



CMS COLLEGE OF SCIENCE AND COMMERCE COIMBATORE (AUTONOMOUS)

AFFILIATED TO BHARATHIAR UNIVERSITY, COIMBATORE, TAMILNADU, INDIA

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SCHOOL OF BIOLOGICAL SCIENCES DEPARTMENT OF BIOCHEMISTRY

INTERNATIONAL CONFERENCE ON

NEXT GEN BIOCHEMISTRY



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ABOUT US

The CMS College of Science and Commerce, founded in 1988 by the CMS Educational and Charitable Trust, stands as a distinguished leader in higher education in Coimbatore. We are proud to be a premier center of academic excellence, delivering accessible and high-quality education to a diverse array of ambitious students each year. Our institution boasts an impressive selection of around 27 undergraduate programs and 15 postgraduate programs across various disciplines, including Life Sciences, Computer Science, Commerce, Management, and the Arts. We are committed to shaping the future leaders of tomorrow through our rigorous academic offerings and supportive learning environment.

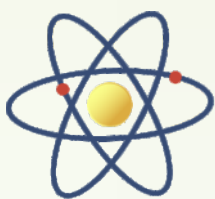
Since 1988



THE SCHOOL OF BIOLOGICAL SCIENCES

The School of Biological Sciences is dedicated to delivering an exceptional education in key scientific fields such as Biochemistry, Microbiology, and Biotechnology. We offer comprehensive undergraduate and postgraduate programs under the Choice-Based Credit System (CBCS), featuring an innovative and autonomous curriculum. Our research-driven approach is crafted and endorsed by experts from Bharathiar University, alongside other prestigious institutions and bio-based industries. Our faculty members are highly qualified and bring a wealth of experience in diverse biological science fields. They have successfully secured substantial research grants from the University Grants Commission (UGC), Government of India.

Additionally, our school is proudly recognized under the DBT-STAR College Scheme initiated by the Ministry of Science and Technology, Government of India, which actively promotes and aims to enhance science education among students.



THE DEPARTMENT OF BIOCHEMISTRY

The Department was established in 2004 with a strong commitment to educating, training, and nurturing exceptional young minds capable of discovering, designing, and delivering innovative solutions that significantly enhance human life and the environment. Our mission is to empower students to generate groundbreaking ideas and concepts while actively supporting their academic and career growth. Through robust collaborations with esteemed national and international institutions, we ensure that our curriculum and syllabus remain at the forefront of advancements in the field.

We proudly offer a comprehensive range of graduate programs, including B.Sc, M.Sc, M.Phil, and PhD (both full-time and part-time). Our faculty members are experts in their respective fields, bringing extensive experience from academia, industry, and research, and are dedicated to fostering student success. Our facilities feature separate undergraduate, postgraduate, and research laboratories, providing students with ample opportunities for hands-on experience and exposure. Our laboratories are well equipped with a fully air-conditioned instrumentation room and state-of-the-art equipment like

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- Remi High-Speed Refrigerated Centrifuge
- Riele Photometer 5010 V5+
- Equitron Rotary Vacuum evaporator
- Robonik readwell touch ELISA reader
- Sigma Plot software with Enzyme kinetics module



These premium equipment provide an extensive range of skill sets and hands-on training, empowering students to excel in Biochemistry and pursue successful careers beyond.



INTERNATIONAL CONFERENCE ON

NEXT GEN BIOCHEMISTRY

Google Meet: <https://meet.google.com/gdb-qshe-hev>

PROGRAM SCHEDULE

Prayer Song	:	Ms. Liyona, II M.Sc., Biochemistry
Welcome Address	:	Dr. T. Vinoth Kumar, Director, SBS
Presidential address	:	Dr. H. Balakrishnan, Principal, CMS-CSC
Technical session I		
Introduction of the resource person	:	Dr. V. Nandhini, Course Coordinator, Dept. of Biochemistry
Presentation	:	Ms. Saranya Varma, Scientist (Analytical Science), Eurofins Scientific, Richmond, Virginia, USA.
Q & A session		
Technical session II		
Introduction of the resource person	:	Dr. G. Akilandeswari, Asst. Prof of Biochemistry
Presentation	:	Dr. Vasanthanathan Poongavanam, Docent, Department of Medicinal Chemistry, Uppsala University, Sweden
Q & A session		
Vote of Thanks	:	Dr. Anubhama K V, Organizing Secretary, NGB 2025

PARALLEL SESSION I - ORAL PRESENTATIONS

Google Meet: <https://meet.google.com/gdb-qshe-hev>

1. **Akhansa Saha, Shobana Chandrasekar,**
Vels Institute of Science, Technology and Advanced Studies (VISTAS),
Chennai
2. **Ashwini R, K. Sonia,**
Ethiraj College For Women, Chennai
3. **Basila Basheer K K,**
Sir Syed Institute for Technical Studies, Taliparamba, Kannur
4. **S. Dhanashree Hemanath, V. Nandhini,**
HKBK College of Physiotherapy & Allied Studies
5. **Fathima Thzuhra,**
Sir Syed Institute for Technical Studies, Taliparamba, Kannur
6. **Jimsha E V,**
Sir Syed Institute for Technical Studies, Taliparamba, Kannur.
7. **J. Jony Blessing Manoj, Sivakumar V,**
Kongu Engineering College, Perundurai.
8. **Koorikkumar Muthusamy, Nithyadevi M,**
CMS College Commerce and Science, Coimbatore
9. **K. Shalini, M. Karthi, M. Muruga Boopathi,**
P.S.R. Engineering College, Sivakasi
10. **Nandana. C, A. Rohini,**
RVS College of Arts and Science, Coimbatore
11. **Fathimathu Rafa V V,**
Sir Syed Institute for Technical Studies, Taliparamba, Kannur
12. **V Rajna, R. Vidya,**
Vels Institute of Science, Technology and Advanced Studies, Chennai
13. **Rumaisa A,**
Sir Syed Institute for Technical Studies, Taliparamba, Kannur
14. **Richa Pradeep,**
Sir Syed Institute for Technical Studies, Taliparamba, Kannur
15. **Suganthamala. S,**
St.Pious X Degree and PG College for Women Nacharam, Hyderabad.,
R.A.Udaya Karthik,
SRM Institute of Science and Technology, Chennai

16. **Subhiksha C,**
Ethiraj College for Women, Chennai
17. **N. Ahamed Kabir,**
V. O. Chidambaram College
18. **P. Kavitha, Aswathi P.K, Indra Priythriline, Vidya Valsrajan, Siddharth,**
Sir Syed Institute For technical Studies, Taliparamba, Kannur
19. **Damodharan, M. Sathya,**
CMS College of Science and Commerce
20. **Gowtham. K, V. Nandhini,**
CMS College of Science and Commerce
21. **Jeevannndham. V, G. Akilandeswari,**
CMS College of Science and Commerce
22. **Liyona.V, Nithyadevi M,**
CMS College of Science and Commerce
23. **Pravin Kumar. K, Nithyadevi M,**
CMS College of Science and Commerce
24. **Sanjay. K, M. Sathya,**
CMS College of Science and Commerce
25. **Sanoobi C. K, Anubhama. K. V,**
CMS College of Science and Commerce
26. **Hisana Mustafa M. T, G. Akilandeswari,**
CMS College of Science and Commerce

PARALLEL SESSION II – POSTER PRESENTATION

Google Meet: <https://meet.google.com/dyh-bzjj-zrt>

1. **Harshini Sundarapandian,**
Ethiraj, and Joemon K J, Garden City University, Bengaluru
2. **Bharath Kumar K, Joemon K J,**
Garden City University, Bengaluru
3. **G. Raja, B. Usharani,**
Vels Institute of Science, Technology and Advanced Studies, Chennai

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Asst. Prof of Biochemistry

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Asso. Prof. &
Course Coordinator,
Dept. of Biochemistry



Mr. JAYARAM JAYARAJ,
Asst. Prof of Biochemistry



Dr. G. AKILANDESWARI,
Asst. Prof of Biochemistry

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Asso. Prof of Biochemistry



Dr. M NITHYA DEVI,
Asst. Prof of Biochemistry

MESSAGE FROM CHAIRMAN



We are delighted to know that the Department of Biochemistry, CMS College of Science and Commerce, Coimbatore is hosting an International Conference on Next Gen Biochemistry 2025 (NGB 2025). This event will serve as an invaluable platform for academicians, researchers, and entrepreneurs to engage in meaningful discussions regarding the latest advancements in Biochemistry. We extend our warmest congratulations to the organizing team for their dedication and efforts in orchestrating this significant conference, which promises to address key issues of interest within the academic and scientific communities. We wish them every success in their endeavor.



MESSAGE FROM PRINCIPAL



I am pleased to present the proceedings of the International Conference on Next Gen Biochemistry 2025. This conference aims to bring together leading professionals from various fields of biochemistry, including research scientists, analytical chemists, clinical biochemists, and other experts, to share their experiences, research findings, methodologies, and advancements in biochemistry and its related fields. This book serves as a summary of the papers presented at the conference.

The School of Biological Sciences at CMS College of Science and Commerce in Coimbatore offers undergraduate and postgraduate courses, as well as doctoral programs in the departments of Biochemistry, Biotechnology, and Microbiology. Our faculty members are actively involved in research, development, and innovation. We strive to enhance our students' skills to make them relevant to the industrial, research, and academic sectors. We are committed to exploring ways to improve our innovation and entrepreneurial initiatives across all our programs and activities.

I would like to extend my gratitude to all the members of the Organizing Committee for their dedication to this important conference. I commend them for leading the efforts that made this event possible. My heartfelt congratulations go out to the faculty members, participants, and everyone who has made significant contributions to this conference.

MESSAGE FROM THE DIRECTOR, SCHOOL OF BIOLOGICAL SCIENCES



It is with great pleasure that I present the Proceedings of the International Conference on Next-Gen Biochemistry as the Director of the School of Biological Sciences and host of this Conference. This year's theme, Next-Gen Biochemistry, is a testament to the ever-evolving nature of biochemical sciences. This Conference aims to bring together leading professionals involved in various aspects of biochemistry, including research scientists, industrialists, entrepreneurs, and other experts, so that they will have a forum to share their experiences, research results and methods, developments, and their contemporary applications as we move ahead in this current century. As we stand at the crossroads of cutting-edge research and technological advancements, we witness groundbreaking innovations in biological sciences involving several fields.

The conference sub-themes aim to highlight several fields, such as Agrobiotechnology, phytochemistry and phytotherapeutics, nutritional biochemistry, nutraceuticals, cosmetic science, forensic science, Clinical Biochemistry and diagnostics, Molecular Diagnostics, metabolomics, omics in healthcare, AI in healthcare, drug designing, clinical research, and data analytics.

We are privileged to have two highly accomplished scientists who have made significant contributions to the field of biochemistry, Ms. Saranya Varma, a Scientist in Analytical Science at Eurofins Scientific, Richmond, Virginia, USA, and Dr. Vasanthanathan Poongavanam, a Docent in Medicinal Chemistry at Uppsala University, Sweden for the technical sessions.

Ms. Saranya Varma has extensive expertise in biochemical analysis, she has played a pivotal role in developing innovative analytical techniques for

pharmaceutical and biomedical research. Her work is crucial in ensuring the accuracy, efficiency, and reliability of scientific testing in healthcare and drug discovery. Her session at the conference provided us with valuable insights into emerging trends in analytical biochemistry and their real-world applications.

Dr. Vasanthanathan Poongavanam is a researcher focused on drug discovery, molecular modeling, and pharmaceutical sciences, contributing significantly to advancements in medicinal chemistry and targeted drug design. His expertise in computational approaches to drug development has been instrumental in identifying new therapeutic molecules. In his talk, he shared his knowledge and command from his groundbreaking research shaping the future of precision medicine.

A special acknowledgment to the Strengthening component of Star College Scheme of DBT, Ministry of Science and Technology, Govt of India for their support in establishing a State-of-the-Art Biochemistry Laboratory with Third Generation Double Beam Spectrophotometer, Reily Semi Autoanalyser, Elisa Reader, Rotary Vacuum Evaporator and Sigmplot Enzyme Kinetics software.

I would like to extend my heartfelt gratitude to our esteemed Patrons, Shri. K. Gereesan, Chairman, Shri. P. V. Shajesh Kumar, Vice Chairman, Shri. V. Chandrakumar, Secretary, Shri. K. V. Sasi Dharan, Joint Secretary, Shri. P. Vijaya Kumar, Treasurer of CMS Educational Charitable Trust, whose vision and leadership have made this conference a reality. I would also like to place on record our gratitude for the unwavering support and encouragement of our Principal, Dr. H. Balakrishnan, Vice Principal, Dr. V. Sujatha, and the Controller of Examinations, Dr. N. Ravichandran, who have been instrumental in fostering academic excellence and research-driven initiatives in our institution.

A special appreciation goes to the Organizing Secretary, Dr. Anubhama. K. V, the editorial board, Dr. M. Sathya, and Dr. N. Nithiya Devi, and the members of the organizing committee, Course Coordinator of Biochemistry, Dr. V. Nandhini, faculty members, Mr. M. Jayaraj Jayaraj, and Dr. G. Akilandeswari, for their dedication and meticulous planning in making this conference a grand success amidst all the challenges.

ENHANCED CYTOTOXIC AND APOPTOTIC EFFECTS OF LIPOSOMAL QUERCETIN IN HUMAN LUNG CANCER CELLS: AN IN VITRO STUDY

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ABSTRACT:

Quercetin, a polyphenolic flavonoid, exhibits potent antioxidant, anti-inflammatory, and anticancer properties. However, its poor solubility and bioavailability limit its therapeutic potential. To address these challenges, quercetin was encapsulated in liposomes to enhance stability, solubility, and targeted delivery. This study investigates the cytotoxic and apoptotic effects of quercetin-loaded liposomes in A549 lung cancer cells and Vero normal cells. MTT assay was used to assess cytotoxicity, and AO/PI dual staining evaluated apoptosis induction. The results demonstrated dose-dependent cytotoxicity, with a significant reduction in A549 cell viability compared to Vero cells, highlighting selective anticancer activity. Apoptotic changes, including chromatin condensation and nuclear fragmentation, were observed in A549 cells, confirming apoptosis induction. These findings suggest that quercetin-loaded liposomes enhance therapeutic efficacy against lung cancer cells while minimizing toxicity to normal cells. The study supports liposomal quercetin as a promising targeted therapy for lung cancer, warranting further preclinical and in vivo investigations.

KEYWORDS: *Quercetin-loaded liposomes, Cytotoxicity, Apoptosis induction, A549 cell line, Drug delivery systems*

GREEN SYNTHESIS AND BIOACTIVITY ASSESSMENT OF MGO NANOPARTICLES CAPPED WITH *COUROUPITA GUIANENSIS* FLOWER PETAL

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ABSTRACT

Research on nano-based systems is rapidly growing due to their potential therapeutic applications in human healthcare. However, conventional chemical capping methods for synthesis often result in undesirable toxicity. Therefore, there is an immediate need for green and biocompatible synthesis approaches. This study presents the first report on the biocompatible green synthesis of *Couroupita guianensis* Flower Petal – capped MgO nanoparticles (Cg-MgO NPs) and evaluates their biological effects. The synthesized MgO nanoparticles (Cg-MgO NPs) were systematically characterized using spectroscopic and microscopic techniques. UV-visible spectroscopy exhibited a prominent absorption peak at 287 nm. X-ray diffraction (XRD) analysis confirmed their crystalline nature with a cubic structure. The presence of magnesium and oxygen was further validated through energy-dispersive X-ray (EDX) spectroscopy. The biofunctional moieties of the green-synthesized Cg-MgO NPs were analyzed using Fourier-transform infrared (FTIR) spectroscopy. Dynamic light scattering (DLS) analyses revealed that the Cg- MgONPs showed an average particle size of 146.8 nm. Cg-MgONPs showed potent antibacterial activity against human pathogens. In addition, Cg-MgONPs showed significant cytotoxicity against the gastric cancer cell line in a dose dependent manner followed by AO/EB staining. Overall, the findings suggest that the MgONPs synthesized using *Couroupita guianensis* flower petal hold significant potential for diverse biological applications.

KEYWORDS: *Couroupita guianensis*, MgO NPs, Antibacterial, Cytotoxicity, Apoptosis

THE COLOUR OF CONCERN: FOOD ADDITIVES AND ASSOCIATED HEALTH RISKS

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ABSTRACT

Consumer pleasure and expectations are strongly determined by colors, a visual characteristic linked to the spectral distribution of light arising from the interaction with matter. This influences their eating impulses and decision. Food colors are colors of sight, smell and taste that influence recognition and product acceptability. Food color can be synthetic, synthesizes equally to the natural, or naturally derived. The use of synthetic coloring additives to replace natural hues has increased to get specific qualities like enhanced look, deeper color saturation, increased colour stability and color uniformity. Foods tend to lose their natural color during preparation and storage, therefore artificial coloring becomes a technical need. At very levels of ingestion, the majority of food colours studied in traditional toxicity tests exhibited harmful effects. Some synthetic colourants might create health issues, specifically allergic reactions, which can lead to hyperactivity in kids and even mutagenic or cancerous diseases. It is often possible to replace synthetic colours with natural food colouring agents in order to overcome the negative health effects. However, the natural food colourant have been found to be relatively safe to humans. Avoiding foods that contain food additives can reduce the chance of acquiring health issues as a result of these additions. In addition to being within the permissible daily intake, the food additives must be applied in controlled amounts and concentrations.

KEYWORDS: food color additives, health risks, consumer awareness, public health

ABUTILON HIRTUM (LAM) SWEET (MALVACEAE) – MEDICINAL POTENTIAL REVIEW

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ABSTRACT

Abutilon hirtum, traditionally known as Indian mallow is a medicinal plant mostly found in tropical & subtropical regions. Traditionally it has analgesic, mucolytic, anti-inflammatory & anti pyretic activity. The given review shows its taxonomy, phytochemical constituents and phytochemical properties. Various bioactive compounds, including flavonoids, phenolic, and glycosides, have been identified, contributing to its antimicrobial, antioxidant, anti-inflammatory, analgesic, antipyretic, antidiabetic, and hepatoprotective properties. The plant's efficacy has been validated through in vitro and in vivo studies, demonstrating significant therapeutic potential. Additionally, biosynthesis of silver nanoparticles (AgNPs) using *A. hirtum* has shown promising antioxidant and cytotoxic effects. This comprehensive review provides insights into the pharmacological significance of *A.hirtum*, highlighting its potential applications in modern medicine.

KEYWORDS: *Abutilon hirtum*, Indian Mallow, phytochemicals, pharmacological activities, antimicrobial, antioxidant, anti-inflammatory, analgesic, antipyretic, antidiabetic, hepatoprotective, medicinal plants, silver nanoparticles (AgNPs).

EVALUATION OF ANTIOXIDANT ACTIVITY OF MALABAR TAMARIND (*Garcinia cambogia*)

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ABSTRACT

Numerous diseases arise as a result of oxygen free radicals causing damage to DNA and bio membranes through peroxidation, which damages tissue. RO Shave been implicated in the development of degenerative disorders, according to a wealth of research. Through a variety of mechanisms, antioxidants counteract the effects offer a radicals and may shield the body from a number of illnesses. Research indicates that compounds, particularly those derived from natural sources, can offer defense against free radicals. This has sparked a lot of interest in natural antioxidant research. Antioxidants which are abundant in some plants are crucial in absorbing and scavenging free radicals. Malabar tamarind (*Garcinia cambogia*) is a tropical fruit native to Southeast Asia. It is widely used in traditional medicine. The fruit contain Hydroxy citric acid, which believed to contribute to it's health benefits. Regarding antioxidant activity, *G.cambogia* has been shown to possess strong antioxidant properties. It contains poly phenolic compounds, such as flavonoids and catechins, which help neutralize free radicals in the body. These antioxidants may help protect cells from Oxidative stress, reduce inflammation and also aids in reducing the risk of chronic diseases, such as heart disease and cancer. In this study, antioxidant activity of *G.cambogia* was evaluated using Total Antioxidant Capacity (TAC), Ferric Reducing Antioxidant Power (FRAP) and Nitric Oxide (NO) scavenging assays. The results showed that the plant extracts exhibited strong antioxidant properties, with their effectiveness increasing with higher concentrations. These antioxidant activities are significant in cancer prevention, as they help combat the freeradicals responsible for DNA damage during carcinogenesis.

KEYWORDS: Antioxidant. Free radicals, Malabar tamarind, *Garcinia cambogia*.

ADVANCED BREAST CANCER SCREENING: INTEGRATIVE GENOMIC ANALYSIS OF BRCA2 MUTATIONS FOR EARLY DETECTION AND RISK ASSESSMENT

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ABSTRACT

Breast cancer is a leading cause of cancer-related mortality worldwide, with both genetic and environmental factors contributing to its onset. Among hereditary breast cancers, mutations in the BRCA2 gene play a crucial role by impairing DNA repair mechanisms, increasing susceptibility to tumor development. Identifying BRCA2 mutations is essential for early detection, risk assessment and personalized therapeutic strategies. This study aims to identify BRCA2 gene mutations through a molecular screening approach. Specific primers were designed and validated for BRCA2 amplification, ensuring high specificity and efficiency. DNA was extracted from blood samples using standard protocols, followed by quantification to assess sample integrity. Polymerase Chain Reaction (PCR) was performed to amplify the target regions and agarose gel electrophoresis was used to confirm successful amplification. This research aims to explore fine mutation detection techniques to enhance the accuracy of breast cancer risk assessment. By integrating molecular diagnostics into clinical applications, this study contributes to improving genetic screening strategies, enabling more precise early detection and personalized interventions. The findings will support advancements in precision medicine, facilitating better clinical decision making for individuals at high risk of hereditary breast cancer.

KEYWORDS: *Breast cancer, BRCA2 mutations, genetic screening, PCR, Precision Medicine*

STUDIES ON EXTRACTION OF BIOACTIVE COMPOUNDS FROM UNVENDIBLE DRIED AMARANTH LEAVES

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ABSTRACT

Gaining awareness about the ill effects of unapproved colours, consumers increasingly dislike foods with unapproved synthetic colorants. This cause the food industries to find an alternative food colour with low cost. *Amaranthus tricolour* is an edible plant with lot of health benefits but still giving low profit to the farmers. Drying is a critical post-harvest process for preserving the nutritional and sensory qualities of leafy vegetables like *Amaranthus tricolour*. The choice of drying method significantly impacts the final product's water activity (a_w), color, and bioactive components retention. This study evaluates the effects of drying methods like fluidized bed and shade drying on the quality attributes of *Amaranthus tricolour*. Fresh *Amaranthus tricolour* leaves were dried using fluidized bed (30–70°C), and under shade. Drying kinetics, effective moisture diffusivity were calculated using thin-layer drying models. Statistical analysis was performed to compare the drying methods. Fluidized bed drying at 50°C achieved the lowest a_w . Color analysis revealed that fluidized bed drying preserved greenness (a^*) better than shade drying. Fluidized bed drying is the most efficient method for achieving low water activity (0.434) and preserving quality attributes in *Amaranthus tricolour*. These findings provide valuable insights for optimizing drying processes in the food industry, ensuring both energy efficiency and product quality. The bioactive components at various drying conditions were extracted. The pink solution obtained at high yielding condition was applied in a food product and found not much deviation in sensory scores.

KEYWORDS: *Amaranthus tricolour*, water activity, fluidized bed drying, microwave drying, drying kinetics, color preservation.

COMPARATIVE STUDY ON POLYHERBAL PLANT FORMULATION WITH MEDICINAL PLANT: A NOVEL PREPARATION FOR ANTI-DIABETIC ACTIVITY

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ABSTRACT

Diabetes with their devastating outcomes has been discussed with polyherbal as well. This study aimed to comparatively evaluate different polyherbal formulations, each comprised of antidiabetic activity. The formulations were assessed based on [parameter such as *in vitro/in vivo* efficacy against a specific disease/condition, phytochemical analysis, antioxidant activity, antimicrobial activity, toxicity studies, etc]. Polyherbal formulations, harnessing the combined therapeutic effects of multiple medicinal plants, offer a promising approach for managing inflammatory conditions. This study comparatively evaluated two polyherbal formulations: Formulation A (containing *Senna auriculata*, *Salacia reticulata*, and *Andrographis paniculata*), Formulation B (*Withania coagulans*, *Tinospora cordifolia*, and *Gymnema sylvestre*). The formulations were assessed for their anti-inflammatory activity using carrageenan-induced paw edema in rats, and their phytochemical profiles were analyzed using HPLC. Results demonstrated that Formulation A exhibited the highest anti-inflammatory activity, significantly reducing paw edema compared to Formulations B. HPLC analysis revealed the presence of key bioactive compounds, including curcumin, gingerol, and boswellic acids, in Formulation A. These findings suggest that the specific combination of *Senna auriculata*, *Withania coagulans*, and *Tinospora cordifolia* in Formulation A provides a potent synergistic anti-inflammatory effect. Further clinical trials are needed to validate these preclinical findings. [e.g., cell culture assays, HPLC, GC-MS, etc]. Specific phytochemicals were identified and quantified, synergistic effects were observed, no significant toxicity was found, etc]. These findings suggest that the study provides valuable insights into the synergistic interactions within polyherbal formulations by using medicinal plants.

KEYWORDS: *Adiponectin, anti-diabetic activity, diabetes, glucose transport, peroxisome proliferators-activated receptor-gamma*

EXTRACTION, CHARACTERIZATION, COMPARISON OF SILICA FROM SUGARCANE BAGASSE AND ITS APPLICATION IN NANOCOATING

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ABSTRACT

Silica extraction from soil can have a major negative impact on the environment by causing pollution, soil erosion, and habitat damage. As an alternative, silica derived from agricultural waste, such as sugarcane bagasse, offers a more sustainable solution that minimizes environmental impact and promotes waste management. This study aims to extract, characterize, and compare silica from sugarcane bagasse to commercially available silica and to apply the silica nanoparticle in hydrophobic nanocoating. The sugarcane bagasse was incinerated into ash and silica was extracted from the ash by extraction-precipitation method. The silica nanoparticles were characterized by using Fourier Transform Infrared Spectroscopy (FTIR), UV-Vis Spectroscopy, X-ray Diffraction (XRD) and Scanning Electron Microscopy (SEM). The extracted silica nanoparticles were found to be in an amorphous state with a specific crystal structure. The silica nanoparticles were utilized to develop a hydrophobic nanocoating, enhancing water repellency on surfaces. Modified with hydrophobic agents, the silica-based coating exhibited excellent durability and self-cleaning properties. This eco-friendly approach demonstrates the potential of sugarcane bagasse-derived silica for sustainable nanocoating applications in various industries.

KEYWORDS: *Silica Nanoparticles, Sugarcane Bagasse, Extraction-Precipitation method, Nanocoating, Waste Management*

BIOREMEDIATION OF *NICOTIANA* LEAVES POLLUTANTS USING MICROBIAL CONSORTIUM

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ABSTRACT

Environmental pollution caused by tobacco waste is a growing concern due to its adverse effects on ecosystems and human health. Bioremediation using microbial strains presents an eco-friendly and sustainable approach to mitigating these pollutants. This study focuses on the biodegradation of nicotine and tobacco-specific nitrosamines (TSNAs) and lead from tobacco leaf powder. Nicotine biodegradation was carried out using *Pseudomonas* species in NIM medium. The efficiency of degradation was assessed using high-performance liquid chromatography (HPLC). For TSNA biodegradation, *Bacillus* species were utilized in an inorganic salt-based medium, and fermentation process optimization was conducted to enhance degradation efficiency. The residual TSNAs were quantified using high-performance liquid chromatography (HPLC). For lead biodegradation different *Bacillus* species suspensions were prepared, and degradation efficiency was analyzed at varying temperatures to determine optimal conditions. The degradation process was monitored using spectroscopy, with Eriochrome Black T used as a coloring agent to enhance detection sensitivity. The findings of this research highlight the potential of microbial strains in degrading hazardous environmental pollutants, offering promising applications in bioremediation strategies. The study contributes valuable insights into the use of *Pseudomonas* and *Bacillus* for the sustainable removal of toxic compounds, paving the way for further advancements in environmental biotechnology.

KEYWORDS: *Microbial Bioremediation, Fermentation, Pseudomonas, Bacillus, Heavy metal Biodegradation*

EXPLORING THE PHYTOCHEMICAL CONSTITUENTS OF *PHYLLANTHUS NIRURI*

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ABSTRACT

Medicinal plants have been widely recognized as valuable sources of bioactive compounds with diverse pharmacological properties. *Phyllanthus niruri*, a well-known medicinal plant has been extensively studied for its hepatoprotective, nephroprotective, antimicrobial and anti-inflammatory properties. The presence of key secondary metabolites such as alkaloids, flavonoids, tannins, phenolic and saponins contributes to its medicinal properties. Traditionally *Phyllanthus niruri* has been used for the treatment of liver disorders, kidney stones and microbial infections. Recent scientific investigations support these traditional claims, highlighting its antioxidant, immune modulator, and antibacterial activities. Additionally its potential applications in veterinary medicine are explored, demonstrating its efficacy as a natural alternative to synthetic drugs for improving animal health. Despite its promising pharmacological benefits, challenges such as standardization, toxicity assessment and clinical validation remain critical for its widespread therapeutic use. Integrating traditional herbal knowledge with modern scientific validation can promote the development of plant based therapeutics. Overall, this review reinforces the significance of *Phyllanthus niruri* in drug discovery and advocates for continued research in to its medicinal applications.

KEYWORDS: *Phyllanthus niruri*, Medicinal plant, Antioxidant, Antimicrobial, Therapeutic Applications

EVALUATION OF IN VITRO ANTI-DIABETIC ACTIVITY OF *CNIDOSCOLUS ACONITIFOLIUS* LEAF EXTRACT AND ITS SILVER NANOPARTICLES.

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ABSTRACT

Diabetes is a clinical condition brought on by an absolute or relative insulin deficiency. The incidence and prevalence of diabetes mellitus have significantly increased in recent decades. Alpha-glucosidase and alpha-amylase are two intestinal digestive enzymes essential for the breakdown of carbohydrates. Alpha-glucosidase and alpha-amylase enzyme inhibitors play a vital role in controlling hyperglycemia by reducing the intestinal absorption of glucose and can therefore be an important blood glucose management strategy. The objective of current study was to screen the aqueous extract of leaves of *Cnidoscopus aconitifolius* and the biosynthesized silver nanoparticles for its in vitro antidiabetic activity. Our assay result suggests that leaves extract and AgNPs of *Cnidoscopus aconitifolius* exhibit dose-dependent increase in percentage inhibitory activity on α -glucosidase enzymes (IC_{50} 326.61 μ g/ml and 294.05 μ g/ml respectively) and α -amylase (IC_{50} of 315.12 μ g/ml and 283.09 μ g/ml). Acarbose was used as standard to compare. The study proves that silver nanoparticles possess the highest anti-diabetic activity when compared to leaf extract and is nearest to the standard Acarbose.

KEYWORDS: *in vitro* antidiabetic activity, *Cnidoscopus aconitifolius*, alpha-amylase, alpha-glucosidase.

GENOMIC INSIGHTS INTO FEMALE INFERTILITY: CHARACTERIZING WEE2 AND BMP15 MUTATIONS IN REPRODUCTIVE DYSFUNCTION

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ABSTRACT

Female infertility is a complex disease that is influenced by genetic, environmental and hormonal factors. Recent genomic studies have highlighted the crucial role of WEE2 and BMP15 in oocyte maturation and early embryonic development. WEE2, a key regulator of meiosis, is essential for the proper maturation of oocytes and BMP15 plays a central role in folliculogenesis and oocyte competence, with mutations leading to primary ovarian insufficiency (POI) and impaired ovarian function. The goal of primer designing is to create particular primers for the genes WEE2 and BMP15, which are linked to reproductive failure. To amplify exonic areas containing harmful mutations, we created primers optimized for polymerase chain reaction (PCR) and sequencing techniques. By making genetic screening and functional research easier, the proposed primers will help us better understand how WEE2 and BMP15 mutations contribute to infertility. This study aims to characterize the functional impact of WEE2 and BMP15 mutations on reproductive dysfunction by integrating functional assays to assess their pathogenicity. Understanding these genetic contributions to female infertility could facilitate the development of targeted therapeutic strategies and improve assisted reproductive technologies (ART).

KEYWORDS: *Infertility, WEE2, BMP15, primer designing, exonic areas, PCR, genetic Screening.*

GENETIC ANALYSIS OF BRCA1 GENE TO EVALUATE THE MUTATIONS THAT INCREASE THE RISK OF BREAST CANCER

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ABSTRACT:

Breast cancer is a leading cause of cancer-related mortality worldwide, with both genetic and environmental factors contributing to its onset. Among hereditary breast cancers mutations in the BRCA1 gene play a crucial role by impairing DNA repair mechanisms, increasing susceptibility to tumor development. Identifying BRCA1 mutations is essential for early detection, risk assessment and personalized therapeutic strategies. The purpose of this project is to use molecular screening to find mutations in the BRCA1 gene. High specificity and efficiency were ensured by designing and validating specific primers for BRCA1 amplification. Using accepted procedures, DNA was extracted from blood samples and the integrity of the samples was evaluated by quantification. The target areas were amplified using the Polymerase Chain Reaction (PCR) and amplification process was verified by agarose gel electrophoresis. The goal of the study is to improve mutation detection methods so that breast cancer risk assessment is more accurate. This work advances genetic screening methods by incorporating molecular diagnostics into clinical applications allowing for more accurate early detection and individualized treatments. Better clinical decision-making for those at high risk of hereditary breast cancer will be made possible by the results, which will boost developments in precision medicine.

KEYWORDS: BRCA1, breast cancer, genetic screening, PCR, precision medicine

ARTIFICIAL INTELLIGENCE ASSISTED HEALTH CARE: A REVIEW OF CURRENT ADVANCES AND FUTURE APPLICATIONS

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ABSTRACT

Artificial Intelligence (AI) has been a pushing and crucial factor in the process of furthering of healthcare purposes, pushing limits which mankind has been hindered by for many years in the past. AI to heavily increment the quality of healthcare, nursing in particular. AI systems may be deployed almost everywhere in the world as large amounts of data about each and every minute aspect of health is being amassed by various Machine Learning and AI models all over the world. Healthcare specialists to relate and treat their patients in a more improvised manner by utilizing the combined wisdom of the best medical research performed and top-notch analytic technology. AI is being trialed for a range of healthcare purposes. It is observed in cases like AI – Powered Radiology, AI – guided cancer therapies, AI chatbots for patients, smart watches and other types of wearable's that AI and Machine Learning when utilized hand-in-hand ensure that the healthcare facilities which were once unobtainable in certain parts of the world and to certain amounts of people, can now experience this global right of rejuvenation and health. Implementation of AI in healthcare also poses various challenges like ethical issues, rationality of AI can also be questioned in extreme cases when a more 'human' mind could be the need of the hour, securing the trust of the people also can be labeled as one more difficulty. A key challenge would be ensuring that AI is developed and utilized in such a manner that there is no opaqueness in the credibility of the AI model, and it must also be compatible with the public's general interest whilst stimulating and increasing drive in the need for innovation in this sector of procuring Artificial Intelligence and Machine Learning in order to integrate it into the delicate field of healthcare.

KEYWORDS: AI, Health care, Machine Learning, Cancer therapy, Radiology

SYNTHESIS AND CHARACTERIZATION OF VANILLIN-CROSSLINKED GELATIN NANOCARRIER - A NOVEL APPROACH FOR DRUG DELIVERY APPLICATIONS

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ABSTRACT

Gelatin, a highly versatile natural biopolymer, is extensively utilized in the pharmaceutical industry due to its biocompatibility, biodegradability, and affordability. This study aims to develop a biodegradable and environmentally friendly gelatin-based nanocarrier for targeted drug delivery systems. Vanillin-crosslinked gelatin nanocarrier (V-GE) were synthesized using an emulsion crosslinking method, with vanillin serving as the cross-linker. The successful crosslinking of gelatin with vanillin was confirmed through UV-Vis spectroscopy, Fourier-transform infrared (FTIR) spectroscopy, and X-ray diffraction (XRD), with FTIR spectra indicating Schiff base formation and hydrogen bonding. Scanning electron microscopy (SEM) revealed uniform, spherical nanocarrier with smooth surfaces. Particle size distribution analysis confirmed nanoscale dimensions. The antitumor potential of V-GE was assessed against MDA MB231 human breast cancer cells using the MTT assay and AO/EB staining. The nanocarrier significantly reduced MDA MB231 cell viability, demonstrating potent anticancer activity. These findings highlight the potential of vanillin-crosslinked gelatin nano carrier as a biocompatible and efficient platform for targeted drug delivery in cancer therapy.

KEYWORDS: *Gelatin, vanillin, crosslinking, anticancer activity, targeted system*

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ABSTRACT

Nanobiotechnology is a hybrid new discipline that collaborates with both nanotechnology and biotechnology. Sustainable agriculture is a key component of the effort to meet the food demand of a rapidly increasing global population. Nanobiotechnology is a promising tool for sustainable agriculture. Plant diseases are caused by bacteria, fungi, insects, nematodes, phytoplasmas, and viruses; the diseases provoked by these pests cause financial losses by reducing attainable yields, product quality, and/or shelf life; fungicides in challenge to control plant pathogens. Traditional plant protection strategies often prove insufficient, and applying chemical-based pesticides has negative effects on animals and human beings apart from causing a decline in soil fertility. The impact of climate change on plant growth and productivity is profound, resulting in significant stresses such as biotic and abiotic factors. We review the effects of nanoparticles' different types, properties, and concentrations on plant growth and various abiotic (salinity, drought, heat, high light, and heavy metals) and biotic (pathogens and herbivores) stresses. Agricultural developments by this nanobiotechnology are also very significant. Besides all the positive developments, some harmful impacts of these nanoparticles also exist. Nanoparticles can alleviate biotic and abiotic stresses and improve morphological, physiological, and other biological parameters in medicinal plants and their production.

KEYWORDS: *Nanobiotechnology, Sustainable Agriculture, Biotic and Abiotic, Nanoparticle*

ANALYSIS OF PHYSICO-CHEMICAL PARAMETERS OF SOLAR SALTPAN

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ABSTRACT

In the present study, the physico-chemical parameters of the saltpan water were analyzed. The maximum and minimum pH values recorded during September and May was 7.19 and 6.21, respectively. Electrical conductivity was high in the month of April (84.2 mhos) and it reduced during December (40.1 mhos). The temperature of the crystallizer pond was recorded as 37.8 °C during April and the temperature was lowered during November (31 °C). The maximum brine density recorded was 28.1°Be during September, whereas it was minimal in December with a value of 20.1°Be. The chloride content was maximum during April (188.6 g l⁻¹) and it was minimal during June (151.5 g l⁻¹). The sulphate content varied between 34.2 g l⁻¹ and 39.1g l⁻¹. The calcium content was observed as 0.088g l⁻¹ in April and it reduced as 0.21g l⁻¹ during November. The maximum and minimum magnesium concentration values recorded during August and November were 12.62 g l⁻¹ and 12.1g l⁻¹ respectively. The sodium ion concentration ranging from 58.79 g l⁻¹ to 58.1 g l⁻¹. The maximum and minimum value of potassium concentration recorded was 3.23 and 2.12 g l⁻¹ during June and December respectively.

KEYWORDS: *Saltpan, physico-chemical, EC, salts, paramete*

EVALUATING THE ROLE OF SERUM Cystatin C IN TYPE 2 DIABETES MELLITUS PATIENTS

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ABSTRACT

Diabetes Mellitus Patients. Type 2 diabetes mellitus (T2DM) is a metabolic disorder characterized by insulin resistance and impaired insulin secretion, leading to chronic hyperglycemia. T2DM patients are at increased risk of developing kidney disease. Serum cystatin C, a cysteine proteinase inhibitor, has emerged as a potential marker. The present aimed to evaluate the role of serum cystatin C as a marker of renal function in T2DM patients. Specifically, we investigated the relationship between serum cystatin C levels and renal function and diabetic complications in T2DM patients. This cross-sectional study included 110(90+20) T2DM patients attending outpatient clinics. Serum cystatin C levels were measured using a nephelometric assay. Renal function was assessed using estimated glomerular filtration rate (eGFR) including blood pressure, Urea, Creatinine Uric acid, HbA1c were also evaluated. Serum cystatin C levels were significantly higher in T2DM patients with impaired renal function (eGFR < 60 mL/min/1.73m²) compared to those with normal renal function. Elevated serum cystatin C levels were associated with impaired renal function and increased suggesting its potential role in risk stratification and monitoring of T2DM patients. Further studies are needed to validate these findings and explore the clinical applications of serum cystatin C in T2DM management.

KEYWORDS: *Cystatin C, Type 2 diabetes mellitus, urea, creatinine, eGFR, nephelometric assay.*

A COMPARATIVE STUDY OF ANTIOXIDANT ACTIVITY IN LEAF EXTRACTS OF *PHYLLANTHUS ACIDUS* AND *THESPESIA POPOULNEA*

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ABSTRACT

The study aimed at evaluating the antioxidant activity of leaf extracts of *Phyllanthus acidus* and *Thespesia populnea*. The extracts were obtained with ethanol, hydroethanol, and aqueous and were evaluated for the screening of phytochemicals, quantitative assessment of secondary metabolites, free radical scavenging assay, and the assessment of antioxidant status. Hydroethanolic leaf extracts of *Phyllanthus acidus* and aqueous leaf extracts of *Thespesia populnea* showed the presence of the maximum number of secondary metabolites. The study reported the highest phenols in the hydroethanolic leaf extract of *Phyllanthus acidus* when compared to that of aqueous leaf extracts of *Thespesia populnea*. The highest free radical scavenging activity and antioxidant status were reported in the hydroethanolic leaf extracts of *Phyllanthus acidus*. The study revealed that the hydroethanolic leaf extracts of *Phyllanthus acidus* exert high antioxidant activity.

KEYWORDS: *Thespesia populnea*, *Phyllanthus acidus*, hydroethanol, aqueous leaf extract

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PRELIMINARY PHYTOCHEMICAL INVESTIGATION AND EVALUTION OF *IN VITRO* ANTIOXIDANT AND ANTIDIABETIC ACTIVITY OF *FICUS RELIGIOSA L.* LEAVES

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ABSTRACT

Ficus religiosa L., commonly known as the sacred fig, is a medicinal plant widely used in traditional medicine for its diverse therapeutic properties. The present study aims to investigate the preliminary phytochemical profile of *Ficus religiosa L.* leaves using different solvent extracts, including aqueous, diethyl ether, chloroform, and ethanol. The phytochemical screening revealed a higher presence of bioactive compounds in the chloroform extract compared to other solvents. Further quantitative analysis of the chloroform extract demonstrated a significant presence of flavonoids, phenols, and tannins, which are known for their medicinal properties. The antioxidant potential of the chloroform extract was assessed using *in vitro* methods, including DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging and nitric oxide (NO) radical scavenging assays. Additionally, enzymatic (catalase activity) and non-enzymatic (vitamin C content) antioxidant assays were conducted to evaluate the extract's efficacy in neutralizing oxidative stress. The results indicated a significant dose-dependent antioxidant potential, suggesting its role in combating free radical-induced cellular damage. The antidiabetic activity of the chloroform extract was evaluated using the α -amylase inhibition assay. The extract demonstrated notable inhibitory activity against α -amylase, indicating its potential to regulate postprandial glucose levels. The presence of flavonoids, tannins, and phenolic compounds in the chloroform extract is likely responsible for its bioactivity. These findings suggest that *Ficus religiosa L.* chloroform extract possesses potent antioxidant and antidiabetic properties, which could be explored for therapeutic applications. Further studies are warranted to isolate and characterize the bioactive compounds and elucidate the molecular mechanisms underlying their pharmacological effects.

COPPER NANO-PARTICLE FOR ANTIMICROBIAL PROPERTY: A PROMISING APPROACH IN GREEN SYNTHESIS

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ABSTRACT

In recent ages, green nanotechnology had gained attraction in the synthesis of metal nano particles due to their cost-effectiveness, simple preparation steps, environment-friendly and targeted activity. The present study explores the green synthesis of copper nano particle (CuNPs) from *Ixora coccinea* and evaluates their antimicrobial, antifungal, and antioxidant properties. *Ixora coccinea*, a medicinal plant belonging to the family Rubiaceae, is known for its anti-inflammatory, antimicrobial, antifungal, and antioxidant activities. This study shows limelight to analyze the phytochemical present in the plant and to assess its antimicrobial and antifungal activity against *Staphylococcus aureus* and *Malassezia furfur*, and characterize the synthesized CuNPs. The study involved phytochemical screening using ethanol, chloroform, and aqueous extracts of *Ixora coccinea*. Quantitative analysis of *Ixora coccinea* revealed significant amounts of carbohydrates (8 mg/mL), proteins (15 mg/mL), flavonoids (10 mg/mL), and phenols (10 mg/mL) in the ethanolic extract. Antioxidant potential was assessed using DPPH and nitric oxide radical scavenging assays, showing maximum activity at 2000 µg/mL (85% and 73%, respectively). Antimicrobial and antifungal activity tests confirmed that the plant extract was effective at 500 µg/mL. Copper nano-particle were synthesized using an eco-friendly, cost-effective approach by reacting copper sulfate (CuSO₄) with the plant extract, resulting in a color change from dark green to bluish green. The synthesized CuNPs were characterized using UV-Vis spectrophotometer. The results indicate that green-synthesized CuNPs exhibit promising biomedical applications due to their potent antimicrobial, antifungal, and anti-inflammatory properties, from the study it is suggested that the potential use of *Ixora coccinea* in target-based drug development and anti-dandruff formulations will be highly useful to the society.

KEYWORDS: *Ixora coccinea*, Copper nano-particle, Antimicrobial.

STUDY OF *ARTOCARPUS HETEROPHYLLUS* FOR ITS ANTIOXIDANT AND ANTIMICROBIAL ACTIVITY

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ABSTRACT

Artocarpus heterophyllus is a medicinal plant known for its rich phytochemical composition. The study evaluates the in-vitro antioxidant and antimicrobial activity of *Artocarpus heterophyllus* leaf plant sample using chloroform, Aqueous, ethanol as a solvents. From the preliminary phytochemical analysis that shows the presence of bioactive compounds such as phenols, flavonoids, tannins were confirmed in the sample extract. Phytochemical results are largely present in the aqueous extract. The preliminary phytochemical analysis of aqueous extract of *Artocarpus heterophyllus* leaves was carried out in the present study. Antioxidant activity was assessed using DPPH (2,2-diphenyl-1-picrylhydrazyl) and NO (Nitric oxide) radical scavenging assays. The aqueous extract exhibited the highest free radical scavenging activity, followed by the chloroform, ethanol extracts, indicating a strong correlation between phenolic content and antioxidant potential. The antimicrobial activity of *Artocarpus heterophyllus* leaf sample against *Escherichia coli*, *Staphylococcus aureus*, *Bacillus sp.* Phytochemical screening revealed that chloroform, aqueous, ethanol extract contained adequate concentrations of flavonoid by (AlCl₃ assay), phenolics by folin-ciocalteu method, and tannins by folin's dennis method, which are known contributors to antioxidant and antimicrobial properties. These findings suggest that *Artocarpus heterophyllus* leaf possesses a range of medicinal properties that may serve as natural therapeutic agents for oxidative stress and bacterial management. The results highlight the potential of *Artocarpus heterophyllus* leaves as a promising source of antioxidant and antimicrobial compounds for food preservation and pharmaceutical application.

KEYWORDS: *Artocarpus heterophyllus*, Antimicrobial, free radical, Antioxidant.

IN VITRO STUDY OF ANTI-OXIDANT AND ANTI-DIABETIC ACTIVITY OF LEAF EXTRACT OF *PERSEA AMERICANA* MILL.

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ABSTRACT

Avocado (*Persea americana* Mill.) is a medicinal plant known for its rich phytochemical composition, including phenols, flavonoids, and tannins. Approximately 540 million people worldwide have diabetes, with about 10.5% of the adult population (20-79 years) living with the condition and in India has an estimated 212 million people with diabetes, making it the most affected country in the world. The study evaluates the *in vitro* antioxidant and antidiabetic potential of avocado leaf extracts prepared using chloroform, ethanol, petroleum ether and water as solvents. Phytochemicals are largely present in the chloroform extract. Antioxidant activity was assessed using DPPH (2, 2-diphenyl-1-picrylhydrazyl) and NO (Nitric oxide) radical scavenging assays. The chloroform extract exhibited the highest free radical scavenging activity, followed by the aqueous, petroleum ether and ethanol extracts, indicating a strong correlation between phenolic content and antioxidant potential. For antidiabetic activity, α -amylase inhibition assay was performed to evaluate the extract's ability to modulate carbohydrate metabolism. The Antidiabetic activity was done with chloroform extract and the most significant inhibitory effects against enzymes, suggesting its potential to regulate the glucose levels. Phytochemical screening revealed that ethanol, petroleum ether, chloroform and aqueous extracts contained adequate concentrations of flavonoids, phenolics, and Tannins, which are known contributors to antioxidant and antidiabetic properties. These findings suggest that Avocado leaf extracts, particularly the chloroform extract, Estimation of tannin's, phenolics, and flavonoids, possess potent bioactive compounds that may serve as natural therapeutic agents for oxidative stress and diabetes management. The results highlight the potential of Avocado leaves as a promising source of natural antioxidants and antidiabetic compounds for pharmaceutical and nutraceutical applications.

KEYWORDS: *Avocado, anti-oxidant activity, DPPH, folin dennis reagent, phytochemical screening.*

PHYTOCHEMICAL ANALYSIS, ANTI-AGING PROPERTIES AND FORMULATION OF FACE SERUM USING *LINUM USITATISSIMUM* SEEDS (FLAXSEED) AND *PRUNUS DULCIS* OIL (SWEET ALMOND OIL)

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ABSTRACT

The aim of the present study was to investigate the phytochemical composition, anti-aging properties, and formulate a face serum using flaxseed extract and almond oil. The phytochemical analysis revealed the presence of phenolic acids and flavonoids, which are known for their antioxidant and anti-inflammatory activities. Antioxidant assays, including DPPH and NO, demonstrated significant antioxidant activity of the flaxseed extract. Qualitative tests confirmed the presence of hyaluronic acid and beta-sitosterol, which are known for their moisturizing and anti-aging properties. The SPF of the extract, almond oil, and prepared face serum were evaluated using the Mansur equation, showing promising sun protection properties. The stability and pH of the product was also assessed, ensuring their safety and efficacy. The results demonstrate the potential of flaxseed extract as a natural ingredient for anti-aging skin care products, providing a promising natural remedy for aging skin. The face serum formulated in this study was found to be stable, non-greasy, and effective in improving skin hydration and elasticity. The combination of flaxseed extract and almond oil provides a synergistic effect, enhancing the anti-aging and moisturizing properties of the face serum. This study contributes to the development of natural and effective anti-aging skin care products, providing a promising alternative to synthetic ingredients. The face serum formulated in this study can be used as a natural and effective solution for improving skin health and reducing the visible signs of aging.

KEYWORDS: *hyaluronic acid, beta-sitosterol, Sun protection, anti-ageing serum, antioxidants*

BIOCHEMICAL CHARACTERIZATION OF VOLATILES AND NON-VOLATILES FROM *CINNAMOMUM SPP.*

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ABSTRACT

Cinnamomum species exhibit significant biochemical diversity in both volatile and non-volatile compounds, contributing to their distinct aromas and metabolic variations. This study focuses on comparing the volatile profiles of essential oils extracted from the leaves and bark of *Cinnamomum* species with unique fragrances, assessing the biochemical diversity of petiole extracts, and evaluating sweetness using a refractometer. Additionally, the relationship between sweetness index and volatile composition was explored. Volatile profiling of 20 *Cinnamomum* accessions identified unique compounds, including neointermedeol, valencene, safrole, sylvestrene, curlone, and cubenol in *C. riperium*, *C. cassia*, and specific accessions. Notably, *C. malabattrum* exhibited a distinct volatile profile compared to *C. verum*. Bark oil analysis showed cinnamaldehyde as the most abundant compound, with concentrations ranging from 5.28% in accession 9917 to 74.53% in *C. cassia*. In contrast, eugenol dominated the leaf oil composition, with its abundance varying from 0.9% in *C. cassia* to 94.77% in accession No. 1. Non-volatile analysis revealed a broad range of sugar content in petioles, with total sugars varying from 4.93% (accession No. 1) to 17.91% (accession 9902-2). Accession No. 9 displayed the highest sweetness in methanol (3.23% sucrose equivalent) compared to water (0.86%), indicating a higher extraction efficiency for sweet compounds in methanol. A positive correlation was observed between cinnamaldehyde levels in leaf oil and petiole sweetness in water, whereas in methanol, the correlation was weaker. These findings provide valuable insights into the biochemical complexity of *Cinnamomum* species, emphasizing their potential in flavor, fragrance, and pharmaceutical applications.

SYNTHESIS OF COTTON STALK BASED DIP-STICKS FOR RAPID DRUG DETECTION.

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ABSTRACT

The global necessity of rapid drug detection is increasing in health care, law enforcement, and forensic science to address the rising drug abuse and trafficking. Conventional methods are often time-consuming, expensive, and dependent on laboratory, which making them not suitable for widespread use. The main objectives of this study are to develop the cotton stalks-based dip sticks for rapid drug detection in eco-friendly manner, and also compare the efficiency and accuracy with traditional methods. The methodology of this study involves synthesising cotton stalk-based sheets from the agricultural by product (cotton stalks) and suitable reagent coating needs to be done for drug which has to be tested. As a result, the cotton stalk-based dip sticks for rapid drug detection will be created. In conclusion, this study addresses the issues associated with traditional method by utilising agriculture by-product, to synthesize eco-friendly and affordable dip sticks for rapid drug detection, providing a sustainable and scalable solution to this global issue.

KEYWORDS: cottonstalk, dip-sticks, eco-friendly, rapid detection, portable.

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FORMULATION AND COMPARATIVE ANALYSIS OF ECO-FRIENDLY FINGERPRINT POWDERS: EVALUATING ADHESION, RIDGE CLARITY, AND ENVIRONMENTAL STABILITY ACROSS DIVERSE SURFACE

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ABSTRACT

Fingerprint powders play a crucial role in forensic investigation by enhancing latent fingerprint on various surface. However, conventional fingerprint powders often contain synthesis chemicals that may pose environmental and health risk. This study focus on the formulation and comparative analysis of eco-friendly fingerprint powders derived from biodegradable and sustainable materials. The research involves the preparation of white powder using eggshell powder and black powder using coconut shell ash and orange rind powder. These powders are evaluated based on their adhesion efficiency, ridge clarity, and environmental stability across different surface types, including glass, plastic, metal, and Paper

A comparative study is conducted against commercially available fingerprint powders to assess performance in terms of particle size, surface adherence, contrast quality, and long-term stability. Advanced image analysis techniques are utilized to quantify ridge patterns visibility and contrast. Additionally, the environmental impact and sustainability of these powders are analyzed in comparison to conventional formulations. The findings aim to establish eco-friendly, and efficient alternative for forensic fingerprint development, promoting sustainable forensic science practices

KEYWORDS: *Eco-friendly, fingerprint powders, Eggshell, Coconut shell ash, orange rind, Latent fingerprint development, Ridge clarity analysis, Adhesion efficiency, Biodegradable forensic materials, Sustainable forensic investigation*

ROLE OF SERUM MAGNESIUM IN TYPE 2 DIABETES MELLITUS.

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ABSTRACT

Magnesium is an important mineral very essential for glucose homeostasis and insulin sensitivity. Comparison of serum Mg levels in type 2 diabetic patients with healthy controls and results of this hypomagnesemia patient with uncontrolled glycemic homeostasis. Mg is involved in reactions like kinases, protein synthesis, oxidation and insulin secretion. Mg is an intracellular cation plays a role in physiological and biological process like regulating insulin action, insulin mediated glucose uptake. Hypomagnesemia leads to tyrosine kinase activity impairment in insulin receptor levels leads to defective insulin action, insulin resistance and oxidative stress in type 2 DM and further development of chronic condition like heart diseases, macrovascular defects like stroke, myocardial infarction and peripheral artery diseases, microvascular defects like nephropathy, neuropathy and retinopathy. The observation of this study is serum Mg levels strongly correlated to glycemic control and recommends monitoring serum Mg levels in type 2 diabetes and supplementation should be considered in the management of diabetes.

KEYWORDS: *Diabetes mellitus, Magnesium, macrovascular defects, microvascular defects*

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