Kemenkes

Badiklat
Ikatan Apoteker Indonesia

MoleGro
Molecular Probes Discovery Group

Akreditasi Badiklat IAI
Akreditasi A, No: HK.02.02./F/1233/2024

Presented:

International Conference

Interdisciplinary Innovation in Drug Development: Challenges and Opportunities for Indonesia

2025

Wisma Kalla Makassar on June 24th–25th 2025 (Hybrid)

SKP IAI

IAI
IKATAN APOTEKER INDONESIA

金沢大学
KANAZAWA UNIVERSITY

BRIN
BADAN RISET DAN INOVASI NASIONAL

LABORATORIUM KLINIK Prodia

Fasri Group

Opening Remark

Distinguished guests,
Honorable keynote and invited speakers,
Researchers, colleagues, and fellow participants,

Assalamu'alaikum warahmatullahi wabarakatuh and warm greetings to you all.
It is a great pleasure and honor for me, on behalf of the organizing committee, to welcome you to the *International Conference on Interdisciplinary Innovation in Drug Development: Challenges and Opportunities for Indonesia.*

We are truly delighted to host this important gathering of scientists, professionals, and scholars in the field of pharmaceutical sciences and drug discovery. This conference aims to serve as a dynamic platform for the exchange of ideas, research findings, and collaboration opportunities across disciplines, with a focus on the innovation and transformation of drug development, especially in response to global health challenges.

I would like to express our deepest appreciation to **Prof. Kazuma Ogawa** from Kanazawa University, Japan for his gracious presence here with us today. We are truly honored by his participation, and we look forward to his insightful presentation. Our sincere thanks also go to all our **invited speakers** from various institutions who are joining us virtually:

1. **Prof. Bambang Purwono, Ph.D.** (Universitas Gadjah Mada, Yogyakarta)
2. **Prof. apt. Muchtaridi, Ph.D.** (Universitas Padjajaran, Bandung)
3. **Assoc. Prof. apt. Muammar Fawwaz, Ph.D.** (Universitas Muslim Indonesia, Makassar)
4. **Dr. rer.nat. Rien Ritawidya, M.Farm** (National Research Center, BRIN, Serpong.

Though distance separates us physically, your knowledge and contributions are invaluable and help to enrich the depth and scope of this conference. We also extend our heartfelt gratitude to all participants, sponsors, reviewers, moderators, and the organizing team who have worked tirelessly to make this event a success. Total participants are 160 participants divided into offline 75, and online 85 participants.

Let us use this opportunity not only to gain new knowledge but also to build meaningful connections that will contribute to advancing drug development in Indonesia and globally.

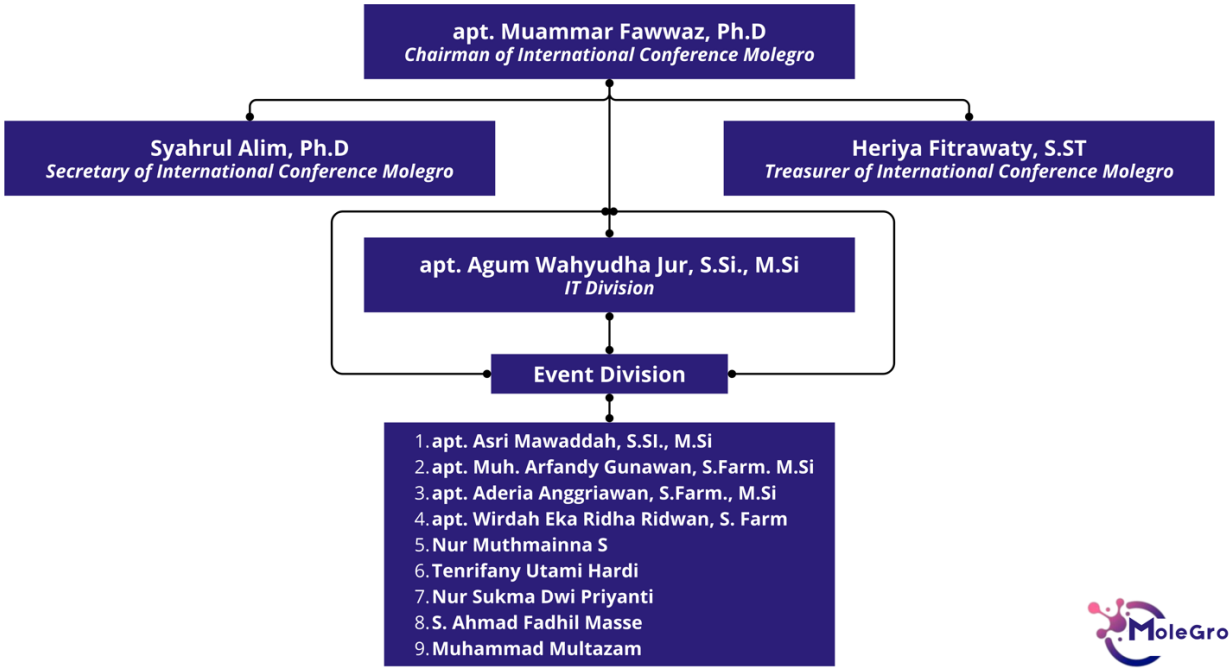
Thank you once again for your presence and support.
Wassalamu'alaikum warahmatullahi wabarakatuh,
Enjoy the conference, and may it be a fruitful and inspiring experience for us all.

Makassar, June 25th 2025

apt. Muammar Fawwaz, M.Si., Ph.D.
Chairman of Molecular Probes Discovery Group (MoleGro)

Committee Structure

International Conference:
Interdisciplinary Innovation in Drug Development: Challenges and Opportunities for Indonesia



Kementerian Kesehatan
Direktorat Jenderal Tenaga Kesehatan
Jalan Hang Jebat III Blok F3, Kebayoran Baru
Jakarta Selatan 12120, Kotak Pos No. 6015/JKS/GN
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SURAT KETERANGAN REGISTRASI PENINGKATAN KOMPETENSI

Nomor : 22699/F.V/REG-KT.03.02/2025

Berdasarkan keputusan Plt. Direktur Mutu Sumber Daya Manusia Kesehatan, menyatakan:

"TEREGISTRASI"

Nama	:	International Conference Interdisciplinary Innovation in Drug Development: Challenges and Opportunities for Indonesia
Jenis Kegiatan	:	Konferensi
Waktu Pelaksanaan	:	24 Juni 2025 s/d 25 Juni 2025
Angkatan	:	1
Jumlah Peserta	:	450
Penyelenggara	:	BADAN PENDIDIKAN DAN PELATIHAN (BADIKLAT) IKATAN APOTEKER INDONESIA
Cakupan	:	Internasional

Dapat diselenggarakan sesuai dengan ketentuan yang berlaku, dan surat keterangan registrasi ini berlaku untuk 1 kali pelaksanaan.

Validasi di sini:

Ditetapkan di : Jakarta
Pada tanggal : 27 Mei 2025
Plt. Direktur Mutu Sumber Daya Manusia Kesehatan

dr. Ika Trisia, MKM
NIP 197406022005012003

Lampiran Surat
Nomor : 22699/F.V/REG-KT.03.02/2025

SKP PESERTA

No.	Profesi	Status	SKP
1	Apoteker	Disetujui dengan Nilai SKP	14

DAFTAR MATERI

No.	Nama Materi	JEP	SKP Narsum	SKP Moderator
1	Radiotheranostic development for oncology	60	4	2
2	Drug discovery by synthesis molecule compounds based on natural resources	60	4	2
3	Development of radioimaging agent small molecule compound based TKIs as lung cancer imaging agent	60	4	2
4	From lab to market: Industry perspective on Indonesian drug development	60	4	2
5	Development of radiotheranostic agent for oncology imaging and therapy	60	4	2
6	Drug development from medicinal plant, vitex sp., based on DNA barcoding genes	120	8	4

Ditetapkan di : Jakarta
Pada tanggal : 27 Mei 2025
Plt. Direktur Mutu Sumber Daya Manusia Kesehatan

dr. Ika Trisia, MKM
NIP 197406022005012003

Terms of Reference (TOR)

International Conference

Theme:

Interdisciplinary Innovation in Drug Development: Challenges and Opportunities for Indonesia

A. Conference Overview

1. Background

The global pharmaceutical landscape is increasingly relying on interdisciplinary collaboration to drive forward innovations in drug development. This collaboration allows for pooling resources, knowledge, and expertise across various sectors to solve complex challenges such as identifying drug candidates, improving manufacturing processes, and meeting regulatory standards. The integration of fields such as artificial intelligence (AI), big data, molecular biology, bioinformatics, and nanotechnology into drug discovery and development is reshaping the industry's approaches and methods.

This conference aims to provide a platform for researchers, clinicians, scientists, engineers, and regulatory experts to share insights, present their findings, and discuss emerging trends in the field. Topics could include but are not limited to:

a. Advanced Drug Discovery and Design: The application of AI, machine learning, and bioinformatics in identifying novel drug targets and biomarkers. In modern drug discovery, synthetic and plant-based approaches often complement each other.
b. Development of Imaging Agent: The development of imaging agents for cancer involves creating compounds that can help visualize and detect tumors with high specificity and sensitivity. These imaging agents, often used in combination with imaging techniques like positron emission tomography (PET), computed tomography (CT), magnetic resonance imaging (MRI), or single-photon emission computed tomography (SPECT), play an essential role in early detection, diagnosis, staging, and monitoring treatment response.
c. Halal Issue in Drug Development: Refers to the challenge of ensuring that pharmaceutical products, including drugs, medical devices, and supplements, comply with Islamic law (Shariah).

d. **Regulatory Affairs and Compliance**: The challenges and evolving standards in bringing drugs to market, focusing on the regulatory harmonization efforts across borders.

2. General Objectives

The conference emphasizes the importance of bringing different scientific disciplines and professional sectors together to optimize drug development timelines, enhance efficacy, and reduce costs. Key objectives include:

a. Fostering Cross-Disciplinary Knowledge Exchange: Encouraging collaboration between academic researchers, pharmaceutical companies, clinicians, and regulatory bodies.
b. Promoting Innovation in Drug Development: Creating a space for discussing the latest advancements in biotechnology, pharmacology, and therapeutics, and how they can be applied in practical drug development.
c. Building Partnerships: Facilitating partnerships between industry players, startups, academic institutions, and healthcare professionals to accelerate the journey from discovery to market.
d. Addressing Global Healthcare Needs: A focus on global health challenges such as rare diseases, antibiotic resistance, and vaccines, fostering collaborative solutions for public health needs.

3. Specific Objectives

Focuses on cross-disciplinary collaboration to accelerate and improve the drug discovery and development process. Here are some specific objectives that can be explained:

a. Present the Latest Research and Innovation
   Be a forum for researchers and practitioners to present the latest research results, new technologies, and innovative approaches in drug discovery, clinical trials, and pharmaceutical production.
b. Bridging the Gap between Academic Research and the Pharmaceutical Industry
   Facilitate discussions between academics, industry, and regulators so that research results can be more easily translated into market-ready and regulatory-compliant products.
c. Promote Technology and Data-Based Approaches
   Explore the use of artificial intelligence, machine learning, computational modeling, and big data analytics to support the efficiency and accuracy of drug development.

d. Develop International Networks

Facilitate the exchange of ideas, build global research partnerships, and open up opportunities for collaboration between institutions across countries.

B. Scale of Conference

The conference was carried out in the city of Makassar, Indonesia, which will be attended by participants from within the country and abroad. The conference will consist of keynote speeches, panel discussions, and interactive workshops, where experts will dive into real-world case studies, success stories, and failures. Attendees will have the opportunity to engage in networking sessions, discuss collaborative research projects, and form potential partnerships.

1. ***Target professions***

   Apothecary, pharmacist, health workers, lecturers, undergraduate, graduate, and doctoral students from within the country and abroad.

2. ***Scope of conference***

   National and international participants

2. ***Speakers***

   Keynote Speaker: Rector of Universitas Muslim Indonesia.

   Plenary Speaker:

   1) Prof. Kazuma Ogawa, Ph.D. (Kanazawa University, **Japan**)
   2) Prof. Bambang Purwono, Ph.D. (Universitas Gadjah Mada, **Yogyakarta**)
   3) Prof. apt. Muchtaridi, Ph.D. (Universitas Padjajaran, **Bandung**)
   4) Assoc. Prof. apt. Muammar Fawwaz, Ph.D. (Universitas Muslim Indonesia, **Makassar**)
   5) Dr. rer. nat. apt. Rien Ritawidya (National Research and Innovation Agency, **BRIN**)

3. ***Number of target participants***

   200 participants

C. Implementation

This conference is organized by the Molecular Probes Discovery Group (MoleGro) at Universitas Muslim Indonesia as part of the KATALIS research consortium.

1. ***Method***

   The conference will be held using a hybrid approach, combining in-person and virtual participation. This method was chosen to allow international participants to join.

2. ***Participant rates***

General	: IDR 350.000
Student	: IDR 250.000
Oral presenter	: IDR 550.000
Poster presenter	: IDR 500.000
Foreigner	: USD 50

3. ***Facilities***

Proceeding book

Certificate

Lunch and coffee break

D. Event's Schedule

The conference will be held in a hybrid format.

Date	: June 24 – 25, 2025
Time	: 08.00 – 17.00 WITA
Venue	: Wisma Kalla, Saoraja Ballroom, Makassar.

E. Contact Person

apt. Muammar Fawwaz, M.Si., Ph.D. (Chairman)

Email: muammar.fawwaz@umi.ac.id

Phone/WA: 082125556303

Invited Speakers

Prof. Kazuma Ogawa, Ph.D

Graduate School of Medical and Pharmaceutical Sciences, Kanazawa University, Japan.

Topic: Development of Radiopharmaceuticals for Radiotheranostics Containing Targeted Alpha Therapy

Prof. Bambang Purwono, Ph.D

Department of Chemistry, Universitas Gadjah Mada (UGM), Yogyakarta.

Topic: Design and Synthesis of Antimalarial Agents from Vanillin Precursor

Prof. apt. Muchtaridi, Ph.D

Department of Pharmaceutical Analysis and Medicinal Chemistry, Universitas Padjajaran, Bandung

Topic: Computer-Aided in Drug Delivery: Success Story to Improve Alfa-Mangostin as Anti Breast Cancer

Assoc. Prof. Muammar Fawwaz, Ph.D.

Department of Pharmaceutical Sciences Universitas Muslim Indonesia (UMI), Makassar

Topic: Radiobrominated Tyrosine Kinase Inhibitors Targeting EGFR Dual Mutation in Lung Cancer

Dr. rer. nat. Rien Ritawidya, M.Farm

Research Center for Radioisotope, Radiopharmaceutical, and Biodosimetry Technology, BRIN, Serpong

Topic: Targeted Radiopharmaceuticals for Theranostic Application

Conference's Schedule

June, 24th 2025

Time	Event and Activity	PIC
07.30 – 08.00	Registration & Morning Coffee	*Organizer*
08.00 – 08.20	Opening remark	*MC: Andi Muhammad Arsyil*
08.20 – 08.30	National anthem	*MC*
08.30 – 08.45	Conference Chairman's Speech	**Assoc. Prof. apt. Muammar Fawwaz, Ph.D.** *Conference Chairman*
08.45 – 09.00	Opening remark by PD IAI Sul-Sel	**apt. Andi Alfian, S.Si., M.Si.** *Chairman of PD IAI Sul-Sel*
09.00 – 10.00	**Invited speaker 1** Topic: Development of Radiopharmaceuticals for Radiotheranostics Containing Targeted Alpha Therapy	**Prof. Kazuma Ogawa, Ph.D.** School of Pharmaceutical Sciences, Kanazawa University, Japan **Moderator :** **Assoc. Prof. apt. Nurmaya Effendi, Ph.D.**
10.00 – 10.15	Discussion	**Moderator**
10.15 – 10.45	**Invited Speaker 2** Topic: Design and Synthesis of Antimalarial Agents from Vanillin Precursor	**Prof. Bambang Purwono, Ph.D.** Department of Chemistry, Faculty of Mathematics and Natural Sciences, Universitas Gadjah Mada, Yogyakarta **Moderator :** **Assoc. Prof. apt. Muammar Fawwaz, Ph.D**
10.45 – 11.00	Discussion	**Moderator**
11.00 – 11.30	Research Support in Prodia	**Andi Heriadi Pallige, S.ST., M.Biomed** Prodia Makassar
11.30 – 12.00	**Invited Speaker 3** Topic: Radiobrominated Tyrosine Kinase Inhibitors Targeting EGFR Dual Mutation in Lung Cancer	**Assoc. Prof. apt. Muammar Fawwaz, Ph.D.** Faculty of Pharmacy, Universitas Muslim Indonesia, Makassar **Moderator:** **Assoc. Prof. apt. Ahmad Najib, Ph.D**
12.00 – 12.15	Discussion	**Moderator**
12.15 – 12.45	Lunch and Break	**MC**
12.45 – 13.15	**Invited Speaker 4** Topic: Targeted Radiopharmaceuticals for Theranostic Application	**Dr. rer.nat. Rien Ritawidya, M.Farm.**

		Research Center for Radioisotope, Radiopharmaceutical, and Biodosimetry Technology, BRIN, Serpong **Moderator :** **Assoc. Prof. apt. Muammar Fawwaz, Ph.D.**
13.15 – 13.30	Discussion	**Moderator**
13.30 – 13.50	**Oral Presentation 1**	Assoc. Prof. apt. Ahmad Najib, Ph.D.
13.50 – 14.10	**Oral Presentation 2**	Dr. rer. nat. Adryan Fristyohadi, M.Sc
14.10 – 15.00	**Invited speaker 5** Topic: Computer-Aided in Drug Delivery: Success Story to Improve Alfa-Mangostin as Anti Breast Cancer	**Prof. apt. Muchtaridi, Ph.D.** Department of Pharmaceutical Analysis and Medicinal Chemistry, Universitas Padjajaran, Bandung **Moderator:** **Assoc. Prof. apt. Muammar Fawwaz, Ph.D.**
15.00 – 15.20	**Oral Presentation 3**	Alfhika Azzahrani
	Closing ceremony - Certificates and awards to invited speakers (Prof. Kazuma Ogawa) - Best Oral Presenter Award (Dr. rer. nat. Adryan Fristyohadi, M.Sc) - Award to the Moderator - Giving souvenirs to all oral presenters (Dr. Wahyuni, M.Si. and Alfika Azzahrani). - Award to the proactive participant - Documentation and take a picture together	**MC**

June, 25th 2025 (Virtual meeting by zoom for online oral presentation and poster)

Time	Event and Activity	PIC
09.00 – 09.30	Registration	*Organizer*
09.30 – 09.45	Opening remark	**Assoc. Prof. apt. Muammar Fawwaz, Ph.D.** *Conference Chairman*
10.15 – 10.30	**Oral Presentation 4**	Maryline Angelvin Firdaus
10.30 – 10.45	**Oral Presentation 5**	apt. Dr. Karlina Amir Tahir, S.Si., M.Si
10.45 – 11.00	**Oral Presentation 6**	apt. Dr. Wahyuni, S.Si., M.Si
11.00 – selesai	Poster 1	Dr. apt. Mirawati, M.Si
	Poster 2	apt. Rahmawati, M.Sc
	Poster 3	apt. Megawati
	Poster 4	Dr. apt. Sukmawati, M.Kes
	Poster 5	apt. St. Maryam, S.Si., M.Sc
	Poster 6	apt. Masdiana Tahir, M.Si
	Poster 7	apt. Muzakkir Baits, M.Si
	Poster 8	apt. Sitti Amirah, M.Sc
	Poster 9	apt. Selpida Handayani, M.Si
	Poster 10	apt. Irma Santi, M.Si
	Poster 11	apt. Nurul Ilmi Ainun Nisaa, M.Farm
	Poster 12	apt. Mamat Pratama, M.Si
	Poster 13	apt. Nurlina, M.Sc
	Poster 14	Dr. apt. H. Saparuddin Latu, MH., M.Kes.
	Poster 15	apt. Asni Amin, M,Farm
	Poster 16	apt. Risda Waris, M.Sc
	Poster 17	apt. Sukmawati, M.Farm
	Poster 18	apt. Fitriana, M.Sc
	Poster 19	apt. Vina Purnamasari, M.Sc
	Poster 20	apt. Asriani Suhaenah, M.Si
	Poster 21	apt. Siska Nuryanti, M.Sc
	Poster 22	apt. A. Hasrawati, M.Sc
	Poster 23	apt. Ira Asmaliani, M.Sc
	Closing speech	*Conference Chairman*

Organizing Committee

OP001

Development of Radiopharmaceuticals for Radiotheranostics Containing Targeted Alpha Therapy

Kazuma Ogawa*

Graduate School of Medical Sciences, Kanazawa University, Kakuma-machi, Kanazawa, Ishikawa 920-1192, Japan:

*Corresponding author: kogawa@p.kanazawa-u.ac.jp

ABSTRACT

Radiotheranostics, which integrates diagnostic imaging and targeted radionuclide therapy, has become a powerful approach in oncology. Among therapeutic strategies, targeted alpha therapy (TAT) using alpha particles with high linear energy transfer (LET) is gaining attention for its potential to eliminate tumor cells while minimizing off-target damage. My research focuses on the development of radiopharmaceuticals incorporating TAT with Astatine-211 (^{211}At). In particular, I have explored the use of RGD peptides as tumor-targeting carriers, given their high affinity for $\alpha_v\beta_3$ integrin, which is overexpressed in tumor vasculature and various cancer cells. I developed a variety of ^{211}At-labeled RGD peptides through various design strategies. As a result, these compounds exhibited improved tumor selectivity and favorable pharmacokinetics, making them promising candidates for radiotheranostics. This presentation will highlight my recent progress in the design, synthesis, and preclinical evaluation of radiopharmaceuticals. I will discuss their biodistribution profiles, therapeutic efficacy, and potential for combination with immunotherapeutic strategies.

Keywords: Astatine-211 (^{211}At), radiotheranostics, cancer, targeted alpha therapy (TAT)

OP002

Design and Synthesis of Antimalarial Agents from Vanillin Precursor

Bambang Purwono*

Department of Chemistry, Faculty of Mathematics & Natural Science, Universitas Gadjah Mada
Bulaksumur, Yogyakarta 55281, Indonesia

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ABSTRACT

Malaria represents one of the most devastating and common infectious disease globally. Nearly half of the world population is under the risk of being infected, and more than 200 million new clinical cases with around half a million deaths occur annually. Drug therapy is the mainstay of antimalarial therapy, yet current drugs are threatened by the development of resistance. Drug resistance in malarial parasite has become one of the most important problems in the disease control in recent years. Resistance has been reported in almost all the antimalarial drugs, including chloroquine. Therefore, it's urgent to develop new antimalarials with excellent activity against both drug-sensitive and drug resistant Plasmodium which could act on dual-stage and multistage of the parasite life cycle. Considering this aspect, development of new drugs is of primary importance. The QSAR, Molecular Docking and ADMET are an advanced, novel and convenient technique to design the antimalarial agents. From those analyses, one can design drug molecules and also predict the drug-receptor binding. A series of antimalarial agents from vanillin precursor would be reported.

Keywords: Malaria, drug resistance, *Plasmodium falciparum*, vanillin.

OP003

Computer-Aided in Drug Delivery: Success Story to Improve of Alpha Mangostin as Anti Breast Cancer

Muchtaridi*

Department of Pharmaceutical Analysis and Medicinal Chemistry, Universitas Padjajaran, Bandung

*Corresponding author: muchtaridi@gmail.com

ABSTRACT

Computer-Aided Drug Design (CADD), including molecular dynamics and docking simulations, is a valuable strategy to improve drug solubility, stability, and therapeutic efficacy through rational design. Alpha mangostin (AM), a natural xanthone compound derived from *Garcinia mangostana*, exhibits potent anticancer activity, but its clinical application is limited by poor aqueous solubility and low bioavailability. This study applied two in silico approaches to overcome these challenges: formulation optimization using polymeric and cyclodextrin-based systems, and targeted drug delivery through conjugation with trastuzumab against HER2-positive breast cancer. Molecular dynamics simulations were conducted to evaluate amorphous solid dispersions (ASD) and cyclodextrin inclusion complexes of AM. The AM–poloxamer system (1:5 ratio, cooled at 1 °C/ns) showed the most promising performance, with an RMSD of 20 Å, six stable hydrogen bonds (score 10/10), a solvent-accessible surface area (SASA) of 0.9 nm^2, and a total interaction energy of −972.9 kcal/mol. HPβCD also demonstrated better encapsulation and stability than βCD. In a separate molecular docking simulation using PatchDock, a combination of AM and chitosan was conjugated with trastuzumab and targeted to HER2 (PDB ID: 1N8Z). The conjugated particle showed strong binding at the Fc region of trastuzumab and the highest docking score (3828) at 50 Å particle size. Although conjugation increased atomic contact energy and altered interaction modes, it enhanced binding affinity. These findings support the application of CADD to design stable, solubility-enhancing, and targeted drug delivery systems. The integration of formulation and targeting strategies offers promising potential for improving the therapeutic performance of alpha mangostin in HER2-positive breast cancer treatment.

Keywords: CADD, Molecular Dynamics, Amorphous Solid Dispersion, Cyclodextrin Complex, Alpha Mangostin, Drug Delivery

OP004

Retrosynthetic Planning as a Fundamental Framework in Organic Synthesis

Muammar Fawwaz*

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ABSTRACT

Retrosynthetic analysis plays a fundamental and pivotal role in the field of contemporary organic chemistry. It serves as a strategic approach that guides chemists in the design and construction of complex organic molecules. At its core, retrosynthesis involves mentally working backward from the target molecule—often a complex and biologically important compound—to identify simpler chemical entities that can be used as building blocks. This is done through a logical process known as "disconnection," where specific bonds within the target structure are systematically broken to reveal potential precursor molecules. These intermediates are then further simplified in successive stages until the route reaches substances that are commercially available or easily synthesized from basic reagents. One of the key strengths of retrosynthetic thinking is its focus on identifying crucial transformations, such as the conversion of one functional group into another or the formation of carbon-carbon bonds, that are essential to assembling the target compound. Through this analytical breakdown, chemists are able to devise efficient synthetic routes that minimize the number of steps (step economy), reduce waste (atom economy), and enhance control over stereochemistry—an important consideration in the synthesis of chiral compounds. This ultimately leads to more sustainable and practical chemical processes. In the context of drug development, natural product synthesis, and other applications requiring the preparation of structurally intricate molecules, retrosynthetic analysis is especially valuable. It allows chemists to tackle the challenge of assembling multi-functional, stereochemical-rich molecules with a high degree of precision. The insights gained through retrosynthetic planning not only make the synthesis of such targets achievable but also improve the reproducibility and scalability of the process—two essential factors for transitioning laboratory results into industrial-scale production. In summary, retrosynthesis is not merely a theoretical exercise; it is a powerful and indispensable tool in organic synthesis. It empowers chemists to approach the construction of complex molecules with both creativity and scientific rigor, ensuring that the resulting synthetic strategies are practical, efficient, and adaptable to a wide range of applications in both research and industry.

Keywords: Biologically, organic chemistry, synthesis, molecule, precision

OP005

The Potential of Gold Nanoparticles for the Delivery of Theranostic Radiopharmaceutical

Rien Ritawidya*, Herlan Setiawan, Maskur Maskur, Amal Rezka Putra, Ahsanal Fikri, Sumandi Juliyanto

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ABSTRACT

The photothermal method, in conjunction with radionuclide-based radiotherapy, has garnered significant interest from researchers over the past few decades for future therapeutic applications. Optimal hyperthermia induced by the photothermal process exerts a deadly impact on radio-resistant cells and enhances intratumoral blood flow, hence elevating oxygen levels and mitigating the resistance of cancer cells to radionuclide. Interestingly, gold nanoparticles can overcome this combination of radio-photothermal therapy due to their surface plasmon resonance properties which cause strong absorption of light at a tunable wavelength to produce heat for the photothermal destruction of cancer cells. Due to their ability to deliver a large payload of radionuclides, excellent bioavailability, and easily modified surfaces, gold nanoparticles might improve efficacy when employed with targeted radioligand therapeutic agents. The findings of our previous study group demonstrated that the combined therapy employing radioactive gold nanoparticles ([^{198}Au]AuNPs) with 980 nm laser irradiation had a greater in vitro therapeutic efficacy than radiotherapy alone using [^{198}Au]AuNPs or photothermal alone using ^{197}AuNPs. We have also effectively manufactured [^{198}Au]Au@SiO_2 core-shell nanoparticles as a radio-photothermal agent that displayed effective near-infrared absorption and caused significant cell death in LNCaP cancer cells. These findings suggest a significant potential *in vitro* synergistic effect in the applications of radio-photothermal treatment. However, *in vivo* studies presenting considerable confirmation for this findings are currently not available, and more investigations validating the *in vitro* findings are required. In the future, significant effort will be necessary to develop radio-photothermal agents, especially for targeted therapy, such as cellular uptake, in vivo efficacy, biodistribution studies, dosimetry, radiobiology, and immunology evaluation.

Keywords: gold nanoparticles, phytosynthesis, cancer cell, radio-photothermal therapy.

OP006

North Konawe *Pogostemon cablin*: A Promising Source of Anti-Inflammatory and Anti-cancer Agents Against MCF-7 Hormone-responsive Cell Line

Adryan Fristiohady[1*], Jafriati[2], Irvan Anwar[1], Rathapon asasutjarit[3], La Ode Muhammad Julian Purnama[3], Lidya Agriningsih Haruna[1], Agung Wibawa Mahatva Yodha[4], Hariana[1]

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ABSTRACT

Pogostemon cablin (Patchouli), a medicinal plant traditionally used in Indonesia, is gaining scientific attention for its potential pharmacological activities. This study investigates the anti-inflammatory and anti-cancer properties of *P. cablin* sourced specifically from North Konawe, Southeast Sulawesi, a region known for producing plants with high essential oil content. To evaluate its anti-inflammatory activity, two in vitro models were used: the protein denaturation inhibition assay, simulating inflammatory protein response, and the human red blood cell (HRBC) membrane stabilization assay, which mimics lysosomal membrane stability in inflamed tissues. The extract showed significant, dose-dependent inhibition of protein denaturation, with an IC_{50} value of 62.98 μg/mL. In the HRBC assay, the extract demonstrated membrane stabilization activity with a maximum inhibition of 64.24% at the highest tested concentration (100 μg/mL). The cytotoxic potential was assessed using the MTT assay on MCF-7 hormone-responsive breast cancer cells. The extract exhibited potent anti-proliferative activity, with an IC_{50} value of 91.56 ± 1.31 μg/mL, indicating its effectiveness in inhibiting breast cancer cell growth. These findings highlight *Pogostemon cablin* from North Konawe as a promising natural source of anti-inflammatory and anticancer agents, with the potential to contribute to the development of plant-based therapeutics. Further studies are recommended to isolate active constituents and explore underlying molecular mechanisms.

Keywords: *Pogostemon cablin*, anti-inflammatory activity, HRBC membrane stabilization, protein denaturation, cytotoxicity

OP007

Acorus calamus and Its Role in Managing Type 2 Diabetes Mellitus

Ahmad Najib[1,2]*

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ABSTRACT

Diabetes is a metabolic disorder characterized by hyperglycemia resulting from issues with insulin secretion, insulin action, or both. Type 2 diabetes, which accounts for approximately 90–95% of all diabetes cases, is caused by a combination of insulin resistance and inadequate compensatory insulin secretion. Proper glycemic control is crucial for managing and reducing diabetes. Many plants have been used to lower glucose levels by inhibiting α-glucosidase, an enzyme that breaks down starch and oligosaccharides into glucose. Acorus calamus L (AC) has been traditionally used in folk medicine to treat diabetes. In vitro α-glucosidase assays showed that AC reduced fasting serum glucose levels and suppressed blood glucose spikes after glucose loading in mice. In silico studies also indicated that AC's chemical compounds can inhibit α-glucosidase. Further investigation is needed to understand AC's effects on glucagon-like peptide-1 (GLP-1) expression and release related to its hypoglycemic effects.

Keywords: Diabetes, Hyperglycemia, Insulin, α-Glucosidase, *Acorus calamus*

OP008

Potential Antimetastatic Agents from *Etlingera alba* A.D. Poulsen: Effects on Cell Migration and CD44/FAK Expression in MDA-MB-231 Breast Cancer Cell Line

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ABSTRACT

Etlingera alba is one of the endemic plants of Sulawesi which has broad pharmacological avtivities, one of them is as anticancer. Thus, this study aimed to investigate the anticancer and metastatic activity of compounds isolated from *E. alba*. *Etlingera alba* was extracted and isolated, then the compounds identified by using FTIR, ^{1}H and ^{13}C NMR, and LC-MS/MS. There were 6 compounds successfully identified, which were 1,7- diphenyl-3-heptanol, yakuchinone A, 7-(4"-hydroxy-3"- methoxyphenyl)-1-phenyl-hept-4-en-3-one, oxyphyllacinol, 5-hydroxy-7-(4”-hydroxyphenyl)-1- phenyl-1-heptene and 1-(3'-methoxy-4' -hydroxyphenyl)-7-(4”-hydroxyphenyl)-3- heptanone, respectively. They were possessing anticancer activity with IC_{50} of 40.22; 37.34; 38.66; 35.71; 65.03; and 74.0 µg/ml, respectively. Moreover, 1,7- diphenyl-3-heptanol, oxyphyllacinol, and 5-hydroxy-7-(4”- hydroxyphenyl)-1- phenyl-1-heptene had better anti metastatic activity which suppressing the expression of FAK gene. Thus, *E. alba* has the potential for anticancer and antimetastatic activity which beneficial for discovering new anticancer agent.

Keywords: *E.alba*, metastasis, gene expressions, cell migration, CD44, FAK

OP009

Formulation and Evaluation of the Wound Healing Effectiveness of Gel Containing Ethanol Extract of Pumpkin Seed (*Cucurbita moschata* Duch) in Rabbits (*Oryctolagus cuniculus*)

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ABSTRACT

Wound healing is a complex physiological process involving various cellular and molecular activities aimed at restoring skin integrity. One promising natural agent for enhancing wound healing is pumpkin seed (Cucurbita moschata Duch), which contains secondary metabolites such as tannins, flavonoids, and saponins. Tannins serve as astringents to halt bleeding and reduce inflammation, while saponins facilitate collagen synthesis, thereby accelerating wound contraction. This study aimed to formulate ethanol extract of pumpkin seed into a topical gel and assess its wound healing effectiveness on rabbits (Oryctolagus cuniculus). The ethanol extract was prepared using the maceration method over 72 hours with 96% ethanol until the extract was clear. The gel formulations were developed with varying extract concentrations and evaluated for physical properties including pH, homogeneity, viscosity, spreadability, and adhesion. The in vivo wound healing test was conducted using male rabbits with standardized incisional wounds, and the healing progress was monitored over several days. The gel with 7% extract concentration exhibited the most effective wound healing activity, showing faster wound contraction and re-epithelialization compared to other concentrations. The physical evaluation of the gel indicated optimal properties for topical application, with good homogeneity, suitable pH for skin, appropriate viscosity, and effective spreadability and adhesion. The findings suggest that ethanol extract of pumpkin seed, when formulated into a gel, holds significant potential as a wound healing agent. The gel's efficacy in accelerating healing makes it a promising candidate for natural topical therapy. Further clinical investigation is warranted to explore its application in human wound care.

Keywords: Wound healing, topical gel, pumpkin seed extract, phytotherapy, herbal medicine

OP010

The Potency of Bajakah Tampala (*Spatholobus littoralis* Hassk.) Wood Compounds Against Apoptotic p38 MAPK (3HEG)

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ABSTRACT

The bajakah tampala (BT, *Spatholobus littoralis* Hassk.) wood has been used traditionally for many ailments such as for antioxidant, antiinflammation, antibacterial and anticancer. The study aims to examine the potential of BT wood compounds as anticancer agents through apoptosis mechanism mediated by the p38 mitogen-activated protein kinase (3HEG) with an *in silico* approach. Among the BT's compounds were choose ten compounds, which have chromophores similar to its original ligand sorafenib with Liganscout software. The ligands and receptor were prepared then with Discovery Studio (DS), while Autodock Tools to examine the ligand-receptor binding. The procced was validated with Sorafenib (RMSD 1.72±0.01) ligand and tested to BT's compounds to obtain binding affinity values (ΔG) and inhibition constants (Ki). The next step was analyzed their interactions and determined pharmacokinetic profile using DS and ADMETLab 3.0. The results showed that the ΔG's and Ki's of compounds were range on -1.74±0.03 to -0.10±0.001 kcal/mol and 982.40 ±0.09 to 51.15±0.03 mM compare to sorafenib's -10.50±0.02 kcal/mol to 5.41 ± 0.01 mM. The molecular visualization revealed hydrophobic bond interactions between Rincophyllin and p38's residues on lys- 118 and cys-119. Its pharmacokinetic analysis indicated favorable bioavailability and Lipinski's Rule compliance, although potential toxicity was observed. These findings suggest that an alkaloid Rhynchophyllin from *Spatholobus littoralis* Hassk. and BT's compounds have promising potential as an anticancer drug candidate.

Keywords: Bajakah tampala, *spatholobus littoralis* hassk., p38 MAPK, *in silico*

OP011

Isolation of Endophytic Bacteria in Kepok Banana Stem Sap (*Musa acuminate x balbisiana*) and Antibiotic Potential Test on Bacterial Growth *Staphylococcus aureus*

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ABSTRACT

Research has been carried out on the isolation of *endophytic* bacteria in the stem sap Kepok banana (*Musa acuminate x Balbisiana)* This research aims to determine antibiotic potential tests and isolate samples of Kepok banana stem sap. This type of research is an experimental laboratory research design to see the effectiveness of kepok banana stem sap (*Musa Acuminate x Balbisiana)* Testing was carried out using *endophytic* bacteria from isolates produced from the isolation of *Staphylococcus aureus*. The research results obtained from each treatment were 12.10 mm, 11.05 mm, 10.89 mm, 11.35 mm, 17.84 mm. Isolation of *endophytic* bacteria from kepok banana stem sap effectively inhibited the growth of *Staphylococcus aureus*. The effective inhibition zone produced is included in the strong inhibition zone category, and the statistical test results of the Kepok banana stem sap isolate stated that it was below sig <0.05 so it could have an effect on *Staphylococcus aureus*.

Keywords: Banana stem sap kepok, endophyric bacteria, antibacterial, *Staphylococcus aureus*

OP012

Significance of TCF712 Gene Polymorphism on the Incidence of Type 2 Diabetes Mellitus in Various Ethnic Groups: A Systematic Review

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ABSTRACT

Type 2 Diabetes Mellitus (T2DM) is a multifactorial metabolic disease with a significant genetic component. The TCF7L2 (Transcription Factor 7-like 2) gene is one of the genetic loci most consistently associated with increased risk of T2DM across ethnic populations. Several TCF7L2 polymorphism variants, including rs12255372, rs7903146, rs7901695, rs11196205, and rs7895340, have shown strong associations with T2DM predisposition in various studies. Objective: To present an updated review (2024–2025) of the significance of TCF7L2 polymorphisms on T2DM incidence across various ethnic groups, and to highlight the clinical relevance of these findings in the development of genetic-based prevention and therapeutic strategies. Methods: A systematic review was conducted of publications from 2024–2025 evaluating the association of TCF7L2 polymorphisms with T2DM in European, African, and Asian populations. The main focus was given to population studies involving the genotypes of rs12255372, rs7903146, rs7901695, rs11196205, and rs7895340. The analysis included data on statistical significance, allele distribution, and cross-ethnic differences. Results: The rs12255372 polymorphism showed a significant association with T2DM in Caucasian and Cameroonian European populations. The rs7903146 variant was consistently associated with an increased risk of T2DM in French, Austrian, African American, and South Indian populations. The rs7901695 polymorphism showed significance in the Italian population, while rs11196205 and rs7895340 were found to be relevant in the Japanese and African American populations, respectively. These findings support that TCF7L2 variants have a consistent cross-ethnic influence on T2DM risk, albeit with variations in allele frequencies and relative effects. TCF7L2 gene polymorphisms play a key role in the pathogenesis of T2DM across ethnicities, with some variants showing strong associations across different population groups. These findings support the importance of population genomics approaches in understanding T2DM susceptibility and guiding the development of personalized medicine strategies for more effective prevention and treatment.

Keywords: Genetic polymorphism, type 2 diabetes mellitus, ethnicity, genetic predisposition, personalized medicine

OP013

The Relationship Between Low Back Pain Incidence in Knee Osteoarthritis Patients and C-Reactive Protein (CRP) and Interleukin-6 (IL-6) Levels: Systematic Review

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ABSTRACT

This study is a literature review aimed at evaluating the relationship between inflammatory biomarkers, specifically high-sensitivity C-reactive protein (hs-CRP) and interleukin-6 (IL-6), with the incidence and progression of osteoarthritis (OA) and other musculoskeletal disorders. Based on the 20 journals analyzed, most studies showed a positive correlation between elevated hs-CRP and IL-6 levels with local inflammation, joint pain, and musculoskeletal dysfunction. Studies by Pearle et al. (2007) and Ravela et al. (2017) confirmed that elevated hs-CRP and IL-6 are closely associated with synovial inflammation and the severity of knee OA. Livshits et al. (2009) added that IL-6 plays a significant role in predicting the onset of radiographic OA. In addition, Smith et al. (2012) showed that high hs-CRP levels correlate with poorer functional outcomes after total knee arthroplasty (TKA). Meanwhile, a meta-analysis by Jin et al. (2013) confirmed that systemic inflammation plays a greater role in OA symptoms than radiographic changes. Furthermore, studies in patients with low back pain (Park & Lee, 2010; Surbakti & Nasution, 2020) showed that hs-CRP levels are not always elevated, indicating variations in the inflammatory response depending on etiology. Overall, scientific evidence supports the important role of low-grade inflammation in the pathogenesis of OA, with hs-CRP and IL-6 as potential biomarker candidates for early diagnosis, progression monitoring, and therapy evaluation. Further research is needed to explore specific molecular mechanisms and anti-inflammatory interventions that can reduce these biomarker levels and improve joint function.

Keywords: C-reactive protein, interleukin-6, osteoarthritis, inflammatory, musculoskeletal pain.

PP014

In Vitro Anti-Inflammatory Effect of Ethyl Acetate Fraction of Ficus elastica Leaves Using the Red Blood Cell (RBCs) Membrane Stabilization Method

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ABSTRACT

Rubber tree leaves (*Ficus elastica*) are a plant species originating from India. This plant has the ability to grow to a height of between 8 and 40 meters. This plant contains flavonoids which are known to have pharmacological activity, including as an anti-inflammatory agent. This study aims to determine the in vitro anti-inflammatory effect of the ethyl acetate fraction of rubber tree leaves (*Ficus elastica*) using the red blood cell (RBCs) membrane stabilization method. Fractionation was carried out using the liquid-liquid partition method using ethyl acetate as a solvent. The comparison solution used was sodium diclofenac with a concentration of 40 ppm (53.266%), 80 ppm (55.104%), 120 ppm (56.797%), 160 ppm (59.894%) and 200 ppm (62.167%). The results of the percentage of red blood cell membrane stability of the ethyl acetate fraction of rubber tree leaves (*Ficus elastica*) at a concentration of 40 ppm (28.402%), 80 ppm (30.670%), 120 ppm (31.750%), 160 ppm (39.255%) and 200 ppm (60.530%). This shows that the fraction with a concentration of 200 ppm has the highest anti-inflammatory activity. This shows that rubber tree leaves (*Ficus elastica*) have the potential as an anti-inflammatory.

Keyword: Anti-inflammatory, ethyl acetate fraction, *Ficus elastica*, stabilization of RBCs membranes.

PP015

Antibacterial Activity of Isolates of Endophytic Fungi from Bidara Leaves (*Ziziphus mauritiana* Lam)

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ABSTRACT

The bidara plant (*Ziziphus mauritiana* Lam) is a plant with potential antibacterial properties. The antibacterial compound content of the bidara plant originates from secondary metabolites produced by endophytic fungi, which are endophytic compounds of the plant. Endophytic fungi are fungi that live in a mutualistic symbiosis with their host and can produce the same secondary metabolite compounds as their host. This study aims to determine the antibacterial activity of selected isolates of endophytic fungi code IFDZ 8 from bidara leaves against test bacteria *Staphylococcus aureus*, *Staphylococcus epidermidis* and *Propionibacterium acnes*. This study used the stab method to purify the endophytic fungal isolate IFDZ 8. Production of secondary metabolites by fermentation method in Maltose yeast broth (MYB) media carried out for 21 days at a speed of 200 rpm. The fermentation results are extracted liquid-liquid using ethyl acetate solvent and then evaporated until a thick extract is obtained. Antibacterial activity test using agar diffusion and TLC-Bioautography methods and identification of chemical components using thin layer chromatography (TLC) methods. The results of the antibacterial activity test using the diffusion method to obtain the diameter of the inhibition zone at concentrations of 800 ppm, 1600 ppm and 3200 ppm against the test bacteria. The results of the TLC-Bioautography test showed 2 active spots with 1 spot with an Rf value of 0.80 providing activity against all test bacteria while 1 spot with an Rf value of 0.58 provided activity against *Staphylococcus epidermidis* and *Propionibacterium acnes* bacteria. The results of the identification of chemical components suspected to provide activity are the flavonoid, alkaloid, phenolic, and anthraquinone groups.

Keywords: Antibacterial activity, bidara leaves, bidara plants, endophytic fungi

PP016

In Silico Study and In Vitro Testing: Potential of *Muntingia Calabura* L. Blossoms as An Anticholesterol

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ABSTRACT

Currently, medicinal plants are widely used as active ingredients in the manufacture of pharmaceutical preparations. One of the potential plants is cherry flowers (*Muntigia calabura* L.). Cherry flowers have chemical compounds that are beneficial to human health because they contain flavonoids consisting of flavones, flavonones, flavans, biflavans, tannins, and polyphenols that play a role in antioxidant and anticholesterol activities. The new thing or novelty of this study is that no research data has been found related to the anticholesterol test of cherry flower ethanol extract. The purpose of this study was to test the potential of cherry flower ethanol extract as anticholesterol in silico and in vitro. The method or activity plan carried out was through a series of research stages starting with anticholesterol testing in silico and then determining anticholesterol activity using the UV-Vis spectrophotometry method using the Liebermann-Buchard reagent. The results obtained are based on the results of the docking simulation data analysis and visualization of 10 test ligands from the cherry plant with the value of free binding energy (ΔG) and its amino acid residues showing the best affinity of simvastatin as a comparison are 6 test ligands, namely Kaempferol 7-(6"-p-coumarylglucoside) or Biondnoid A Myrtillin, 5,7,3',4'-Tetrahydroxy-6,8-di-C-prenylflavanone, 3'-Hydroxydaidzein, Hiravanone,l and ligand 3'-Hydroxy-7,8,4',5'-tetramethoxyflavone. The anticholesterol test using the Liebermann-Burchard method showed that cherry flower extract can lower cholesterol levels with an EC50 inhibitory power of 349.193 ppm. The interaction of the amino acids involved allows for contact or interaction between the ligand and the HMG CoA receptor so that it has the potential for anti-cholesterol activity and inhibits cholesterol in vitro.

Keywords: *Muntigia calabura* L. blossoms, anticholesterol, in silico, liebermann-buchard reagent

PP017

Antipyretic and Antiinflammatory Effect of Ethanol Extract *Ziziphus mauritiana* Leaf on Rat

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ABSTRACT

Ziziphus mauritiana is one of the plants widely used in traditional medicine. *Ziziphus mauritiana* is traditionally used as an antimicrobial, antidepressant, analgesic, antipyretic, anti-inflammatory, antioxidant, anticancer, antidiabetic, nephroprotector, hepatoprotector, neuroprotector. This research aims to determine the antipyretic-anti-inflammatory effectiveness of ethanol extract *Ziziphus mauritiana* leaf on rat. Antipyretic research began with induced by 5% peptone, after 1.5 hours rats were divided into 5 groups, groups 1, 2 and 3 (given extract doses of 200 mg/kgBW, 300 mg/kgBW and 400 mg/kgBW), paracetamol and NaCMC. Body temperature measurements were taken every 30 minutes for 180 minutes. Anti-inflammatory research used the rat hind paw edema method on rat divided into 5 test groups, groups 1, 2 and 3 (given extract doses of 100 mg/kgBW, 200 mg/kgBW and 300 mg/kgBW), Sodium dilofenac 4.5 mg/kgBW, and NaCMC. After 30 minutes of induction by 1% carrageenan intraplantarly. The foot volume was measured every 1 hour for 3 hours. The results of the research showed that the ethanol extract of bidara leaves had antipyretic and anti-inflammatory effect. The results of statistical analysis showed that the extract with a dose of 400 mg/kgBW had the same antipyretic effect as paracetamol. While the anti-inflammatory effect, a dose of 200 mg/kgBW had the greatest anti-inflammatory effect and had the same AUC value as the sodium diclofenac. It was concluded that the ethanol extract of *Ziziphus mauritiana* leaves has the potential as an antipyretic with an effective dose of 400 mg/kgBW and anti-inflammatory at a dose of 200 mg/kgBW.

Keywords: *Ziziphus mauritiana*, antipyretic, antiinflammatory

PP018

Determinations of Sun Protection Factors (SPF) of Ethanol Extract and Sunscreen Cream Containing Ethanol Extract of Mangosteen (*Garcinia mangostana* L.) Peel

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ABSTRACT

Excessive ultraviolet (UV) radiation exposure is a major contributor to skin damage, including premature aging and increased skin cancer risk. Sunscreens are essential for preventing UV-induced harm. Mangosteen (*Garcinia mangostana* L.) peel, rich in antioxidant xanthones, presents potential as a natural UV-protective agent. This study aimed to formulate and evaluate a sunscreen cream incorporating ethanol extract of mangosteen peel. The extract was obtained via maceration with 96% ethanol and formulated into creams using varying concentrations (3%, 4%, and 5%) of Tween 80 and Span 60 as emulsifiers, alongside titanium dioxide as a physical UV blocker. The formulations were assessed for organoleptic properties, homogeneity, pH, viscosity, rheological behavior, droplet morphology, emulsion type, and in vitro sun protection factor (SPF) using UV-Vis spectrophotometry, both before and after accelerated stability testing. All formulations produced stable creams meeting standard criteria. However, SPF values of the final products were lower than those of the pure extract, indicating possible degradation or interactions during formulation. These results support the feasibility of using mangosteen peel extract in sunscreen development and highlight the need for formulation optimization to enhance UV protection.

Keywords: Mangosteen peel extract, sunscreen, cream, SPF

PP019

Antibacterial, Antioxidant and Antiinflammatory Activity of *Chromolaena odorata* L. Leaves

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ABSTRACT

Chromolaena odorata L. is one of the wild plants belonging to the Asteriaceae family, which thrives in tropical and subtropical regions. This plant is known as kopasanda, containing various secondary metabolites including alkaloids, quinones, steroids, terpenoids, polyisoprenoids, flavonoids, odoratenin, essential oils, saponins, and tannins, and has several pharmacological effects such as antidiabetic, antioxidant, antibacterial, anti-cholesterol, anti-hyperuricemia, as a sunscreen, and effective for treating burns. This research aims to analyze the antibacterial potential of gastrointestinal infection-causing agents using the cup method, antioxidant capacity with the FRAP method (quercetin), and the anti-inflammatory properties of *Chromolaena odorata* L. with the protein denaturation method (sodium diclofenac). The research results obtained for *Chromolaena odorata* L. as an antibacterial against Escherichia coli bacteria at concentrations of 0.8-25.6% (radical), 0.4% (radical/irradical), and 0.1-0.2% (irradical); Vibrio cholerae at concentrations of 3.2-25.6% (radical), 0.4-1.6% (radical/irradical), and 0.1- 0.2% (irradical); Salmonella typhi at concentrations of 0.8-25.6% (radical), 0.8-1.6% (radical/irradical), and 0.1-0.4% (irradical); Shigella dysenteriae at concentrations of 0.8-25.6% (radical), 0.8-1.6% (radical/irradical), and 0.1-0.4% (irradical). Antioxidant capacity of 33.673 mgQE/g and anti-inflammatory with an IC50 value of 299.719 ug/mL. As a conclusion, *Chromolaena odorata* L. has the most radical antibiotic potential against the bacteria *Shigella dysenteriae* at a concentration of 25.6% with the largest average inhibition diameter of 18.30 mm, low antioxidant capacity, and very weak anti-inflammatory effect.

Keywords: *Chromolaena odorata* L., antibacterial, anti-inflammatory, antioxidant, gastrointestinal infection

PP020

Antiinflamation Activity of Etanol Extract of *Muntingia calabura* L. Flower In Silico and In Vitro Using Membran Stabilization Red Blood Cells Methods

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ABSTRACT

Muntingia calabura L flower contains phenolic and flavanoid compounds that can provide several pharmacological activities, one of which is anti-inflammatory. The purpose of this study was to examine the potential anti-inflammatory activity of ethanol extract of *Muntingia calabura* L. flower in silico and in vitro. In silico studies were conducted to screen chemical compounds of *Muntingia calabura* L plant obtained from KnapSack family database with molecular docking method using Autodock vina software against COX-2 receptor (5IKR). While in vitro testing uses the red blood cell membrane stabilization method with diclofenac sodium as a comparison. The results of in silico testing obtained three compounds whose bond free energy (ΔG) value is smaller than the ΔG value of the comparison, namely Hiravanone ΔG -10.62 kcal/mol, Myrtillin ΔG -11.48 kcal/mol, and Kaempferol 7-(6"-p-coumarylglucoside) or Biondnoid A ΔG -12.59 kcal/mol, while mefenamic acid as a comparison has a ΔG value of -9.804. The results of in vitro testing showed that the optimal ethanol extract of kersen flower at a concentration of 200 ppm had a % stability of 47.084%, while the % stability of diclofenac sodium 200 ppm was 62.167%. Kersen flower ethanol extract has the ability to stabilize red blood cell membranes as an anti-inflammatory and the compound Kaempferol 7-(6"-p-coumarylglucoside) or Biondnoid A has the potential to be developed as an anti-inflammatory drug candidate.

Keywords: Anti-inflammatory, *Muntingia calabura* L. flower, in silico, red blood cell membrane stabilization method

PP021

The Effect of Pharmacistist Intervention on Hypertension Patients on Knowledge, Compliance, Clinical Outcome, Quality of Life and Perception of Halal Products in Pharmacy Kimia Farma Lueng Bata

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ABSTRACT

Hypertension globally has nearly doubled over the past three decades, reaching 1.3 billion adults in 2019 from 650 million in 1990. Based on the results of the 2018 Basic Health Research or Riskesdas, the prevalence was found to be 34.1% of sufferers diagnosed with hypertension based on measurements of the population aged over 18 years in Indonesia, the highest figure occurred in North Sulawesi Province at 13.2% of sufferers and the lowest figure was in Papua Province at 4.4% of sufferers. In Aceh Province, the prevalence of hypertension is 12,259 (26.4%) sufferers. This study aims to determine the impact of pharmacist intervention on the level of knowledge, compliance, clinical outcomes, quality of life and perception of halal products in hypertensive patients. The study was conducted at the Halal Pharmacy Kimia Farma Lueng Bata for 30 days with a quasi-experimental design of two groups pre-posttest. The sample selection used the purposive sampling method, involving 108 Hypertension patients who were active PRB participants. The research instruments were the HK-LS questionnaire, treatment compliance with the MARS-5 questionnaire, clinical outcome assessment was measured based on Blood Pressure values (mmHg), quality of life using the WHOQOL-BREF questionnaire and Perception of Halal Products of patients using a closed questionnaire on a Likert scale. The results of the Mann-Whitney test showed significant differences and median values in the control group and the treatment group statistically respectively: knowledge 5 (1-11) and 13 (5-22) p (<0.00), compliance 6 (4-14) and 14 (5-75) p (<0.02), clinical outcomes 1 (1-2) and 1 (1-2) (p<0.005), quality of life 6 (4-14) and 14 (5-75) (p<0.00), perception of halal products 6 (4-14) and 14 (5-75) (p<0.02). Pharmacist intervention improves knowledge, compliance, clinical outcomes, quality of life and perception of halal products in hypertension patients participating in PRB at the Kimia Farma Lueng Bata pharmacy.

Keywords: Intervention, pharmacist, knowledge, compliance, clinical outcome, quality of life, perception of halal products

PP022

Cytotoxic Potential of Vitex Trifolia L. Leaf Extract Against EGFR Wild-Type Cancer Cells

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ABSTRACT

Vitex trifolia L., also known as Arabian lilac, is a medicinal plant species widely distributed across tropical and subtropical regions including Southeast Asia, Micronesia, Australia, and East Africa. Its leaves are known to contain a variety of bioactive compounds, such as alkaloids, saponins, flavonoids, polyphenols, and essential oils, which possess therapeutic potential against cancer. This study aims to investigate the cytotoxic potential of ethanolic leaf extract of *V. trifolia* as a therapeutic agent targeting cancer cells exhibiting the Epidermal Growth Factor Receptor (EGFR) wild-type phenotype. Extraction was performed using Ultrasonic-Assisted Extraction (UAE), an eco-friendly and efficient method that employs ultrasonic waves to disrupt plant cell walls, enhancing permeability and improving the yield of bioactive compounds while operating at mild temperatures. This method effectively preserves thermolabile compounds while enhancing the recovery of bioactive molecules. Cytotoxic activity was evaluated using the Water-Soluble Tetrazolium (WST) assay to measure cell viability and determine the half-maximal inhibitory concentration (IC_{50}). The ethanol extract of *V. trifolia* leaves exhibited significant cytotoxicity against EGFR wild-type H441 cancer cells, with a promising IC_{50} value indicating strong antiproliferative activity. Phytochemical analysis revealed the presence of key secondary metabolites potentially contribure to this effect. These findings underscore the potential of *V. trifolia* as a natural source of anticancer agents targeting EGFR pathways, necessitating further investigation for therapeutic development.

Keywords: *Vitex trifolia* L., cytotoxic agent, EGFR wild-type, WST assay, cancer therapy

PP023

Effect of Pomelo Peel Ethanol Extract (*Citrus maxima*) on Blood Pressure and Histopathology of Heart, Kidney, Liver Rat (*Rattus norvegicus*) Hypertension Model

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ABSTRACT

Organ damage is a condition of complications due to diseases such as uncontrolled or prolonged hypertension. Some of the organs affected are the heart, kidneys, and liver. Hypertension causes increased heart rate, heart enlargement, risk of heart failure, and damage to the blood vessels of the kidneys, and damage to the hepatocyte membrane in the liver. One way to overcome hypertension is by giving medicines such as herbal medicines. Herbal plants that have the potential as antioxidants are ethanol extracts of pomelo peel (*Citrus maxima*). The extract contains flavonoids, phenolics, alkaloids, lycopene, and vitamin C. The flavonoid derivative compounds are naringin and hesperidin which are natural angiotensin converting enzyme (ACE) inhibitors. This study aims to test the effect of pomelo peel ethanol extract (EEPP) on blood pressure and histopathological features of the heart, kidneys and liver of hypertensive rats (*Rattus norvegicus*). This study used a laboratory experimental method with The Postest-Only Control Group Design. Thirty rats were divided into 6 groups, namely normal control, negative control (1% NaCMC), positive control (Captopril), EEPP 100 mg/KgBW group, EEPP 150 mg/KgBW group, and EEPP 200 mg/KgBW group. Hypertensive conditions were induced with 1.5 mg/KgBW prednisone and 2% NaCl for 21 days. The test preparation was administered orally for 14 days. The research variables observed were blood pressure measured using a Blood Pressure Analyzer Tail Cuff and microscopic examination of the histopathology of heart, kidney and liver tissue. The results of the study showed that the ethanol extract of pomelo peel was able to lower the blood pressure of hypertensive rats at doses of 100 mg/KgBW, 150 mg/KgBW, and 200 mg/KgBW. In histopathological testing of the heart, kidney and liver organs, specifically a dose of 150 mg/KgBW was able to repair damage to the structure of the heart, kidney and liver tissue of rats with hypertension.

Keywords: *Citrus maxima*, hypertension, histopathology, organ damage, pomelo peel

PP024

The Anti Peptic Ulcer Potential of Combination Centella Asiatica Leaf and Caesalpinia Sappan Wood Ethanol Extract

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ABSTRACT

Centella asiatica and *Caesalpinia sappan* are plants that have long been used in general in the community. Both contain chemicals such as flavonoids, triterpenoids and saponins. The chemical content has anti-inflammatory and antioxidant properties that can repair gastric damage. This study aims to explore the potential of anti-peptic ulcers and effective dosage of the combination of ethanol extracts of *Centella Asiatica* and *Caesalpinia Sappan* Lignum leaves. The study utilized 24 rats which were divided into six groups: a normal control, a negative control (Na-CMC 1%), a positive control (Omeprazole), and three treatment groups receiving varying doses of the combined ethanol extract of *Centella asiatica* and *Caesalpinia sappan* specifically, 250:375, 200:400, and 150:425 mg/kg BW. All groups, except for the normal control, were subjected to aspirin induction (200 mg/kg BW) for nine days, followed by a 14-day treatment period with the respective doses. After treatment, the animals were sacrificed, and their gastric organs were examined both macroscopically and microscopically. The data were statistically analyzed using the Kruskal-Wallis test. The results showed that in all treatment groups, no differences were found in the color and consistency of the gastric organs after treatment. The histopathological results did not find any damage to the gastric tissue. It can be concluded that the test extract at all doses has the effect of repairing gastric damage with an effective dose of 150: 425 mg/kgBB.

Keywords: Anti-ulcer, *Centella asiatica* l., *Caesalpinia sappan* l., histopathology, aspirin

PP025

In Vivo Evaluation of Pineapple Peel *(Ananas comosus)* Extract and Physical Characterization of Capsule Formulation as a Natural Immunomodulator

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ABSTRACT

Pineapple peel (*Ananas comosus*) is a plant-derived material known to contain flavonoid compounds with potential immunomodulatory properties. This study aimed to evaluate the **in vivo** immunomodulatory activity of ethanol extract from pineapple peel and to assess the physical characteristics of its capsule formulation in accordance with pharmaceutical standards. The research was conducted experimentally in a laboratory and included stages such as pineapple peel preparation, extraction, phytochemical screening, preparation of 2% sheep red blood cell (SRBC) suspension, mice preparation, **in vivo** immunomodulatory activity testing (IgM response), formulation, and evaluation of the physical characteristics of granule and capsule preparations, followed by data analysis. The results showed that the most effective concentration of pineapple peel ethanol extract was 250 mg/kg, which demonstrated **in vivo** immunomodulatory activity indicated by agglutination up to a dilution of 1/128 in male mice. The formulation and evaluation of granule preparations revealed an angle of repose of 28.59°, moisture content of 4.95%, and flow rate of 8.2 seconds. Capsule evaluation showed weight uniformity of 0.679 g and a disintegration time of 3 minutes and 34 seconds. These findings suggest that the ethanol extract capsule formulation of pineapple peel meets pharmaceutical requirements and holds potential for further development as a natural immunomodulator.

Keywords: Capsule, flavonoids, immunomodulator, in vivo study

PP026

Potential of Ethanol Extract, Ethyl Acetate ann n-Hexane Fractions of Qust Al Hindi (*Saussurea lappa*) as Anti-hyperuricemia

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ABSTRACT

Hyperuricemia is a disease caused by an increase in uric acid levels in the blood. Uric acid is a product of purine metabolism that deposits in the joints and forms small crystals, causing severe pain and stiffness, as well as joint swelling and protrusion. Currently, the use of natural ingredients to treat hyperuricemia is being developed. One of the potential plants containing various bioactive compounds that can be developed as anti-hyperuricemia is Qust al Hindi (*Sausserea lappa*). This study aimed to determine and obtain the 50% inhibitory concentration value (IC_{50}) of the ethanol extract, ethyl acetate and n-hexane fraction leading to inhibition of xanthine oxidase enzyme. The research method used was to inhibit the enzyme xanthine oxidase in vitro by creating an extract followed by fractionation (liquid-liquid extraction) with increasing polarity, then creating a comparison solution using allopurinol. It was then incubated and the absorbance measured with a microplate reader at 570 nm. The results showed that the 50% inhibitory concentration (IC_{50}) values of ethyl acetate and n-hexane extracts were 79.873 µg/L, 83.92 µg/mL and 72.846 µg/mL (strong type), respectively, not good. than allopurinol which has a strong inhibitory effect. IC_{50} is 1,185 µg/mL (very strong). *Saussurea lappa* extract and fraction significantly inhibit xanthine oxidase, which can reduce uric acid formation in the blood and has potential as a uric acid-lowering drug.

Keywords: Anti hyperuricemia, uric acid, xanthine oxidase, *in vitro*,S*aussurea lappa.*

PP027

Effect of Extraction Method on Antioxidant Activity of Kedondong Leaves (*Spondias dulcis*) Using DPPH & FIC Methods

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ABSTRACT

Spondias dulcis plant is a tropical plant in the Anacardiaceae family. One of the plants from nature that has antioxidant properties. The aim of the research was to see the effect of variations in *Spondias dulcis* leaf extraction methods on the antioxidant activity of eliminating DPPH and FIC radicals. The % yield of various extracts from the maceration extraction method was 2.625%, UAE was 23.36% and digestion was 23.08%. Screening of the phytochemical compound components of the ethanolic extract of *Spondias dulcis* leaves, the three variations of maceration extraction method, Ultrasonic (UAE) and digestion using thin layer chromatography using the eluent n-hexane: ethyl acetate (8:2) detected flavonoid and tannin content, while only the maceration extraction method was detected containing steroids, then the third alkaloid screening extraction variation was not detected. The conclusion is that the heating process in the digestive extraction method affects the antioxidant activity of the DPPH radical removal method of *Spondias dulcis* leaf extract, even though the percentage yield of extract from the digestive method is high (IC_{50} 66,620 µg/mL). Still, the antioxidant activity is at a lower level. It is classified as strong compared to extraction without maceration heating (IC_{50} 38,979 µg/mL and UAE (IC_{50} 29.838 µg/mL) are in the very strong category extraction and antioxidant activity of the FIC method in the ethanolic extract of *Spondias dulcis* leaves, the maceration extraction method IC_{50} 342.72 µg/mL has a weak antioxidant activity category. In contrast, the UAE extraction method (IC_{50} 54.059 µg/mL) and digestion (IC_{50} 83.093) are classified as strong. So, the antioxidant activity method and DPPH reduction are more effective than the Fe chelating method.

Keywords: Kedondong (*Spondias dulcis*), extraction, digest, ultrasonic, antioxidant

PP028

Formulation of Mineral Salt and Milk Fish Bone Waste to Prevent Preeclampsia

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ABSTRACT

The high number of maternal deaths in this era has made people realize how important it is to improve maternal health. Preeclampsia is a disease of hypertension, proteinuria and edema that occurs due to pregnancy. Deficiencies in the minerals potassium, magnesium and calcium play a role in the occurrence of preeclampsia. This research aims to analyze the mineral content of mineral salt formulations and milkfish bone waste. The research method uses a laboratory experimental method using an *atomic absorption spectrophotometer* (AAS) instrument. If consumed every day, 5 grams can meet potassium levels of 1.490%, magnesium levels of 45%, calcium levels of 65.26%. It is hoped that this value can be an alternative as a preventive measure in non-pharmacological therapy to fulfill micronutrient intake for the health of pregnant women.

Keywords: Preeclampsia, potassium, magnesium, calcium

PP029

Anti-inflammatory Activity and Determination of Ethanol Macerate Phenol Content - *Stachytarpheta jamaicensis*

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ABSTRACT

Inflammation is a response to the stimulation of harmful agents, infection, or tissue damage. Horse whip leaves (*Stachytarpheta jamaicensis* L.) contain phenols, flavonoids, saponins and tannins, of which flavonoids are known to have potential as anti-inflammatory. This study aims to determine the anti-inflammatory ability invitro and in vivo, as well as the determination of phenol content of ethanol-water macerate of horse whip leaf extract. Method: the research design is a laboratory experiment. Horse whip leaf extract was obtained from 3x24 maceration for 6 times remaceration using 70% ethanol-water distillation liquid. The invitro anti-inflammatory test was carried out by measuring the membrane stability of sheep red blood cells exposed to hypotonic solutions at concentrations of 25; 50; 100; 150; and 200 ppm. In vivo tests were carried out on male mice consisting of 3 concentration groups of 10, 20 and 30 mg/kgBB, with diclofenac sodium as the anti-inflammatory comparator. Determination of phenol content used the method colourimetry with Folin Ciocalteu measured with a microplate reader at a wavelength of 720 nm. The test results prove that the concentration of 100 ppm (38.46%) can inhibit the haemolysis of red blood cells equivalent to diclofenac sodium. Meanwhile, invivo obtained ethanol extract of horse whip leaves as a good anti-inflammatory with an effect similar to the work of diclofenac sodium in the 30 mg/kgBB dose group after 3 hours of extract administration. Determination of phenol content with gallic acid comparator obtained levels of 25.653 mg GAE/g. Ethanol-water maserat extract of horse whip leaves have anti-inflammatory activity: with phenol content as a potential anti-inflammatory agent.

Keywords: Anti-inflammatory, phenol, macerate, ethanol-water, *Stachytarpheta jamaicensis*

PP030

Formulation of Anti-Acne Gel and Activity Evaluation of *Caesalpinia sappan* L. Extract Against *Propionibacterium acnes* and *Staphylococcus Epidermidis*

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ABSTRACT

Caesalpinia sappan L. (sappanwood) is a medicinal plant known to contain several bioactive compounds, including flavonoids, alkaloids, and phenols, which exhibit antibacterial properties. This study aimed to evaluate the stability of a gel formulation containing ethanolic extract of *C. sappan* and its anti-acne activity against *Propionibacterium acnes* and *Staphylococcus epidermidis*. The anti-acne activity of the extract was determined by evaluating its Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) values. Gel formulations were prepared using different concentrations of gelling agents, namely Carbopol and HPMC. The resulting gels were then characterized and tested for physical stability and antibacterial activity by measuring their inhibition zones against *P. acnes* and *S. epidermidis*. The MIC and MBC values were found to be 0.05%, with inhibition zone diameters of 11.58 mm for *P. acnes* and 8.58 mm for *S. epidermidis*. Based on characterization and stability evaluations, the gel formulated with 1.875% Carbopol demonstrated optimal physical stability and antibacterial activity, with inhibition zones ranging between 10–20 mm against both bacterial strains.

Keywords: *Caesalpinia sappan* extract, gel, anti-acne activity

PP031

Formulation and Characterization of Brazilin-Loaded Proniosomes from Caesalpinia Sappan L

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ABSTRACT

Caesalpinia sappan L., commonly known as sappanwood, has long been valued for its therapeutic potential, particularly due to its rich content of brazilin—a natural compound known for its antioxidant, anti-inflammatory, and antimicrobial effects. Despite its promising bioactivities, the application of brazilin in topical treatments remains limited because of its poor water solubility and low ability to penetrate the skin. this study aimed to formulate and characterize proniosomes as a delivery system for brazilin derived from *C. sappan* extract. Proniosomes were prepared using the coacervation method with combinations of non-ionic surfactants (Span 60 and Tween 80), cholesterol, and lecithin. The formulations were evaluated for organoleptic properties, entrapment efficiency of brazilin, particle size, zeta potential, pH, viscosity, and morphology using optical microscopy and dynamic light scattering. The amount of brazilin entrapped was quantified using UV-Vis spectrophotometry. The optimized proniosomal formulation demonstrated favorable characteristics, including a smooth gel-like appearance, pH compatible with skin application (5.5–6.0), nanometric vesicle size (<500 nm), and high entrapment efficiency (>70%). Zeta potential values indicated good physical stability, while microscopic analysis confirmed the formation of uniform spherical vesicles. The proniosomal system also showed potential for improved physicochemical stability compared to free extract. In conclusion, brazilin-loaded proniosomes offer a promising approach to enhance the solubility, stability, and topical delivery of active compounds from Caesalpinia sappan L., making them suitable for future dermatological or cosmeceutical applications.

Keywords: *Caesalpinia sappan* L., brazilin, proniosomes, topical delivery

PP032

Antibacterial Activity of Tetracycline and Ethanol Extract of Kopasanda Leaves (*Chromolaena odorata* L.) Combination

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ABSTRACT

Chromolaena odorata L. is a medicinal plant widely utilized in traditional therapies for treating skin infections. Recent scientific approaches have explored the synergistic potential of combining natural products with conventional antibiotics to enhance antibacterial efficacy while minimizing adverse effects. This study investigates the antibacterial activity of tetracycline combined with the ethanol extract of *C. odorata* leaves against Staphylococcus aureus and Propionibacterium acnes, two clinically relevant bacteria often implicated in dermatological infections. The research employed both dilution and agar diffusion methods. The minimum inhibitory concentration (MIC) of the ethanol extract was determined to be 12.8%, and this concentration was subsequently used to evaluate the antibacterial effects of the extract alone, tetracycline alone, and the combined formulation. The agar diffusion assay assessed inhibition zone diameters for each treatment against both bacterial strains. Results revealed that against P. acnes, the combination group demonstrated significantly lower inhibition zones than tetracycline alone ($p<0.05$), although the extract alone showed minimal activity. In contrast, against S. aureus, the extract alone exhibited significantly smaller inhibition zones compared to tetracycline ($p<0.05$), at the same time combination group produced inhibition zones that were slightly smaller but not statistically different from the antibiotic alone. These findings suggest a potential synergistic interaction, particularly in enhancing the efficacy of the *C. odorata* extract when used in conjunction with tetracycline, despite the statistical insignificance in some cases. The study offers promising implications for the integration of phytotherapeutic agents with conventional antibiotics, opening new avenues in the development of combination therapies for bacterial skin infections with improved safety and reduced resistance risks.

Keywords: *Chromolaena odorata*, agar dilution, agar diffusion, extract-antibiotic combination, tetracycline

PP033

Anti-Inflammatory Potential of Blue Porterweed Leaf Extract (*Stachytarpheta jamaicensis* L.) on Red Blood Cell Membrane Stability

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ABSTRACT

Inflammation is a biological response to harmful stimuli, such as infection or tissue injury. Blue porterweed leaves (*Stachytarpheta jamaicensis* L.) contain bioactive compounds such as phenols, flavonoids, saponins, and tannins, with flavonoids particularly recognized for their anti-inflammatory properties. This study aimed to evaluate the anti-inflammatory potential of blue porterweed leaf extract by assessing its effect on red blood cell membrane stability. An in vitro experiment was conducted using sheep red blood cells exposed to a hypotonic solution. The results demonstrated that the extract enhanced red blood cell membrane stability in a concentration-dependent manner, with stabilization rates of 28.67% (25 ppm), 32.86% (50 ppm), 38.46% (100 ppm), 42.65% (150 ppm), and 48.25% (200 ppm). For comparison, sodium diclofenac—a standard anti-inflammatory agent—exhibited higher stabilization rates at equivalent concentrations: 38.46% (20 ppm), 44.75% (40 ppm), 51.04% (60 ppm), 58.04% (80 ppm), and 64.33% (100 ppm). These findings indicate that while the anti-inflammatory activity of blue porterweed extract increased with concentration, it remained less effective than sodium diclofenac. Statistical analysis using the Kruskal-Wallis test followed by the Mann-Whitney U test confirmed significant differences between the extract concentrations and the extract and sodium diclofenac groups.

Keywords: Anti-inflammatory, *Stachytarpheta jamaicensis* L., red blood cell membrane stability

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