57-2.03 µg mL^{-1}. The Intra-day repeatability expressed as % RSD was 0.24-1.76%. The environmental

impact of the proposed method was assessed by three metric tools: Analytical Eco-scale, AGREE, and AGREEprep. When comparing all the metric tools, only the Analytical Eco-scale tool qualified the proposed method as green.

Keywords: Supramolecular solvent, sulphonamides, HPLC, Greenness assessment.

S2C29.

(E)-4-arylidenedihydrofuran-2, 3-diones and (E)-1-benzyl-4-arylidenepyrrolidine-2,3-diones as new electrophiles in enantioselective organocatalyzed Michael additions

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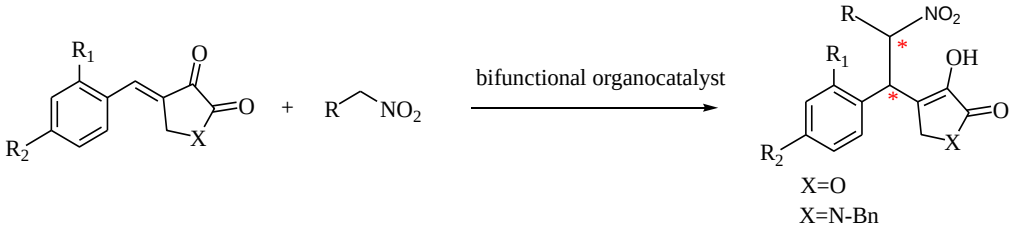
Research towards organocatalytic enantioselective methodologies to access enantioenriched molecules has received much attention in the last ten years[1] and have many advantages in terms of efficiency, selectivity and environmental benefits.

In this context, we became interested in the challenging reactivity of 1,2-dicarbonyl compounds as pronucleophiles in organocatalyzed transformations as only few examples have been reported so far.[2] Although underexploited in comparison to their 1,3-dicarbonyl homologues,[3] the presence of adjacent multiple reactive centers allows the selection of specific activation modes to enhance the reactivity of these important ambident pronucleophiles. Hence, we successfully developed the first enantioselective organocatalyzed Michael additions of 1,2-ketoamides and 1,2-ketoesters on nitroalkenes with excellent stereoselectivities and very good yields.[4]

To further exploit the synthetic potential of 1,2-dicarbonyls in organocatalysis, we plan to investigate the reactivity of nitroalkanes with little studied (E)-4-arylidenedihydrofuran-2,3-diones[5] and (E)-1-benzyl-4-arylidenepyrrolidine-2,3-diones[6] as electrophiles in enantioselective Michael additions with bifunctional organocatalyst to create up to two stereogenic centers.



[1] (a) Enantioselective Organocatalysis : Reactions and Experimental procedures, Ed. P. I. Dalko, *Wiley, Weinheim*, **2007**. (b) D. Enders, C. Grondal, R. M. Hüttl, *Angew. Chem. Int. Ed.* **2007**, *46*, 1570.
[2] (a) W. Raimondi, D. Bonne, J. Rodriguez, *Angew. Chem. Int. Ed.* **2012** , *51*, 40. (b) W. Raimondi, D. Bonne, J. Rodriguez, *Chem. Commun*. **2012**, *48*, 6763.
[3] (b) D. Bonne, Y. Coquerel, T. Constantieux, J. Rodriguez, *Tetrahedron: Asymmetry* **2010**, *21*, 1085.
[4] (a) O. Baslé, W. Raimondi, M. M. Sanchez Duque, D. Bonne, T. Constantieux, J. Rodriguez *Org. Lett.* **2010**, *12*, 5246. (b) W. Raimondi, O. Baslé, D. Bonne, T. Constantieux, J. Rodriguez, *Adv. Synth. Catal.* **2012**, *354*, 563.
[5] H. Zimmer, M. J. Manning, M. Ventura, A. Amer and A. M. El Massry. *J. Heterocycl. Chem.* **1986**, *23*, 199
[6] X. Chen, L. Zhu, L. Fang, S. Yan, J. Lin, *RSC Adv.* **2014**, *4*, 9926.

S2C30.

Application of green adsorbent in the removal of malachite green from wastewater: Isotherm, kinetics, and toxicity studies

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The abundance of Malachite green (MG), a cationic dye, in the environment is inevitable due to its widespread application in in the textile industry, and in poultry farming as an antiseptic. As useful as it is, it's accumulation in the environment poses a threat to both flora and fauna. In this study, *Moringa oleifera* seed husk (MOH), an agrowaste, was prepared and used to remove malachite green singly and in the presence of methylene blue (MB), from wastewater. MOH was prepared and characterized using Fourier Transform Infrared, Scanning Electron Microscope and pH_{pzc}. Equilibrium data was collected through batch adsorption system at different conditions such as sorbent dosage, initial MG concentration, contact time, pH and temperature. The isotherm, kinetics and thermodynamics of the process were also studied. Toxicity test was carried out on the residual solution using *Allium cepa*, and the effective concentration at 40% (EC_{40}) was calculated. It was revealed that the surface of MOH was rough, porous in nature, and comprises of some functional groups that favor the removal of malachite green through adsorption. It was also observed that the removal process was dependent on the varying experimental conditions. The isotherm followed Freundlich model in the single system while in the binary system it conforms with Langmuir model. The maximum adsorption capacity of MOH for MG in binary system (13.05 mg/g) was higher than that of single system (1.45 mg/g). The Pseudo-second order model explains the kinetics of the process in both systems. The process was feasible, spontaneous and endothermic. The EC_{40} of MG solution was 12 mg/L before treatment and upon treatment becomes 23 mg/L. MOH can effectively decolourise and detoxify wastewater containing Malachite green..

Keywords: Malachite green, agrowaste, Moringa oleifera, Methylene blue, Allium cepa, Freundlich, Langmuir

S2C31.

Plant Nanofactory: Toward green synthesis of inorganic nanoparticles

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The unique morphological (shape, size, and charge distribution) and physicochemical properties of nanomaterials lead to considerable differences in mechanical properties, melting point, optical absorption, thermal, electrical conductivity, biological, and catalytic activities. As such, synthesis of nanoparticles has underpinned great interest due to their novel properties as compared to their bulk counterparts. "Green" synthesis has gained extensive attention as eco-friendly method for synthesizing a wide range of materials/nanomaterials including metal/metal oxides nanomaterials, hybrid materials, and bioinspired materials. As such, green synthesis is regarded as a safe, simple, sustainable, and cost-effective alternative tool in comparison with traditional methods of synthesis. In our investigation, we report for the first time the direct synthesis of inorganic ZnS nanoparticles from biological extract of brown algae collected on West Africa seashore. The synthesis mechanism is discussed according the different experimental characterizations (XDR, SEM, TEM, FTIR, HPLC). In this work, we highlight the role of secondary metabolites in the sequestration of atomic Zn prior to nucleation of ZnS nanocrystals. Herein, we enlight the enumerable potential of plants as sustainable intermediates for the synthesis of nanoparticles.

Keywords: Nanoparticles, Macroalgae, Metabolites, biosynthesis, innovative synthesis

CHEMISTRY OF WATER AND ENVIRONMENTAL 2 **S3C32 – S3C37**

- **President:**
- **Prof. Emmanuel Ngameni**

S3C32.

Efficiency of wastewater treatment plants to remove micropollutants in Durban, South Africa

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Wastewater treatment plants (WWTPs) form an integral part of sanitation and water management in order to ensure public health safety. A typical municipal WWTP treats water arising from domestic households, commercial enterprises, and industrial plants. The process steps at the plant entail collecting, treating and purifying wastewater before its release back into the environment. Wastewater was determined to be the source of a number of epidemics and, hence, WWTPs were originally designed to treat pathogens. However, the advent of industrialization and globalization has meant an improvement in general lifestyles that has also impacted on the compounds that accumulate in wastewater. Of particular concern are micropollutants (MPs) derived from metabolized or unmetabolized treatment drugs, electronic equipment (such as flame retardants), personal care products, and pesticides, among others. These compounds can now be easily detected at the ng L^{-1} level due to advances in analytical instrumentation. It has been ascertained that a number of these MPs have endocrine-disrupting properties and, in particular, antibiotics can give rise to antibiotic resistant genes in microorganisms. Their subsequent build-up in the environment poses numerous adverse health and environmental effects. Influent and effluent water from five WWTPs in the eThekwini municipality was monitored daily over a week for a wide range of MPs. This lecture will discuss the findings and removal rates of MPs of concern.

Keywords: Wastewater treatment plants, micropollutants, removal efficiencies

S3C33.

Enhancing Water Resources and Sustainability through Membrane-Based Water Pretreatment using novel flat and tubular microfiltration ceramic membranes made from Moroccan red clay

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Membrane filtration is increasingly used as a separation process in many fields, especially in the water cycle (water purification, effluent treatment, water reuse, softening, desalination...).

The ability to achieve very specific separations, without phase change, at low or ambient temperatures makes membrane filtration a much more cost-effective solution than conventional methods in many applications. [1]

Membrane separation processes fall into several classes. Microfiltration, ultrafiltration nanofiltration and reverse osmosis. These techniques have potential applications in all branches of industry. The advantages of this technology compared to other physicochemical processes are mainly the ease of control of the system and the respect of the environment (the membrane separation does not require the addition of chemicals). [2]

This work aims to synthesis a composite ceramic membrane based on Moroccan red clay. The innovative character of this project is the choice of the ceramic materials used and it's also aims to reduce costs and increase productivity.

The raw clay was characterized in terms of chemical composition (XRF), mineralogical composition (XRD), Thermal analysis (TGA), and spectroscopic analysis (FTIR).

The ceramic membrane was obtained by uniaxial pressing process and sintering. The sintering temperature was investigated in the range of 850 to 1050 °C. The water permeability reached a value of 473.25 L/h.m^2.bar. In addition, the membrane has a mechanical resistance of 27.0 MPa and doesn't present any deformation or linear shrinkage at different temperature.

The performance of prepared membrane was evaluated by frontal microfiltration of industrial wastewater effluents (Textile). Experimental results show that retention of turbidity achieved 97%. The evolution of pH, conductivity and absorbance were also studied.

Keywords: Red Clay; Uniaxial pressing; Ceramic membrane; Microfiltration; Textile effluent.

References:

[1] Ana Catarina Silva, João Nuno Moreira, José Manuel Sousa Lobo, Current Applications of Pharmaceutical Biotechnology - P11- 2020.
[2] Norman N Li, Anthony G. Fane, W. S. Winston Ho Advanced Membrane Technology and Applications 2011.

S3C34.

Evaluation of the use and management practices of fertilizers and pesticides by farmers in the municipality of Sadio (Senegal)

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To reduce losses and increase agricultural yields, farmers, in addition to fertilizers, use pesticides to achieve their objectives. With the absence of recognized commercial companies in the sale of pesticides, growers buy these products in the local market. Most of its farmers are not trained in the management and use of pesticides, so they are often the first to introduce them. To evaluate the management and utilization of its products, a survey of 50 producers in the municipality of Sadio indicates that more than 20 commercial specialities are registered, of which 15 names are known. The most the pesticides are emulsifiable concentrate (EC) and two are granules. This study has shown that 76% of farmers are combined chemical fertilizer and composts and 72% of them are used pesticides for the insects. Used one week by 68% growers, 41.18% of packaging and bottles are discarded in the environment after and 5.88% of containers are brought at home. Despite frequent contact with these toxic products with different symptoms, many producers are not consulted after their campaigns for a health check-up.

Key words: Municipality of Sadio pesticides, fertilizers

References.

Ahouangninou C, Fayomi BE, Martin T, 2011. Évaluation des risques sanitaires et environnementaux des pratiques phytosanitaires des producteurs maraîchers dans la commune rurale de Tori-Bossito (Sud-Bénin). Cah Agric 20 : 216-22. doi : 10.1684/agr.2011.0485.

Charvet, R., Katouzian-Safadi, M., Colin, M.-E., Marchand, P.-A., & Bonmatin, J.-M. (2004). Insecticides systémiques : de nouveaux risques pour les insectes pollinisateurs. Annales Pharmaceutiques Françaises, 62(1), 29–35. doi:10.1016/s0003-4509(04)94278-2

Feng, J., Zhang, Q., Liu, Q., Zhu, Z., McClements, D. J., & Jafari, S. M. (2018). Application of Nanoemulsions in Formulation of Pesticides. Nanoemulsions, 379–413. doi:10.1016/b978-0-12-811838-2.00012-6

S3C35.

Studies, characterization of Mauritanian clays for their use as natural membranes for water treatment

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Aqueous discharges from various activities in the chemical industry may contain heavy metals which are non-biodegradable and toxic pollutants. These ions contained in the wastewater are the most common pollutants in the chemical industry. The presence of these heavy metals constitutes a serious environmental problem, but also a human health problem, because of their tendency to accumulate in the living organism (plant, human and animal organisms) and thus find their way into the human body causing various diseases. Indeed, under certain physico-chemical conditions, heavy metals (Cd (II), Pb(II), Ni(II), Co(II), Cu(II)) become soluble and contaminate natural water sources and their environment.

The elimination of these heavy metals becomes an imperative for the protection of the environment and the health of living beings. Some techniques are already used to remove these metals from water such as: reverse osmosis, chemical precipitation, ion exchange, extraction by solvents, etc. ..... However, adsorption is still the most used method to remove heavy metals from solutions (activated carbon, zeolites, sewage sludge, silica...). Recent studies show that natural clay minerals are widely used for the elimination of these heavy metals by ionic exchange or adsorption, which is why we chose our thesis entitled: Studies, characterization of Mauritanian clays for their use as natural membranes for water treatment.

This work is part of the thesis on the development of Mauritanian clays and their use for the treatment of micropollutants. The proposed clays will first be characterized by different physicochemical techniques (X-ray diffraction, infrared spectroscopy, thermal analysis, chemical analysis, ...). This characterization will allow the selection of the most suitable samples for this type of applications, it was made from several tests such as:

- Adsorption isotherms
- The effects of the quantity of clay and metal for each type of metal and each variety of clay.
- The establishment of retention mechanisms using Langmuir and Freundlich models. A correlation with the clay microstructure will also be performed by scanning electron microscopy observations
- In application, membranes will be established to test their ability to extract metals.

It will be then question to improve their capacities of retention of certain metals (Zn, Cu, Cd, Pb) by these natural Mauritanian clays and to improve their properties by acid activation or by surface modification.

Keys words: Clay, adsorption, heavy metals.

S3C36.

Direct spectrofluorimetric method for analysis of bifenthrin and resmethrin in Senegalese surface and groundwater

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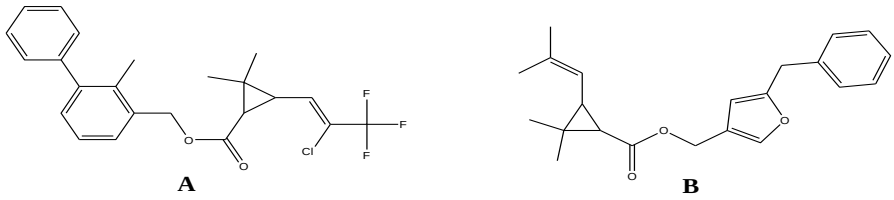
This work examines bifenthrin and resmethrin, two pyrethrinoid insecticides used in the agricultural Niayes area, with a focus on their toxicity and analysis in spiked surface (runoff water) and groundwater (well water). The analytical parameters, including wavelength excitation and emission, pH, and solvent, were optimized. Bifenthrin exhibits one excitation band (213-234 nm) and one emission band at 300-315 nm. However, resmethrin is present in excitation bands localized at 208-227 nm and 232-260 nm, respectively, with an emission band at 283-293 nm. Both pesticides have an optimal pH value of 7. The optimal percentage of methanol in a water-methanol mixture is 80/20 v/v for bifenthrin and 20/80 v/v for resmethrin. The comparison of fluorescence intensity in different solvents shows that the fluorescence intensity is lower in methanol and much higher in water for bifenthrin. However, the fluorescence intensity of resmethrin in water-methanol is 4.9 times higher than in water. Calibration curves ranging from 0.15-7.5 µg mL^{-1} were established in different solvents, and their linearity was evaluated through variance analysis. The regression variance is greater than the residual variance (p-value ≤ 5), indicating a significant regression. Additionally, the lack of fit variance was not significantly greater than the pure error variance (p-value > 5%), which validates the linear model. The precision values were also within acceptable ranges, with daily precision values below 2% and intraday precision values ranging from 1.8 to 4.3%, attesting to the repeatability and reproducibility of the results. The method measurement is highly sensitive, with LOD values ranging from 2 to 33.6 ng mL^{-1} and LOQ values ranging from 6.7 to 112 ng mL^{-1}, depending on the medium and pesticide. The recovery results for the determination of the two pesticides in spiked natural waters were satisfactory, ranging from 92.6-107%.



A **B**

Chemical structure of bifenthrin (**A**) and resmethrin (**B**).

[1]- J. Bae, W. Kwon, The deleterious toxic effects of bifenthrin on male fertility, Reprod. Toxicol. 101 (2021) 74-80.

[2]- H. Park, W. Lee, M. Zang, H. Hong, C. Park, J. Kim, H. Song, Evaluation of Resmethrin Toxicity to Neonatal Testes in Organ Culture Toxicol. Sci. 173 (2020) 53-64.

S3C37.

Synthesis, Spectroscopic, Characterization and X-ray Structures of Lanthanide(III) Complexes derived from 1,5-bis (phenyl(pyridin-2-yl)methylene)carbonohydrazide.

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The use of 1,5-bis(phenyl(pyridin-2-yl)methylene)carbonohydrazide (H_2L) in the coordination chemistry of lanthanides (III) led to the formation of complexes containing two ligand molecules. The

synthesis was carried out with a Ln/H2L ratio of 1/2, thereby obtaining mononuclear complexes such as $[Ln(H_2L)_2(\eta^2\text{-}NO_3)3\text{-}x](NO_3)x$ (with Ln=La (1), Sm (4), Gd (6), and Yb (7)), as well as $[Ln(H_2L)_2(NO_3)_3]$ (Ln=Pr (2), Eu (5)), and a co-crystal of the type $\{[Nd(H_2L)_2(\eta2\text{-}NO_3)_2(\eta1\text{-}NO_3)], [Nd(H_2L)_2(\eta2\text{-}NO_3)(\eta1\text{-}NO_3)(H_2O)]\}.(NO_3).2CH_3OH\}$ (3). The structures of complexes (2) and (3) were determined by X-ray crystallography from single crystals. The use of 1,5-bis(phenyl(pyridin-2-yl)methylene)carbonohydrazide (H_2L) in the coordination chemistry of lanthanides (III) led to the formation of complexes containing two molecules of ligand. In the mononuclear complex of PrIII, two neutral ligand molecules behave as tridentate ligands. The complex with NdIII has one atom coordinated to two neutral tridentate ligands and three bidentate nitrate anions, while the other NdIII atom is linked to two neutral tridentate ligands, one monodentate nitrate, one bidentate nitrate, and one water molecule, with a free nitrate ensuring neutrality. The complex (2) crystallizes in the triclinic space group P-1 with specific parameters. The complex (3) crystallizes in the monoclinic space group P21/c with its own parameters. The coordination geometry of the PrIII atom is described as a distorted icosahedron. In the co-crystal, one NdIII atom is coordinated to eleven positions while the other is coordinated to ten, each having distinct geometries.

Keywords: Schiff Base, Co-crystal, Complex, Lanthanide, Mononuclear

1. R. Ragno, A. Coluccia, G. La Regina, G. De Martino, F. Piscitelli, A. Lavecchia, E. Novellino, A. Bergamini, C. Ciaprini, A. Sinistro, G. Maga, E. Crespan, M. Artico, R. Silvestri, Design, Molecular Modeling, Synthesis, and Anti HIV-1 Activity of New Indolyl Aryl Sulfones. Novel Derivatives of the Indole-2-carboxamide, Journal of Medicinal Chemistry (2006), 49, 3172–3184.
2. V. Palomo, D. I. Perez, C. Roca, C. Anderson, N. Rodríguez Muela, C. Perez, J. A. Morales-Garcia, J. A. Reyes, N. E. Campillo, A. M. Perez-Castillo, L. L. Rubin, L. Timchenko, C. Gil, A. Martinez, Subtly Modulating Glycogen Synthase Kinase 3 β: Allosteric Inhibitor Development and Their Potential for the Treatment of Chronic Diseases, Journal of Medicinal Chemistry (2017), 60, 4983–5001.
3. R. M. Zaki, A. M. Kamal El-Dean, S. M. Radwan, A. S. A. Sayed, Synthesis and Antimicrobial Activity of Novel Piperidinyl Tetrahydrothieno[2,3-c]isoquinolines and Related Heterocycles, ACS Omega (2020), 5, 252–264.
4. Y. Hasegawa, Y. Kitagawa, T. Nakanishi, Effective photosensitized, electrosensitized, and mechanosensitized luminescence of lanthanide complexes, NPG Asia Materials (2018), 10, 52–70.

S4C38.

Isolation and antimicrobial activities of a novel discolornolide and other compounds from *Monanthotaxis discolor*

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Characterisation of a novel discolornolide (**1**) isolated from a first-time investigation of *Monanthotaxis discolor* is described. Other 6 known compounds, karatavin (**2**), N-acetylanonaine (**3**), quercetin-3-O–arabinose (**4**), stigmasterol (**5**), a mixture of stigmasterol and b-sitosterol (**6**) and octahydro-5-isopropyl-3-methyl-2-methyleneazulene-8,8-diol (**7**) isolated are also reported. The structures were established by spectroscopic methods. Citotoxicities and antimicrobial activities of the compounds and crude extracts are also reported whereby compound 1 showed in vitro antifungal activity against *Candida albicans* and *Aspergilus niger* at concentrations of 0.13 and 0.17 mg/ml with zones of inhibitions of 7.0 and 5.5 mm respectively. The compound also showed cyitotoxic activity in the brine shrimp test with LC_{50} of 5.88 mg/ml. Compound **4** exhibited antibacterial activity against *E. coli* and *S. aureus*. The compound also exhibited cytotoxic activities in the brine shrimp test with LC_{50} of 24.73 mg/mL. The crude extracts exhibited varying cytotoxic and in vitro antimicrobial activities.

S4C39.

Optimization of extraction conditions by the dosage of polyphenols and determination of antioxidant activity: case of *Melothria maderaspatana* organs, a plant used in traditional African medicine for the treatment of diabetes

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Melothria maderaspatana is a medicinal plant of Asian origin belonging to the Cucurbitaceae family. It has a wide range of phytochemicals such as alkaloids, flavonoids, tannins, saponins, steroids, terpenoids, phenolic compounds. The leaves, roots and fruits are considered to have stomachic activities. It is a plant very rich in phenolic compounds, generally responsible for the biological activity of plants. In this study, we optimized the extraction parameters, including temperature, duration and solvent mass/volume ratio, by determining the total polyphenol contents and the antiradical activity at DPPH•. The Folin-Ciocalteu reagent was used to evaluate the content of phenolic compounds, with gallic acid as a reference. The determination of flavonoids with $AlCl_3$ was carried out with quercetin as a reference. The DPPH• radical made it possible to measure the antioxidant power of the extract, with reference to Trolox. This study showed that the optimal conditions for extraction of bioactive molecules, responsible for antioxidant activity, are obtained for a temperature of 80 °C, for a period of 30 min in a ratio of 1 g for 50 mL of extraction solvent which is distilled water. Under these conditions, the contents of total polyphenols and flavonoids are evaluated for the other organs of the plant. The values obtained show

that the three parts of the plant contain approximately the same polyphenol contents and exhibit the same DPPH• antioxidant activity. As for the flavonoid content, the leaves are revealed to be the richest part, compared to the stems and fruits. These physicochemical indicators in secondary metabolites and biological activity justify the primary choice reserved for this plant by traditional practitioners for the treatment of numerous pathologies.

Keywords: *Melothria maderaspatana*; Optimization; Extraction; Polyphenols; Flavonoids; Antioxidant activity

S4C40.

Anti-hyperglycemiant effect of Schiff base imine derivatives

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The aim of the study was to evaluate the profile of the effect of schiff base imine derivatives (SBID) (NFF-5, NFF-22, NFF-26, NFF-29, NFF-X) on blood glucose.

The different ligands were tested in normoglycemic rats and on a glucose tolerance test administered *per os* and intraperitoneally (ip).

The SBID have no effect on the baseline blood glucose levels of normoglycemic rats. NFF-5 and NFF-22 are anti-hyperglycemic during an oral glucose tolerance test (GTT-*per os*). After glucose (4 g/kg, *per os*) administration, glycemia levels respectively equal 1.36 ± 0.07 g/L and 1.30 ± 0.08 g/L versus 2.04 ± 0.13 g/L in the control group ($p < 0.05$, $n = 3$), at a dose of 30 mg/kg *per os* of NFF5 and NFF22. An intraperitoneal glucose tolerance test (ip-GTT, 1.75 g/kg) abolishes the anti-hyperglycemic effect of NFF5 and NFF22. The blood glucose levels are respectively 1.66 ± 0.16 g/L and 1.58 ± 0.20 g/L, respectively after administration of NFF5 and NFF22 versus 2.30 ± 0.3 g/L in the control group (ns, n=5).

NFF-5 and NFF-22 molecules are exclusively anti-hyperglycemic, through a mechanism which would involve an inhibition of intestinal glucose transport.

Keywords: Schiff Base Imines, Blood Glucose, Glucose Tolerance Test

S4C41.

Rapid identification of anti-oxidants in ethanolic and aqueous extracts of mangrove trees from Senegal using UHPLC coupled on-line to nanoESI-HRMS/MS and DPPH-based assay

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In Senegal, six mangrove species are present : *Rhizophora mangle* L., *Rhizophora racemosa* Meyer, *Rhizophora harisonnii* Leechman, *Laguncularia racemosa* (L.) Gaertn.f., *Avicennia germinans* (L.) Stearn and *Conocarpus erectus* L. **[1]**. They are used in traditional medicine by the local population to treat various pathologies. Furthermore, the livelihoods of local populations are closely linked to the productivity of mangrove ecosystems **[2]**. Thus, the discovery of biologically active natural molecules from mangrove could contribute to the conservation and sustainable management of these ecosystems.

The aim of this study is to identify the antioxidant compounds in the aqueous and ethanolic extracts of 24 plant drugs by 1,1-diphenyl-2-picrylhydrazyl (DPPH) assay. The DPPH method is based on the measurement of the scavenging capacity of molecules. The DPPH radical has a deep violet color in solution, and it becomes colorless or pale yellow when neutralized. The activity was evaluated by measuring the decrease of DPPH absorbance detected at 517 nm.

First, 96-well plate is used to measure IC_{50} for all extracts (concentration necessary to reduce 50% of the initial radical DPPH•) and most active were selected.

Secondly, a reversed-phase UHPLC coupled to on-line radical scavenging detection system according to Breaud *et al.***[3]** with some modification is reported. The sample was separated by UHPLC and the eluate split into two flows. The minor portion (5 µL/min) was directed into a nano electrospray ionisation HRMS system, while the major part (195 µL/min) was detected by DAD detector and then mixed with DPPH solution in the reaction coil. The reaction was measured by Vis detector in order to reveal antioxidant properties of separated molecules.

The ethanolic and aqueous extracts of the bark of *Rhizophora harisonnii*, are the most active extracts with IC_{50} 11.5 µg/ml and 12.0 µg/ml respectively. The least active extracts have IC_{50} values greater than 60.0 µg/ml. The On-Line RP-UHPLC-HRMS-DAD-DPPH-VIS system allowed us to identify and annotate flavonoids and tannins, responsible for the antioxidant activity of the extract

S4C42.

Physicochemical study of honeys from the southern district of Senegal (Casamance)

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Honey is a highly complex biological compound that sits somewhere between the animal and plant worlds. With its wide diversity, honey offers a multitude of properties, both nutritional and therapeutic. In order to determine its physicochemical characteristics, five types of samples were collected from the southern region of Senegal. These are Eucalyptus honey, Diallium honey, Mangrove honey, Anacardia honey and Daniellia honey. These honeys are analyzed for pH, water content, electrical conductivity, ash content, acidity, hydroxymethylfurfural content and reducing sugars. The results of the physicochemical analyzes informed us that the samples have on average an acidic pH of 3.78 ± 0.29, a water content of 16.34 ± 0.81%, an electrical conductivity of 0.36 ± 0.07 ms/cm, an ash content of 0.29 ± 0.15%, a free acidity of 20.77 ± 4.72 meq/kg, an HMF content of 12.97 ± 6.01 mg/kg and a content in reducing sugars of 52.40 ± 3.33%.

The results showed that there were differences from one honey sample to another, and that they all met international standards. The physicochemical parameters studied are the most frequently used as indicators of honey quality and stability, and have a major influence on its organoleptic properties.
Key words: Honey, physicochemical parameters, honey quality, honey stability, Senegal.

S4C43.

Preparation and characterization of activated carbon using agricultural wastes (corn cobs)

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This research project investigated the presence and concentrations of heavy metals in dust samples collected from three stone crushing sites in Igbeti Community, Oyo State, Nigeria. Three samples were collected from each site using stratified random sampling technique. The study aimed to evaluate the extent of heavy metal contamination in the dust samples and assess the associated environmental risks. The sampling design employed a stratified random sampling technique to collect dust samples from three quarry sites. These samples were subjected to acid digestion procedure and analyzed using Perkin Elmer AAnalyst 200 model atomic absorption spectrophotometer (AAS). The results revealed presence of five heavy metals, with mean concentrations as: Lead (8.65 mg/kg - 20.65 mg/kg), Cadmium (4.15 mg/kg – 15.85 mg/kg), Nickel (3.10 mg/kg – 13.70 mg/kg), Chromium (0.50 mg/kg – 1.35 mg/kg), and Zinc (21.10 mg/kg – 81.20 mg/kg). These concentrations raise concerns about potential environmental hazards linked to stone crushing activities. Notably, the concentrations of these heavy metals varied across the different quarry sites, with quarry site 2 and quarry site 3 exhibiting the highest concentrations of lead and cadmium, respectively. Quarry site 3 had the highest concentration of nickel, and quarry site 2 showed the highest concentration of chromium. Additionally, zinc levels in quarry site 1 were the highest among all samples, indicating the need for site-specific monitoring and mitigation measures. Statistical analysis, including correlation coefficients and ANOVA, provided insights into the relationships between different heavy metals and also revealed significant differences in concentrations between various quarry sites. Pb, Cd, Ni and Zn show P-values (0.001071 to 0.018929) less than the significance level (0.05) indicating that the dust samples are not uniform. However, p-value of Cr (0.050904) is slightly above the significance level as a result, this suggested Chromium levels are relatively consistent across all the dust samples. Alarmingly, the concentrations of lead and cadmium in all samples exceeded the permissible guidelines set by the World Health Organization (WHO), posing serious health risks. Furthermore, samples 9 and 10 displayed slightly elevated nickel concentrations. These findings underscore the urgency of implementing effective dust control measures and raising awareness to minimize the potential health and environmental impacts of heavy metal contamination. Consequently, the study recommends further research to assess the broader environmental implications of heavy metal contamination in the area. This research contributes to a better understanding of heavy metal concentrations in quarry sites and highlights the necessity for proactive measures to mitigate the environmental risks associated with heavy metal contamination.

Keywords: heavy metals, dust samples, stone crushing, environmental risks, contamination, quarry sites.

S4C44.

High-sensitivity on-site early warning system for monitoring deltamethrin and λ-cyhalothrin pesticides by photo-induced fluorescence

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This paper describes the prototype of a High-Sensitivity on-site Early Warning system, using Photo-Induced Fluorescence, for pesticide monitoring in natural waters (HSEW-PIF). To achieve high sensitivity, the prototype was designed with two main features. Four UV LEDs are used to excite the photoproducts at different wavelengths and select the most effective one. Two UV LEDs are used simultaneously at a wavelength of 280 nm to increase the excitation power and then the fluorescence emission of the photoproducts. High-pass filters are used to prevent saturation of the spectrophotometer and to increase the signal-to-noise ratio. The design of this new experimental device is explained and described, then analytical applications are carried out online for the determination of deltamethrin and λ-cyhalothrin. We obtained a linear calibration range of 3 to 3000 ng mL^{-1} with detection limits of 0.29 ng mL^{-1} for deltamethrin and 1.65 ng mL^{-1} for λ-cyhalothrin. An average recovery of 92.01% for deltamethrin and 89.72% for λ-cyhalothrin shows that the method is accurate, furthermore a standard deviation of 1.96% for deltamethrin and 2.49% for λ-cyhalothrin shows that the method is reproductible. Compared to other photo-induced fluorescence pesticide determination methods, the HSEW-PIF prototype shows good sensitivity with better detection limits and good analytical performance. These results show that HSEW-PIF can be used to monitor pesticides in natural waters to protect industrial facilities from accidental contamination.

Keywords: Photo-induced fluorescence; monitoring; pesticides; natural waters; high sensitivity.

S4C45.

Synthesis of new polyanilines doped with ionic liquids for the elimination of heavy metals by electrodialysis technic

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During the last decades, the levels of heavy metals such as copper (Cu^{2+}), lead (Pb^{2+}), cadmium (Cd^{2+}) etc. have continued to increase. Some of these heavy metals are toxic and pollute the environment. Generally the heavy metals come from to the industrial processes, the household waste, the combustion of coal, the petroleum etc. Several separation technics allowing their elimination were developing. We are interested in the application of polyaniline (PANI) and PANI doped by ionic liquids for the treatment of solutions containing the metals Cu^{2+}, Pb^{2+} and Cd^{2+} by electrodialysis technic.

Firstly, the chemical synthesis of the conductive polymer (PANI) in the presence of HCl (1 M) and in the presence of two ionic liquids: 1-butyl-3-methylimidazolium tetrafluoroborate ($BMimBF_4$) and 1-hexyl-2,3-dimethylimidazolium chloride (HMMimCl) were carried. The polymers obtained were used in combination with the polyvinyl alcohol for the fabrication of cationical exchange membranes. The membranes were characterized by: optical microscopy, differential scanning microscopy, thermogravimetry and differential scanning calorimetry.

After this fabrication and characterization work, the membranes were used for the treatment of solutions of Cu^{2+}, Pb^{2+} and Cd^{2+}, all with a concentration equal 320 $mg.L^{-1}$. The removal percentages of metals vary between: 80.63 to 96.04 % (Cu^{2+}), 87.89 to 99.55 % (Pb^{2+}) and 68.33 to 88.03 % (Cd^{2+}).

S4C46.

Effects of Coagulation and Ozonation Pretreatments on Biochemical Treatment of Fluid Catalytic Cracking Wastewater

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Fluid catalytic cracking (FCC) salty wastewaters, containing quaternary ammonium Compounds (QACs), are very difficult to treat by biochemical process. Anoxic/oxic (A/O) biochemical system, based on nitrification and denitrification reactions, was used to assess their possible biodegradation. Because of the negative effects of high salt concentration (3%), heavy metals and toxic organic matter on microorganisms' activities, some techniques consisting of dilution,

Coagulation and flocculation, and ozonation pretreatments, were gradually tested to evaluate chemical oxygen demand (COD), ammonia-nitrogen (ammonia-N) and total nitrogen (TN) removal rates. In this process of FCC wastewater, starting with university-domesticated sludge, the ammonia-Nand TN removal rates were worst. However, when using domesticated SBR's sludge and operating with five-fold daily diluted influent (thus reducing salt concentration), the ammonia-N removal reached about 57% while the TN removal rate was less than 37% meaning an amelioration of the nitrification process. However, by reducing the dilution factors, these results were inflected after some days of operation, with ammonia-N removal decreasing and TN barely removed meaning a poor nitrification. Even by reducing heavy metals concentration with coagulation/flocculation process, the results never changed. Thereafter, by using ozonation pre-treatment to degrade the detected organic matter of di-tert-butylphenol and certain isoparaffins, COD, ammonia-N and TN removal rates reached 92%, 62% and 61%, respectively. These results showed that the activities of the microorganisms were increased, thus indicating a net denitrification and nitrification reactions improvement.

S4C47.

Optimized process for the fabrication of laser-scribed porous graphene electrodes for the simultaneous sensing of heavy metal ions

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Laser-scribed porous graphene electrodes (pLSGEs) gained popularity in electrochemical applications due to their straightforward preparation, cost-effectiveness, porous structures, high specific surface area, and favorable electronic properties. In this study, we investigated the electrochemical detection of heavy metal ions, specifically cadmium (II) and lead (II), utilizing carefully optimized pLSGEs. The optimization process involved fine-tuning of laser beam parameters, such as laser power and speed, as well as refining the detection parameters. The optimal pLSGEs, fabricated with a laser power of 6.4 W and a laser speed of 30 $cm \cdot s^{-1}$, were characterized using digital imaging, scanning electron microscopy and Raman spectroscopy. These features confirmed the porous nature of the scribed electrodes. Additionally, electrochemical characterizations were performed to assess the electrode functionality. The fabricated LSGEs were then used for the simultaneous detection of Cd(II) and Pb(II) ions in a 0.1 M acetate-buffered solution at pH = 4 using square wave anodic stripping voltammetry. The measured key metrics of the sensor are: i) sensitivities of 0.45 and 0.93 $\mu A \cdot ppb^{-1} \cdot cm^{-2}$ and ii) linear ranges from 25 to 1000 ppb (LOD = .613 ppb) and 10 to 500 ppb (LOD = 2.96 ppb) respectively for

Cd(II) and Pb(II) (at S/N = 3).The electrochemical sensor exhibited the capability to simultaneously detect both ions in real samples, including ore and tap water. This underscores the practical applicability and versatility of the optimized LSGEs for heavy metal ion detection in complex environmental matrices.

KEYWORDS: LIG; Optimization; Heavy metal ions; SWASV; Sensing; Ores

S4C48.

Development of a novel trimethoprim vanillin embedded conjugate imprinted polymers for dyes removal from aqueous medium: Equilibrium, kinetics, modeling and thermodynamics study

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Bromocresol green (BCG) and Malachite green (MG) dyes are water-soluble and toxic organic dyes that cause severe health problems and environment pollution. The conjugate imprinted adsorbent (CIA) was synthesized by incorporating trimethoprim vanillin $(TMP-V)$ ligand onto the highly crosslinked polymer for efficient removal of BCG and MG from wastewater. The characterization of CIA was performed using x-ray powder diffraction, Fourier transform infrared and scanning electron microscopy analyses. The adsorption characteristic of the CIA was evaluated using batch adsorption process, where the effects of contact time, initial dye concentration, pH, and the temperature were investigated. The % adsorbed of BCG and MG at equilibrium time onto MIP_{BCG}, MIP_{MG}, NIP_{BCG} and NIP_{MG} adsorbents was found to be $99.27, 98.99, 51.82\ and\ 62.90\%$, respectively. The kinetic and isotherm models were used for the description of BCG and MG adsorption. The thermodynamic results showed that the BCG and MG adsorption on $MIPs$ was preceded via a $non-spontaneous$ and $spontaneous$ exothermic reactions, concomitantly, under the examined temperature conditions. Also, the adsorbent had a considerable $adsorption-desorption$ percentage after five reuse cycles without any apparent loss in adsorptive performance. The validity of the adsorbent was proven with real textile wastewater sample and a removal of BCG/MG between $85.5-87.5\%$ was achieved. The adsorbent showed much higher adsorption of BCG/MG, compared with any previously published materials. Based on the attained results, it can be concluded that the synthesized CIA is a promising adsorbent for removal of BCG/MG dye, contributing to water sustainability.

Keywords: Conjugate imprinted polymer, toxic chemicals, adsorption, isothermal model, Bulk polymerization

ORAL COMMUNICATIONS - 5TH SESSION ROOM *Adansonia*

ELECTROCHEMISTRY AND NANOTECHNOLOGY **S5C49 – S5C55** **10:40 - 12:05**

- **President:**
- **Prof. Neil Coville**

S5C49.

Electrocatalyst Based On Conducting Polymers And Metal Oxide: What are the opportunities for the future?

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Sustainable energy development is a major challenge, particularly when considering population increase, rising energy demands resulting from the excessive use of nonrenewable fossil fuels, and growing consequences on global pollution and climate change. It is critical to continue to develop new sources of renewable and clean energy. This work is devoted to discussing the recent progress in anode catalysts based on conducting polymers (CPs) materials from the viewpoint of synthesis techniques, morphology, and catalytic performance for various applications. In the first part of this work, we will explore the most commonly used methods for preparing metal-conducting polymer-based nanocomposites, including the key factors influencing their morphology regardless of the application. The catalytic performances of mono-, bi-, and tri-metal catalysts deposited on conducting polymer-based supports for the electrooxidation of methanol and ethanol reactions or as electrochemical sensors will be examined in detail in the second part. We will also highlight the effect of the introduction of carbon nanomaterials into conducting polymer supports on the electrical properties and on the performance of the catalysts. In order to increase the effectiveness of direct ethanol fuel cells (DEFCs), current research efforts aim to avoid the poisoning of the surface of electrocatalysts, minimize the use of Pt-based catalysts by replacing them with non-noble metals. Metal oxides such as Nickel, Ruthenium or Copper oxide are generally used for this purpose. Conducting polymers meet the requirements for Direct Ethanol Fuel Cell support including a high specific surface area, strong electrical conductivity, and high stability. The combination of Conducting polymers and metal oxide is a new strategy to enhance the performance of the catalyst. Indeed, the presence of aromatic compounds rich in carbon and azote in the backbone of conducting polymers such as polypyrrole, polyaniline, and poly-phenylenediamine improve their capacity to quench metallic particles via amine group to include them into their frameworks. The developed nanocomposites offer also a great potential for application as sensors for detection of Nitrite and Nitrate ions and hydrogen evolution reaction. Our work provides a feasible, straightforward approach for preparing advanced cost-effective electrocatalysts for energy conversion and sensor device.

References

1. Copper nanoparticle modified chain-like platinum nanocomposites for electro-oxidation of C1-, C2-, and C3-type alcohols, R Bayat, A El Attar, M Akin, M Bekmezci, M El Rhazi, F Sen, International Journal of Hydrogen Energy, In press,
2. New and Ultra-Rapid Approach for Electrosynthesis of Highly Efficient Catalysts of Poly (para-phenylenediamine) Supported Copper Oxide for Ethanol Oxidation in Alkaline Medium, Anas El Attar, Badr Bouljoihel, Amine Ezzahi, Mama El Rhazi, ChemElectroChem, 2023
3. Smartphone-Assisted Electrochemical Sensor Based on $Mg_{0.5}Co_{2.5}(PO_4)_2$ and Carbon Black for Trace Bisphenol A Detection, O Salhi, L Oularbi, T Ez-zine, A El Attar, S Chemchoub, A Aaddane, ChemElectroChem, 10 (9) 2023
4. Electrosynthesis of eco-friendly electrocatalyst based nickel-copper bimetallic nanoparticles supported on poly-phenylenediamine with highest current density and early ethanol oxidation onset potential, S Chemchoub, A El Attar, L Oularbi, SA Younssi, F Bentiss, C Jama, Mama El Rhazi, International Journal of Hydrogen Energy, 47, 2022, 39081

5. Interfacial charge storage mechanisms of composite electrodes based on poly(*ortho*-phenylenediamine)/carbon nanotubes via advanced electrogravimetry, EM Halim, R Demir-Cakan, H Perrot, M El Rhazi, O Sel, The Journal of Chemical Physics 156 (12),2022, 124703

S5C50.

Ultra-sensitive electrochemical detection of Caffeic acid at Ionic liquid functionalized halloysite modified glassy carbon electrode

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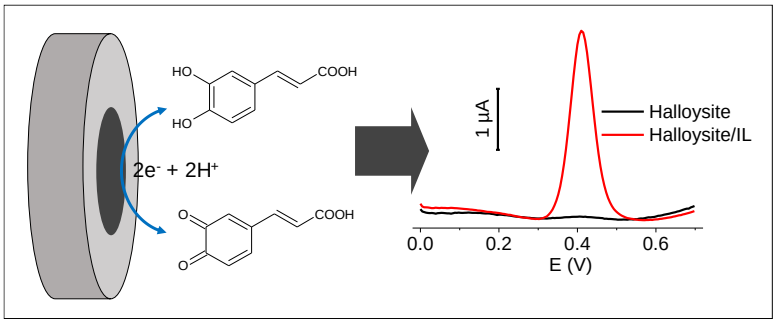
Caffeic acid (CA) belongs to the large family of phenolic compounds synthesized by plants and widely used in the medical, food and cosmetic industries due to its anti-inflammatory, anticancer and antioxidant activity.[1,2] Development of more precise and sensitive detection methods of this compound is thus very useful. Electrochemical methods are particularly efficient thanks to the simplicity of the equipments and precision of the measurements. This method unfortunately suffers from the lack of sensitivity and selectivity of conventional electrodes. In this work, halloysite clay mineral was functionalized with an ionic liquid (1-methylnaphthyl-3-(2-hydroxyethyl)-imidazolium chloride) in order to provide anionic exchange property to this almost neutral clay mineral. The obtained material was subsequently used as an electrode modifier for the electrochemical detection of CA.



Scheme: Electrochemical detection of CA at pristine and IL functionalized halloysite

Physicochemical characterizations (XRD, IRTF, ^{13}C NMR and TGA) confirmed the quantitative grafting of the ionic liquid in the interlayer space of halloysite. Electrochemical characterizations (cyclic voltammetry and EIS) highlighted the anionic exchange properties of functionalized halloysite. This property was then exploited for the electrochemical detection of caffeic acid in aqueous solution. The open circuit preconcentration strategy was applied in order to overcome the interference of the anions of the electrolytic solution. After optimization of the experimental analysis parameters (accumulation time, pH of the solution, repeatability, etc.) a calibration curve was obtained for CA concentrations ranging between 0.05 to 1.5 µM, with a detection limit of 3.2 nM.

Keywords: Halloysite, Ionic liquid, Caffeic acid, electrochemical detection, Anion exchange

References

1 N. Karikalan, R. Karthik, S. M. Chen, H. A. Chen, *Scientific Reports*, **2017**, *7*, 1–10.

2 R. Nehru, Y.F. Hsu, S. F. Wang, *Analytica Chimica Acta*, **2020**, *1122*, 76-88.

S5C51.

Facile electrosynthesis of titania nanotubes incorporated binary $NiMn_2O_4$ as supercapacitor electrode for sustainable energy storage.

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There is a rapidly increasing demand for energy conversion and storage devices such as supercapacitors, batteries, and fuel cells due to environmental issues posed by fossil fuels and technological advancement. Highly ordered titania nanotubes (TNTs) as a 1D nanostructured material have received a lot of interest in energy storage due to their large surface area and relatively low cost. In this study, TNTs were synthesized directly on the current collector (Ti foil) by anodization in glycerol-based electrolytes. Electrochemical reduction process was used to modify the TNTs to overcome its high resistivity. Furthermore, binary $NiMn_2O_4$ were incorporated into the nanotubular structures of the reduced TNTs (R-TNTs) using pulse electrodeposition method. The performance of the $NiMn_2O_4$/R-TNTs as supercapacitor electrode was evaluated by cyclic voltammetry (CV), galvanostatic charge-discharge (GCD), cycle stability test and electrochemical impedance spectroscopy (EIS) in a mixed electrolyte (KCl and NaOH) using three electrode-configuration. The R-TNTs shows improved capacitance which is 7 times higher than the pristine TNTs. After incorporation of binary $NiMn_2O_4$, the capacitive performance of R-TNTs was enhanced to 98 mF cm^{-2}. All cyclic voltammograms and galvanostatic charge-discharge curves indicate a pseudocapacitive contribution from the deposited binary metal oxides. Interestingly, the sample retained about 98% of the capacitance over 5000 charge discharge cycles at 0.5 mA cm^{-2}, suggesting an excellent electrochemical stability.

Keywords: Electrosynthesis, titania nanotubes, supercapacitor, titanium foil, energy storage.

S5C52.

Reversible dimerization of anion radicals of carbonyl compounds and the electrosynthesis of pinacols. The case of 9-fluorenone

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The reversible dimerization of anion radicals of carbonyl compounds was studied using various techniques, including cyclic voltammetry, chronoamperometry, electrolysis, digital simulation, and quantum chemical calculations. The study focused on the electroreduction of 9-fluorenone in DMF with 0.1 M Bu_4NClO_4 as the electrolyte. The experimental data confirmed that the reaction is thermodynamically unfavorable, as predicted by DFT calculations.

The study found that the dimerization equilibrium is not shifted by ion pairing of the 9-fluorenone anion radicals with lithium cations or hydrogen bonding with water. However, the reversibility of the dimerization decreases in the presence of phenol due to the protonation of the dimeric dianion and the irreversibility of the dimerization of the anion radical-phenol complexes. The contribution of these pathways to the general hydrodimerization process was discussed.

Keywords: Anion radical - Dimerization - Cyclic voltammetry - Chronoamperometry - Digital simulation

S5C53.

Electrochemical sensor based on a CNT/MoS_2/Fe_2O_3 material modified glassy carbon electrode (GCE) and application to the sensitive detection of Hg^{2+} ions in tap water.

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The presence of heavy metals in the environment poses a threat to human health and the ecosystem due to their high toxicity, non-biodegradability and accumulation effects [1]. Among these heavy metals, mercury (Hg), even at very low concentrations, is toxic to animals, plants and humans due to its very high accumulation capacity within several animal and plant species. Given its high toxicity and adverse effects on living beings, plants, micro-organisms and ecosystems, the analysis and control of mercury is of considerable importance in protecting the environment and human health [2]. It is in this context that this work is carried out, demonstrating the effectiveness of an ultrasensitive sensor made from the combination of carbon nanotubes (CNT), molybdenum disulfide (MoS_2) and iron oxide nanoparticles (Fe_2O_3) in the detection and quantification of mercury (II) ions in aquatic samples. For this purpose, differential pulse voltammetry was used as the electrochemical method. Under optimum experimental conditions, the developed sensor offers good electrochemical performance, with a detection limit of 0.015×10^{-9} mol/L (S/N = 3), a wide linearity range and high sensitivity. In addition to its ability to detect mercury at extremely low concentrations, the manufactured electrode features good reproducibility, very satisfactory repeatability and high selectivity. Finally, the usefulness of the electrode was realized by the determination of Hg^{2+} in tap water.

Key words: Electrochemical sensor, sensitive detection, mercury ions.

Reference

[1] B Fall, A K D. Diaw, M Fall, and al. Materials Today Communications, **26** (2021) 102005. https://doi.org/10.1016/j.mtcomm.2020.102005.
[2] M Niang, M L Sall, B Fall, and al. Dyes and Pigments, **225** (2024) 112028. https://doi.org/10.1016/j.dyepig.2024.112028.

S5C54.

Amperometric nonenzymatic determination of glucose via a glassy carbon electrode supported with carbon nanotubes, molybdenum disulfide nanocomposite and nickel nanoparticle.

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Glucose detection by means of nanomaterials is attracting increasing interest due to the growing demand for sensitive, selective, and efficient sensors in pharmaceutical, clinical, and industrial settings [1]. Thanks to their large surface areas and interesting physical and electrochemical characteristics, carbon nanotubes (CNTs) and molybdenum disulfide (MoS_2) are potential candidates as electrode active materials for electrochemical detection [2].

Combining these two nanomaterials with nickel nanoparticles (NiNPs), which exhibit high catalytic activity for glucose electro-oxidation [3], we have developed a new type of electrochemical sensor, based on GCE/CNT/MoS_2/NiNPs, for non-enzymatic glucose detection. After electrochemical (cyclic voltammetry (CV) and electrochemical impedance spectroscopy) and spectroscopic (X-ray diffraction, Infrared, and Scanning Electron Microscopy) characterization, the electrocatalytic behavior of the sensor was analyzed by CV and amperometry measurements in an alkaline medium. In glucose detection the sensor shows excellent sensitivity, approximately 1200 $\mu A.mM^{-1}.cm^{-2}$, with a wide linearity

range (0.05-0.65 mM), a low detection limit of 0.2 µM, and a short response time (3 seconds). Further studies have shown that this sensor has good stability, reproducibility and repeatability, and significant selectivity towards glucose. It has been used to determine glucose levels in samples of 3X beverages widely consumed in Senegal. The very satisfactory results obtained show that the proposed electrode is a promising candidate for the development of non-enzymatic glucose sensors.

In further work, we plan to use carbon dots to detect glucose by fluorescence spectrometry.

REFERENCES

[1] Q. Dong, H. Ryu, Y. Lei, Electrochim Acta, 370 (2021) 137744. https://doi.org/10.1016/j.electacta.2021.137744.
[2] Z. Bojarska, M. Mazurkiewicz-Pawlicka, S. Gierlotka, Ł. Makowski, Nanomaterials, 10 (2020) 1865. https://doi.org/10.3390/nano10091865
[3] N. Singer, R. G. Pillai, A. I. D. Johnson, K. D. Harris, A. B. Jemere, Microchim. Acta, 187 (2020) 196. https://doi.org/10.1007/s00604-020-4171-5

S5C55.

Synthesis and characterization of electrochemical properties of a new gel polymer electrolyte for energy storage device applications

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The electrolyte solution is one of the most important components of energy storage devices. There is a close relationship between the properties of the electrolyte and the performance of the electrochemical device using it. Conventional electrolyte solutions, like most organic compounds, have drawbacks, such as their environmental impact. Problems of chemical instability are also noted once in contact with certain device components. For example, the use of aqueous solutions in lithium-ion batteries can lead to safety problems. In recent years, the development of digital technology has opened up a wide field of application for energy storage devices. These fields of application require new device architectures such as flexibility and biocompatibility to facilitate portability and portability, as noted in the development of connected objects known as Internet of Things (IoTs) which are electronic systems with a need for low energy densities. To overcome environmental safety and toxicity concerns, gelled polymer electrolytes (GPEs) are increasingly used in the manufacture of flexible energy storage devices such as flexible supercapacitors. GPEs, which are generally concentrated solutions, present a quasi-solid aspect with the potential to enable good device flexibility. Work in recent years has shown that bio-based GPEs offer an alternative for the fabrication of high-performance flexible devices in the IoTs field. In the present work, we have prepared a conductive bio-based GPE using mainly bio-based compounds namely poly(vinylalcohol), carboxymethyl cellulose and tannic acid. The electrochemical properties of the resulting electrolyte bio-gel show that it could well be tested in the development of a flexible supercapacitor for energy storage and conversion.

Keywords: Energy storage, gel polymer electrolytes, biopolymers, conductivity, electrochemical impedance spectroscopy.

References:

S. Samantaray, D. Mohanty, I-M. Hung, Md Moniruzzaman, S. K. Satpathy, Journal of Energy Storage, 72 (2023) 108352
J. Yan, L. Miao, H. Duan, D. Zhu, Y. Lv, L. Li, L. Gan, M. Liu, Chinese Chemical Letters, 33 (2022) 2681-2686
T. S. Bhat, P. S. Patil, R. B. Rakhi, Journal of Energy Storage, 50 (2022) 104222
T. Xu, K. Liu, N. Sheng, M. Zhang, W. Liu, H. Liu, L. Dai, X. Zhang, C. Si, H. Du, K. Zhan, Energy Storage Materials, 48 (2022) 244-262

President:

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S5C56.

Effect of heat treatment on physico-chemical parameters and extractability of free radical scavengers from *Hibiscus sabdarifa juice*

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Conventional techniques for producing and preserving natural beverage juices essentially use heating methods at different temperatures. However, the temperature and duration of heating could influence the quantity and nature of the compounds extracted. It is with this in mind that this study was initiated with the objective of defining the optimal extraction temperature conditions while retaining the qualities and nutritional properties of the constituents of the juices obtained.

The material consists of dried calyxes of Hibiscus sabdarifa. Molecular absorption spectrophotometry was used for the quantification of phytochemicals and the evaluation of their antiradical activity.

According to the results of the experiments, the production of juice at 100°C made it possible to extract more phytochemical compounds: flavonoids (66.6 mg EQ/100g), total polyphenols (49.3 mg EAG/100g) and total phenols (13.8 (mg EAG/100g). At 150 °C, the quantities obtained were: 47.6, 12.502 and 57.5 mg EQ/100g respectively for flavonoids, polyphenols and total phenols. Results also showed better anti-radical activity for the juice obtained at 100°C compared to the other juices. Indeed, the highest percentage of inhibition was obtained with the lowest concentration of the juice extracted at 100°C (0). .4 mg/mL).

These results enabled us to determine the optimum extraction temperature and the nature of the phytochemical compounds contained in Hibiscus sabdarifa juice.

Keywords: *Hibiscus sabdarifa*, polyphenols, temperature, free radical scavenger.

S5C57.

Towards total synthesis of amphidinolide U

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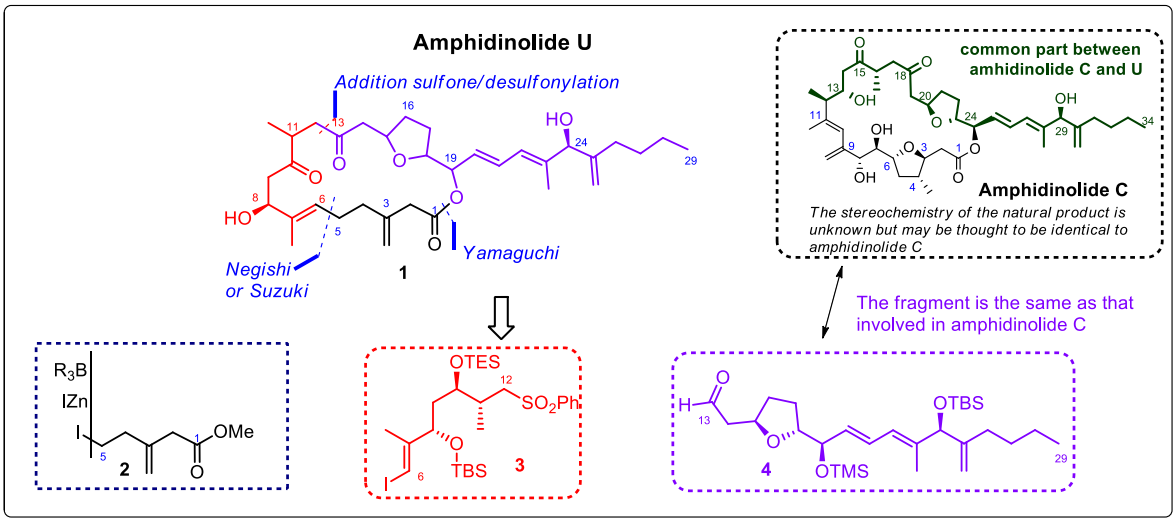
The oceans are an inexhaustible reservoir of new, original, and biologically active natural products. Amphidinolide U belongs to a large family of macrolactones isolated from dinoflagellates Amphidinium sp., living in symbiosis with flatworms Amphiscolops sp. This natural substance caught our attention because of its similarity – 75% identical structure – with amphidinolide C, which our team recently made a synthetic study of.[1] This molecule has excellent activity against human squamous cell carcinoma (KB) cells and murine lymphoma lines (L1210).[2] Due to the possible difficulty of supply from

its natural environment, the total synthesis of amphidinolide U is necessary to explore its therapeutic potential fully. Our objectives are synthesizing target fragments **2**, **3,** and **4** to access amphidinolide U, with control of the absolute and relative configurations of the asymmetric centers. The methodology planned to use convergent synthesis from a disconnection in three fragments: C1-C5, C6-C12, from C13-C29. As a result, we could access the three synthons with good yields and perfect control of all the asymmetric centers. the coupling of fragments 2 and 3 was carried out using the Suzuki reaction using the 9-MeO-9-BBN variant.[3]



The strategy considered for the total synthesis of amphidinolide U

References

[1] Ferrié, L.; Fenneteau, J.; Figadère, B. *Org. Lett.* **2018**, *20* (11), 3192–3196. b) (3) Ferrié, L.; Ciss, I.; Fenneteau, J.; Vallerotto, S.; Seck, M.; Figadère, B. Amphidinolides F and C2: An Odyssey in Total Synthesis. J. Org. Chem. 2022, 87 (2), 1110–1123. https://doi.org/10.1021/acs.joc.1c02458..

[2] a) Tsuda, M.; Endo, T.; and Kobayashi, J. *Tetrahedron*. 55, **1999**, 14565-14570. b) Kobayashi, J.; and Tsuda, M. *Natural Product Reports*. 65, **2004**, 271–284.

[3] Ciss, I.; Seck, M.; Figadère, B.; Ferrié, L. Synthetic Studies Toward the C1-C12 Fragment of Amphidinolide U. Synlett 2023, (34) 2017-2021. https://doi.org/10.1055/a-2099-6389.

S5C58.

Ethnobotanic survey of AIDS opportunistic infections in the Ziguinchor district, Senegal

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HIV / AIDS infection is characterized by the reduction of the body's defenses favoring the occurrence "opportunistic" infections, as bronchitis, mycoses and tuberculosis etc. Thus, to fight against this virus, antiretrovirals are used. The Ziguinchor district (Senegal) has a higher seroprevalence rate of 2.2% above the national average of 0.7%. It is in this sense that a survey of two herbalists, 35 tradipraticians and eight resource persons was conducted to identify the plants used in the management of opportunistic AIDS diseases because as the populations often resort to phytotherapy. 88 plants were identified and divided into 79 genera and 38 families. Some species were mentioned very more frequently and in many diseases. These are: *Cordilapinnata Poir.* (78%), *Guiera senegalensis* (73.1%), *Khaya senegalensis (67%), Icacina oliviformis* (55%), *Terminalia macroptera* (55%), *Cassia sieberiana (*47%), etc. Leaves and roots constituted the greatest use in the form of macerated, infused, for drinking, bathing, or fumigation, etc. The expected result during this study was the establishment of a repertory of medicinal plants used for the management of opportunistic diseases.

Keywords: Plants; opportunistic infections; AIDS; Ziguinchor; Senegal

S5C59.

Isolation, characterization and evaluation of the antimicrobial activity of three new molecules from Carapa procera seeds

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Carapa procera DC. (Meliaceae), a woody tree with high therapeutic potential, is widespread in the wooded savannahs of Africa and Latin America, and is widely used in traditional medicine by the rural population of southern Senegal. It has been shown to have a wide range of biological activities, including antioxidant, antimicrobial, anti-inflammatory, antisickling, antiplasmodial, antiviral and antifungal properties. It is also often used against: ticks and to treat cattle wounds, rheumatism and is said to be a tonic and vermifuge, skin diseases etc. C. procera is described as containing limonoids such as andirobin, evodulone, mexicanolide, 5,6-dehydro-7-deacetoxy-7-oxogedunine, as well as carapolides. The aim is to isolate and characterize limonoids from the ethyl acetate extract of *C. procera* delipid seeds. Following bioguided fractionation by Masshunter and DNP (Dictionnary of Natural Products) of the ethyl acetate extract delipidated seeds of *C. procera* followed by fractionation by chromatography on Combiflash, the most interesting fractions were purified by HPLC then characterized by MS, ^{1}D and ^{2}D NMR, UV and their crystal structures determined by X-ray diffraction (XRD). Thus, thirteen compounds were identified including 6,17-dihydroxyazadiradione, a new limonoid with an intact chain, deoxydetigloylswietenine and 7-hydroxygedunine, identified for the first time from *C. procera*. The antiinfectious activity of these molecules was evaluated against *Staphylococcus aureus* ATCC 6538, *Pseudomonas aeruginosa* ATCC 15692, *Candida albicans* ATCC 9563 and *Mycobacterium marinum* M000140 ATCC 927. Deoxydetigloylswietenine showed the best activity with a MIC of 22 µM against *Mycobacterium marinum* M000140 ATCC 927.

Keywords: Meliaceae, *Carapa procera*, NMR, limonoids, antiinfectious activity

S5C60.

Quality assessment of honey samples sold on Dakar market

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Bees (*Apis mellifera L.*) produce honey using nectar collected from plants. Honey types characteristics are influenced by geographical, botanical and seasonal origins. Chemical composition further depended by harvest and post-harvest processing methods as well as storage conditions. In 2024, honey consumption may hit 2.8 million tons worldwide. Therefore, this foodstuff must prove to be completely harmless to consumer health.

Present study aimed to assess quality of honey samples sold on Dakar city market.

A total of 18 samples were collected from 3 markets and 3 supermarkets. Various parameters were determined : colour (visual inspection), moisture and volatile matter (loss on drying), pH (potentiometric measurement), titratable acidity (volumetric titration), ash content (oven calcination) and minerals content (absorption spectrophotometry). Colour varied from brown to intense blackish. Physico-chemical characteristics study revealed following average values: moisture and volatile matter content: 19.9%, acidity: 53.4 mÉq/kg, pH: 3.3 and ash content: 0.58%. Essential minerals (K, Ca, Mg, Zn, Fe, Mn, Cu) as well as metallic contaminants (Pb and Cd) were quantified. Number of deviations from current regulations was observed. Therefore, it might be appropriate to study the possibility of establishing much more specific national regulations.

Keywords: Quality, honey, minerals, Dakar

References:

1. Ndungu N.N. et al. 2024. Bio-functional properties and phytochemical composition of selected *Apis mellifera* honey from Africa. *Heliyon*, 10, e30839, 1-12.
2. Lomiso D.F. et al. 2021. Physicochemical quality of honey samples collected from Chena district, southwestern Ethiopia. *J. Food Nutr. Sci.* 9(5), 117-123.
3. CODEX STAN 12-1981. Revised in 1987 and 2001. Standard for honey.

S5C61.

Physico-chemical characterization, by theoretical methods, of mycolactone A/B, infectious factor of mycobacterium ulcerans, agent of Buruli ulcer

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Buruli ulcer (BU) is an infectious disease caused by *Mycobacterium ulcerans*, a microorganism belonging to the family of bacteria responsible for Tuberculosis and Leprosy[1]. This disease occurs in humid tropical and subtropical regions, and has been observed in thirty-three (33) countries in the world, including twenty-seven (27) in Africa[2]. The after-effects of BU cause a serious impairment of quality of life. The World Health Organization (WHO) organized the first international conference on BU in Yamoussoukro in Côte d'Ivoire in July 1997[3] and set up the GBUI (Global Buruli Ulcer Initiative) to coordinate efforts in control and research. *Mycobacterium ulcerans* secretes a toxin called mycolactone into skin tissues, which is responsible for tissue damage because of its cytotoxic, anticoagulant and immunosuppressive properties. To date, six different mycolactones of natural origin have been isolated[4]. The A/B form, found in Africa, is one of the most virulent. The treatment method for BU remains limited to antibiotic therapy and reconstructive surgery and involves numerous relapses. Most research in this area is focused on the ecology of *Mycobacterium ulcerans*. The objective of this work is to use Quantum Chemistry methods to determine the interaction sites of mycolactones A/B and then to simulate the interactions of these sites with various metals. We hypothesize that the annihilation of such sites by the action of metals could hinder the toxin secretion action of mycolactones.

Keywords: Quantum Chemistry, mycolactones, Buruli Ulcer

References

[1]Kobina, A.A., Asare, P., De-Graft Binnah, D., Maccaulley, S., Opare, W., Röltgen, K., Pluschke, G., Yeboah-Manu, D. «Burden and Historical Trend of Buruli Ulcer Prevalence in Selected Communities along the Offin River of Ghana,» *PLoS Negl Trop Dis,* vol. 10 (14), pp. 1371 - 1382, 2016.
[2]Abgueguen, P., Pichard, E., Audry, J.«Buruli ulcer or Mycobacterium ulcerans infection,» *Medecine et Maladies Infectieuses,* vol. 40 (12), pp. 60 - 69, 2010.
[3]Asiedu, K., Scherpbier, R., Raviglione, M. «Rapport de la Conférence, déclaration de Yamoussoukro, Résolution Finale,» chez *Ulcère de Buruli à infection Mycobacterium ulcerans*, WHO/CDS/GBUI, pp. 473 - 483, 2000.

[4]Beissner, M., Huber, KL., Badziklou, K., Halatoko, WA., Maman, I., Vogel, F., Piten, E., Helfrich, K., Mengele, C., Nitschke, J., Amekuse, K., Wiedemann, FX., Dietfenhardt, A., Kobara, B., Herbinger, KH., Kere, AB., Prince-David, M., Bretzel, G. «Implementation of a national reference laboratory for Buruli ulcer disease in Togo,» *PLoS Negl Trop Dis,* vol. 7 (11), pp. 1371 - 1380, 2013.

S5C62.

Ibuprofen adsorption using *Discorea bulbifera* derived chars− experimental and DFT study

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Discorea bulbifera seed peel is an underutilized waste which motivated its use in this work for treatment of ibuprofen polluted water. *Discorea bulbifera* seed peel derived biochar and hydrochar were prepared and characterized using BET, SEM, XRD, EDX and FTIR measurements to study their physico−chemical properties. BET measurements revealed larger surface area and pore volumes for hydrochar than biochar, these correspond with SEM measurements which show more coarse surface morphology for hydrochar than for biochar. Observed phases for the chars from diffraction patterns of powder XRD reveal amorphicity due to plant derived carbon materials, and the presence of inorganic compounds appear as crystalline phases. EDX measurements gave high carbon contents for the prepared chars and smaller contents of inorganic compounds, corroborating powder XRD results. FTIR show more aromatization in biochar, corelating to higher amorphicity from diffraction results. Vibrational signals of Al−O and Si−O−Al observed in FTIR spectra perfectly agree with XRD crystalline peaks and correspond to presence of the inorganic compounds from EDX results. Ibuprofen adsorption equilibrium was established in 2 hours for biochar and hydrochar, that the highest ibuprofen removal occurred at pH 4 with hydrochar hving adsorption capacity (23.876 $mg.g^{-1}$) greater than biochar (22.516 $mg.g^{-1}$). Pseudo−second order kinetic model gave the best description of the adsorption kinetics. Density functional theoretical calculations gave more negative interaction for hydrochar (−27.305 $kJ.mol^{-1}$) than for biochar (−20.000 $kJ.mol^{-1}$). Results from equilibrium and kinetic studies on *Discorea bulbifera* derived biochar and hydrochar show great promise as ibuprofen adsorbents and this assertion is in excellent agreement with theoretical findings.

Keywords: Biochar, ibuprofen, hydrochar, DFT

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Presidents:

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S6C63.

Improved Safety and Security in the Chemistry Labs: Results and Actions implemented at The Faculty of Sciences of Tunis

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The variety and quantity of chemicals and solvents that are frequently found at academic institutions' research and teaching laboratories pose significant risks to the security and safety of employees, teachers, and students. Their organization, storage, and management must be subject to ongoing monitoring and vigilance. Due to the potential hazards associated with many of these substances, rigorous processes and protocols must be implemented to prevent potentially catastrophic incidents.

One of the biggest and oldest scientific faculties in Tunisia, the Faculty of Sciences of Tunis, is a case study that sheds light on the situation of chemical management in Tunisian academia today. This talk will look at the processes used in this institution's facilities and share the safety and security precautions implemented to avert threats to those areas.

S6C64.

Synthesis and Characterization of Composite (Zn0.3Mg0.7Fe2O4@PPy): Use for the elimination of Chromium (VI) in water by the adsorption method

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Water pollution by heavy metals causes serious health problems, which can sometimes cause death. Heavy metals like arsenic, lead, mercury, chromium etc which are very toxic and are found in water due to anthropogenic and natural activities. The presence of these metals in water, even at low concentrations, is dangerous for humans and animals due to their toxic nature. It is therefore essential to eliminate them. Developing easily accessible and ecologically sustainable disposal strategies is therefore a challenge for scientists. Our study aims to develop a composite based on spinel ferrite oxide (Zn0.3Mg0.7Fe2O4) and polypyrrole (sol-gel method) for the elimination of chromium (VI).

The adsorbent was characterized by the techniques of infrared (IR), X-ray diffraction (XRD), scanning electron microscopy (SEM), Raman spectroscopy, energy dispersive spectroscopy (EDS) and electrochemical analysis. A batch of adsorption experiments were carried out to evaluate the chromium removal performance. Zn0.3Mg0.7Fe2O4@PPy showed a very high removal capacity of 75 mg.g-1, an adsorption percentage greater than 90% at an initial chromium concentration of 50 mg L-1 at 25°C . The adsorption isotherm could be better defined by the Freundlich model than by the Langmuir model. The adsorption kinetics followed the pseudo-second order model. In addition, the thermodynamic study showed the endothermic and spontaneous nature of the adsorption.

Keywords: Chromium, composite, adsorption, aqueous medium,

S6C65.

Chemical investigation of the marine sponge Diplastrella sp

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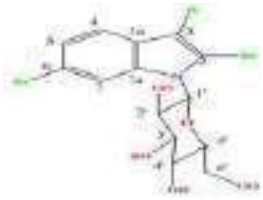
Isolation and identification of new secondary metabolite of *Diplastrella* sponge.

Extractions, fractionations and HPLC purifications were carried out using HPLC grade or 100% purity solvents. All the solvents used are: methanol (MeOH), water (H_2O), dichloromethane (CH_2Cl_2), acetonitrile (CH_3CN) and formic acid (FA). The use of milli-Q water was recommended for fractionations and those by HPLC.

Accelerated solvent extractions of the wetted species were carried out using a Turrax Mill and an Ultrasonic Bath. Chromatographic techniques used are: Reverse phase column chromatography, Analytical and Semi-preparative High Performance Liquid Chromatography (HPLC). Spectral analyses: high resolution mass spectroscopy (HRMS) and Nuclear Magnetic Resonance (NMR):

After purification, the analysis of the spectral data led to the characterization of a new tribrominated indole nucleoside



The chemical study of the *Diplastrella* sponge resulted to the isolation and characterization of one new tribrominated indole nucleoside: 2,3,6-tribromoindole-N-glycoside. In perspective, we intend to carry out biological evaluation of on this new compound; Its total synthesis is also envisaged.

Keywords : Marine species, *Dipl*astrella *sp*. Indole nucleoside, marine metabolite

References:

[1] T. M. Zabriskie et *al* (1986), Jaspamide, amodified peptide from a *Jaspis sponge*, with insecticidal and antifungal activity. . *Am. Chem. Soc.*, 108, 3123-3124.
[2] Z.-Q Zhang et *al* (2013), Animal biodiversity: An update of classification and diversity in, *Zootaxa*, DOI : 10.11646/zootaxons.3703.1.3.
[3] J. Charles et *al* (2020), Spongiaires et Cténaires à part, TIS, 2017, https://doi.org/ 10.50668/F7KH0KBK.

S6C66.

Synthesis of CaO Nanoparticles from Periwinkle Shell and application in adsorption and photocatalysis for the Removal of Tetracycline(TCN) from Water

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Due to the ever-increasing discharge of antibiotics into water and the need to curtail future attack on the environment, the present study was conducted to apply adsorption and photodegradation technologies to degrade tetracycline in water using CaO nanoparticle (obtained from periwinkle shells). The nanoparticles displayed microporous properties (pore diameter = 2.09 nm) and a BET surface area of 582.68 m^2/g. The FTIR spectrum showed peaks associated with CaO nanoparticles at 1500 and 7000 cm^{-1} while EDX compositional analysis revealed 76% Ca and 23% O contents. The optimum adsorption removal efficiency of the tetracycline was 88% at pH of 10 after 80 minutes of contact but photodegradation showed a maximum performance of 97% at ionic strength of 0.4 M, concentration of 500 ppm and adsorbent dosage of 2.0 g. The adsorption process favors Freundlich and Temkin models, while the photodegradation mechanism agreed with the Langmuir-Hinshelwood, the Modified Freundlich, first order and parabolic diffusion kinetics models. The catalyst showed strong efficiency (above 90%) towards repeated reusability. Nonlinear models best described the dependency of the photocatalyzed degradation with time for pair-wise consideration but under the inter play of all investigated factors, the average response surface model predicted 96% performance. Results from computational calculations showed agreement with experimental results concerning the band gap, spontaneity of the adsorption process and the involvement of electrons and holes in the photodegradation of the drug. The study reveals that tetracycline can totally be excluded from the aquatic environment through photodegradation or be separated using adsorption method.

S6C67.

Control of the wetting properties of bio-inspired surfaces by model-free electropolymerisation of benzotrithiophene monomers

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The difficulty of obtaining regular nanometric order at low cost is a major challenge for the development of materials for applications in the fields of sensors, photocatalysis, energy storage, photovoltaics, drug delivery and biomedical imaging. [1-3]

The dimensions of these features (diameter, height, porosity, shape) have a significant impact on the macroscopic properties of the surface. In particular, the focus has been on nanostructured interfaces with particular wettability due to their high surface-to-volume ratio. [4-6] However, their preparation is complex and often requires the use of hard templates, and many membranes and steps are needed to control their ratio.

In contrast, template-free electropolymerisation can easily and rapidly lead to controllable porous nanostructures such as nanotubes. With this in mind, our team and the NICE-LAB group have embarked on a number of initiatives to develop functional surfaces inspired by natural species such as rose petals and gecko legs, using the electropolymerisation of benzotrithiophene monomers. With these monomers, we prepared several polymers using pattern-free polymerisation in two different solvents, including CH_2Cl_2 and $CH_2Cl_2 + H_2O$

Key words: Wettability control, Nanostructured surfaces, Electropolymerization

References:

[1] Omar Sane and all. *Electrochimica Acta,* **2019**,320, 134594.
[2]. T. Darmanin and all. *J. Mater. Chem. A*. **2016**, 4, 3197-3203.
[3]. Salif Sow and all. *Prog. Org. Coat.* **2020**, *138*, 105382.
[4]. Marwa Khodja and all. *Journal of Colloid and Interface Science*, **2020**, 564, 19-27.
[5]. Fatoumata Sow and all. *Materials Today Chemistry*, 17, **2020**, 100278.
[6]. Salif Sow and all. *ChemistrySelect,* 2022, e202200354,

S6C68.

Structural features and DNA binding ability of SBA-15 nanostructured silica containing amino acids grafted with vanadocene complexes

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Novel silica nanostructured materials, synthesized by functionalizing SBA-15 with amino acids and vanadocenes, have been meticulously characterized using a range of spectroscopic and thermal techniques. Employing FTIR, solid-state UV-vis, XRF, XRD, and TGA analyses, we have unequivocally confirmed the successful functionalization of the silica carriers. The incorporation of our target molecules predominantly occurred within the pores of these silica-based systems, as evidenced by the discernible reduction in peak intensities in the corresponding diffractograms post-functionalization. Complementing these findings, solid-state ^{51}V NMR investigations suggest a four-coordinated local symmetry around V in the final materials (S6–S8). Additionally, we conducted qualitative DNA binding tests on S7, which yielded compelling results indicating DNA adherence to the surfaces of the metallodrug-functionalized nanomaterials. Considering these results, our proposed nanosystems exhibit significant promise as potential anticancer agents.

Keywords: Vanadocene, Amino acid, SBA-15, Functionalization, DNA-binding, Nanostructures

1. W. A. Wani, S. Prashar, S. Shreaz, S. Gomez-Ruiz. Nanostructured materials functionalized with metal complexes: In search of alternatives for administering anticancer metallodrugs. *Coord. Chem. Rev.* **2016**, *312*, 67-98.
    1. Bjoïrk, E. M. (2017). Synthesizing and characterizing mesoporous silica SBA-15: A hands-on laboratory experiment for undergraduates using various instrumental techniques. *Journal of Chemical Education*, *94*(1), 91-94.
    2. Díaz-García, D., Sommerova, L., Martisova, A., Skoupilova, H., Prashar, S., Vaculovic, T., ... & Gómez-Ruiz, S. (2020). Mesoporous silica nanoparticles functionalized with a dialkoxide diorganotin (IV) compound: In search of more selective systems against cancer cells. *Microporous and Mesoporous Materials*, *300*, 110154.
    3. Liédana, N., Marín, E., Téllez, C., & Coronas, J. (2013). One-step encapsulation of caffeine in SBA-15 type and non-ordered silicas. *Chemical Engineering Journal*, *223*, 714-721.
2. Wu, S. H., Hung, Y., & Mou, C. Y. (2011). Mesoporous silica nanoparticles as nanocarriers. *Chemical Communications*, *47*(36), 9972-9985.

S6C69.

Study of the contamination of oysters from the beach of Soumbedioune /Dakar/Senegal by PCBs 123, 167 and 189, by GC-MS/MS

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Anthropocentric management of the environment has led to the dispersion of pollutants in all its compartments. Thus, the sea represents the main transit zone for these entities. Furthermore, to better understand the impact of pollutants, it is necessary to evaluate them in different matrices such as aquatic species. In Senegal, there is little data relating to fishery products, particularly seafood. Hence such work could contribute to good food security and raise awareness of the consequences of pollution. In this work, the profile of the contamination of oysters from the beach of Soubedioune /Dakar/Senegal by three PCB-DLs was studied. The analyzes carried out by GC-MS/MS based on the QuEChERS (Quick, Easy , Cheap, Rugged and Safe) extraction method , show remarkable results for the months of July, August and September 2021. We note high levels of average value for the three months of 5.263; 1.749 and 7.102 µg/Kg for PCB 123, PCB 167, PCB 189 respectively. Furthermore, these concentrations are well above the ADI established by WHO which is 0.002 µg/Kg/Day. Which explains the real danger posed by the consumption of its oysters and the state of contamination of this site. Therefore, it would be necessary to put in place an effective policy to remedy this problem.

Keywords: Contamination, oysters, soumbedioune , PCB-DL, QuEChERS

References:

[1] Afssa, (Février 2008). Évaluation du dispositif de surveillance chimique des zones de production conchylicole et du risque lié à la consommation des coquillages, notamment dans la situation du bassin Arcachon, 71p.
[2] Dione CT, Delhomme O., Diagne I., Diebakate C., Ndiaye B., Cisse D., Hane M., Dione MM, Diouf S., Diop A., Ndiaye M. & Millet M., (2022). Application of the QuEChERS method for the determination of pesticides, PAHs and PCBs in fish in Senegal , Journal of Environmental Science and Health , Part A, 57:10, 869-879.

S6C70.

Bioinspired Parahydrophobic Surfaces by Electropolymerization of Thieno[3,4-b]-thiophene Derivatives with Various Substituents

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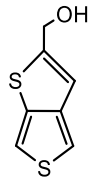
The control of surface wettability is very important for various applications such as optical and electronical devices sensors as well as wetting properties [1-2]. The bio-inspiration is an excellent way to perform a breakthrough in a scientific field, particularly in wetting properties [3]. Ordered surface structures are omnipresent in Nature as reported for example for the cicada wings able to both repel water and kill bacteria, or gecko pads known for its strong adhesion to substrates and surface [4– 5]. These last properties are developed by parahydrophobic surfaces characterized by high water apparent contact angle, but also high-water adhesion [6]. All these properties depend largely of two keys parameters for the control of wettability, which are the surfaces energy and the surface structure [6]. To control these parameters, we used electropolymerization which is a very straight forward process using the control of both, electrochemical parameters and the monomer structure [7]. In this presentation, we firstly investigate about the influence of substituents, on the electrodeposited conducting polymers. An analogical study of substituents nature on wetting properties of these surfaces will be carried out. The most efficient polymer films are highlighted, in correlation with the rigid or flexible nature of the substituents, but also with surface morphologies and roughness. These polymeric materials have many domestic and industrial applications such as water harvesting systems in hot areas and sensing platforms.



Thiéno-OH

Precursor core of electrodeposited films

Keywords : Electropolymerization, Parahydrophobicity, Adhesion, Conducting polymers, Morphology, Roughness

References

[1] Cheng, Y.; Yang, H.; Yang, Y.; Huang, J.; Wu, K.; Chen, Z.; Wang, X.; Lin, C.; Lai, Y., J. Mater. Chem. B **2018**, 6, 1862−1886.
[2] Cheng, Z.; Gao, J.; Jiang, L. Tip Geometry Controls Adhesive States of Superhydrophobic Surfaces. Langmuir **2010**, 26, 8233−8238.]
[3] Yu, S.; Guo, Z.; Liu, W., Chem. Commun. **2015**, 51, 1775−1794.
[4] Darmanin T., Guittard F., Mater. Today **2015**, 18, 273-285
[5] Szczepanski C.R., Darmanin T., Guittard F., Adv. Colloid Interface Sci. **2017**, 241, 37-61
[6] Sow S., Dihissou S., Dramé A., Sene A., Orange F., Dieng S.Y., Guittard F., Darmanin, T., ChemistrySelect **2022**, 7, e202200354
[7] Diouf K., Dramé A., Diouf A., Orange F., Guittard F., Perepichka I.F. Darmanin T., Journal of Electroanalytical Chemistry **2023**, 946, 117747

S6C71.

Zinc oxide Nanomaterials: Synthesis and Application to wastewater depollution

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According to UNESCO, more than 80% of the world's wastewater produced by various human activities is discharged into the environment without any proper treatment. Mauritania has a coastline of 720 km where regions and cities known for their industrial activities using various chemical products or dyes are located. Other activities using harmful chemical derivatives such as artisanal dyeing can also be mentioned. However, several methods exist for the elimination of these pollutants, such as adsorption, which is accessible due to its low cost, simplicity, and effectiveness.

In this study, we focused on investigating Zinc Oxide nanoparticles doped with Cobalt and Nickel as potential adsorbents for the removal of specific dyes, methyl orange and tartrazine, which are commonly found in the wastewater of various industries such as textile, food, cosmetics, etc.

Keywords: zinc oxide, cobalt, nickel, adsorption, tartrazine, methyl orange, wastewater

S6C72.

Soft-template electropolymerization from triphenylamine-based monomers: From vertically aligned nanotubes to nanomembranes

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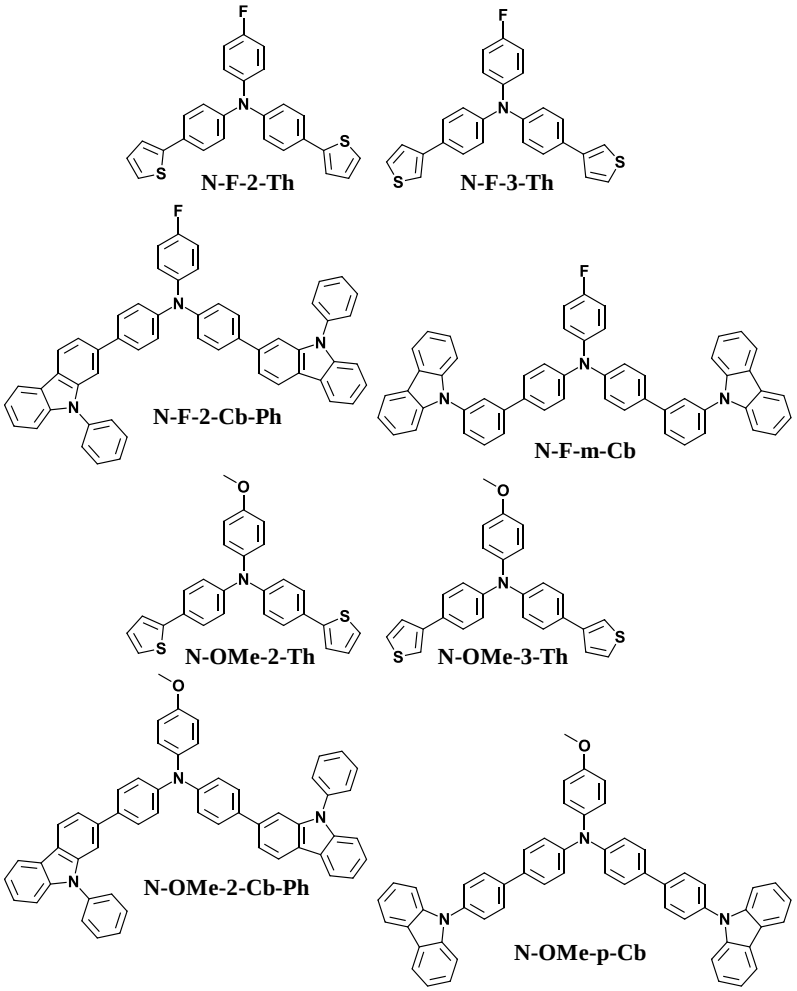
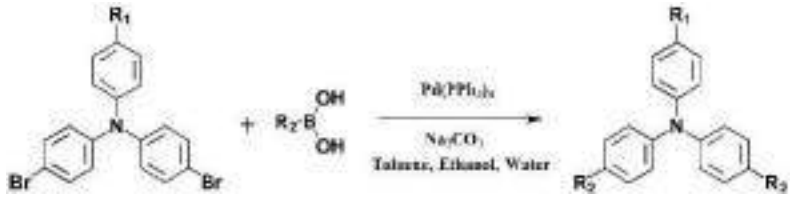
We report a bioinspired approach to tune surface nanostructures by soft-template electropolymerization in micellar condition. Monomers highly favoring ⊏-stacking interactions are particularly interesting for favoring the polymer deposition in one direction and the formation of vertically aligned nanotubes. Here, for inducing very strong ⊦ -stacking interactions, a triphenylamine building block was selected and substituted by two different substituents (fluorine F and methoxy OMe). These synthons were di-substituted with various fully conjugated thiophene and carbazole derivatives. All the monomers have high electrodeposition capacity except the monomers with thiophene in 3-position. Confirming previous works, electrochemical analyses in the electrodeposited films show the presence of monomers but with significant difference as a function of the used monomer. The surface structures are highly depending on the monomer structure while the depositions at constant potential lead to more ordered structures. With some of these monomers, densely packed nanotubes are created and their merger at high deposition charge, leading to nanomembranes. Their hydrophobicity and oleophobicity are also investigated and extremely various. Such materials could be used in the future in practical applications such as in oil/water separation membranes or in water-harvesting systems.

Monomer synthesis and characterization

These original monomers were obtained using two Suzuki reactions (Scheme 2). The reactants were purchased form TCI. Two dibromides (*N*,*N*-bis(4-bromophenyl)-4-fluoroaniline and 4,4'-dibromo-4"-methoxytriphenylamine) were tested as starting reactants. Six boronic acids including two thiophene derivatives (2-thiopheneboronic acid, 3-thiopheneboronic acid) and four carbazole derivatives (4-(9*H*-carbazol-9-yl)phenylboronic acid, 3-(9*H*-carbazol-9-yl)phenylboronic acid, 2-(9*H*-carbazol-9-yl)phenylboronic acid and 9-phenylcarbazole-2-boronic acid). However, the monomers obtained with sufficient yield are the monomers represented in Scheme 1.



Scheme 1. Original triphenylamine-based monomers investigated in this paper.



Scheme 2. Synthesis way to monomers

Keywords: Conjugated polymers, Electropolymerization, Nanomembrane, Nanotubes, Soft-template.

S6C73.

Synthesis of highly luminescent N, P co-doped carbon dots: characterisation and application in sensitive and selective fluorescence determination of Hg(II) in complex samples.

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In this work, N and P doped carbon dots (N,P-Cdots) with high and stable luminescence were synthesized via hydrothermal approach. Sodium citrate, phytic acid and ethylenediamine were used as precursors, allowing heteroatoms doped carbon dots formation. The produced N,P-Cdots were

characterized by spectroscopic technics and transmission electron microscopy (TEM). The nanomaterials were found to absorb in the UV domain with photoluminescence (PL) excitation/emission located at 350/440 nm with a quantum yield up to 84% in reference to quinine sulfate. The TEM analysis revealed that the N,P-Cdots are spherical, possess narrow size distribution with a mean size of 2.26 nm. The PL of N,P-Cdots was found to be selectively quenched in the presence of Hg(II). Then, several experimental parameters were optimized for Hg(II) sensing, using the N,P-Cdots as fluorescent nanoprobes. Under optimized conditions (0.1 M phosphate buffer, pH 7), a linear response in the range 100 ₋ 2000 nM was obtained with a limit of detection estimated as 17 nM. The interference study proved the high selectivity of the nanoprobes toward Hg(II). Then, the developed method was validated and employed to determine Hg(II) in real water and vaccines samples. The herein synthesised nanomaterials exhibited good features showing their potential application in various fields.

Keywords: fluorescence, QDs, mercury, environment.

Références:

1. A. Ghanem, R.A.-Q.B. Al-Marjeh, Y. Atassi, Novel nitrogen-doped carbon dots prepared under microwave-irradiation for highly sensitive detection of mercury ions, Heliyon. 6 (2020) e03750. https://doi.org/10.1016/j.heliyon.2020.e03750.
2. K.H. Hama Aziz, K.M. Omer, R.F. Hamarawf, Lowering the detection limit towards nanomolar mercury ion detection via surface modification of N-doped carbon quantum dots, New Journal of Chemistry. 43 (2019) 8677-8683. 10.1039/c9nj01333d.
3. H. Wu, C. Tong, Nitrogen- and Sulfur-Codoped Carbon Dots for Highly Selective and Sensitive Fluorescent Detection of Hg2+ Ions and Sulfide in Environmental Water Samples, J. Agric. Food. Chem. 67 (2019) 2794-2800. 10.1021/acs.jafc.8b07176.

S6C74.

Screening of series of hybrid perovskites for the development of light-emitting diodes

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This last two decades, a new lighting technology has been developed namely "Phosphors converted LEDs" (pc-LED). They are based on the use of luminescent materials converting the blue/UV light produced by an LED into white light. These LEDs energy consumption is low compared to incandescent lamps. Indeed, the use of old sources is costly for the global energy economy due to the very low light/electricity conversion efficiency [1-2]. However, the current technology for manufacturing a white light-emitting diode (LED) has several drawbacks, hence the remarkable entry of the hybrid perovskite sector into this technology [3]. Our general objective is to find materials that can be single sources of white light and specifically change toxic precursors by using less toxic ones abundant in our subsoils for the valorization of our mining resources. We adopt synthesis by rapid crystallization at low temperature. This synthesis pathway makes possible to screen a large number of materials and isolate those exhibiting the targeted properties. We have isolated interesting perovskite phases with tin halides (quantum yield 13%), compared to those in the literature based on potentially toxic $PbBr_2$ or $PbCl_2$ (record quantum yield 9%) [4]. We plan to produce LED prototypes in the laboratory.

Key word: perovskites, photoluminescence, white, light

Références:

[1] G. Zissis, État de l'art de la science et technologie des systèmes d'éclairage : Economies d'énergie et Développement Durable, JEEA 2007 ENS Cachan – Antenne de Bretagne (2007):DOI: 10.1051/j3ea:2007005.
[2] U.S. Department of Energy and Optoelectronics Industry Development Association. The promise of Solid State Lighting for General Illumination; Optoelectronics Industry Development Association: Washington DC, (2002).

[3] E. R. Dohner, E. T. Hoke and H. I. Karunadasa, J. Am. Chem. Soc. 136 (2014) 1718-1721.
[4] S. Brochard-Garnier, M. Paris, R. Génois, Q. Han, Y. Liu, F. Massuyeau, R. Gautier Adv. Funct. Mater. (2018) 1806728

S6C75.

Sol gel coating of a new phosphate-nickel-titanium composite material. Characterization and application for corrosion protection

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A strong industrial interest is focused on the development of coatings for anticorrosion protection. In this context, phosphate composite materials are expanding strongly due to their chemical characteristics and their interesting physicochemical properties. Sol-gel coatings offer high homogeneity and purity that may lead to obtain coating presenting good adhesion to metal surface.

The goal behind this work is to develop efficient coatings for corrosion protection of steel to extend its life. In this context, a sol gel process allowing to obtain thin film coatings on carbon steel with high resistance to corrosion has been developed.

The optimization of several experimental parameters such as the hydrolysis time, the temperature, the coating technique, the molar ratio between precursors, the number of layers and the drying mode has been realized in order to obtain a coating showing the best anti-corrosion properties.

The effect of these parameters on the microstructure and anticorrosion performance of the films sol gel coating has been investigated using different characterization methods (FTIR, XRD, Raman, XPS, SEM, Profilometer, Salt Spray Test ...).

An optimized coating presenting good adhesion and very stable anticorrosion properties in salt spray test, which consists of a corrosive attack accelerated by an artificial salt spray consisting of a solution of 5% NaCl, pH neutral, under precise conditions of temperature (35 ° C) and pressure has been obtained.

Keywords: sol gel coating, FTIR, Raman, XPS, SEM / EDX, corrosion

S6C76.

Contribution to the development of attapulgite as a cement substitute in reinforced concrete

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On the basis of recent developments in the cement industry concerning the constant reduction of clinker production and consumption, numerous natural products and by-products of industrial activities are now being studied in view of their use as partial cement substitute materials. Consequently, this work is part of a project to develop attapulgite, a Senegalese clay from Pout (Thiès region), for use in the formulation of concrete and reinforced concrete. To this end, a study was carried out to characterize the physical and mechanical properties of concretes hardened after several days of curing, some of which containing calcined attapulgite. This was followed by a characterization of the pozzolanic reactivity of calcined attapulgite and a a study of its influence on steel-concrete bonding. The tests results showed that the strength and Young's modulus of concrete dosed with clay are lower at an early age (up to 14 days).

However, after 28 days of curing, the compressive strength and Young's modulus of concrete with attapulgite added are slightly higher than those of concrete dosed with 100% portland cement. ATG analysis also showed pozzomanic reactivity of attapulgite beyond 28 days. The results obtained from pull-out tests showed that the bond strength of calcined clay-based concretes is lower than that of the reference.

Key words: Steel-concrete adhesion, attapulgite, concrete, reinforced concrete, cement, valorization

S7C77.

Mineral materials circularity to contribute to the energy transition technologies

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The need to drive towards sustainable metal resource recovery from waste cannot be overstated [1]. This is especially so for Africa where principles of circular economy require expeditious implementation. Developed countries are seeking to recycle greater quantities of the components and materials currently being discarded to waste dumps, and recycling legislation is being implemented. South Africa is one of the countries with recycling legislation and strives to control the waste produced from its mining industries and other sectors but there is less attention on the metal recycling industry as a result it remains an informal activity. Other developed countries have the processing power for metal waste streams. China has banned the import of solid waste to prevent the accumulation of further waste, and this necessitates other countries to process their solid waste and drive towards a circular economy especially for precious metals. South Africa has embraced a circular economy [2] with other global players, such as the UK, EU, China and USA. A transition to a circular economy shifts the focus to reusing, repairing, refurbishing, repurposing, and recycling.

Circular economy principles provide guidance on increasing resource productivity while minimizing environmental impacts. Africa has mainly been focused on dismantling and reusing metal waste but there is a concerted effort to understand the scope of waste management and opportunities for recycling. Urban mining needs to be viewed as contributing towards sustainable mining, especially if recycling rates can be increased, given that secondary mining will supplement the primary mining in order to overturn the supply-demand imbalance. The non-renewable character of minerals from primary mining may be less constraining than it may seem if considered in line with principles of sustainable development. This paper will therefore present examples of metal recovery processes from waste from our own laboratory [3]. The paper will also probe into aspects of application of mineral materials in technologies towards sustainable and clean fuel production and processes [4], and examples from our laboratory will be illustrated.

Keywords: mineral materials, circular economy, energy, fuels

[1] Xolo, L; Moleko-Boyce, P.; Makelane, H.; Faleni, N. and Tshentu, Z.R. Status of recovery of strategic metals from spent secondary products, *Minerals* 2021, 11, 673. https://doi.org/10.3390/min11070673

[2] Kilian, A. South Africa Starting to Embrace a Circular Economy. Creamer Media's Engineering News. 2017. Available online: http://www.engineeringnews.co.za/article/south-africa-starting-to-embrace-a-circular-economy-2017-05-04 (accessed on 28 May 2024).

[3] Moleko-Boyce, P.; Makelane, H.; Ngayeka, M.Z. and Tshentu, Z.R. Recovery of platinum group metals from leach solutions of spent catalytic converters using custom-made resins, *Minerals*, 2022, 12, 361. https://doi.org/10.3390/min12030361

[4] Majodina, S.; Poswayo, O.; Dembaremba, T.O. and Tshentu, Z.R. Towards improvement of hydroprocessing catalysts - understanding the role of advanced mineral materials in hydroprocessing catalysts, *Miner Miner Mater,* 2, 2023. https://dx.doi.org/10.20517/mmm.2023.23

S7C78.

Enhanced performance by heteroatom-doped reduced graphene oxide-TiO2-based nanocomposites as photoanodes in dye-sensitised solar cells

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The photoanode in a dye-sensitised solar cell (DSSC) plays a crucial role in achieving a high power conversion efficiency (PCE). It supports the sensitiser and acts as a transporter of photo-excited electrons from the sensitiser to the external circuit. A large surface area and a fast charge transport rate enhance these two functions. This study compared the photoanode performance of boron- or nitrogen-doped reduced graphene oxide (B- or N-rGO) nanocomposites integrated with TiO_2 (Figure 1). N-rGO-TiO_2 displayed good charge carrier separation ability and electron transfer. The low TiO_2 content in the nanocomposites led to the suppression of electron-hole recombination, reduction in the bandgap energy, and improvement in electron transport, resulting in higher current density. Two photo-harvesting dyes (sensitisers) were investigated, i.e., eosin B and Sudan II. Photoanodes fabricated from N-rGO-TiO_2 and B-rGO-TiO_2 showed enhanced photo-exciton generation, higher short-circuit current densities, and significantly better PCEs than their undoped rGO-TiO_2 counterparts.

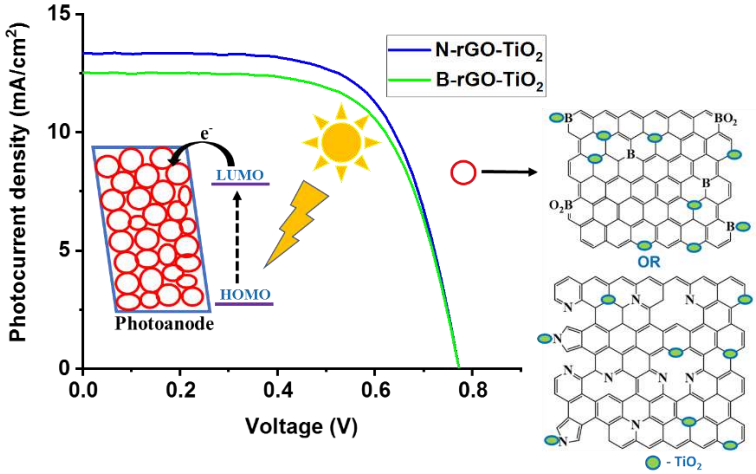

Figure 1: Heteroatom-doped reduced graphene oxide-TiO_2 nanocomposites in dye-sensitised solar cells

S7C79.

Optimization of operating parameters for the extraction of cellulose from millet husk

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Annual production of millet residues in Senegal is estimated at 1,133,224 tons. These residues are generally used for animal feed, composting or biochar production. We focused on the extraction of cellulose from the husk. A design of experiment based on response surface methodology was used to estimate the effect of extraction parameters such as NaOH concentration, cooking temperature and extraction time on final yield. Analysis of the different models shows that the quadratic model is the best suited to describe the variation in yield as a function of the factors studied, with a correlation coefficient of 0.9827. ANOVA was used to assess the relevance and significance of the chosen quadratic model.

The results show that all the factors studied except temperature have a significant effect on extraction yield, while only the interaction (NaOH concentration-time) has a significant effect. NaOH concentration is the most influential factor, with a predicted yield of 87.57%. Trials with the selected parameters, i.e. NaOH concentration 5 mg/L, temperature, and cooking time 110°C and 60 min respectively, gave a yield of 83.6%, less than 4% off the predicted value.

Keywords: Glume, extraction, cellulose, Anova

S7C80.

Preparation of activated carbon from olive stones and modification of its characteristics by acids (H_3PO_4, HNO_3, H_2SO_4)

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Water pollution is an increasingly worryng issue that cause numerous environmental and public health damages **[1]**. To remedy this, many processing techniques have been used. Thus adsorption represents a treatment of choice for recovering polluants encountered in industrial effluents and wastewater **[2]**. Recently research has focused on the use of adsorbents made from biomasse such as activated carbon **[3]**, due to their performance in trapping contaminants such as heavy metals, dyes and pesticides. The aim of the present study is summarized in a first part to a preparation of actived carbon from olive stones and to carry out its characterization (porosity, specific surface area, surface functions, pH zero charge). The second part consits of studying the effect acid treatment (H_2SO_4, HNO_3 et H_3PO_4) on the morphogy and characteristics of the activated carbon obtained from olive stones in order to improve the adsorption capacity of this latter as an excellent adsorbent. The results obtained show that the activated carbon prepared by physical activation has a specific surface area of 862 m^2/g and is made up 62% of micropores. The treatment by acids has brought clear improvement on the characteristics of the activated carbon (15 to 30% of increasing of specfic surface area, rising of surface functions, pore and micropore volume)

Keywords : adsorption, activated acrbon, pollutant.

Références

[1] Li Lin., Haoran Yang., Xiaocang Xu, (2022) effects on water pollution on human health and disease heterogeneity. Front Environ Sci . Sec water and wastewater management, 10 :1–16
[2] Agarwal RM, Singh K (2017) Heavy metal removal from wastewater using various adsorbents: a review. J Water Reuse Desalination 7(4):387–419
[3] Rwayhah, Y.M.N., Hassan, M.L. Shehata, M.R. (2017). Nanoporous ac tivated carbon from olive stones wastes. Journal of Scientific & Industrial Research, 76, 725–732

S7C81.

Contribution to the development of attapulgite as a cement substitute in reinforced concrete

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On the basis of recent developments in the cement industry concerning the constant reduction of clinker production and consumption, numerous natural products and by-products of industrial activities are now being studied in view of their use as partial cement substitute materials. Consequently, this work is part of a project to develop attapulgite, a Senegalese clay from Pout (Thiès region), for use in the formulation of concrete and reinforced concrete. To this end, a study was carried out to characterize the physical and mechanical properties of concretes hardened after several days of curing, some of which containing calcined attapulgite. This was followed by a characterization of the pozzolanic reactivity of calcined attapulgite and a a study of its influence on steel-concrete bonding. The tests results showed that the strength and Young's modulus of concrete dosed with clay are lower at an early age (up to 14 days). However, after 28 days of curing, the compressive strength and Young's modulus of concrete with attapulgite added are slightly higher than those of concrete dosed with 100% portland cement. ATG analysis also showed pozzomanic reactivity of attapulgite beyond 28 days. The results obtained from pull-out tests showed that the bond strength of calcined clay-based concretes is lower than that of the reference.

Keywords: Steel-concrete adhesion, attapulgite, concrete, reinforced concrete, cement, valorization

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S7C82.

Synthesis and spectroscopic characterization of Cd^{2+}, Hg^{2+} and Sn^{4+} complexes derived from the salophen Schiff base ligands.

Aichetou Diakhate[a], F.B. Tamboura[b], M. Diallo[a], M.A.K. Sanhoury[a],

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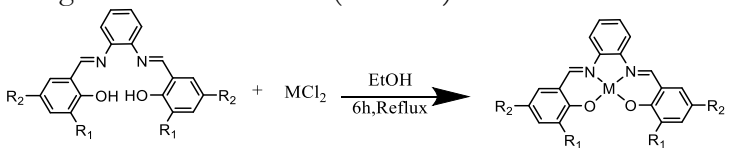
Schiff base ligands are currently attracting attention from many research groups due to their wide-ranging applications in various fields such as biology [1], coordination chemistry, and catalysis [2]. They are studied for their antioxidant, antibacterial, and antiviral properties [3]. Our previous work has focused on metal coordination with organophosphorus ligands [4, 5]. In this work, we turn on attention to metal complexes with Schiff base ligandsand report herein on the synthesis of the salophene-tBu type ligand complexes with Cd^{2+}, Hg^{2+} and Sn^{4+} cations. These compounds were fully characterized bymultinuclear (^{1}H,^{13}C, and ^{119}Sn) NMR, IR and UV-visible spectroscopic techniques.The 1H NMR spectra of various complexes show a shift and broadening of the signals compared to those of the free ligands. The IR spectra of the complexes show a shift of the vibration band of the (C=N) bond towards lower frequencies compared to those of the free ligands. This specifically confirms the coordination of the nitrogen atom of the imine group of the ligand to the metal ion (C=N-M).



M=Cd,Hg,Sn
R1=R2=Tbu,H

Keywords: Schiff base, 3,5-di-tert-butylsalicylaldehyde, salophen, mercury, cadmum complex.

References

[1] J. Patole;U.Sandbhor; S. Padhye;D. N. Deobagkar; C. E.Anson; A. Powell; *Bioorg. Med. Chem. Lett.* 2003, 13, 51.
[2] R. B.Singh ; P. Jain ; R. P. Singh; *Talanta* 1982, 29, 77.
[3] S.N.Mali ; B.R.Thorat; D.R.Gupta; A.Pandey; *Eng. Proc.* 2021, 11, 21.
[4] K. Ebeid,F. Ebnou,M.M'haiham ,C.L.Carpenter-Warren , A.M.Z.Slawin , J.D.Woollins , M.T.Ben Dhia, A.H. Barry, M.A.K. Sanhoury *J. Coord. Chem* . 2021, 74, 2670 – 2681

[5] F. Laribi, M.A.K Sanhoury H. Mechi, D.Merlet, I. Chehidi, *Inorganica Chimica Acta*, 2022, 5331,

S7C83.

Modification of low molecular weight chitosan with African Arrow root Lilly starch and characterization of formed blend films as utility product

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Reported here, is the modification and characterization of blend films derived from African Arrowroot Lilly starch and Pleurotus tuberregium sclerotia, targeting the development of a functional pharmaceutical excipient and tableting product. The blend films were made via the simple vortex mixing process after individual material processing. Fourier-transform infrared spectroscopy (FTIR) confirmed successful modification, accenting successful interaction and compatibility between Lilly starch and Pleurotus tuberregium sclerotia, forming a cohesive blended material. Scanning electron microscopy (SEM) revealed a well-defined morphology, while mechanical testing showcased improved tensile strength and flexibility, indicating the films' suitability for tableting applications. Thermal stability, evaluated using thermogravimetric analysis (TGA), demonstrated enhanced resistance to temperature variations. The water absorption and solubility characteristics were studied and the result is suggestive of the blend's potential as a functional pharmaceutical excipient with controlled drug release properties. The modified blend films exhibit potential as functional excipients in pharmaceutical formulations and as tableting materials due to their favorable mechanical and thermal properties. The modified blend films of African Arrowroot Lilly starch and Pleurotus tuberregium sclerotia show promise as multifunctional materials, offering a sustainable and biocompatible option for pharmaceutical applications and utility product in the field of tablet formulation.

POSTERS

16:05 - 16:35

POSTER – 1ST SESSION: P1-1 – P1-13

Presidents

- **Pr. Clarence Mgida**
- **Dr. Amine Ezzahi**

P1-1.

Regioselective Amination of Porphyrins via Ring-Opening of Elec-trogenerated Pyridiniums Precursors

Abdou K. D. Dimé,[1] Asmae Boushima[2], Julie Echaubard[2], Mathieu Bethelot[2], Amelle M. Mankou[2], Julien Roger [2], Charles H. Devillers[2]

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For many decades, porphyrins have attracted considerable attention due to their implication in natural processes (photosynthesis, O_2 transport in blood…) and their recent applications in various research fields such as photovoltaic solar cells, non-linear optical materials, photodynamic therapy and molecular electronics. To finely tune and improve the performance of porphyrin-based materials, peripheral functionalization of the porphyrin ring with judicious (hetero) atoms or molecular fragment(s) is essential. In particular, the introduction of a nitrogen atom directly bonded to the meso or β position of the porphyrin induces intense alterations of the electronic, optical, and electrochemical properties.

Numerous methods exist to introduce an amine function on porphyrin (reduction of a nitro function [1], coupling with palladium of Buchwald-Hartwig [2] or the attack of an azide on a bromine atom) [3]. However, they remain not very selective and require pre-functionalization of the porphyrin. In our research team, we recently demonstrated the possibility of creating an intramolecular C-N^+ bond on sulfanyl pyridine derivatives of porphyrin by electrosynthesis via activation of a C-H bond [4].

We have extended these preliminary results to intermolecular (regio) selective coupling on various free base porphyrins thus allowing access to new amino porphyrins by simple nucleophilic attack of piperidine [5].

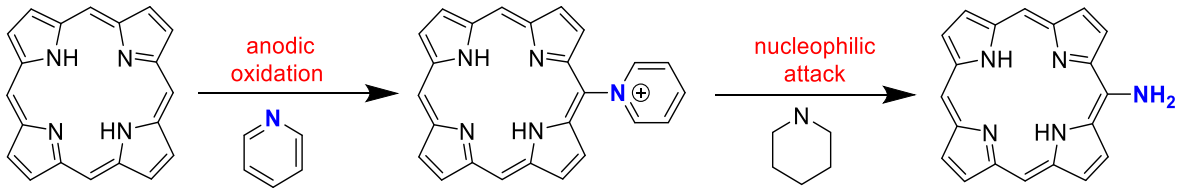

Figure 1. Electrochemical C-H amination

REFERENCES

[1]: J. E. Baldwin, M. J. Crossley and J. DeBernardis, *Tetrahedron*, 1982, 38, 685–692.
[2]: L. J. Esdaile, M. O. Senge and D. P. Arnold, *Chem. Commun.*, 2006, 4192–4194.
[3]: K.-I. Yamashita, K. Kataoka, S. Takeuchi and K.-I. Sugiura, *J. Org. Chem.*, 2016, 81, 11176–11184.
[4]: M. Berthelot, G Hoffmann, A Bousfiha, J. Echaubard, J. Roger, H. Cattey, A. Romieu, D. Lucas, P. Fleurat-Lessard and C. H. Devillers, ***Chem. Commun.***, 2018, **54**, 5414–5417.
[5]: A. Bousfiha, A. K. D. Dimé, A. M. Mankou, J. Echaubard, M. Berthelot, H. Cattey, A. Romieu, J. Roger and C. H. Devillers, *Chem. Commun.*, 2020, 56, 884-887.

P1-2.

Assessing the quality of food salts consumed in Senegal

Adrienne Ndiolene [a], Tidiane Diop [a], Alassane Traore [b], Maguette Ndiaye [c], Mamadou Sidibe [a] et Cheikh Abdoul Khadir Diop

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Food-grade cooking salt is iodized for public health reasons, to prevent iodine deficiency disorders (IDD) [1, 2]. Maximum and minimum quantities are standardized. Salt, a natural product, contains heavy metals and sulfates in varying proportions. Some trace metals can become toxic when concentrations exceed a certain threshold. The aim of this study is to assess the quality of cooking salt in Senegal. This quality will be assessed in relation to the Senegalese standard NS03-037 (1994) [3]. From September to October 2022, one hundred and twelve (112) salt samples were collected in Dakar, Fatick, Thies and Kaolack, Tambacounda, Saint-Louis and Ziguinchor. Iodine levels were determined using method NS03-038 (1994) [4]. Heavy metals were determined by ICP-OES. Qualitative analysis of sulfates, carbonates and other chemical elements was carried out by x-ray fluorescence and infrared spectroscopy. Sulfates were determined by Hach DR3900 spectrophotometer using the turbidimetric method after reaction with the barium reagent SulfaVer 4. The results revealed that 25% of salts had iodine levels between 30-50 ppm, i.e. adequately iodized. Our results also showed that 50% of samples were under-iodized and 25% over-iodized. Heavy metal levels (As, Cd, Hg, Pb and Cu) were generally acceptable in relation to the Senegalese standard, in line with the codex standard. Sulphate quantification shows high levels. The study shows that the iodization state of the salts is not satisfactory, and they contain other chemical elements such as sulfates. This shows that urgent action is needed to improve the quality of iodized salt in Senegal.

Keywords: *iodine, Salt; Trace metals; Senegal*

References

1. Ndersson M, Takkouche B, Egli I, Allen HE, de Benoist B. 2005. Current global iodine status and progress over the last decade towards the elimination of iodine deficiency. *Bull World Health Organ*,83 : 518–525. PMCID: PMC2626287.
2. Farebrother J, Naude CE, Nicol L, Sang Z, Yang Z, Andersson M, Jooste PL, Zimmermann MB. 2015. Systematic review of the effects of iodised salt and iodine supplements on prenatal and postnatal growth: study protocol. *BMJ Open.* 23;5(4): e007238. DOI: 10.1136/bmjopen-2014-007238.
3. *NS 03-037*.-Sel de cuisine iodé. - 1994.-6p.

NS 03-038.- Méthode de détermination de l'iode dans le sel de cuisine iodé par l'iodate de potassium. - 1994.- 5p.

P1-3.

Reversible dimerization of anion radicals of carbonyl compounds and the electrosynthesis of pinacols. The case of 9-fluorenone

Arona Ngom [a,b] , Mamadou Dieng[a], Diariatou Gningue-Sall [a] , Viatcheslav Jouikov [b], Andrey S. Mendkovich [c]

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The reversible dimerization of anion radicals of carbonyl compounds was studied using various techniques, including cyclic voltammetry, chronoamperometry, electrolysis, digital simulation, and quantum chemical calculations. The study focused on the electroreduction of 9-fluorenone in DMF with 0.1 M Bu_4NClO_4 as the electrolyte. The experimental data confirmed that the reaction is thermodynamically unfavorable, as predicted by DFT calculations.

The study found that the dimerization equilibrium is not shifted by ion pairing of the 9-fluorenone anion radicals with lithium cations or hydrogen bonding with water. However, the reversibility of the dimerization decreases in the presence of phenol due to the protonation of the dimeric dianion and the irreversibility of the dimerization of the anion radical-phenol complexes. The contribution of these pathways to the general hydrodimerization process was discussed.

Keywords*:* Anion radical - Dimerization - Cyclic voltammetry - Chronoamperometry - Digital simulation

P1-4.

Analysis for vitamin A, iron and iodine in commonly consumed foodstuffs in Gambia

Bilkisu A. Jallow and Anayo Chris Etonihu[+]

Chemistry Unit, Division of Physical and Natural Sciences, School of Arts and Sciences, University of The Gambia, Faraba Campus, P.O. Box 3530, The Gambia.

Food fortification can effectively address micronutrient deficiencies and significantly influence nutritional outcomes including the world-wide alleviation of vitamin A, iron, and iodine deficiencies. Vitamin A in edible oils, iron in wheat flours, and iodine in edible salts are useful vitamin and minerals for the human body. The study analyzed the levels of iron, vitamin A and iodine in wheat flour, edible oil and salt commonly consumed foodstuffs in The Gambia. The research utilized advanced analytical tools namely iCheck Chroma 3 for vitamin A analysis, iCheck Iron for iron assessment and MBI International kits for iodine determination. Sample collections were at the different markets in The Gambia (Serekunda, Banjul, Brikama, Bakau and Kairaba). The samples were collected according to Food Safety and Quality Authority (FSQA) of The Gambia sampling protocols standard. The edible oil samples (EO1, EO2, EO3, EO4 and EO5), wheat flour samples (WF1, WF2, WF3, WF4 and WF5) and edible salt samples (ES1, ES2, ES3, ES4 and ES5) were analyzed as purchased without further pre-treatment. Among the samples, for iron content in wheat flour, levels ranged from 24.8 mg/kg (WF5) to 110.6 mg/kg (WF2). Only samples WF2 and WF3 met The Gambia standard for iron fortification among the wheat flour samples. The vitamin A content in edible oil samples varied between < 9.99 IU/g (EO2 and EO4) to 23.9 IU/g (EO3). These values showed that only EO3 sample met The Gambia recommended standard for vitamin A fortification. Salt analysis showed that only sample ES3 has dietary iodine content of 15 ppm, which was within the recommended Gambia standard for household salt. The findings could contribute to the solution of reducing the risk of anemia and micronutrient deficiency in The Gambia food chain.

Keywords: Food fortification, iodine, micronutrient, vitamin A
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P1-5.

Determination of Total Mercury in Biota using Ultrasound assisted Tetramethylammonium Hydroxide digestion

Birame Ndiaye[1], Sitor Diouf[1], Mame Mor Dione[1], Cheikh Tidiane Dione[1], Ibrahima Diagne[1], Dame Cissé [1], Maoudo Hane[1], Seydou Ba[1], Momar Ndiaye[1], Mamadou Sarr[1], Ousmane Ka[1], Benita Pérez Cid[2]

[1] *Department of Chemistry, Faculty of Science and Technology, Cheikh Anta Diop University of Dakar, Senegal*
[2] *Department of Analytical and Food Chemistry, Faculty of Chemistry, University of Vigo, As Lagoas-Marcosende s/n, 36310 Vigo, Spain*

Ultrasound-assisted tetramethylammonium hydroxide (TMAH) digestion method has been applied to the determination of total mercury in biota samples (fish species, marine algae and aquatic plants) from Galician Rías and Dakar coasts **[1]**. The influence of diverse experimental parameters (mass of sample, nitric acid solution, sonication time and UV irradiation time) was evaluated. In addition, the results obtained using the proposed procedure were compared with those from conventional TMAH solubilization **[2]** and microwave acid digestion, for the same biota samples, and no significant differences were found among them when the analysis of variance (ANOVA) was applied. The accuracy of the three sample preparation methods was evaluated by the analysis of two biological reference materials (DORM-2 and BCR-60); the percentages of recovery obtained with respect to the certified values of total mercury were between 99.1 and 100.3 %. Finally, a satisfactory correlation (r = 0.841) was found between mercury accumulation in biota samples from Galician Rías and Dakar coasts. The first aquatic system was found to be more polluted. For this reason, algae can be considered good bioindicators of metal contamination in diverse coastal environments and even several studies using different algae species (Ulva) have been developed **[3]**.

Keywords: Total mercury, biota, ultrasound, TMAH

References

1. B. Ndiaye, M. Ndiaye, B. Perez-Cid, A. Diop, I. Diagne, D. Cisse, C.T. Dione, M. Hane. Bioaccumulation of Mercury in Marine Algae from Dakar Coast (Senegal) and Galician Rias (Spain). Science Journal of Analytical Chemistry. 9(1), 26-31 (2021).
2. Y. Wu, Y. Lee, L. Wu and X. D. Hou, Simple mercury speciation analysis by CVG-ICP-MS following TMAH pre-treatment and microwave-assisted digestion, Microchem. Journal, 103, 1, 105 (2012).
3. S. Costa, D. Crespo, B.M.G. Henriques, E. Pereira, A. C. Duarte, M. A. Pardal. Kinetics of Mercury Accumulation and Its Effects on Ulva lactuca Growth Rate at Two Salinities and Exposure Conditions. Water Air Soil Pollution, 217, 689 (2011)

P1-6.

Modification and Characterization of blend films of African Arrow root Lilly starch and pleurotus tuberregium sclerotia as functional pharmaceutical excipient and tableting product

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Reported here, is the modification and characterization of blend films derived from African Arrowroot Lilly starch and Pleurotus tuberregium sclerotia, targeting the development of a functional pharmaceutical excipient and tableting product. The blend films were made via the simple vortex mixing process after individual material processing. Fourier-transform infrared spectroscopy (FTIR) confirmed successful modification, accenting successful interaction and compatibility between Lilly starch and Pleurotus tuberregium sclerotia, forming a cohesive blended material. Scanning electron microscopy (SEM) revealed a well-defined morphology, while mechanical testing showcased improved tensile strength and flexibility, indicating the films' suitability for tableting applications. Thermal stability, evaluated using thermogravimetric analysis (TGA), demonstrated enhanced resistance to temperature variations. The water absorption and solubility characteristics were studied and the result is suggestive of the blend's potential as a functional pharmaceutical excipient with controlled drug release properties. The

modified blend films exhibit potential as functional excipients in pharmaceutical formulations and as tableting materials due to their favorable mechanical and thermal properties. The modified blend films of African Arrowroot Lilly starch and Pleurotus tuberregium sclerotia show promise as multifunctional materials, offering a sustainable and biocompatible option for pharmaceutical applications and utility product in the field of tablet formulation.

P1-7.

Evaluation of mineral content and antioxidant activity of *Detarium senegalense* leaves extracts

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Free radicals are implicated in development of several pathologies such as obesity, cancer, diabetes, inflammation, atherosclerosis and degenerative diseases. Antioxidants are a family of substances that can neutralize free radicals and prevent occurrence of malfunctions associated with oxidative stress. *Detarium senegalense* is considered as a source of natural medicines. This study aimed to evaluate mineral composition and antioxidant activity of *Detarium senegalense* leaves extracts. Toxic and edible chemotypes of the plant were used.

Two free radical scavenging methods using 2,2-diphenyl-1-picryl hydrazyl (DPPH) and 2,2'-azino-bis-(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) were employed to evaluate antioxidant activity. Mineral element contents were determined by X-ray fluorescence spectrometry.

Mean inhibitory concentrations (IC_{50}) ranged from 16.263±0.481 µg/mL to 260.942±36.293 µg/mL for DPPH and 2.707±0.064 µg/mL to 38.238±0.815 µg/mL with ABTS. Analysis of mineral composition revealed presence of various elements such as calcium, phosphorus, potassium, sulfur, chlorine, iron, manganese, copper, zinc and strontium at concentrations ranging from 0.028±0.001 to 24.351±0.157 mg/g.

Present study reveals that both toxic and edible chemotypes of *Detarium senegalense* leaves possess significant antioxidant power. These leaves also represent a good source of minerals whose main elements are potassium, calcium, sulfur and phosphorus.

Keywords: Minerals, antioxidant activity, DPPH, ABTS, X-ray fluorescence, *Detarium senegalense*

P1-8.

Anti-hyperglycemic effect of the stilbenes derived from benzaldehyde and anthradehyde

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Previous works had demonstrated the anti-hyperglycemic properties of stilbenes derived from anthraldehyde (RD2) and benzaldehyde (RD4). The objective of the study was to evaluate the effect on

blood glucose of ligands derived from RD2 (MM105, MM112) and RD4 (MM102). **Methods:** The tests were performed in normoglycemic rats and on a glucose tolerance test orally (*per os*-GTT) and intraperitoneally (ip-GTT) administered.

The ligands MM102, MM105 and MM112 do not modify the baseline glycemia of normoglycemic rats. However, they are anti-hyperglycemic during *per os*-GTT. MM102 (10 mg/kg, *per os*) powerfully prevents a temporary hyperglycemia peak after administration of glucose (4 g/kg, *per os*) (1.17±0.05 vs 2 .04±0.13) ($p<0.05$, n=5). Similar results in preventing temporary hyperglycemia were observed with MM105 (1.31±0.09 vs 2.04±0.13) ($p<0.05$, n=5) and MM112 (1.21±0. 12 vs 2.04±0.13) ($p<0.05$, n=5). The induction of ip-GTT abolishes the anti-hyperglycemic effect of MM102 (2.10±0.16 vs 2.30 ± 0.3 g/L) (ns, n=5).

Stilbenes derived from benzaldehyde (MM102) and anthraldehyde (MM105, MM112) are exclusively anti-hyperglycemic. The abolition of the anti-hyperglycemic effect of MM102 during ip-GTT probably suggests an action upstream of glucose absorption, by a mechanism which would involve an inhibition of intestinal glucose transport.

Keywords: Stilbene, Benzaldehyde, Anthraldehyde, Blood glucose

P1-9.

Design and total synthesis of photoactivatable latrunculin B

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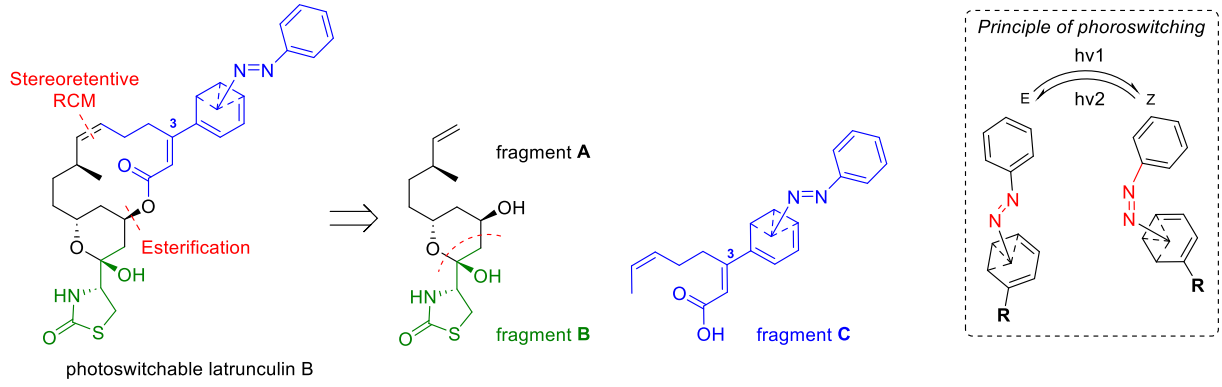
Latrunculins are marine metabolites, isolated from the Red Sea sponge Negombata magnifica[1]. They have a significant biological value as inhibitors of actin polymerization and constitute important tools in cell biology[2]. Structurally, they are based on a 14- or a 16-membered macrolactone, with a 2-thiazolidinone substituent. More particularly, we are interested in latrunculin B, the 14-membered natural product, which sequesters monomeric actin G. he objectives of this work concerns the synthesis of latrunculin B functionalized with an azobenzene in position C3 in order to design photoswitchable tools for biology. An important challenge was the control of the absolute and relative configurations of the asymmetric centers. This poster will describe our progress on the total synthesis of latrunculin B, through a convergent strategy using three fragments A/B/C, and the more specifically design of a fragment C bearing an azobenzene photoswitch, to be incorporated in the natural product.[3,4]



Design and total synthesis of photoactivatable latrunculin B

References:

[1] Y. Kashman, A. Groweiss, and U. Shmueli; Tetrahedron Lett. 1980, 21, 3629–32. [2] S) Allingham, Klenchin, Rayment; Cell. Mol. Life Sci. 2006, 63, 2119. [3] Regina. Zibuck, Nigel J. Liverton, and Amos B. Smith; J. Am. Chem. Soc. 1986, 108, 2451–53. [4] Benjamin Joyeux and others; J. Org. Chem. 2023, 19, 428–33.

P1-10.

Part of melissopalynology in the labeling of Casamance honeys

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To contribute to the labeling of Senegal honeys, Casamance was chosen because it is an area of high honey potential. Several types of honey are identified by beekeepers under the name of a plant essence without scientific analysis, with varied extraction methods. Mélissopalynology or Pollen analysis, a technique for identifying pollen grains and hence the plant taxa visited by bees, is a means of clarifying the floral origin of honey. The objective of this study is to determine the pollen composition of the honey product in Casamance.

40 honey samples were collected and analyzed according to the method of the International Commission on Beekeeping Botany Louveau et al. (1978) improved by Battesti (1992), was used which classifies pollens according to their relative frequency: Predominant pollen (more than 45% of the pollen grains counted);Secondary pollen (16-45%); Significant minor pollen (3-15%); Minor pollen (less than 3%). This technique allowed us to have the following results: 44.83% of nectar-producing plants, 13.79% of polliniferous plants and 41.38% of polliniferous nectar-producing plants. 15 samples with non-dominant pollen representing polyfloral honeys and 25 samples of dominant pollen with relative frequencies (FR) of more than 45% or 62.5% representing monofloral honeys of Elaeis guineensis FR 88.49%, of Daniellia oliveri FR 50.75%, Avicennia germinans (47.33%) Combretaceae type pollen (86.71%), Ceiba pentandra (52.5%) and Asteraceae type pollen (97.25%) and Myrtaceae type pollen (61.93%). The results of melissopalynology made it possible to have a first typology of Casamance honeys.

Keywords : labeling, mélissopalynology, honey, Casamance, Senegal

References:

Louveaux J, Maurizo A, Vornwoh G. (1978). Methods mellissopalynology. Bee World 59: 139- 57.

Battesti M. J, & Goeury C. (1992 Effectiveness of quantitative melissopalynological analysis for certification of the geographical and botanical origins of honeys: The model of Corsican honey. Review of Palaeobotany and Palynology, 75, 77-102

P1-11.

Mechanism of analgesic action of piperidine and pyrrolidine derivatives

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Previous works had highlighted the interest of piperidines and pyrrolidines in the regulation of pain by a central or peripheral mechanism. The aim of the study was to evaluate the mechanism of analgesic action of ED21 (piperidine) and ED24 (pyrrolidine).

The tests were performed on models of acetic acid writhing, Haffner mouse tail clip, and rat tail removal on a thermal plate.

The ligands ED21 and ED24 are potently analgesic in the acetic acid contortion test in mice. Indeed, after administration of ED21 and ED24 at a dose of 1 mg/kg ip, the number of contortions respectively equal to 34.40±3.94 and 33.20±4.52 versus 72.60±6.64 in the control group. ED21 (3 mg/kg, ip) (22.5±5.41 vs 4.00±1.32 s) and ED24 (0.5 mg/kg, ip) (47.39±5.41 vs 4.00±1.32 s) lengthen significantly compared to that of the control group, the reaction time of the mouse on a Haffner tail clip

test. Naloxone, a direct opioid receptor antagonist, abolishes the analgesic effect of ED24 in the thermal plaque model. Under the same conditions, the analgesic effect of ED21 is unreactive to the action of naloxone.

ED24 is a centrally acting analgesic that involves opioid receptors such as morphine. The analgesic action of ED21 could involve vanilloid or canabinoid receptors.

Keywords: Piperidines, Pyrrolidines, Pain, Opioid receptors, Naloxone

P1-12.

Comparative study of groundwater potability in the commune of Sinthiou maléme in the Tambacounda region and the industrial zone of Mboro (Senegal)

Maoudo Hane, Mame Mor Dione, Cheikh Tidiane Dione, Birame Ndiaye, Ibrahima Diagne, Dame Cisse, Seydou Ba, Sitor Diouf , Oussmane Ka, Modou Sarr, Momar Ndiaye

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Water is an essential resource for human beings. Despite its importance, 1.1 billion people have no access to drinking water and 2.6 billion live without adequate sanitation. Water security is a challenge for the State of Senegal. Already facing water stress, the State of Senegal is forecasting a 30-60% increase in water withdrawals by 2035. Water-related extreme events and pollution already cost Senegal more than 10% of GDP every year. A study of the physico-chemical quality of water resources is therefore essential. The aim of this study is to compare a number of potability parameters for groundwater in the Sinthiou maléme commune (Tambacounda) and the Mboro industrial zone. The physical parameters electrical conductivity (EC), Total Dissolved Solids (TDS) and pH were measured using a HANNA portable multiparameter. Chloride (Cl^-), sulfate (SO_4^{2-}), calcium (Ca^{2+}), magnesium (Mg^{2+}), nitrate (NO_3^-), fluoride (F^-) and phosphate (PO_4^{3-}) were determined using a PF11 photometer. The results obtained show that the conductivity, TDS and carbonate hardness of water in the Mboro area, respectively 735.00±372.42 µS/cm, 367±186.326 and 166.875±78.192, are significantly higher than those in the Sinthiou maléme commune, 237.59±67.24 µS/cm, 119.50±34.68 µS/cm and 67.50 mg/L respectively. The values found for these three parameters at the sites are below the maximum admissible values set by the WHO at 2000 µS/cm, 1000mg/L and 200 mg/L respectively. The pH values at the two sites, 6.915±0.215 and 6.68±0.57 respectively, are comparable. These values are in line with the WHO standard (6.5-8.5). In terms of chemical parameters, the mean Cl^-, SO_4^{2-}, Ca^{2+} and Mg^{2+} ion contents found in the Mboro nappe are respectively 197.500±134, 976, 128, 000±59, 352, 49, 350±25, 968 and 10, 682±4, 781 mg/L higher than those found in the Sinthiou Maléme nappe respectively 14.56±9.54, 38.11±17.92, 32.70±16.33 and 6.02±5. 18 mg/L. On the other hand, F^- and NO_3^- levels, respectively 0.61±0.35, 34.87±30.77 mg/L found in Sinthiou Maléme waters are slightly higher than those found in groundwater from the Mboro region respectively 0.250±0.111 and 21.500±1.500mg/L. For phosphate, the level found in Sinthiou Maléme groundwater (3.09±2.18 mg/L) is much higher than the level found in Mboro area groundwater (0.80±0.00 mg/L). What's more, both values exceed the standard value of 0.5 mg/L. In view of the results obtained, groundwater from the Sinthiou Maléme commune is more suitable for human consumption. With the exception of phosphate ions, all the parameters studied at these two sites comply with WHO standards.

P1-13.

Synthesis, characterization, and identification of five new mononuclear transition metal complexes involving manganese, cobalt, copper, nickel, and zinc with the ligand 1,3-bis-((5-methyl-1h- imidazol-4-yl) methyleneamino) propan-2-ol)

Gorgui Awa Seck[a], Mbossé Ndiaye Guèye[a], Pokpa Habab[b], Ibrahima Elhadji Thiam[b], Ousmane Diouf[b], Abdou Salam Sall[a] and Mohamed Gaye[b]

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Our laboratory has been interested for several decades in Schiff bases, which are molecules possessing multiple donor sites that can be soft or hard, playing a central role int he coordination chemistry of metals. These Schiff bases have enabled the preparation of a large number of complexes with original structures and remarkable properties. [1]. They have also allowed the development of mimetic chemistry to study complexes involved in biological processes. Transition metal complexes, derived from symmetric or asymmetric Schiff bases, have attracted considerable attention in the field of coordination chemistry due to their simple synthesis processes, fascinating structures, and broad range of diverse applications, covering photochemistry, catalysis, and biomimetics [2-4].

In this context, we synthesized a symmetric and flexible ligand with two arms containing coordination sites capable of encapsulating a metal ion. This ligand (1,3-bis-((5-methyl-1H-imidazol-4-yl) methyleneamino) propan-2-ol(H_3L)].), obtained by reacting 1,3-diaminopropan-2-ol and 5-methyl-1H-imidazole-4-carbaldehyde previously dissolved in methanol, enabled the preparation of transition metal complexes (Mn, Co, Ni, Cu, and Zn), which were characterized by spectroscopic studies, and the structure of the Copper(II) complex was resolved by X-ray diffraction analysis. The ligand acts as neutral tetradentate in all the complexes, its hydroxyl group remaining non-coordinated.

References:

1. Shatir TM, Aly KA, Ebrahium MM, Saddeek YB, Kumar ER. Linear and non-linear optical and dielectric properties of transition metals complexes films derived from Azo-Schiff base for photovoltaic applications. J. Mol. Liq. 2024;401:124636
2. Adam MSS, Abdel-Rahman OS, Makhlouf MM. Metal ion induced changes in the structure of Schiff base hydrazone chelates and their reactivity effect on catalytic benzyl alcohol oxidation and biological assays.J. Mol. Struct. 2023;1272:134164
3. Ghassemzadeh M, Faghani F, Shirkhani S, Mohsenzadeh F, Aghapoor K, Tahghighi A, Neumüller, B. Novel cobalt(II) complex of a new 24-membered macrocyclic bis-Schiff base bearing 3-mercapto-1,2,4-triazole: Synthesis, characterization, thermal and biological investigations. J. Mol. Struct.
4. Bao R-D, Song X-Q, Kong Y, Li F-F, Liao W-H, Zhou J, Zhang J-H, Zhao Q-H, Xu J-Y, Chen C-S, Xie M-J. A new Schiff base copper(II) complex induces cancer cell growth inhibition and apoptosis by multiple mechanisms. J. Inorg. Biochem. 2020;

16:25 - 16:55

POSTER – 2ND SESSION : P1-14 P1-27

Presidents

- **Prof. Issa Tapsoba**
- **D. Shimaa Heikal**

P2-14.

Coordination of the N and O atoms (donors) of the Schiff base ligand N, N'-bis (3-Methoxy Salicylidenimino-1, 3-diaminopropane) with Nickel (II), Copper (II) and Zinc (II): Syntheses, Crystal structure

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The reactions between 2-mercaptobenzoic acid with the complexes of Cobalt Chlorine and zinc respectively hexahydrate and tetrahydrate $CoCl_2.6H_2O$ and $ZnCl_2.4H_2O$, allowed the synthesis of two new complexes of $\{[CoLi_2C_{28}H_{18}O_9S_4)]\}$ (1) and $\{[Zn_2Li_2C_{56}H_{32}O_{16}S_8)].3(H_2O)\}$ (2). In situ oxidation of mercaptobenzoic acid was observed which led to the ligand: bis (2 carboxyphényl) disulfide with chemically similar Co (II) and Zn (II) complexes with the only difference in the number of molecules crystallization solvent. The two complexes crystallize in the same system with the same space group and with very similar cellular parameters. In the structure of each of the complexes, the metal ion is surrounded by four oxygen atoms, resulting in an O4 coordination set best described as a distorted tetrahedral geometry. A particularity is observed in complex 1 with a Li(I) located in the O4 site and another in the O4S site while in complex 2, the Li(I) ions are located in the O4S coordination set. The geometry around each pentacoordinated Li (I) is trigonal bipyramidal while the tetracoordinated Li(I) ions have a tetragonal geometry. The distances between the Co1…L1 and Zn1…L1 molecules are 3.750(8) and 3.168(4) Å, respectively. We observe in the structure of complex 1, an intramolecular hydrogen bond involving the hydrogen atom of the coordinated water molecule (donor) and a carboxylate oxygen atom (acceptor) (O9—HO9A•••O6).

We note a stacking of molecules which shows that C – H•••S type interactions and intermolecular hydrogen bonds involving the coordinated water molecule as donor and a sulfur atom as acceptor (O10—H10B••• S4) , connect the sheets of the coordination polymer units, resulting in the formation of a three-dimensional supramolecular structure.

Keywords: Cobalt, Zinc, Lithium, Disulfide, tetrahedral, Bipyramidal.

References:

[1]. M. Nandy, D. Saha, C. Rizzoli, S. Shit, Trigonal dodecahedral sodium coordination in a trinuclear copper(II)-sodium complex incorporating a salen-type compartmental Schiff base, Zeitschrift für NaturforschungB, 72, 2017, 133-140. https://doi.org/10.1515/znb-2016-0208

[2]. R. Divya, V. T. Vineeth, B. R. Bijini, C. M. K. Nair, K. RajendraBabu, Growth and characterization of heterobimetallic copper-sodium complex of cyanuric acid: A novel photoluminescent material, Journal of Molecular Structure, 1200, 2020,127031.https://doi.org/10.1016/j.molstruc.2019.127031

[3]. S.-P. Zheng, L.-B. Huang, Z. Sun, M. Barboiu, Self-Assembled Artificial Ion-Channels toward Natural Selection of Functions, AngewandteChemie International Edition, 60(2), 2021, 566- 597. https://doi.org/10.1002/anie.201915287.

[4]. P. Mukherjee, M. G. B. Drew, A. Figuerola, A. Ghosh, Incorporation of a sodium ion guest in the host of copper(II)-Schiff-base complexes: Structural characterization and magnetic study, Polyhedron, 27, 2008, 3343- 3350. https://doi.org/10.1016/j.poly.2008.07.025.

P2-15.

Ladder-like Organostannoxane: Synthesis and Crystal Structure of the Second Polymorph {[$(C_6H_5)_2Sn]_2[(C_6H5)_2ClSn]2(\mu_3$-O)$_2(\mu_2$-OH)$_2$}·[DMF]$_2$

SARR Modou, DIASSE-SARR Aminata, DIOP Libasse

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A ladder-like organostannoxane identified as a polymorph of bis-[chloro-(μ_2-hydroxo)- (μ_3-oxo)-tetraphenyl-di-tin] dimethylformamide solvate, {[$(C_6H_5)_2Sn]_2[(C_6H_5)_2ClSn]_2(\mu_3$- O)$_2(\mu_2$-OH)$_2$}·[DMF]$_2$ (1), has been synthesized and structurally characterized by means of single-crystal X-ray diffraction analysis. Compound 1 crystallizes in the monoclinic space group $P2_1/c$ with a = 23.4137(12) Å, b = 11.2525(6) Å,

c = 20.2719(11) Å, β = 100.461(2)°, V = 5252.1(5) Å3 , Z = 4 and Z' = 1.

The XRD discloses that the polymorph reported in this work is the full molecule which does not crystallize about any inversion center. Complex 1 exhibits a tetranuclear organotin(IV) ladder-like structure containing two external chlorides. The tetranuclear structure is comprised of a three-rung-staircase Sn_4O_4 cluster which consists of a ladder of four Sn_2O2 units. The central Sn_2O_2 core forms dihedral angles of 4.00(7)° and 1.62(8)° with its two fused four-membered rings, describing a slightly bent ladder. This folding is further noticed with the dihedral angle between the two external Sn_2O_2 cores of 4.65(8)°. In the structure, two types of distorted trigonal bipyramid geometry at tin centers like-arrangement are disclosed. The most Sn–O bridges bond lengths describe a static trans effect affording dissymmetrical bonds. The dimethylformamide solvate molecules form a dihedral angle of 74.5(2)° and are interlinked to the tetranuclear organotin(IV) ladder via O–H···O hydrogen bond patterns.

Additional inner C–H···Cl and C–H···O hydrogen bonds as well the C–H···O interactions are present. Moreover, the intermolecular C–H···O hydrogen bonds do not contribute to direct the crystal structure framework; they do not play an important function in forming a supramolecular architecture.

Keywords: organostannoxane, tetranuclear organotin(IV) ladder, trigonal bipyramid, crystal structure, polymorph.

References:

[1] Hoti, N., Zhu, D.E., Song, Z., Wu, Z., Tabassum, S., & Wu, M. (2004). P53-dependent apoptotic mechanism of a new designer bimetallic compound tri-phenyl tin benzimidazolethiol copper chloride (TPT-$CuCl_2$): In vivo studies in Wistar rats as well as in vitro studies in human cervical cancer cells. Journal of Pharmacology and Experimental Therapeutics, 311, 22-33.https://doi.org/10.1124/jpet.104.069104

[2] Wang, S., Li, Q.-L., Zhang, R.-F., Du, J.-Y., Li, Y.-X., & Ma, C.-L. (2019). Novel organotin(IV) complexes derived from 4-carboxybenzenesulfonamide: Synthesis, structure and in vitro cytostatic activity evaluation. Polyhedron, 158, 15-24. https://doi.org/10.1016/j.poly.2018.10.048

[3] Diop, T., Ndiolene, A., Diop, M.B., Boye, M.S., van der Lee, A., Dumitru, F., Diop, C.A.K., & Sidibé, M. (2021). Synthesis, spectral (FT-IR, 1H, 13C) studies and crystal structure of [(2,6-CO2)2C5H3NSnBu2(H2O)]2·CHCl3. Zeitschrift für Naturforschung, B76, 127-132. https://doi.org/10.1515/znb-2020-0195

[4] Diop, M.B., Seck, G. A., Sarr, M.,Diop, L., & Oliver, A.G. (2020). Co-crystallization of oxalate salts of monoprotonated amines with a double Sn-Ph bond cleavage. American Journal of Heterocyclic Chemistry, 6, 16-23. https://doi.org/10.11648/j.ajhc.20200602.11

P2-16.

Biochar based on date grains for removal hexavalent chromium in solution

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Recycling waste is one of the biggest challenges of our time. In Senegal, a large quantity of dates is consumed, particularly during the month of Ramadan [1]. This results in a large quantity of dates grains thrown away as waste. Hence the need to find another use for these seeds. The aim of this work is to prepare an activated carbon based on date seeds for use in chromium (VI) removal. In this poster we studied the adsorption of hexavalent chromium in solution by a biochar based on date nuts chemically activated by phosphoric acid (H_3PO_4) [2]. Optimisation of the various characteristics (pH, adsorbent mass, initial concentration, temperature, contact time) for improved adsorption of chromium (VI) resulted in the following optimum values: pH=2, m=0.1g, c_0=50mg/L, θ=40^{0}C, t=90 min. The study of Langmuir and Freundlich adsorption isotherms revealed that the adsorption of chromium (VI) by biochar is favourable but follows the Langmuir isotherm better [3]. The pseudo-second-order kinetic study is better suited to the Cr(VI) adsorption process. Analysis of all these parameters leads to the conclusion that adsorption of chromium (VI) by this biochar is chemisorption.

Keywords: biochar, adsorption capacity, isotherm

References

[1] ANSD Bulletin mensuel des statistiques économiques et financières Mai 2023 https://www.ansd.sn/Indicateur/bulletin-mensuel-des-statistiques-economiques-et-financieres
[2] R Sahmarani, S N, Chaza Chbib, Moomen Baroudi, Baghdad Ouddane Elimination of organochlorine pesticides from water by a new activated carbon prepared from Phoenix dactylifera *Environ Sci Pollut Res* date stones (2020) https://doi.org/10.1007/s11356-020-11445-0
[3] S.M. Yakout, G. S. El-Deen, Characterization of activated carbon prepared by phosphoric acid activation of olive stones, *Arabian Journal of Chemistry*, **9**, (2016), S1155-S1162, https://doi.org/10.1016/j.arabjc.2011.12.002

P2-17.

Electrochemical assisted deposition of thin silica film on ITO modified by diazonium salt for conductive polypyrroles sensor of parathion

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One of the current challenges in science is to produce hybrid materials by miniaturization for more efficient technological devices. Here, we describe a new electrochemical route for constructing hybrid materials from polypyrroles (PPy). In this context, thin films of mesoporous silica (TEOS) deposited electro-assisted on an ITO surface modified by diazonium salt (ITO-NH_2) were covered with an adhesive layer of polypyrroles. The low deposition time leads to more electroactive silica layers compared to the longer deposition time. The growth of a silica layer on the surface of the ITO-NH_2 electrode was confirmed by electrochemical method. The different flexible electrodes were characterized by XPS, by electrochemical and scanning electron microscopy (SEM), which showed the central role of the diazonium chemical interface in the development of PPy on mesoporous silica (ITO-NH_2/TEOS/PPy). The strategy of modifying the ITO surface with diazonium salts generates PPy/TEOS polymers with higher conductivity compared to a similar coating without integrated treatment, as assessed by electrochemical impedance spectroscopy measurements. In summary, ITO-NH_2/TEOS/PPy showed distinct catalytic behavior in parathion oxidation. This work demonstrates the power of a subtle combination of diazonium coupling agent, TEOS and conductive polymers to design high performance materials for electrochemical behavior parathion.

Keywords: parathion, diazonium silica mesoporous polypyrrole, sensor, electrochemical behavior

P2-18.

12 years of experimentation with the XLE membrane for the partial elimination of fluoride and salinity on a community scale

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The vast majority of populations living in the peanut basin area of Senegal (Diourbel, Fatick, Kaolack) consume excessively fluoridated and salty borehole water. The specificity of the problem of excess fluoride in drinking water in Senegal (which far exceeds 1.5 mg/L, the limit recommended by the WHO) compared to other countries, is the concomitant presence of fluoride and high salinity (>2 g/L) which gives the water an unpleasant taste. Regular consumption of such water has harmful consequences on the health of the populations concerned, which are manifested by the development of dental and/or bone fluorosis. The effectiveness of membrane processes has proven itself throughout the world for the treatment of such water in order to produce water of impeccable quality. However, the application of these processes is generally difficult to implement in African countries, especially in isolated rural areas due to the lack of facilities such as electricity and the necessary maintenance. Region of Kaolack in Keur Mariama in Senegal, we have installed at the foot of a borehole a 500 L/h production unit on a community scale which has been operating with XLE reverse osmosis membranes since 2012 independently using solar panels. Fonteniers are trained on site to regularly monitor parameters such as flow, pressure and conductivity of the filtered water.

Periodic chemicals and mechanicals cleanings are carried out. After several series of chemical cleaning, it becomes almost impossible to regain 100% of the initial performance of the XLE membrane and it is only from this moment that mechanical cleaning will be carried out which is effective and allows recovery the values of the initial parameters of the XLE. These results demonstrate the sustainability of drinking water production using membrane technology in rural areas.

Keywords:| Water, membrane, Fluorid, salinity.

P2-19.

Analgesic and anti-inflammatory properties of structural analogs of 4-aminopiperidine-phenoxy derivatives

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Previous works had demonstrated the analgesic and anti-inflammatory properties of molecules derived from piperidine. The study aimed to evaluate the analgesic and anti-inflammatory activity of structural analogs of 4-aminopiperidine-phenoxy derivatives.

Analogs of 4-aminopiperidine-phenoxy derivatives (RS74, RS79, RS104, RS121, RS125) were tested on the carrageenan inflammatory edema model, the acetic acid contortion test in mice and removal of the rat's tail on a thermal plate.

RS121 (3 mg/kg, *per os*) and RS125 (3 mg/kg, *per os*) powerfully prevent the development of acute inflammatory edema due to carrageenan. The anti-inflammatory power of RS121 (10.36±3.91 % vs 103.46±8.95 %) and RS125 (15.47±7.34% vs 103.46±8.95%) is comparable to that of betamethasone (20.47±4.66 vs 103.46±8.95%), an anti-inflammatory glucocorticoid. Under the same conditions, RS74 (3 mg/kg, *per os*), RS 79 (3 mg/kg, *per os*) and RS104 (3 mg/kg, *per os*) do not prevent the appearance of inflammatory edema at carrageenan in rats. Contrary, they are analgesic in the acetic acid contortion test in mice. The phenoxy derivatives RS74 (3 mg/kg, *ip*) and RS104 (3 mg/kg, ip) extend the withdrawal time of the rat's tail from the thermal plate. The tail withdrawal time respectively equals 8.1±1.0 seconds and 8.32±1.08 seconds after administration of RS74 and RS104 vs 5±0.5 seconds in the control group.

Structural analogs of 4-aminopiperidine-phenoxy derivatives possess analgesic and anti-inflammatory properties. The anti-inflammatory power of RS121 and RS125 is reminiscent of that of glucocorticoids such as betamethasone. The RS74 and RS104 derivatives are centrally acting analgesic molecules.

Keywords: 4-aminopiperidine-phenoxy derivatives, Pain, Inflammation

P2-20.

Synthesis and characterization of thiourea derivatives for the preparation of complexes for therapeutic purposes

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Because of their chelating properties, thiourea derivatives have been used in water treatment, metal recovery and pharmaceuticals [1,2]. Complexes derived from thiourea have shown therapeutic interest, hence the research advances in their studies [3,4]. In this work, we have synthesized a Schiff base ligand, derived from thiourea, which is characterized by basic techniques including XRD, IR, RMN, …

The interaction of benzoyl chloride and ethylendiamine in the presence of potassium thiocyanate gave a white solid, $C_{18}H_{18}N_4O_2S_2$, consisting of two benzoylthioureido groups linked by an ethylene chain. The asymmetric unit of the title compound is a half-molecule, the other half being generated by an inversion center located at the midpoint of the ethylene C_1–C_{1a} bond. The stability of the complex is ensured by intramolecular hydrogen bonds between N_1–H_1 and the carbonyl O and thioamide H atoms forming rings S(6). In the crystal, the Z-shaped molecules have their two halves roughly parallel to the ac plane, while the midpoint of the C_1–C_{1a} bond is orthogonally parallel to the (100) plane. Molecular layers almost parallel to the ac plane are formed by intermolecular C–H···O and C–H···S interactions. These layers are stacked along direction *b*.

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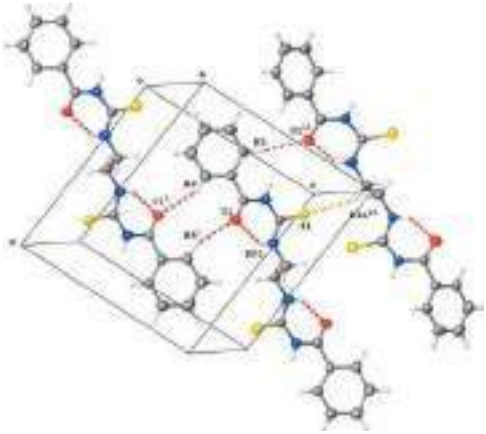

Figure 2: Partial crystal structure of the title compound, showing C-H...O (red dotted lines) and C-H...S (yellow dotted lines) interactions

[1] E. Khan, S. Khan, Z. Gul, M. Muhammad, Medicinal Importance, Coordination Chemistry with Selected Metals (Cu, Ag, Au) and Chemosensing of Thiourea Derivatives. A Review, Critical Reviews in Analytical Chemistry 51 (2021) 812–834.

[2] A. Saeed, U. Flörke, M.F. Erben, A review on the chemistry, coordination, structure and biological properties of 1-(acyl/aroyl)-3-(substituted) thioureas, Journal of Sulfur Chemistry 35 (2014) 318–355.

[3] R.K. Mohapatra, P.K. Das, M.K. Pradhan, M.M. El-Ajaily, D. Das, H.F. Salem, U. Mahanta, G. Badhei, P.K. Parhi, A.A. Maihub, Md.K. -E-Zahan, Recent Advances in Urea- and Thiourea-Based Metal Complexes: Biological, Sensor, Optical, and Corroson Inhibition Studies, Comments on Inorganic Chemistry 39 (2019) 127–187.

[4] A. Saeed, M.N. Mustafa, M. Zain-ul-Abideen, G. Shabir, M.F. Erben, U. Flörke, Current developments in chemistry, coordination, structure and biological aspects of 1-(acyl/aroyl)-3- (substituted)thioureas: advances Continue …, Journal of Sulfur Chemistry 40 (2019) 312–350.

P2-21.

Study of the distribution of the azadirachtin-A (Aza-A) molecule in neem seed (*Azadirachta indica* A. Juss)

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In order to determine of azadiractin-A (Aza-A) in the different layers of the neem seed, we collected ripe fruits in the commune of Touba (Senegal). After drying and ginning; we have prepared five categories of granulometry by abrasion. Seed sizes are defined with afnor sieves.

The extraction is made with methanol and water (45/55) for three hours of stirring. Aza-A is determined in the technical extracts by high performance liquid chromatography (HPLC). The results of the assay showed that Aza-A is not homogeneously distributed in the different layers of the seed. It is more present in the zone between 2mm and 1, 6 mm with a content of 5,133%.

Keywords: neem seeds, abrasion, extraction, azadiractin-A, dosage

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P2-22.

Simultaneous determination of naproxenand ibuprofen by synchronous fluorescence spectroscopy (SFS) in cyclodextrin and micellar media

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Despite their positive effects, drugs represent a major source of pollution for the aquatic and terrestrial environment. Concentrations in the environment generally range from ng/L to µg/L. The worldwide presence of these drugs threatens the survival of many living species, including fish and aquatic plants. Chromatographic methods are mainly used for drug determination. However, other highly sensitive and accessible alternative methods have made drug detection possible. These include simple, rapid and highly sensitive fluorimetric methods. Various experimental parameters (solvent type, Δλ selection, influence of CTAC micellar organized media and β-CD cyclodextrins) affecting the performance of the proposed SFS method were optimized. Optimal conditions for both drugs were an aqueous solution of β-CD cyclodextrins (6×10^{-3} M) with a Δλ = 80 nm. Interesting limits of detection and quantification were found, respectively equal to 0.008 and 0.02 ng/mL for naproxen; 0.31 and 1.039 ng/mL for ibuprofen. This method was applied to tap water collected from Marne la Vallée in France, natural water samples (sea water), STEP effluent samples from Senegal and real pharmaceutical drug samples using the standard addition method. The recovery rates obtained were satisfactory, ranging from 72.79 to 109.80 for ibuprofen and 85.27 to 109.87 for naproxen. DSR values are relatively low, ranging from 0.18 to 0.40 for naproxen and from 1.37 to 2.17 for ibuprofen. This very interesting result, compared with those obtained in the literature, makes SFS a good alternative for the simultaneous determination of pollutants in the environment, particularly NSAIDs drug residues.

Keywords: non-steroidal anti-inflammatory drugs (NSAIDs) ; naproxen; ibuprofen; synchronous fluorescence spectroscopy (SFS); quantification, natural waters, environment.

P2-23.

Spectrofluorimetric determination of tyramine in fish products

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Many cases of food poisoning are observed following the consumption of foods containing biogenic amines. They are present in many foods, including fish products. Food safety is a significant factor affecting public health and the well-being of society. As reported by the World Health Organization in 2017, an estimated 600 million cases of illness were caused by rotten food supplies [1]. In addition to histamine, tyramine has been declared a biohazard for foods and beverages by the European Food Safety Authority (EFSA) and the Food and Agriculture Organization of the United Nations (FAO) [2,3]. Indeed, tyramine is considered the main trigger of hypertension attacks due to diet [4]. This increase in blood pressure is coupled with headaches, dizziness, nausea, diarrhea and vomiting. In extreme cases, this pressure can cause vessel rupture, leading to cerebral hemorrhage [4]. This is why, after histamine, tyramine represents the second type of biogenic amine involved in food poisoning [5]. Given the importance of the consumption of fishery products at national and global level, we propose to develop a new method for analyzing tyramine in fishery products by spectrofluorimetric means.
The fluorescence spectra were determined using a Perkin Elmer spectrofluorimetry, model LS-45 interfaced with a computer equipped with FL-Winlab software. To recover tyramine in fish products, the solid phase extraction (SPE) procedure was applied from a certain mass of shrimp or fish subjected to grinding.

Low limits of detection (LOD) between (0.56 ng/mL and 1.22 ng/mL) and limits of quantification (LOQ) between (1.87 ng/mL and 4.06 ng/mL) were determined . The low values of relative standard deviations (RSD) obtained, between 0.30% and 0.58%, demonstrate the good reproducibility of our measurements. The application of this method on our samples made it possible to detect tyramine with satisfactory recovery rates of between 93.68% and 106.60%.

Keywords: Tyramine, spectrofluorimetry, Biogenic amine, Analysis, Shrimp

References

[1] Yousefi H. *et al.*, ACS Sensors, 4 (2019) 808-821.
[2] EFSA Journal, 9 (2011) 2393.
[3] FAO, (2014) 574.
[4] Sadighar *et al.*, Food Production, Processing and Nutrition, 6 (30) (2024) 1-9
[5] Ordóñez *et al.*, Journal of Food Protection, 60(11) (1997) 1371-1375.

P2-24.

Antimicrobial and anticancer activities of diazenyl compounds

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Infectious diseases represent one of the leading causes of death worldwide. Every year, there are more than 17 million deaths, especially in Africa due to low income (1). Furthermore, theAntibiotic resistance is one of the most serious threats to global health today.(2). Behind these infectious diseases comes cancer with more than 10 million new cases per year. Taking into account all these public health problems, it is very urgent to develop new molecules, but in a simpler, more effective and more environmentally friendly way.(3).

The objective of our research is to synthesize new diazene molecules and evaluate their antimicrobial activity against five reference strains: *Escherichia coli*, *Staphylococcus aureus*, *Enterococcus faecalis*, *Pseudomonas aeruginosa*, and *Candida albicans* and their anticancer activity against four cell lines: breast (MCF-7), lung (Calu-3), pancreas (PANC-1) and prostate (PC-3) and on a normal fibroblast cell line (HTK).

The diazocopulation method was used for the synthesis of diazenes. Antimicrobial activity was measured using the 96-well plate microdilution method and the MTT (3-[4,5 dimethyl thiazol-2-yl]-2,5-diphenyl tetrazoIium bromide) test method. was used to determine the anticancer activity of the diazenes obtained.

Three new heterocyclic diazenyl compounds were synthesized by diazotization. The diazo compounds **2** and ***3*** showed strong activities against *C. albicans* with MIC values of 150 µM and 120 µM respectively. Compound **1** showed the broadest spectrum of activity with good MICs of 138 to 276 µM on the four strains. Good anticancer activities were noted with these diazenes on tumor lines with IC_{50} values from 9,4 to 9,8 µM. The best anticancer activity was obtained with compound **1** on Calu-3 with an IC_{50} of 9,4 µM.

The results suggest that compound **1** is an interesting scaffold for pharmacomodulation.

To improve these results, pharmacomodulation of these compounds is envisaged and tests on other microbial strains.

Keywords: Diazene, Single crystal, X-rays, antimicrobial, anticancer.

Références

1. Conseil H. Les maladies infectieuses émergentes 2011 ; 4-7.
2. Bertrand X and al. Surveillance de la résistance bactérienne aux antibiotiques 1998–2003. Médecine Mal Infect. 1 juin 2005; 35(6): 329-34.
3. Guimarães D. and al. Antibiotics: therapeutic importance and perspectives for the discovery and development of new agents. Quím Nova. 2010 ; 33: 667-79.

P2-25.

Establishment of a reference situation on the contamination of trace metal elements (As, Sb, Cd and Ni) of plants and soils in the vicinity of the tailings pond before the operation of the BIOX plant at the Sabodala-Massawa gold mine.

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Bio-oxidation mining of the Massawa gold deposit will generate large quantities of metalloids (arsenic and antimony) and heavy metals (nickel and cadmium) in the Sabodala environment, as gold is encapsulated in sulfides such as arsenopyrite, pyrite, stibine and Gersdorffite. Both biotic and abiotic organisms will be exposed to these toxic, non-biodegradable contaminants. The overall aim of this study is to establish a baseline contamination situation for plants and soils under vegetation prior to the operation of the bio-oxidation plant. To achieve this objective, we will assess metal (Cd, Ni) and metalloid (As and Sb) contamination of soils under vegetation. Sampling of matrices (soils and plants) was carried out during the rainy season. The study of metal bioavailability in root soils shows that arsenic and antimony are not bio-accessible, so these two toxic metalloids are not found in the anatomical parts of plants. Cadmium and nickel are bioavailable in root soils in proportions of 50% and 27% respectively. Nickel is found at high levels in certain plants, far exceeding the admissible limit values (50 ppm). Phyto-attractant plants include: *Boscia angustifola* (158.49ppm) and *Combretum nigricans* (146.43ppm). Some plants phyto-stabilize nickel: Cordyla Pinata (187.2ppm), and Dombeya quinqueseta (110.24ppm). Cadmium levels in anatomical plant parts are low, with maximums of 0.25ppm *(Pterocarpus erinaceus*) in roots and

0.21ppm in aerial parts *(Hexalobus monopetalus*). Soil-plant transfer of cadmium is very low, mainly due to its low bioavailability in soils.

Keywords: Heavy metals, metalloids, pollution, bioavailability, mining

P2-26.

Synthesis and Characterization Schiff Base Molecules and Antidiabetic, Anti-inflammatory et Antimicrobial Activity Complexes

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A Schiff base is defined as being the product resulting from the condensation of primary amine with a ketone or aldehyde, comprising a C=N double bond with the nitrogen atom linked to an aryl or alkyl group [1], their general formula is $R^1R^2C=NR^3$, wher R is an organic chain. By extension the corresponding complexes are called symmetric complexes, they are known to be good metal chelators [2]. Indeed, the deprotonation of the two phenol functions of the ligand provides two negative charges, which makes it possible to obtain neutral complexes from dications[3].

Schiff Bases and their metal camplexes are widely used in the biological field because of their antibacterial; antifungicals; anti-inflammatory; antimicrobials properties… in the fields of chemistry, namely analytical chemistry, homogeneous and heterogeneous catalysis, the pharmaceutical industry, as well as in medicine.

This work is part of the synthesis and characterization of Schiff base molecules and complexes of Antidiabetic, Anti-inflammatory and Antimicrobial activities.

Key words: Schiff bases, imine, metal complexes, catalysis, biological activities,

References :

1] K. Bouhadjra, *Mémoire de Magiste*r, Université Mouloud Mammeri, Tizi-Ouzou, Algérie, **2011**
[2] Malik S, Singh A, et Ahmed N; Spectral characterization and thermal behavior of Schiff base metal complex derived from 2-aminobenzimidazole. *Advances in applied science research*, **2015,** 6(8), 199-204,
[3] Tadele, Antioxidant Activity of Schiff Bases and Their Metal Complexes: *A Recent Review. Journal of pharmaceutical and medicinal research*, **2017,** 3 (1), 73-77.

P2-27.

Effects of hydrocolloids (Arabic and Maltodextrin gums) on the production of fast millet rolled flour "Arraw"

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Millet flour granules or "arraw" in Senegal are a traditional rolled product, consumed in the form of porridge with an average cooking time of 37 minutes. It is therefore necessary to reduce the cooking time in order to increase its competitiveness on the market. The aim of this study was to develop a new method for preparing millet granules that would reduce cooking time. To achieve this, the cooking-extrusion technique combined with the use of hydrocolloids such as gum arabic and maltodextrin was used. Four pre-cooked millet flour granules were developed from extruded millet flour (FE), gum arabic (GA) and maltodextrin (MD): FEGA7 (93% FE + 7% GA); FEGA9 (91% FE + 9% GA); FEMD11

(89% FE + 11% MD) and FEMD13 (87% FE + 13% MD). Traditional millet flour (TrM) granules were used as a control. Total granules yields were 56% for FEGA7, FEGA9 and FEMD13 and 63% for FEMD11. The latter are lower than the control yield of 70%. Analyses showed water absorption indices of 3.68 and 4.56 g/g for FEGA7 and FEGA9, 3.57 g/g for FEMD11 and FEMD13 versus 1.04 g/g for TrM and 6.63 g/g for FE. Water solubility indices ranged from 13.18 to 15.24% for FEMD formulations, and from 11.31 to 11.71% for FEGA formulations, compared with 5.17% for TrM and 12.75% for FE. Cooking times for slurry preparation ranged from 6 to 8 minutes for FEGA7 and EMGA9, and 6 minutes for EMMD11 and EMMD13 with a 2mm diameter, compared with 23 minutes for traditional slurry. Gum arabic and maltodextrin are excellent binders for rolling extruded flour. Maltodextrin significantly improved the solubility of pre-cooked millet granules. Cooking-extrusion has a significant effect on reducing slurry cooking time and increasing absorption.

Keywords: millet flour granules, extrusion cooking, maltodextrin, gum arabic, cooking time