

"Dunărea de Jos" University of Galați

Scientific Conference of Doctoral Schools

Perspectives and challenges in doctoral Research
14th Edition of SCDS-UDJG
11th and 12th of June 2026

BOOK OF ABSTRACTS



Dunărea de Jos” University of Galați
DOCTORAL SCHOOL OF MECHANICAL AND INDUSTRIAL ENGINEERING
DOCTORAL SCHOOL OF FUNDAMENTAL SCIENCES AND ENGINEERING
DOCTORAL SCHOOL OF HUMANITIES AND SOCIAL SCIENCES
DOCTORAL SCHOOL OF BIOMEDICAL SCIENCES

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CONFERENCE PROGRAMME

THURSDAY – June 11, 2026

08:00-10:00	Invited plenary lectures
09:00-11:00	Participants registration
10:00-13:00	Invited lectures Oral presentations in concurrent sections
13:00-14:00	Lunch (building D - 1 st floor)
14:00-16:00	Oral presentations in concurrent sections
16:00-16:30	Coffee break (building D - 1 st floor)
16:00-18:00	Oral presentations in concurrent sections
18:00	Cultural evening

FRIDAY – June 12, 2026

09:00-10:30	Oral presentations in concurrent sections
10:30-11:00	Coffee break (building D - 1 st floor)
11:00-13:00	Posters session
11:00-13:00	Workshop
13:00-14:00	Awarding ceremony. Closing ceremony
14:00-15:00	Lunch (building D - 1 st floor)

TABLE OF CONTENTS

Nicoleta Platon, Vasilica Alisa Arus, Oana Cristina Pârvulescu - Hydrolyzed Collagen and Konjac Glucomannan as Functional Additives in Frozen Dough Bread Systems	9
Andreea-Loredana Comănescu, Ana-Raluca Măghinici, Andrei-Daniel Geman, Andra-Georgiana Trifan, Constantin Apetrei - Amperometric biosensors based on enzymes used in food analysis	10
Elisabeta-Irina Geană, Corina Teodora Ciucure, Adelina Andreea Constantin, Claudia Sandru, Irina Mirela Petreanu - Utilization of Agri-Food Industry By-Products to Develop Value-Added Bioproducts in the Context of the Circular Bioeconomy	11
Alexandra-Mariana Ionescu, Andreea-Veronica Botezatu, Ana-Maria Mocanu, Anna Busuioc, Maria Daniela Mihăilă, Alina Viorica Iancu, Bianca Furdui, Mihaela Silion, Costel Vîntor, Rodica Mihaela Dinică - Characterization of Chemical Composition and Biological Activities of <i>Sideritis spp.</i>	12
Andrei-Daniel Geman, Andreea-Loredana Comănescu, Constantin Apetrei - Detection and Quantification of Resveratrol Using Voltammetric Biosensors Based on Screen-Printed Carbon Electrodes Modified with Gold Nanoparticles and Carbon Nanofibers	13
Andra-Georgiana Trifan, Constantin Apetrei - Electrochemical Detection of Estradiol Using a Gold Nanoparticle-Modified Carbon Electrode	14
Cristina-Mihaela Vîină, Aurel Tăbăcaru - Copper(I) Complexes with Antitumor Activity: Intrinsic Property or Activation Conditioned by the Tumor Microenvironment?	15
Măghinici Ana-Raluca, Comănescu Andreea-Loredana, Geman Andrei-Daniel, Constantin Apetrei - Development of a Laccase-Based Biosensor for the Accurate Detection of Paracetamol	16
Andreea-Loredana Comănescu, Andrei-Daniel Geman, Mihaela Timofti, Constantin Apetrei - A Disposable Electrochemical Sensor for Ultrasensitive Detection of Histamine in Bluefin Tuna	17
Maria Daniela (Ionică) Mihăilă, Andreea Veronica Botezatu, Valentina Andreea Călmuc, Puiu Lucian Georgescu, Cătălina Iticescu, Bianca Furdui, Rodica Mihaela Dinică - Development and Assessment of a Fast Chromatographic Workflow for Isolating Secondary Metabolites from Natural Sources Using Off-Line SPE	18
Diana Cătălina Coman Stroia, Andreea Veronica Botezatu, Bianca Furdui, Rodica Mihaela Dinică - Bioremediation of Soil from Petroleum Hydrocarbon Contaminants	19
Andra-Georgiana Trifan, Constantin Apetrei - Square-Wave Voltammetric Detection of Melatonin Using a Reduced Graphene Oxide-Modified Electrode	20
Hanane Oublid, Mohamed Ait Hamza, Abdellah El Hamdaoui, Latifa Askarne, Mohamed El Yaagoubi, Hassan Boubaker, Fouad Msanda - Phytochemical Content, Antioxidant, Antifungal, and Insecticidal Potentials of <i>Withania adpressa</i> Coss. Ex Batt. for Eco-Friendly Control of Stored Products	21
Harouna Diète Souleymane, Kouakou N'goran David Vincent, Haoua Sabo Seyni, Fred Bukachi, Rodica Mihaela Dinică - Development of Dietetic Eggs by Valorizing Two Ivorian Herbaceous Plants (<i>Corchorus olitorius</i> and <i>Euphorbia heterophylla</i> Seeds) to Improve the Productivity and Nutritional Quality of Laying Quail Eggs (<i>Coturnix coturnix japonica</i>)	22
Raileanu Raluca Nicoleta, Ionescu Alexandra-Mariana, Botezatu Andreea-Veronica, Busuioc Anna, Mihaila Maria Daniela, Iancu Alina Viorica, Furdui Bianca, Amani Brice Kadja, Dinica Rodica Mihaela - Chemical and biological studies of the stems of <i>Zanthoxylum zanthoxyloides</i> from Ivory Coast	23

Ngolo Elva, Mavoumba Beril, Mbougou-Bouesse Blondy, Ondele Radar, Etou Ossibi Arnaud Wilfrid - Preclinical Evaluation of the Acute Toxicity and Aphrodisiac Activity of the Aqueous Extract of Plant X in Male Rats	24
Haoussatou Sidibe, Korotoumou Traore, Issiaka Togola, Mamadou Abdoulaye Konare, Nouhoum Diarra - Antioxidant Potential of <i>Cyperus rotundus</i> L. and <i>Chrysopogon zizanioides</i> L.: Two Plants Traditionnaly Used to Stimulate Female Sexual Desire	25
Michaëlle Chokki, Durand Dah-Nouvlessounon, Alexandra Mariana Ionescu, Rodica Mihaela Dinică, Ramona Suharoschi, Baba-Moussa Farid - Chemical Profiling and Antioxidant Potential of <i>Combretum Racemosum</i> : A Promising Source of Bioactive Natural Compounds	26
Durand Dah-Nouvlessounon, Brice Dangnon, Chokki Michaëlle, Andreea-Veronica Botezatu, Rodica Mihaela Dinică, Lamine Baba-Moussa - <i>Vitellaria paradoxa</i> Used as Gastroprotective Agent for Gastric Ulcer Management	27
Caterina Banu, Jäntschi Lorentz - Applications of Chromatographic Methods in the Analysis of Ascorbic Acid in Pharmaceutical Products	28
Michaëlle Chokki, Durand Dah-Nouvlessounon, Andreea-Veronica Botezatu, Maria Daniela (Ionică) Mihăilă, Ramona Suharoschi, Baba-Moussa Farid, Rodica Mihaela Dinică - Flavonoid-rich <i>Jatropha multifida</i> Leaf Extracts: Anti-Inflammatory Activity and Implications for Anticancer-Related Mechanisms	29
Fatima Zahra Sadiki, Corina Neagu, Geta Carac, Andreea Veronica Dediu Botezatu, Mohamed Chabbi, Bene Kouadio, Mohammed Sbiti, Mostafa El Idrissi, Ali Amechrouq, Rodica Mihaela Dinică - Functional Gummy Candies Enriched with <i>Tetraclinis articulata</i> Essential Oil: Chemical Characterization, Antioxidant and Antibacterial Activities	30
M'po Sonia Marie Blanche, Ouedraogo Clarisse, Guenne Samson, Ouattara Nabéré, Benjamin Kouliga Koama, Meda Nâg-Tiero Roland - Traditional Use of <i>Eclipta alba</i> in the City of Bobo-Dioulasso in Burkina Faso	31
Florence Déclaire Maboua, Lionelle Kenfack Lemfack, Sophie Tomasi, Rodica Mihaela Dinică, Jean-De-Dieu Tamokou, David Ngnokam - In Vitro and in Silico Antibacterial Activities of Secondary Metabolites from Fruits of <i>Picralima nitida</i> (Apocynaceae)	32
Nguemnang Mabou Lile Christère, Nguenang Wonkam Vianney, Bedine Boat Marie Ampère, Davy Moussango Victor, Rodica Mihaela Dinică, Fekam Boyom Fabrice - Antifungal Effect of Clove Essential Oil Against Fungi Responsible for Postharvest Rot of Cassava in Ntui Locality	33
Sabrina Chris Janiba Sanvee, Hèzouwè Kagnou, Yendubé T. Kantati, Mindede Assih, Essotolom Badjabaissi, Aboudoulatif Diallo, Batomayena Bakoma - Chemical Composition and Evaluation of the Neuroprotective Properties of the Aqueous Fraction of <i>Uvaria chamae</i> in Diabetic Flying <i>Drosophila</i> (<i>Drosophila melanogaster</i>)	34
Skakri Soufiane, Anas El Attar, Kellenberger Andrea, Jama Charafeddine, El Rhazi Mama - In Situ Production of Hydrogen via Electrolysis Using Transition Metals Reinforced by a Layer of Conductive Polymer as Electrocatalysts	35
Mampionona Michela Rasoanirina, Rodica Mihaela Dinică, Dimby Andrianina Ralambomanana, Andreea Veronica Botezatu, Alexandra Mariana Ionescu, Alina Viorica Iancu, Hariliva Ramiarison, Rivoarison Randrianasolo, Andrianambinina A. Razakarivony - Bioactivity of Endemic Medicinal Plants of Madagascar	36
Idriss Miganeh Waiss, Andreea Veronica Botezatu, Maria Daniela (Ionică) Mihăilă, Rodica Mihaela Dinică - Granulometric Optimization Enhances Phenolic Concentration and Antioxidant Potential of <i>Abelmoschus esculentus</i> L. Powder	37
Kadjo Aka Fernand; Bene Kouadio - Medicinal Plants Traditionally Used Against Skin Diseases Among the Agni of Bongouanou (Central-East, Côte d'Ivoire)	38

Andreea-Loredana Comănescu, Constantin Apetrei - Detection of histamine in presence of catechol redox probe	39
Andra-Georgiana Trifan, Constantin Apetrei - Electrochemical sensors used in detection of thyroxine hormone	40
Ana-Raluca Măghinici, Constantin Apetrei - Detection of paracetamol with electrochemical sensors based on carbonaceous nanomaterials	41
Andrei-Daniel Geman, Constantin Apetrei - Detection of quercetin with chemically modified sensors	42
Andra-Georgiana Trifan, Constantin Apetrei - Electrochemical Sensors for the Detection of Estradiol: Advances and Applications	43
Ioana-Sabina Trifan, Gabriela Biliuta, Sergiu Coseri	44
Fluorescent Cellulose Derivative for Metal Sensing <i>via</i> Schiff Base Functionalization	
Mathieu Sawalda, Alfred Ngenge Tamfu, Abdourahman Fadimatou, Abubakar Siddiq Salihu, Selcuk Kucukaydin, Wan Mohd Nuzul Hakimi Wan Salleh, Mehmet Emin Duru, Andreea-Veronica Botezatu, Rodica-Mihaela Dinică, Emmanuel Talla - Neuroprotective Potential of Phenolic Compounds from Cameroonian Propolis: In Vitro, Molecular Docking and Molecular Dynamics Simulation Studies	45
Alfred Ngenge Tamfu, Rodica-Mihaela Dinică, Abubakar Siddiq Salihu - Antiinflammatory Potential of Selim Tea Plant (<i>X. aethiopica</i>) Extract with Molecular Docking Insights of Its Phytoconstituents	46
Koudoro Yaya Alain, Olaye Théophile, Olissan Alix Claudie Abossèdé, Agbangnan Dossa Cokou Pascal, Avlessi Félicien, Sohounhloué C. K Dominique, Alexandra Mariana Ionescu, Rodica Mihaela Dinică - Formulation of an Antibacterial Ointment from Extracts of Four Plants Used in Benin to Treat Skin Diseases	47

1. INVITED LECTURES

SECTION VII: CHEMISTRY - ELECTROCHEMISTRY IN LIFE SCIENCES

IL1

HYDROLYZED COLLAGEN AND KONJAC GLUCOMANNAN AS FUNCTIONAL ADDITIVES IN FROZEN DOUGH BREAD SYSTEMS

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ABSTRACT

The bakery industry increasingly uses frozen dough technology due to its extended shelf life and production flexibility; however, freezing negatively affects dough rheology, bread quality, and microbial stability. This study investigated the effects of bovine hydrolyzed collagen (HC) and konjac glucomannan (KGM) as natural bio-sourced additives for improving the quality characteristics of bread obtained from non-frozen dough (NFD) and frozen dough (FD). HC and KGM were characterized using SEM-EDX, MALDI-TOF MS, thermogravimetric analysis (TGA), and differential scanning calorimetry (DSC). A central composite design (CCD) was applied to evaluate the influence of HC and KGM concentrations (0.79–2.21%) on bread porosity, humidity, electrical conductivity, and pH. The results showed that freezing significantly decreased porosity and pH while increasing humidity, whereas electrical conductivity was not significantly affected. The optimal formulation was obtained at 1.5% HC and 1.5% KGM, where the predicted and experimental values showed a good agreement. Bread prepared from FD exhibited delayed mold development compared to that obtained from NFD, indicating improved shelf life. The incorporation of HC and KGM contributed to better water distribution, reduced freezable water content, and improved physicochemical stability of dough systems. These findings demonstrate the potential application of HC and KGM as sustainable and low-cost additives for enhancing frozen bakery products.

Keywords: bread dough properties, hydrolyzed collagen, konjac glucomannan, frozen dough

AMPEROMETRIC BIOSENSORS BASED ON ENZYMES USED IN FOOD ANALYSIS

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ABSTRACT

Electrochemical enzyme-based biosensors are analytical devices with great potential in the food analysis [1]. The most notable characteristics of these devices that make them highly attractive options for competing in the agri-food market with other technologies are: their specificity, their high sensitivity, their short analysis time, their ability to be included in integrated systems, their ease of automation, their ability to work in real time, their versatility that allows the design of customized devices, and their low cost, among others [2]. They are a useful tool for analyzing food quality, food safety, and food process control, allowing for the traceability of any existing problems in each process. The target analytes include biogenic amines, polyphenols, amino acids, carbohydrates, alcohols and also food contaminants or toxins [3]. For this reason, there is a large number of publications on this topic. This paper conducts a literature review of amperometric electrochemical enzyme-biosensors for food analysis developed in the last 10 years with potential to be used in the food industry in the future. The challenges and the future developments in the field are presented.

Keywords: biosensor, enzyme, food analysis

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UTILIZATION OF AGRI-FOOD INDUSTRY BY-PRODUCTS TO DEVELOP VALUE-ADDED BIOPRODUCTS IN THE CONTEXT OF THE CIRCULAR BIOECONOMY

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ABSTRACT

The increasing generation of agri-food industry by-products represents both an environmental challenge and an important opportunity for the development of sustainable bio-based solutions. This study focuses on the utilization of agri-food by-products as renewable feedstocks for the production of value-added bioproducts within the framework of the circular bioeconomy. The proposed approaches promote the valorization of agro-industrial biomass through integrated and environmentally friendly processes aimed at maximizing resource efficiency while minimizing waste generation and environmental impact. Various conversion pathways are considered for the recovery of bioactive compounds, bioethanol, biohydrogen, biomethane, biofertilizers from plant-based agro-industrial by-products, such as grape and apple pomaces, forestry biomass, wheat straw and corn stalk. Laboratory-scale clean technologies and biotechnological processes are emphasized, including extraction, fermentation, anaerobic digestion, and bioconversion methods that support the transition toward low-carbon and sustainable production systems. The integration of these processes contributes to the closure of material and energy loops, supporting near-zero waste strategies and improving the overall sustainability of agri-food supply chains. The research aligns with current global priorities related to climate neutrality, renewable energy production, sustainable agriculture, and resource conservation. By reducing dependence on fossil resources and encouraging the recovery of nutrients and energy from biomass waste, the proposed approach contributes to environmental protection, biodiversity preservation, and the development of resilient bioeconomy systems. Furthermore, the production of renewable energy carriers and biofertilizers supports the transition toward greener agricultural practices and sustainable food systems. Overall, the valorization of agri-food industry by-products offers significant potential for advancing circular economy principles while generating economic, environmental, and societal benefits.

Keywords: bioactive extracts, mobility and energy vectors, biofertilizers

Acknowledgement: This research was funded by the Romanian Ministry of Research, Innovation and Digitization through NUCLEU Program, Contract no. 20N/05.01.2023, Project PN 23 15 04 01: *“The cascade valorisation of agro-industrial waste of plant biomass type in bioproducts with added value in the circular bioeconomy system”*

OP1

CHARACTERIZATION OF CHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITIES OF *SIDERITIS SPP.*

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ABSTRACT

Sideritis spp. are part of the genus *Sideritis* in the Lamiaceae family and are often found in Western and Southwestern Europe [1]. It is currently used for gastric healing, but due to its rich composition of polyphenols, flavonoids, and terpenoids, it can serve as a good starting point for new therapeutic schemes [2]. This work aims to highlight the chemical composition of the *Sideritis spp.* plants by HPLC and TLC methods. Based on the main chemical compounds, the antioxidant activity, the anti-inflammatory activity, and the antimicrobial activities were determined. For all these tests, different methods were used, such as ABTS, albumin method, the Kirby-Bauer, MIC, MBC, and biofilm methods. The obtained results are promising from both chemical and bioactive points of view, so that *Sideritis spp.* can be considered for future in vivo and in vitro testing. In conclusion, these plants can represent a starting point for new phytotherapies in different medical fields, both for chronic and acute diseases.

Keywords: antioxidant activity, antimicrobial activity, chemical composition, HPLC, TLC

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DETECTION AND QUANTIFICATION OF RESVERATROL USING VOLTAMMETRIC BIOSENSORS BASED ON SCREEN-PRINTED CARBON ELECTRODES MODIFIED WITH GOLD NANOPARTICLES AND CARBON NANOFIBERS

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ABSTRACT

Diet is essential for human health, and with the rise of degenerative diseases, it is increasingly important to take care of it through a healthy lifestyle. This can be aided and supported by a diet rich in phenolic compounds [1]. One of these is resveratrol (RESV), an organic compound commonly found in grapes and their derivatives, with anti-inflammatory and anticancer properties, as well as a potential protective role against the development of degenerative diseases [2]. In order to detect resveratrol, a series of measurements were performed using three screen-printed sensors (GNP/SPCE, CNF/SPCE, and CNF-GNP/SCPE), made from carbon modified with gold nanoparticles (GNP) and carbon nanofibers (CNF). Each sensor was modified with laccase to enhance catalytic activity and electron transfer. The electrochemical behavior of RESV was investigated using cyclic voltammetry and differential pulse voltammetry, highlighting a well-defined oxidation signal. The measurements revealed that the biosensors exhibited different dynamic behavior compared to the unmodified sensors. The sensors demonstrated good reproducibility and allowed for the validation of the electrochemical signal, while the biosensors exhibited superior electrochemical performance, characterized by increased sensitivity and low detection limits.

Keywords: phenolic compounds, screen-printed sensor, laccase, electrochemical behavior, detection limit

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ELECTROCHEMICAL DETECTION OF ESTRADIOL USING A GOLD NANOPARTICLE-MODIFIED CARBON ELECTRODE

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ABSTRACT

Estradiol is an essential estrogenic hormone involved in the regulation of reproductive functions, maintenance of bone density, and modulation of various metabolic processes. In this context, an electrochemical sensor based on a carbon electrode modified with gold nanoparticles was developed for the sensitive and rapid detection of estradiol. The electrochemical characterization of the electrode surface was carried out using the ferro/ferricyanide redox system, highlighting the electrode's behavior. Electrochemical kinetics studies performed for estradiol at different scan rates indicated a diffusion-controlled electrochemical process. The analytical determination of estradiol was conducted using cyclic voltammetry, achieving limits of detection and quantification in the micromolar range. The sensor performance demonstrates adequate sensitivity for preliminary analytical applications. The sensor was further validated by determining the estradiol concentration in the pharmaceutical product Lenzetto, confirming its applicability for real sample analysis. The obtained results highlight the potential of the proposed sensor for the detection of estrogenic compounds, with prospects for further optimization toward lower detection limits.

Keywords: carbon, estradiol, gold nanoparticles, cyclic voltammetry

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COPPER(I) COMPLEXES WITH ANTITUMOR ACTIVITY: INTRINSIC PROPERTY OR ACTIVATION CONDITIONED BY THE TUMOR MICROENVIRONMENT?

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ABSTRACT

This paper analyzes the fundamental duality underlying the design of copper(I) complexes with antitumor activity, evaluating the extent to which the biological effect represents an intrinsic property of the coordination structure or is conditioned by the tumor microenvironment. The analysis focuses on Cu(I) mononuclear complexes with P- and N-donor ligands, which exhibit high thermodynamic stability and pronounced luminescence properties, and allow for monitoring of their behavior in biological environments. A critical evaluation of recent literature indicates that intrinsic factors, such as coordination geometry, chelate stability, and ligand-induced lipophilicity, play an essential role in the stability, cellular uptake, and distribution of these complexes. However, the cytotoxic response is frequently associated with microenvironment-dependent activation processes, particularly Cu(I)/Cu(II) redox cycling, which leads to the generation of reactive oxygen species and mitochondrial dysfunction. These observations suggest that while the chemical structure primarily controls pharmacokinetic properties, specific tumor microenvironment conditions, such as redox imbalance and local pH, contribute significantly to pharmacodynamic activation. Overall, the present analysis highlights the need for an integrated strategy in the development of non-platinum anticancer agents, in which rigorous control of the coordination sphere is essential to achieving a balance between stability and tumor selectivity.

Keywords: copper(I) complexes, antitumor activity, tumor microenvironment, cytotoxicity

OP5

DEVELOPMENT OF A LACCASE-BASED BIOSENSOR FOR THE ACCURATE DETECTION OF PARACETAMOL

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ABSTRACT

Paracetamol (PAR) or acetaminophen is a heavily used analgesic and antipyretic drug, frequently accessible without a prescription [1]. Its extensive use, however, has led to its emergence as a prevalent pharmaceutical contaminant in various environmental matrices [2]. Consequently, the development of a robust and sensitive analytical method for its detection is imperative for pharmaceutical quality control. In this work, we present a highly selective biosensor by integrating the biocatalytic specificity of Laccase with the signal-amplification properties of gold nanoparticles (AuNPs) on a disposable screen-printed electrode (SPE). The electrochemical behavior of the Laccase/AuNPs/SPE was investigated using Cyclic Voltammetry (CV) in pH-optimized buffer solution. The integration of Laccase provided superior selectivity, effectively eliminating signals from interferences. This newly developed tool offers a promising alternative for monitoring of PAR.

Keywords: cyclic voltammetry, laccase, screen-printed electrodes, biosensors, pharmaceutical analysis, paracetamol

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OP6

A DISPOSABLE ELECTROCHEMICAL SENSOR FOR ULTRASENSITIVE DETECTION OF HISTAMINE IN BLUEFIN TUNA

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ABSTRACT

Consumption of fish with a high content of histamine (HYS) can cause scombroid poisoning, one of the most common food poisonings in humans [1]. Therefore, it is necessary to develop devices that can detect histamine as sensitively and as quickly possible [2]. For the ultrasensitive detection of HYS, a sensor based on screen-printed carbon electrode (SPCE) modified with graphene (GPH) and gold nanoparticles (GNP) was developed. Cyclic voltammetry was the electrochemical technique used to evaluate the electrochemical response. The GPH-GNP/SPCE sensor presented superior analytical performances characterized by high sensitivity, a low detection limit (in the nanomolar range) and a wide linear range, performances that are due to the synergistic effect between the nanomaterials used. To demonstrate its practical applicability, this sensor was tested for the detection of HYS from complex food matrices, namely from bluefin tuna samples purchased from a local supermarket.

Keywords: graphene, gold nanoparticle, histamine, fish, bluefin tuna

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DEVELOPMENT AND ASSESSMENT OF A FAST CHROMATOGRAPHIC WORKFLOW FOR ISOLATING SECONDARY METABOLITES FROM NATURAL SOURCES USING OFF-LINE SPE

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ABSTRACT

Bioactive compounds represent a dynamic and innovative field with significant implications for human health. These molecules, naturally occurring in species such as *Iris pseudacorus*, exhibit diverse biological activities, antioxidant, anti-inflammatory, and antimicrobial, that contribute to their therapeutic potential in preventing or alleviating chronic and degenerative diseases [1]. Despite advances in analytical and biotechnological tools, the isolation of both targeted and untargeted secondary metabolites remains a major challenge due to their complex matrices and variable bioavailability. This study explores the potential of a fast chromatographic workflow for the semipreparative isolation of secondary metabolites from *Iris pseudacorus* extract using off-line C18 solid-phase extraction (SPE), guided by retention behavior in reverse-phase liquid chromatography [2, 3]. The obtained fractions were subsequently analyzed by thin-layer chromatography (TLC) to evaluate separation efficiency and metabolite distribution. Preliminary results suggest that this combined SPE–TLC approach offers a rapid and cost-effective strategy for obtaining metabolite-enriched fractions suitable for further structural and biological characterization.

Keywords: bioactive compounds, *Iris pseudacorus*, SPE cartridge, thin layer chromatography

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BIOREMEDIATION OF SOIL FROM PETROLEUM HYDROCARBON CONTAMINANTS

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ABSTRACT

A very topical problem for the environment is oil contamination, resulting from various industrial activities and not only, but especially due to activities related to the petrochemical industry. Ecological accidents involving petroleum products are a particular concern for the environment. Hydrocarbon-type compounds are, many of them, carcinogens and neurotoxic organic pollutants. Removal methods that were widely used until recently, such as incineration or burial in unsafe landfills, are prohibitively expensive, especially if the quantities of contaminants are large. The chemical methods generally used to eliminate hydrocarbons from various contaminated sites are expensive and sometimes not very efficient. In this context, bioremediation processes are promising technologies for treating these contaminated sites, being much more cost-effective and can lead to complete mineralization. Bioremediation is based on biodegradation, which can refer to the transformation of complex organic contaminants into other organic compounds or the complete mineralization of organic contaminants into inorganic compounds, carbon dioxide, water, and cellular or simpler proteins by biological agents such as microorganisms. A number of microorganisms are indigenous to soil and water and have the ability to degrade hydrocarbon contaminants. This paper aims to provide an up-to-date and comprehensive overview of the degradation of petroleum hydrocarbons by microorganisms in different ecosystems.

Keywords: hydrocarbon-type compounds, soil, bioremediation processes, biodegradation

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SQUARE-WAVE VOLTAMMETRIC DETECTION OF MELATONIN USING A REDUCED GRAPHENE OXIDE-MODIFIED ELECTRODE

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ABSTRACT

Melatonin is an endogenous hormone involved in the regulation of circadian rhythm and the sleep–wake cycle, having major importance in the biomedical and pharmaceutical fields. Its rapid and accurate determination represents an important objective of modern electroanalytical methods. In this context, a screen-printed electrode modified with reduced graphene oxide was used for the electrochemical detection of melatonin. Reduced graphene oxide provides enhanced electrical conductivity and an electrochemically active surface favorable for electron transfer. The electrochemical study revealed a well-defined redox behavior of melatonin and an efficient interaction between the analyte molecule and the electrode surface. The analytical performance of the sensor was evaluated by square-wave voltammetry, obtaining detection and quantification limits in the micromolar range. Quantitative determination of melatonin demonstrated a linear relationship between analyte concentration and anodic current intensity. Furthermore, the sensor exhibited a stable and reproducible electrochemical response over time. Validation of the sensor using commercial pharmaceutical products confirmed the accuracy and stability of the proposed method.

Keywords: reduced graphene-oxide, melatonin, sensor, square-wave voltammetry

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OP10

PHYTOCHEMICAL CONTENT, ANTIOXIDANT, ANTIFUNGAL, AND INSECTICIDAL POTENTIALS OF *WITHANIA ADPRESSA* COSS. EX BATT. FOR ECO-FRIENDLY CONTROL OF STORED PRODUCTS

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ABSTRACT

Withania adpressa Coss. ex Batt., a medicinal species of the Solanaceae family, thrives in the Moroccan Sahara and Algeria. The purpose of this study was to determine the phytochemical constituents and assess the insecticidal, antifungal, and antioxidant properties of extracts obtained using different solvents. Three solvents with varying polarities (methanol, ethyl acetate, and dichloromethane) were employed for extraction. The methanolic extract exhibited the highest contents of total phenolics (65.19 mg GAE/g extract) and flavonoids (9.38 mg QE/g extract). These compounds were strongly associated with potent antioxidant activities, as confirmed by DPPH (IC₅₀ = 0.029 mg/mL), FRAP (EC₅₀ = 0.007 mg/mL), and total antioxidant capacity assays (335.39 mg AAE/g extract). In contrast, the dichloromethane extract showed only moderate antifungal activity against *Penicillium expansum*, with minimum inhibitory concentrations (MIC) ≥ 5 mg/mL. Insecticidal bioassays against adults of *Tribolium castaneum* revealed that the ethyl acetate extract was the most toxic, with an LD₅₀ value of 1.91 mg/cm². Overall, these findings highlight *W. adpressa* as a promising source of bioactive compounds with strong antioxidant and biopesticidal properties. This supports its potential application in the development of eco-friendly pest management strategies and natural antioxidant agents.

Keywords: *Withania adpressa* Coss. ex Batt., phytochemical analysis, antioxidant capacity, antifungal properties, insecticidal activity, eco-friendly control

OP11

DEVELOPMENT OF DIETETIC EGGS BY VALORIZING TWO IVORIAN HERBACEOUS PLANTS (*CORCHORUS OLITORIUS* AND *EUPHORBIA HETEROPHYLLA* SEEDS) TO IMPROVE THE PRODUCTIVITY AND NUTRITIONAL QUALITY OF LAYING QUAIL EGGS (*COTURNIX COTURNIX JAPONICA*)

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ABSTRACT

In Côte d'Ivoire, poultry farming is a fast-growing sector, especially the breeding of laying quails prized by the population for their eggs. However, eggs are notorious high levels of cholesterol and are susceptible to oxidation. With this in mind with a view to improving the nutritional quality of eggs while also improve the zootechnical parameters of laying quails that this work was carried out by incorporating *Corchorus olitorius* and *Euphorbia heterophylla* in laying quail feed. The trial was carried out at the animal house of the large production farm of the Institut National Polytechnique Félix-Houphouët Boigny (INP-HB) in Yamoussoukro (Côte d'Ivoire). Sixty (60) laying quails (*Coturnix coturnix japonica*), eight (8) months old with an average live weight of 203.56±7.55 g, were used in this study, randomly divided into three (3) groups of 20 laying quails. The first group received commercial layer feed (IVOGRAIN-ponte 20 SIPRA) (100%, control diet [R0]). The second group received a 6% incorporation of *Corchorus olitorius* seeds with the commercial feed (RC) and the third group received 6% Euphorbia heterophylla seeds (RE). After two weeks of experimentation, the egg-laying rate was improved in the respectively by 70.83% for RC and 70.37% for RE, compared with R0 (63.33%). In addition, average egg weight was also improved for RC (10.09 g) compared to R0 (9.45 g). Biochemical analysis showed that RC improved the vitamin A content of the egg yolk (109.50 µg/100g) compared with R0 (88.50 µg/100g). Both RC and RE significantly reduced total cholesterol (TC) levels in egg yolk (RC = 10.65% and RE = 14.69%) and oxidative capacity (CO) (RC = 50.08% and RE = 44.27%) compared to R0 (CT = 23.02 and CO = 35.17%). These results show that the valorization of these two agricultural products (seeds of *Corchorus olitorius* and *Euphorbia heterophylla*) could be beneficial to the poultry industry in Côte d'Ivoire for the production of eggs with excellent nutritional qualities.

Keywords: *Coturnix coturnix japonica*, egg quality, *Corchorus olitorius*, *Euphorbia heterophylla*, Ivory Coast

OP12

Chemical and biological studies of the stems of *Zanthoxylum zanthoxyloides* from Ivory Coast

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ABSTRACT

Zanthoxylum is a genus of the *Rutaceae* family, which is widely known and distributed in many parts of the world. *Zanthoxylum* grows in different areas in North and South America, Africa, Asia, and Australia, with Africa having about 35 different species.

Zanthoxylum zanthoxyloides is a small tree or a shrub with spines that has a yellow bark with a specific fragrance. The genus *Zanthoxylum* is important, especially in the pharmaceutical and cosmetic industry, being a source of raw materials. This work aims to highlight the biological activities of *Zanthoxylum zanthoxyloides* by voltametric, electroanalytical, and optical analysis methods. Based on the main chemical compounds, the antioxidant activity and the antimicrobial activities were determined. For the antimicrobial activity tests, different methods were used, such as the Kirby-Bauer, MIC, and MBC. The obtained results are promising from bioactive points of view, so that *Zanthoxylum zanthoxyloides* can be considered for future in vivo and in vitro testing. In conclusion, the purpose of the experimental part was to confirm the biological efficiency of the plant extract on some dental samples, over a determined period of time.

Keywords: antioxidant activity, antimicrobial activity, optical analysis

OP13

PRECLINICAL EVALUATION OF THE ACUTE TOXICITY AND APHRODISIAC ACTIVITY OF THE AQUEOUS EXTRACT OF PLANT X IN MALE RATS

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ABSTRACT

Plant X is a climbing species from Central Africa belonging to the Apocynaceae family, traditionally recognized for its numerous medicinal properties. In the Republic of Congo, its stems are commonly used in traditional medicine to improve male sexual dysfunction. The present study aimed to evaluate, in a preclinical model, the acute toxicity and aphrodisiac potential of the aqueous extract of Plant X in male rats. Acute toxicity was assessed in mice according to OECD guideline 423, through observation of clinical signs, mortality, and any behavioral changes. Aphrodisiac activity was studied in male rats receiving two oral doses of the extract (250 and 500 mg/kg) for one week, compared to sildenafil (50 mg/kg), used as a reference molecule. The sexual parameters analyzed included erection frequency, penile licking frequency, erection latency, ejaculation latency, and post-ejaculatory interval. These parameters were measured for one hour on days 1, 4, and 7 of the experiment. The results show that the aqueous extract of plant X did not cause any signs of acute toxicity at a dose of 5000 mg/kg, indicating an LD50 greater than 5000 mg/kg. As an aphrodisiac, the 500 mg/kg dose resulted in a significant increase ($p < 0.001$) in erection frequency and penile licking frequency, as well as an improvement in sexual performance parameters, compared to the 250 mg/kg dose. The observed effects were comparable to those of sildenafil (50 mg/kg). This study provides a scientific basis for the traditional use of plant X and could contribute to its development in the treatment of male sexual disorders.

Keywords: plant X, acute toxicity, aphrodisiac

ANTIOXIDANT POTENTIAL OF *CYPERUS ROTUNDUS* L. AND *CHRYSOPOGON ZIZANIOIDES* L.: TWO PLANTS TRADITIONNALLY USED TO STIMULATE FEMALE SEXUAL DESIRE

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ABSTRACT

Formerly taboo and overlooked, women's sexual health is now at the forefront of public health priorities. The present study aimed to identify plants traditionally used to stimulate sexual desire in women and to carry out a phytochemical analysis of the two most frequently cited plants. A semi-structured interview method was used to collect the survey data. Total polyphenol and flavonoid contents were estimated by spectrometry, and antioxidant activity was evaluated using the DPPH/ABTS radical methods as well as the phosphomolybdate assay. The survey identified 49 plant species used to enhance female sexual desire, the most frequently cited being *C. zizanioides* (62%), followed by *C. rotundus* (32%). The highest polyphenol and flavonoid contents were obtained with the decoction extracts of *C. rotundus*, with values of 2.67 ± 0.15 mg GAE/g and 1.82 ± 0.003 mg QE/g, respectively. These extracts also showed the strongest free-radical-scavenging potential, ranging from 685.23 ± 3.71 μ g/mL for ABTS to 1454.0 ± 54.6 μ g/mL for DPPH. These findings show that these species are rich in bioactive compounds and possess strong antioxidant potential. They could be leveraged in the management of hypoactive sexual desire disorder in women.

Keywords: woman sexual health, antioxidant, phytochemistry, *C. rotundus*, *C. zizanioides*

CHEMICAL PROFILING AND ANTIOXIDANT POTENTIAL OF *COMBRETUM RACEMOSUM*: A PROMISING SOURCE OF BIOACTIVE NATURAL COMPOUNDS

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ABSTRACT

Combretum racemosum is a medicinal plant widely used in traditional medicine in Benin, yet its pharmacological potential remains only partially explored. In this study, we aimed to better understand its chemical richness and to evaluate its relevance as a source of natural bioactive compounds with potential applications in drug discovery. Our results show that this plant contains a wide variety of secondary metabolites, including tannins, flavonoids, anthocyanins, saponosides, alkaloids, and quinone derivatives, with clear differences between leaves and roots. Quantitative analyses revealed particularly high levels of polyphenols and flavonoids in ethanolic extracts, reaching approximately 5300 mg GAE/100 g and 13,000 mg QE/100 g, respectively. These findings highlight the chemical richness of the plant, especially in compounds known for their biological activity. Advanced LC-MS analysis further confirmed the presence of several important phenolic compounds, including ellagitannins such as vescalagin, pedunculagin, and casuarictin, as well as various flavonoid derivatives. These molecules are well recognized for their antioxidant and protective properties in biological systems. From a pharmacological perspective, the extracts demonstrated strong antioxidant activity in both DPPH and FRAP assays. This activity was particularly pronounced in hydroethanolic and methanolic extracts and closely correlated with their high polyphenol content. Overall, this work highlights *Combretum racemosum* as a promising and rich natural source of bioactive compounds. It supports the traditional use of the plant and provides a scientific basis for its further investigation in the development of new pharmacologically active molecules, particularly in the context of oxidative stress-related diseases.

Keywords: phytochemicals, antioxidant, *Combretum racemosum* extract, Benin

VITELLARIA PARADOXA USED AS GASTROPROTECTIVE AGENT FOR GASTRIC ULCER MANAGEMENT

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ABSTRACT

Oxidative stress is a pathophysiological factor posing challenging issues for treatment of several diseases including gastric ulcer, inflammatory diseases and adenocarcinomas. *Vitellaria paradoxa* is African plants whose parts is used for treating diseases including gastro-intestinal pathologies. This study aimed to characterize the gastroprotective, antioxidant and anti-inflammatory activities of *V. paradoxa* stem bark extracts based on various solvents. The phytochemical screened and antioxidant evaluation were performed using radical scavenging (ABTS and DPPH) and reduction (FRAP and APM) methods. The anti-inflammatory activity was performed through egg albumin denaturation model. The toxicological evaluation was done on *Artemia salina* and female wistar rats' models, and the gastroprotective activity was carried out on ethanolic induced gastric ulcer rat's model. The results reported that *V. paradoxa* stem bark extracts contain Catechin, Epicatechin, Ferulic acid, Apigenin-7-gluc, and Hesperidin. In the DPPH assay, the 97% ethanolic extract of *V. paradoxa* exhibited the strongest radical scavenging activity with an IC₅₀ of 27.05 ± 0.81 µg/mL. Similarly, for ABTS, the lowest IC₅₀ values were 21.34 ± 1.02 µg/mL (*V. paradoxa*, 97% ethanol) indicating strong antioxidant capacity. In the FRAP assay, methanolic extract for *V. paradoxa*; methanol + 1% HCl reached maximum reducing power of 2.39 mMol AAE/mg of dry extract. For APM, the 97% ethanolic extracts again showed the highest total antioxidant capacities: 31.78 ± 1.481 mMol AAE/mg (*V. paradoxa*). The stem bark extracts of *V. paradoxa* were revealed to be harmless in the *Artemia salina* as well as the rat model. The extracts of *V. paradoxa* exerted strong gastroprotective effect than omeprazole, a reference molecule commonly used. These extracts, rich in compounds exhibited strong antioxidant, anti-inflammatory, and gastroprotective activities, surpassing omeprazole in ulcer protection in rat models.

Keywords: phytochemicals, gastroprotection, oxidative stress, *Vitellaria paradoxa* extract, Benin

APPLICATIONS OF CHROMATOGRAPHIC METHODS IN THE ANALYSIS OF ASCORBIC ACID IN PHARMACEUTICAL PRODUCTS**Caterina Banu^{a*}, Jäntschi Lorentz^a**^a Technical University of Cluj-Napoca, Muncii boulevard, Cluj-Napoca, Romania

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ABSTRACT

Ensuring the quality and stability of vitamins in pharmaceutical products is a major challenge for the industry, given the high sensitivity of these compounds to environmental factors. The present study focuses on the analysis of ascorbic acid (Vitamin C), an essential micronutrient with a critical role in human metabolic processes and immune system function. The primary objective of this research was the development and validation of a precise analytical method for the identification and quantification of ascorbic acid in various pharmaceutical forms (infusion solutions, capsules, and tablets), including the monitoring of its integrity in products at or beyond their expiration date. The study employed high-performance liquid chromatography (HPLC) in reversed-phase mode, using a system equipped with a UV-Vis detector ($\lambda = 240$ nm) and an Eclipse XDB C18 column. The optimized mobile phase consisted of a mixture of water, acetonitrile, and formic acid in a ratio of 94:5:1 (v/v/v). For result validation, a comparison was performed with the iodometric method based on oxidation with potassium iodate in the presence of starch. The HPLC calibration curve exhibited excellent linearity within the concentration range of 5–100 mg/L, with a correlation coefficient of $r = 0.9989$. Analysis of pharmaceutical samples revealed variations between the measured and declared concentrations, particularly in expired products. The HPLC method proved superior to the classical chemical method by eliminating interferences caused by other reducing agents present in excipients. The results confirm that HPLC is the optimal method for quality control of ascorbic acid, providing the sensitivity required to detect its degradation under the influence of temperature and light. The study highlights the importance of proper storage conditions in maintaining the bioactivity of vitamin C-based pharmaceutical products.

Keywords: ascorbic acid, HPLC, pharmaceutical products

FLAVONOID-RICH *JATROPHA MULTIFIDA* LEAF EXTRACTS: ANTI-INFLAMMATORY ACTIVITY AND IMPLICATIONS FOR ANTICANCER-RELATED MECHANISMS

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ABSTRACT

Jatropha multifida is a medicinal plant of interest in natural product chemistry due to its richness in bioactive secondary metabolites, particularly flavonoids and polyphenols. This study investigates the anti-inflammatory activity of its leaf extracts and explores their potential relevance to anticancer-related mechanisms, based on their chemical composition and bioactivity. The anti-inflammatory potential was evaluated using the inhibition of heat-induced albumin denaturation, a widely used in vitro model for assessing protein stabilization under stress conditions. All extracts exhibited dose-dependent inhibitory effects. The hydroethanolic extract showed the strongest activity, reaching $97.31 \pm 0.35\%$ inhibition at $1000 \mu\text{g/mL}$, with the lowest IC_{50} value ($17.37 \pm 0.36 \mu\text{g/mL}$), indicating strong protein-stabilizing capacity. Methanolic and ethanolic extracts also demonstrated significant activity with comparable efficiency, while dichloromethane and acetone extracts showed lower effects. These biological activities are strongly associated with the flavonoid-rich chemical profile of the plant, particularly luteolin, quercetin, kaempferol, and their glycosylated derivatives. These compounds are known to interact with key inflammatory mediators such as $\text{TNF-}\alpha$, $\text{IL-1}\beta$, and IL-6 , thereby contributing to the modulation of inflammatory pathways. From a chemical and mechanistic perspective, these same flavonoids are widely reported in the literature for their antioxidant properties and their ability to interfere with cellular processes involved in cancer development, including oxidative stress regulation, cell proliferation, and apoptosis signaling. Although anticancer activity was not directly evaluated, the observed antioxidant and anti-inflammatory profiles suggest a relevant chemical basis for further investigation in this direction. Overall, *J. multifida* leaf extracts represent a promising source of flavonoid-rich bioactive compounds, highlighting their relevance in natural product chemistry and supporting further studies on their structure–activity relationships and potential pharmacological applications.

Keywords: anti-cancer, anti-inflammatory, *Jatropha multifida* extract, Benin

FUNCTIONAL GUMMY CANDIES ENRICHED WITH *TETRACLINIS ARTICULATA* ESSENTIAL OIL: CHEMICAL CHARACTERIZATION, ANTIOXIDANT AND ANTIBACTERIAL ACTIVITIES

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ABSTRACT

Natural products derived from plant secondary metabolites have attracted considerable interest due to their therapeutic and functional properties. Among them, essential oils and plant extracts are widely recognized for their antimicrobial and antioxidant activities, making them promising candidates for applications in both the healthcare and agri-food sectors. In addition, the development of innovative functional foods enriched with natural bioactive compounds has become an important strategy in the food industry, particularly in confectionery products such as gummy candies. The present study aimed to investigate the chemical composition, antioxidant potential, and antibacterial activity of the essential oil extracted from *Tetraclinis articulata* (Vahl) Masters, as well as to evaluate its incorporation into gummy candies as a value-added functional ingredient. The essential oil was obtained by hydrodistillation using a Clevenger-type apparatus and subsequently characterized by GC-FID and GC-MS analyses. Gummy candies were formulated using sugar, glucose syrup, water, citric acid, agar, and the essential oil of *T. articulata*. The antibacterial activity was assessed against different microbial strains using disc diffusion, liquid macrodilution, and solid dilution methods. The results revealed strain-dependent antimicrobial effects, demonstrating notable inhibitory activity. The antioxidant capacity of both the essential oil and the formulated gummy candies was evaluated using DPPH and ABTS radical scavenging assays. The findings showed significant antioxidant activity for both samples, highlighting the potential of the formulated candies as a functional product enriched with natural bioactive compounds. Overall, these results suggest that *T. articulata* essential oil represents a promising natural resource for therapeutic applications and for the development of innovative functional foods in the healthcare and agri-food industries.

Keywords: *Tetraclinis articulata* (Vahl) Masters, gummy candies, antioxidant activity, antibacterial activity

OP20

TRADITIONAL USE OF *ECLIPTA ALBA* IN THE CITY OF BOBO-DIOULASSO IN BURKINA FASO

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ABSTRACT

The use of traditional medicine is a common practice among indigenous populations in the face of various illnesses. Plants contain a large reservoir of secondary metabolites and possess extensive therapeutic properties. *Eclipta alba* is a medicinal herb well-known in traditional Asian and African medicine. This study was conducted to identify the different pathologies treated with *Eclipta alba* in the city of Bobo-Dioulasso, Burkina Faso. To this end, an ethnobotanical survey was carried out with traditional healers belonging to the "Jigi Sémè Association of Traditional Healers of Houet." The approach used was a semi-structured interview in the local language (Mooré or Dioula). The traditional healers were interviewed using a structured questionnaire about the use of *Eclipta alba* in the city of Bobo-Dioulasso, Burkina Faso. The survey was conducted over three months (July to September). At the end of the survey, proctological conditions (49.35%) and digestive disorders (24.68%) were the primary therapeutic applications of *Eclipta alba*. Interventions in the area of infections and general symptoms (11.69%) were also common. The majority of respondents were men (62.26%) rather than women (37.74%). The leaves were the most frequently used part of the plant (50%), and the most common preparation method was powder. The majority of respondents were between 40 and 60 years old. Furthermore, these results can be considered a source of information for scientific research in the field of pharmacology.

Keywords: Ethnopharmacology survey, *Eclipta alba*, pathologies, Burkina Faso

OP21

IN VITRO AND IN SILICO ANTIBACTERIAL ACTIVITIES OF SECONDARY METABOLITES FROM FRUITS OF *PICRALIMA NITIDA* (APOCYNACEAE)

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ABSTRACT

This study reports the antibacterial potential of secondary metabolites isolated from fruit of *Picralima nitida* (*Apocynaceae*) and their corresponding alkaloid hydrochloride salts. *P. nitida* is a well-known medicinal species widely distributed in tropical Africa, traditionally used for the treatment of malaria, abscesses, hepatitis, pneumonia, diabetes and hypertension, and recognized as a rich source of bioactive phytochemicals. Fruits collected in Cameroon were air-dried and extracted with methanol. Acidification of the crude extract using aqueous hydrochloric acid (4%) enabled conversion of naturally occurring tertiary indole alkaloids into their hydrochloride salt forms to enhance isolation efficiency and biological evaluation. Compounds were purified using classical chromatographic techniques and their structures were established through detailed spectroscopic analysis and comparison with reported data. Antibacterial activity was evaluated by the broth microdilution method against clinically relevant human pathogens. All extracts and isolated compounds inhibited bacterial growth, displaying minimum inhibitory concentrations (MICs) ranging from 32 to 1024 µg/mL with bactericidal effects. The methanolic extract showed notable activity against *Streptococcus pneumoniae* (MIC = 32 µg/mL). Among isolated metabolites, 27,28-dicarboxy ursolic acid and 23-hydroxyursolic acid demonstrated the strongest activity against *Staphylococcus aureus* and *S. pneumoniae* (MIC = 16 µg/mL). Akuammine, 23-hydroxyursolic acid, 7-deoxy-8-epi-loganic acid and akuammicine·HCl exhibited moderate broad-spectrum activity (MIC = 64 µg/mL). Molecular docking analyses revealed that 23-hydroxyursolic acid displayed the most favorable binding across multiple bacterial targets, highlighting a structure-activity relationship driven by hydroxyl functionality and a hydrophobic pentacyclic scaffold. Overall, the results support a multitarget antibacterial mechanism involving inhibition of DNA replication enzymes and suppression of bacterial virulence pathways, underscoring *P. nitida* metabolites as promising leads for antibacterial drug discovery.

Keywords: *Picralima nitida*; secondary metabolites; antibacterial activity; in vitro assays; in silico molecular docking

OP22

ANTIFUNGAL EFFECT OF CLOVE ESSENTIAL OIL AGAINST FUNGI RESPONSIBLE FOR POSTHARVEST ROT OF CASSAVA IN NTUI LOCALITY

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ABSTRACT

Cassava is a vital source of food, employment, and income for many communities in Cameroon. However, its poor storability exposes it to fungal rots during postharvest, reducing both marketable and nutritional quality. This study aimed to isolate the fungi responsible for cassava rot in Ntui locality and to evaluate the antifungal potential of essential oil (EO) from *Syzygium aromaticum* (clove). Pathogens isolated from rotted cassava samples included *Rhizopus* sp. and *Fusarium* sp., with pathogenicity tests revealing *Rhizopus* sp. as the most virulent. The fungitoxic effect of clove EO was investigated in vitro against *Rhizopus* sp. at concentrations of 0.156, 0.312, 0.625, 1.125, and 2.5 mg/mL. Results showed significant antifungal activity, with a minimum inhibitory concentration (MIC) of 0.625 mg/mL. These findings highlight the potential of clove EO as a biofungicide for managing postharvest cassava rot, offering a promising eco-friendly alternative to synthetic fungicides.

Keywords: Cassava root rot, fungi, clove essential oil, biofungicide

OP23

CHEMICAL COMPOSITION AND EVALUATION OF THE NEUROPROTECTIVE PROPERTIES OF THE AQUEOUS FRACTION OF *UVARIA CHAMAE* IN DIABETIC FLYING DROSOPHILA (*DROSOPHILA MELANOGASTER*)

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ABSTRACT

Uvaria chamae is a plant traditionally and commonly used in Togo for the treatment of diabetes and its complications. The objective was to perform a chemical analysis and evaluate the neuroprotective properties of the aqueous fraction of *Uvaria chamae*. The composition of the aqueous fraction of the 50% hydroalcoholic extract of *Uvaria chamae* leaves was determined by chromatographic analysis (UHPLC/HRMS), and the neuroprotective properties of the extract were evaluated using a *Melanogaster drosophila* model. The aim was to determine the effect of the fraction on heat avoidance, negative geotaxis, and oxidative stress parameters in previously induced diabetic fruit flies. The chemical analysis revealed the presence of 11 metabolites, primarily flavonoids. Several compounds were identified, including quercetin, coclaurine, caffeic acid, and rutin. The results of the pharmacological evaluation showed that treating fruit flies with the *Uvaria chamae* fraction at different doses led to a significant decrease ($p < 0.01$) in glucose levels; an increase in negative geotaxis performance on day 30 ($p < 0.001$) at all doses used (2, 4, and 8 mg); and a significantly higher rate of heat avoidance on day 30 compared to untreated diabetic fruit flies ($p < 0.01$ and 0.001 at the 4 and 8 mg doses, respectively). The fraction also induced an increase in antioxidant enzyme activity. This study suggests the possibility of confirming the observed properties in experimental mammalian models such as rats or mice.

Keywords: neuroprotection, diabetes, fractionation, fruit flies

IN SITU PRODUCTION OF HYDROGEN VIA ELECTROLYSIS USING TRANSITION METALS REINFORCED BY A LAYER OF CONDUCTIVE POLYMER AS ELECTROCATALYSTS

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ABSTRACT

The growing demand for clean energy technologies to mitigate environmental challenges has intensified interest in sustainable hydrogen production. Electrocatalytic water splitting using renewable energy sources has emerged as a promising alternative to fossil fuels. Herein, we report an electrochemical investigation into the influence of amine group positioning in conductive phenylenediamine polymers (ortho-, meta-, and para phenylenediamine) on the electrochemical performance of nickel–copper bimetallic nanomaterials as electrocatalysts, aiming to enhance oxygen evolution reaction activity and improve their catalytic properties. The activation of different polymers was conducted in acidic medium using cyclic voltammetry followed by galvanostatic deposition of Nickel-copper particles. The structural and the electrochemical properties of the developed materials were investigated by several techniques such as Scanning Electron Microscopy (SEM), Transmission Electron Microscope (TEM), Selected Area Electron Diffraction (SAED), Electrochemical Impedance Spectroscopy (EIS) and Cyclic Voltammetry (CV). The analytical performance and stability for OER were evaluated using Linear Sweep Voltammetry (LSV) and chronoamperometry method (CA), respectively. The prepared electrocatalyst with para- isomer CPE@pPD / Ni-Cu exhibited high activity toward OER in the alkaline medium with an excellent OER activity and a low overpotential of 247 mV at the current density of 10 mA cm⁻². More interestingly, the results show a remarkable stability and durability of the electrocatalyst. The results suggest that the prepared electrocatalyst CPE@pPD / Ni-Cu could be a prominent catalytic material for effective green hydrogen production.

Keywords: electrolysis, transition metals , Nickel-copper particles

OP25

BIOACTIVITY OF ENDEMIC MEDICINAL PLANTS OF MADAGASCAR

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ABSTRACT

This paper presents the separation and identification of bioactive compounds from an endemic species of Madagascar, *Dionycha bojerii*, a tropical plant of the *Melastomataceae* family which is known in traditional medicine for its curative properties. *D. bojerii* extracts were made using different solvents, polar and non-polar and were further tested for the content of polyphenols and flavonoids. The antioxidant capacity of the extracts was evaluated using methods such as DPPH, ABTS or TAC. The presence of large amounts of polyphenolic compounds in alcoholic extracts was also supported by a higher antioxidant activity that led to the inhibition of free radicals. The extracts were also evaluated for possible antimicrobial properties. The screening performed showed an antimicrobial activity on pathogenic bacteria comparable to that of the antibiotic. Using column chromatography, some fractions were subjected to separation so that six pure compounds were separated and characterized by spectral methods. Studies of this plant are being deepened to elucidate other biologically active properties of this endemic plant.

Keywords: *Dionycha bojerii*, antioxidant activity, antimicrobial activity

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GRANULOMETRIC OPTIMIZATION ENHANCES PHENOLIC CONCENTRATION AND ANTIOXIDANT POTENTIAL OF *ABELMOSCHUS ESCULENTUS L.* POWDER

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ABSTRACT

Okra fruit (*Abelmoschus esculentus L.*), known for its high nutritional content, is widely consumed and cultivated in tropical and subtropical regions of the world. It is particularly appreciated by low-income populations, especially in African countries. Despite its benefits, the short post-harvest shelf life poses challenges for local farmers, particularly in regions like Djibouti, characterized by harsh climatic conditions and vulnerability to food insecurity. Okra fruit was processed into powder through lyophilization and milling. Five granulometric classes with 160, 220, 500 and 800 μm sieves, as well as the unsieved powder were studied for that purpose. Lyophilized okra fruits were milled and sieved into granulometric fractions (<160, 160-220, 220-500, 500-800, and >800 μm). Total polyphenol and total flavonoid contents, as well as antioxidant activity, were assessed using Folin-Ciocalteu, DPPH, and ABTS assays. The finest fraction (<160 μm) exhibited the highest TPC (36.17 ± 1.1 mg GAE/g extract) and demonstrated the strongest antioxidant activity, with DPPH and ABTS inhibition rates of $89.9 \pm 0.6\%$ and $66.4 \pm 1.4\%$, respectively. In contrast, the highest TFC was observed in the 220-500 μm fraction (26.94 ± 0.90 mg QE/g extract), suggesting differential distribution of phenolic subclasses according to particle size. A progressive increase in TPC was observed as particle size decreased. The <160 μm fraction showed significantly higher TPC compared to coarser fractions ($p < 0.05$). These findings confirm that finer particle sizes enhance the concentration and extractability of bioactive compounds, highlighting the importance of granulometric optimization in the development of functional okra-based powders.

Keywords: Okra fruit, Particle size fractionation, Total phenolic content, Antioxidant activity

OP27

**MEDICINAL PLANTS TRADITIONALLY USED AGAINST SKIN DISEASES
AMONG THE AGNI OF BONGONGOUANOU (CENTRAL-EAST, CÔTE
D'IVOIRE)**

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ABSTRACT

Dermatoses appear to be a source of ill-being, as they affect self-image. The aim of this study is to contribute to the valorization of the knowledge and know-how of the Agni of Bongouanou in the fight against skin diseases. This work was carried out using interview and trekking techniques. The frequency of quotation, the Smith index and the degree of consensus among informants were used to analyze the data collected. The survey of 259 people identified 62 species belonging to 58 genera, 34 families. The Fabaceae family (8 species) was the most represented. Leaves (64.52%) were the most commonly used organs. The method of preparation often used to make remedies is kneading. The cutaneous route is the most popular for administering therapeutic recipes. *Senna alata* L. was the most frequently cited by informants. The results obtained constitute a database for research in phytochemistry, pharmacology and toxicology, with a view to eventually proposing an improved antimicrobial traditional medicine (MTA).

Keywords: Agni, Bongouanou, Côte d'Ivoire, Dermatitis, medicinal plants

DETECTION OF HISTAMINE IN PRESENCE OF CATECHOL REDOX PROBE**Andreea-Loredana Comănescu^a, Constantin Apetrei^{a*}**

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ABSTRACT

Histamine is a compound produced by the body from histidine, an amino acid that is a constituent of proteins. Histamine is involved in the inflammatory response, vasodilation, gastric acid production, congestion and other functions of the respiratory system. This molecule is also a neurotransmitter, mediating processes such as thermoregulation, appetite and various cognitive functions, among others. Histamine is present in various foods. It is mainly found in matured and fermented products, such as red wine, matured cheese and certain types of fish. During maturation or fermentation, bacteria convert histidine into histamine [1]. Methods such as Enzyme-Linked Immunosorbent Assay (ELISA) high-performance liquid chromatography (HPLC) and gas chromatography (GC) are used to determine histamine [2-3]. These methods offer very good sensitivity but are complex, expensive and require highly qualified personnel. Electrochemical, sensor-based methods can be an alternative to classic analytical methods, the advantages being sensitivity, rapid and low costs. In this study, an electroanalytical method based on a screen-printed carbon electrode modified with carbon nanofibers was developed for the determination of histamine using catechol as a redox probe. The electrooxidation of catechol leads to the formation of benzoquinone, which reacts with histamine to form an electroactive adduct that is useful in the determination of histamine.

Keywords: carbon nanofibers, histamine, catechol, screen-printed carbon electrode

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ELECTROCHEMICAL SENSORS USED IN DETECTION OF THYROXINE HORMONE

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ABSTRACT

Thyroxine detection is primarily performed using laboratory methods and rapid diagnostic kits that measure the levels of this hormone in the blood to assess thyroid function [1]. The most common methods include immunoassays that detect both free and total thyroxine [2-3]. In this study different commercial sensors based on metallic nanoparticles were characterized and compared. Different redox probes were used for the characterization and comparison of nanostructures such as ferrocyanide and catechol solutions. After, the experimental parameters such as supporting electrolyte and pH. The redox behavior of thyroxine at sensors surfaces is characterized by one irreversible anodic peak at 0.3 V when differential pulse voltammetry is used. The detection of thyroxine was better carried out with sensors based on gold nanoparticles with limit of detection of 20nM.

Keywords: thyroxine, sensor, screen-printed electrode, nanoparticle

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DETECTION OF PARACETAMOL WITH ELECTROCHEMICAL SENSORS BASED ON CARBONACEOUS NANOMATERIALS

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ABSTRACT

Paracetamol is one of the most widely used and recommended medications worldwide, valued for its effectiveness and safety profile compared to other painkillers [1]. Its importance lies in its ability to treat mild to moderate pain and reduce fever – antipyretic- with minimal gastric side effects [2]. The detection of paracetamol using electrochemical sensors based on carbon nanomaterials is an advanced, highly sensitive technology essential for pharmaceutical quality control and environmental monitoring [3]. These sensors leverage the large surface area and excellent conductivity of materials such as graphene, carbon nanotubes, and carbon nanofibers to measure low concentrations of paracetamol. In all cases, the detection of paracetamol take place by electrooxidation of molecule to N-acetyl-p-benzoquinone-imine, a process which consists in exchange of two electrons and two protons. The advantages of electrochemical sensors based on carbonaceous nanomaterials are related to necessity of a small amount of sample, reduction of interferences based on lower potential of detection, and enhanced selectivity in analysis.

Keywords: paracetamol, sensor, carbon nanotube

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DETECTION OF QUERCETIN WITH CHEMICALLY MODIFIED SENSORS**Andrei-Daniel Geman^a, Constantin Apetrei^{a*}**

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ABSTRACT

Quercetin is one of the most widespread flavonoids among foods consumed by humans, being present in high concentrations in garlic, apples and tea [1]. Quercetin is a polyhydroxylated tricyclic flavonoid, which in nature is found glycosylated for instance in rutin (quercetin-3-rutinoside) [2]. Quercetin has numerous beneficial effects on human health, including antitumor activity, cardiovascular protection, cataract prevention, antihypertensive effects, etc.[3]. Therefore, the development of a novel method to detect quercetin from real samples is of great interest. In this study, a carbon paste electrode made from ultrapure graphite and silicon oil was developed and characterized in ferro-ferricyanide and catechol solutions. The redox processes were controlled by diffusion in the case of ferro-ferricyanide and by adsorption in catechol solution. For the enhancement of quercetin detection, the electrode was activated by immersion in 1 M NaOH solution and applying 1.5 V for 180 seconds. The detection of quercetin was carried out in citric acid buffer solution of pH 3 by square wave voltammetry. The limit of the of detection was in the nanomolar range based on the oxidation peak observed in square wave voltammograms. The sensor is useful in the quercetin quantification in nutraceuticals.

Keywords: quercetin, square wave voltammetry, carbon paste electrode

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OP32

ELECTROCHEMICAL SENSORS FOR THE DETECTION OF ESTRADIOL: ADVANCES AND APPLICATIONS

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ABSTRACT

Estradiol (17 β -estradiol) is the biologically active form of estrogen, a steroid hormone involved in the development and maintenance of reproductive functions, female secondary sexual characteristics, bone homeostasis, and neuroendocrine processes. Beyond its physiological role, estradiol is also recognized as a potent endocrine disruptor, capable of affecting growth, metabolism, and reproductive processes. It has been associated with an increased risk of hormone-dependent diseases, including breast and ovarian cancer, and is frequently detected in wastewater, surface waters, and biological samples. Due to its significant biological and ecological impact, monitoring estradiol concentrations is of major importance in both biomedical and environmental fields. In this context, electrochemical sensors have attracted considerable attention as fast, cost-effective, and portable analytical tools. Recent advances in nanomaterials and molecular recognition strategies have enhanced their analytical performance, enabling sensitive and selective estradiol detection in complex matrices.

Keywords: estradiol, hormone, endocrine disruptor, electrochemical sensor

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OP33

FLUORESCENT CELLULOSE DERIVATIVE FOR METAL SENSING VIA SCHIFF BASE FUNCTIONALIZATION

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ABSTRACT

The inherent properties of cellulose, such as its film-forming ability, biocompatibility, and biodegradability, can be further enhanced by structural modification through functionalization reactions, including oxidation and coupling processes. [1]. In this work, a fluorescent cellulose derivative was synthesized via periodate oxidation of cellulose using sodium periodate (NaIO₄), followed by Schiff base condensation with 4-aminobenzonitrile. The resulting material shows strong potential for fluorescent sensing of metal ions in wastewater due to the presence of multiple coordination and signaling sites. Evidence of metal ion binding and complex formation is indicated by changes in fluorescence intensity upon interaction with target ions. These responses are attributed to imine (C=N) bonds, pendant nitrile (–C≡N) groups, and aromatic π–π interactions from benzene rings, which collectively influence the fluorophore’s electronic environment. Overall, this study reports the synthesis and characterization of a functionalized cellulose derivative and demonstrates its use as a fluorescent chemosensor for Fe³⁺ detection. Sensing performance was evaluated through analysis of the fluorescence mechanism, detection limits, complex stoichiometry, and association constants, confirming its sensitivity for metal ion detection.

Keywords: cellulose, fluorescence, chemosensor, wastewaters

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Acknowledgements:

This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS-UEFISCDI, project number PN-IV-P1-PCE-2023-0558, within PNCDI IV.

NEUROPROTECTIVE POTENTIAL OF PHENOLIC COMPOUNDS FROM CAMEROONIAN PROPOLIS: IN VITRO, MOLECULAR DOCKING AND MOLECULAR DYNAMICS SIMULATION STUDIES

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ABSTRACT

Propolis is a resinous plant-derived bee product with medicinal properties. In this study, three phenolic compounds including icaritin, triacontyl p-coumarate and apigenin-7-O-glucoside were isolated from Cameroonian propolis and characterized using ¹H and ¹³C NMR experiments. The potential neuroprotective effects of the compounds against Alzheimer's disease was performed through acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) inhibitions. Icaritin, with an IC₅₀ value of 73.91±0.34 µg/mL, exhibited the highest AChE inhibitory activity compared with Triacontyl p-coumarate and Apigenin-7-O-glucoside, with IC₅₀ values were 81.65±0.90 and 91.08±0.76 µg/mL respectively, using Galantamine as a reference (IC₅₀=5.50±0.25 µg/mL). In the BChE assay, Icaritin, with an IC₅₀ value of 48.92±0.62 µg/mL, close to that of Galantamine used as a standard (IC₅₀=42.10 ± 0.15 µg/mL), proved to be more active than Triacontyl p-coumarate and Apigenin-7-O-glucoside with IC₅₀ values of 65.77±0.90 and 89.51±0.81 µg/mL respectively. Icaritin was the most active compound and exhibited highest binding affinity of -7.721 kcal/mol, representing 94% of the binding strength of galantamine (reference drug). 50 ns molecular dynamics simulation indicated that icaritin is a promising lead compound ensuring structural integrity of the receptor proteins and maintaining close contact with the enzyme. The phenolic compounds from Cameroonian propolis are possible candidates for the development of neuroprotective substances.

Keywords: propolis, neuroprotection, anticholinesterase activity, icaritin, molecular docking, molecular dynamics simulations

ANTIINFLAMMATORY POTENTIAL OF SELIM TEA PLANT (*X. AETHIOPICA*) EXTRACT WITH MOLECULAR DOCKING INSIGHTS OF ITS PHYTOCONSTITUENTS

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ABSTRACT

The anti-inflammatory potential of *Xylopiya aethiopica* extract was evaluated in vitro while its phytoconstituents were evaluated through molecular docking against two key pro-inflammatory targets, cyclooxygenase-2 (COX-2) and tumour necrosis factor-alpha (TNF- α), using GNINA v1.0.3, a deep-learning-augmented docking framework. *X. aethiopica* extract had low inhibition of nitric oxide (NO) and the IC₅₀ was 79.0 \pm 1.3 μ g/mL compared to the standard compound showed IC₅₀ value of 24.2 \pm 0.8 μ g/mL. Oxidative burst (ROS) inhibition of the *X. aethiopica* was good as it exhibited an IC₅₀ value of 16.5 \pm 2.1 μ g/mL compared to the standard ibuprofen whose IC₅₀ value was 11.2 \pm 1.9 μ g/mL. A total of 43 phytoconstituents representing alkaloids, diterpenes, triterpenes, flavonoids, steroids, and phenolics were docked against the rofecoxib-bound form of COX-2 (PDB: 5KIR) and the SPD304-bound trimeric form of TNF- α (PDB: 2AZ5), with ibuprofen as the reference anti-inflammatory compound. Binding affinities were evaluated using the Vina minimized affinity score and the GNINA convolutional neural network (CNN) affinity. Against COX-2, ten compounds exceeded ibuprofen (reference: -7.61 kcal/mol), with trans-tiliroside (-12.48 kcal/mol), lirioidenine (-10.22 kcal/mol), oxonantenine (-9.93 kcal/mol), and lanuginosine (-9.65 kcal/mol) as the strongest binders. Against TNF- α , 37 of 38 natural products surpassed ibuprofen (reference: -5.95 kcal/mol). The aporphine alkaloids lirioidenine and lanuginosine showed consistently high affinity across both targets (average Vina scores of -9.18 and -8.96 kcal/mol, respectively) and are proposed as priority candidates for molecular dynamics (MD) simulation. These findings provide a computational basis for the reported anti-inflammatory activity of *X. aethiopica* extracts.

Keywords: *Xylopiya aethiopica*; ROS and NO inhibition, anti-inflammatory activity, molecular docking; COX-2; TNF- α ; lirioidenine, aporphine alkaloids

OP36

FORMULATION OF AN ANTIBACTERIAL OINTMENT FROM EXTRACTS OF FOUR PLANTS USED IN BENIN TO TREAT SKIN DISEASES

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ABSTRACT

The incidence of bacterial and fungal infections in humans has significantly increased in recent years. This study aims to formulate an antimicrobial ointment based on medicinal plants (*Citrus sinensis*, *Phyllanthus amarus*, *Syzygium aromaticum*, and *Zingiber officinale*) traditionally used in Benin to treat skin diseases. The secondary metabolites of these plants were identified through coloration and precipitation reactions, and the contents of phenolic compounds were evaluated by estimating total flavonoids, tannins, and total phenols using the aluminum chloride, butanol-HCl, and Folin-Ciocalteu methods, respectively. The antioxidant activity of the plant extracts (hydroethanolic and essential oils) was assessed using the DPPH method. The ointment was formulated from the extracts with carefully selected excipients, followed by physicochemical and organoleptic characterization. The results revealed that the plants contain metabolites such as tannins, flavonoids, anthocyanins, anthraquinones, sterols, and terpenes, with high levels of phenolic compounds. The plant extracts exhibited antioxidant activity ranging from 0.1 µg/µL to 45 µg/µL. The ointment formulated from *Citrus sinensis*, *Syzygium aromaticum*, *Zingiber officinale*, and *Phyllanthus amarus* was semi-solid, yellow in color, with a pleasant smell, good homogeneity, a pH of 6.10, and a moisture content of around 5%.

Keywords: skin diseases, extracts of medicinal plants, secondary metabolites, characterization, antiseptic ointment