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PROGRAM BOOK

ISSTEC

5th International Seminar on Science and Technology 2025

Faculty of Mathematics and Natural Sciences
Universitas Islam Indonesia

***Theme: "Recent Breakthroughs in Science,
Technology, & Data Analysis"***

September 23, 2025

Auditorium Prof. K.H. Abdul Kahar Muzakkir
Universitas Islam Indonesia, Yogyakarta



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[isstec.official](https://www.instagram.com/isstec.official)



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Preface

The 2025 Fifth International Seminar on Science and Technology (5th ISSTEC 2025) will be held at Sleman, Daerah Istimewa Yogyakarta, Indonesia, on September 23, 2025 at the Faculty of Mathematics and Natural Sciences, Universitas Islam Indonesia, Yogyakarta. ISSTEC 2009, 2019, 2021 and 2023 have been well received by the research and academic community both on a national and international scale. As a bi-annual academic conference, ISSTEC has been successfully held over the last 16 years, attracting delegates from more than 10 countries and regions, including Malaysia, Thailand, Japan, the United States, Denmark, the United Kingdom, etc. The published proceedings have been indexed in Scopus.

The 5th ISSTEC will be held in hybrid mode, with sessions conducted both on-site and via Zoom. As a leading academic forum, it highlights the latest scientific advances and research achievements. The conference encourages interdisciplinary exchange, inspiring participants to share ideas and build collaborations that spark innovation and transformative breakthroughs in science and technology. Topics of interest for submission include:

1. Advanced Physical Materials
 - Material Science and Nano Materials for Energy storage and conversion
 - Nanomaterial synthesis for environmental applications
 - Computational Physics and Chemical Simulation
 - Carbon capture and utilization with novel catalysts
2. Innovations in Chemical and Physical Sciences
 - Sustainable Catalyst in biomaterials and pharmaceutical applications
 - Nanoscale materials in health-related research
 - Advanced physics in biotechnology
3. Applied physics
 - Mathematical physics
 - Statistical physics and data science
 - Big data analytics in physics

This program book is designed to guide participants throughout the seminar. It provides an overview of the schedule, details of technical sessions, information on keynote and plenary speakers, and important instructions for presenters and attendees. We sincerely hope it will serve as a practical and helpful reference to ensure the success of ISSTEC 2025.



ISSTEC

5th International Seminar on Science and Technology 2025

This year, the 5th ISSTEC 2025 features the following participation:

1. 4 keynote speakers
2. 6 invited speakers
3. 43 poster presentation papers
4. 103 oral presentation papers
5. A total of 146 papers

On behalf of the organizing committee, we extend our deepest gratitude to all parties who have contributed to the success of this seminar—organizers, institutions, sponsors, keynote and plenary speakers, reviewers, and participants. May ISSTEC 2025 become a meaningful, inspiring, and fruitful event, strengthening our shared commitment to the advancement of science and technology.



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Chairperson's Foreword



Assalamu'alaikum Wr. Wb.

Distinguished Guests, Speakers, and Participants, On behalf of the Organizing Committee, I would like to extend my warmest greetings and sincere welcome to all of you at the 5th International Seminar on Science and Technology (5th ISSTEC 2025), organized by the Faculty of Mathematics and Natural Sciences, Universitas Islam Indonesia. This seminar takes place on September 23, 2025, in Sleman, Yogyakarta, Indonesia, in a hybrid format, accommodating both onsite and online participation.

Since its inception in 2009, ISSTEC has grown into a well-recognized biennial scientific forum, consistently attracting researchers and academics worldwide. Following the successful events in 2009, 2019, 2021, and 2023 — with contributions from scholars across Malaysia, Thailand, Japan, the United States, Denmark, the United Kingdom, and beyond — ISSTEC has continued to establish itself as a platform for meaningful scientific exchange. The proceedings of the previous seminars have been published and indexed in Scopus, further affirming the academic quality of this event. The scope of ISSTEC 2025 covers a wide range of disciplines, including theoretical and experimental physics, physical chemistry, environmental science, nanotechnology, pharmacy, applied statistics, data science, and many related fields. We believe that the rapid development of science and technology poses both challenges and opportunities, and through this seminar, we aim to foster discussions, share innovative ideas, and build collaborations that can contribute to addressing global and local issues.

I would like to specially thank our keynote speakers:

- Prof. Hiroyuki Nakamura (Institute of Science, Tokyo, Japan),
- Prof. Teruna Jaya Siahaan (School of Pharmacy, University of Kansas, U.S.),
- Assoc. Prof. Mullika Traidej Chomnawang (Mahidol University, Thailand), and
- Prof. Daniel Wei-Chung Miao (National Taiwan University of Science and Technology, Taiwan),

for their readiness to share their expertise. Your commitment and collaboration are invaluable to the success of ISSTEC 2025.

It is our sincere hope that this seminar provides not only a productive academic gathering but also enriches knowledge, expands professional networks, and sparks new collaborations that will contribute to the advancement of science and technology in Indonesia and globally. Finally, I wish you an insightful and fruitful seminar. May this program book serve as a helpful guide throughout the event.

Wassalamu'alaikum Wr. Wb

Yogyakarta, September 23, 2025

Prof. Riyanto, Ph.D.

Chairperson, 5th ISSTEC 2025



ISSTEC

5th International Seminar on Science and Technology 2025

Remark from the Rector of Universitas Islam Indonesia



Distinguished Keynote Speakers, Esteemed Participants, Ladies and Gentlemen,

On behalf of Universitas Islam Indonesia, it is my distinct honour and privilege to welcome you to The 5th International Seminar on Science and Technology (ISSTEC 2025), organized by the Faculty of Mathematics and Natural Sciences, here in the historic and culturally rich city of Yogyakarta. This seminar, conducted in a hybrid format, allows us to gather an esteemed community of scholars, researchers, and professionals from across the globe to share knowledge and foster collaboration.

ISSTEC has become a significant platform for advancing scientific discourse and promoting innovation across diverse disciplines. This year's seminar continues that tradition by providing an avenue for exchanging ideas, presenting research findings, and encouraging interdisciplinary dialogue that strengthens the contribution of science and technology to society.

We extend our sincere gratitude to our distinguished keynote speakers, all presenters, participants, and sponsors for their valuable contributions. We also express our highest appreciation to the organizing committee for their dedication and tireless efforts in preparing this seminar.

May ISSTEC 2025 serve as an inspiring forum for scholarly exchange and collaboration, leading to discoveries and innovations that benefit humanity. Whether you are joining us physically in Yogyakarta or virtually from other parts of the world, we are truly honoured by your participation.

With highest regards,

Fathul Wahid

Rector of Universitas Islam Indonesia



Committee Chairs

5th International Seminar on Science and Technology (5th ISSTEC 2025)

“Recent Breakthroughs in Science, Technology, & Data Analysis”

Tuesday, September 23, 2025

Chairperson:

Prof. Riyanto, Ph.D (Universitas Islam Indonesia, Indonesia)

Scientific Committee:

apt. Saepudin, Ph.D.

Dr. Edy Widodo, M.Si.

Prof. Is Fatimah, M.Si.

Prof. Dr. apt. Yandi Syukri, M.Si.

Tri Esti Purbaningtyas, M.Si.

Arum Handini Primandari, M.Sc.

Dr. Dwiarto Rubiyanto, M.Si.

Prof. apt. Suci Hanifah, Ph.D.

Technical Committee

Muhaimin, M.Sc.

apt. Fitra Romadhonsyah, M.Pharm.Sci.

Febi Indah Fajarwati, M.Sc.

apt. Anami Riastri, M.Pharm.Sci.

Rahmadi Yotenka, M.Sc.

Dr. apt. Viviane Annisa

apt. Azizah Amin, M.Pharm.Sci.

Ghiffari Ahnaf Danarwindu, M.Sc.

Dr. apt. Dimas Adhi Pradana, M.Sc.

Dr. Sci. Dhina Fitriastuti, M.Sc.

Ayundyah Kesumawati, M.Si.

Purnama Akbar, M.Si.

Nurchahyo Iman Prakoso, M.Sc. Ph.D.

Dr. Muhammad Arsyik Kurniawan S., M.Sc.

Imam Sahroni, M.Sc., Ph.D.

Ganjar Fadillah, M.Si., Ph.D.

apt. Fajar Aji Lumakso, M.Pharm.Sci.

Wiyogo Prio Wicaksono, Ph.D.

Arianto Sugeng

Yuniar Rahmawati, S.Kom.

Muhammad Miqdam Musawwa, M.Sc.

Sekti Kartika Dini, M.Si.

apt. Uzulul Hikmah, M.Farm.

Siswanta, S.Pd.

Dzaki Hafids Nur Ardianto, S.M.

Ida Zulfa Rahma Kurnia, S.E.

Rizal Arrosyid, S.Si.

Fitria Prihatini, S.T.

Istyarto Damarhati, S.Pd.Si

Yorfan Ruwindya, A.Md.

Rizky Wibowo, S.Kom.

Muhammad Aly Sa'id, S.Pd., M.Pd.

Cecep Sa'bana Rahmatillah, S.Si.

Izdihar Rohadatul Aisy, S.Si

Muhammad Chabiburrohmah, S.Kom.

Sri Devi Maheswari, S.M.

Achmad Rossy Cendana, A.Md.

Bagus Suprianto

Sigit Mujiarto

Vira Megasari Haqni, S.Kom., M.Kom.



General Information for Participants

5th International Seminar on Science and Technology (5th ISSTEC 2025)

“Recent Breakthroughs in Science, Technology, & Data Analysis”

GUIDELINES FOR ONLINE PRESENTERS (ORAL AND POSTER) AND LISTENERS

1. **For presenters:** Please rename your Zoom ID using the following format:
Paper ID_Full Name_Presenter
(e.g., 15224_Muhaimin_Presenter)
2. **For listeners:** Please rename your Zoom ID using the following format:
Full Name_Listener
(e.g, Muhaimin_Listener)
3. Participants are encouraged to use a virtual background during the event or change the profile picture with the virtual background.
4. Virtual background can be downloaded from the website of ISSTEC : (science.uii.ac.id/isstec)

PRESENTATION GUIDELINES

Oral Presentations

1. The presenter must attend the conference program.
2. For oral presentations, you can send the presentation files to the committee at the conference on September 23, 2025.
3. Presentations are scheduled in conjunction with other sessions in the conference program.
4. Presentation duration: 7 minutes available, followed by a 3-minute question and answer session.
5. Presentation templates can be downloaded [here](#).

Poster Presentations

1. Poster dimensions 60 x 160 cm using an X-banner stand (provided by participants)
2. Click [here](#) to view the X-Banner design visualization
3. Presentation file templates can be downloaded [here](#).
4. Posters must be brought for offline presentations and submitted for online presentations to the committee at the conference on September 23, 2025.
5. For participants delivering **online presentations**, posters **must** be created with a **4:5 aspect ratio**, in **PNG, JPG, or JPEG format**, and with **high resolution**.
6. Participants presenting **online posters** are required to upload their poster files via the following link: [\[upload here\]](#).
7. The committee is not responsible for any undesirable things related to the poster display after the conference is over.
8. Please see the conference book program for the detailed poster presentation schedule and room.



Plenary Session

1. Participants must register before heading to the conference room.
2. All participants must dress modestly.
3. For online participants, cameras and microphones must be turned off during the session, but may be turned on at the presenter's or moderator's request.
4. All participants are allowed to ask questions during the discussion session, and the moderator will organize a question-and-answer session at the end of each session.

Parallel Sessions

1. Oral presenters will be divided into room meetings. Please see your room in the conference program.
2. Participants who will deliver **oral presentations** are required to submit their presentation files via the following link: [\[upload here\]](#).
3. The session starts from 1.00 PM until 4.00 PM and will be opened by the invited speaker session.
4. The moderator will open the session with a greeting and introduce the invited speaker.
5. The invited speaker has a maximum of 20 minutes of presentation and 10 minutes of discussion.
6. For oral presentation, which has 7 minutes of presentation and 3 minutes of discussion.
7. The moderator will take a picture at the end of the session.
8. At the end of the session, the moderator announces the award appreciation and closing remarks.
9. Please see the conference book program for the detailed oral presentation schedule and room.

CERTIFICATE

- **Certificate of Presentation or Certificate of Attendance**

A certificate of attendance includes the participant's name, certifying their participation in the conference.

- **Certificate Distribution**

Oral and poster presenters will receive a certificate of presentation from the 5th ISSTEC conference committee in the form of an e-certificate via each participant's email or printed copy onsite.

The certificate of presentation will not be issued, either at or after the conference, to authors whose papers are registered but not presented.



General Schedule

5th International Seminar on Science and Technology (5th ISSTEC 2025)

“Recent Breakthroughs in Science, Technology, & Data Analysis”

Tuesday, September 23, 2025, 08.00-16.30 (West Indonesian Time)

Auditorium Prof. K.H. Abdul Kahar Muzakir, Kampus UII Terpadu,
Jl. Kaliurang km 14.5, Sleman Yogyakarta, IndonesiaLink Zoom Meeting: uii.id/ISSTECPlenary2025 (939 6745 1558)

Time	Activity	Speaker	Media
08.00-08.20	Registration Entertainment	Committees	Hybrid
08.20-08.50	Opening Ceremony Recitation of Holy Qur'an National Anthem of Indonesia Hymn of Universitas Islam Indonesia Traditional Dance (Saraswati)	Master of Ceremony: Mr. Yono Malakiano Qori: Cecep Sa'bana Rahmatillah	Hybrid
	Indonesian Chemical Society (HKI)	Prof. Adi Darmawan, S.Si., M.Si., Ph.D.	Hybrid
08.50-08.55	Opening and Welcoming Address by The Rector of Universitas Islam Indonesia	Prof. Fathul Wahid, S.T., M.T., Ph.D.	Offline
08.55-09.00	Photo Session	Master of Ceremony: Mr. Yono Malakiano	Hybrid
09.00-12.00	Plenary Session 1 09.00-09.30 Prof. Teruna Jaya Siahaan, Ph.D. (School of Pharmacy, University of Kansas United States of America) Peptide as a Targeted Drug Delivery System	Moderator: apt. Annisa Fitria, S.Farm., M.Sc.	Zoom; Offline
	09.30-10.00 Mulika Traidej Chomnawang, Ph.D. (Department of Microbiology, Faculty of Pharmacy, Mahidol University Thailand) Plant-derived Natural Products and Their Mechanistic Roles in Combating Antimicrobial Resistant Pathogens Discussion Plenary Session 1 10.00-10.30		Offline

Time	Activity	Speaker	Media
	Plenary Session 2 10.30-11.00 Prof. Daniel Wei-Chung Miao <i>(National Taiwan University of Science Technology, Taiwan)</i> Markov chain modeling of a limit order book with limit and market order arrivals deviating from Poisson processes 11.00-11.30 Prof. Hiroyuki Nakamura <i>(Institute of Science Tokyo, Japan)</i> Next-Generation Agents for BNCT: Toward Precision Cancer Therapy <i>Discussion Plenary Session 2</i> 11.30-12.00	Moderator: Dr. Atina Ahdina, S.Si., M.Si.	Offline Offline
12.00-13.00	Break and Poster Session	Committees	Hybrid
13.00-13.30	Parallel Session: Invited Speaker Session	Moderator	Hybrid
13.30-15.30	Parallel Session: Oral Presentation	Moderator in each Room	Hybrid
15.30-16.00	Awarding for best poster and best presenter	MC/Scientific Team	Hybrid
	Closing Speech	Each room	Hybrid



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**5th International Seminar
on Science and Technology 2025**

Parallel Session

***5th International Seminar on Science and Technology
“Recent Breakthroughs in Science, Technology, & Data Analysis”***

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Auditorium Prof. K.H. Abdul Kahar Muzakkir
Universitas Islam Indonesia, Yogyakarta





Parallel Session

5th International Seminar on Science and Technology (5th ISSTEC 2025)
“Recent Breakthroughs in Science, Technology, & Data Analysis”
 Tuesday, September 23, 2025, 08.00-16.30 (West Indonesian Time)
 Hybrid, Indonesia

Room 1 – (Offline) : DPPAI 3rd Floor

No	Time	Moderator: Arum Handini Primandari, S.Pd.Si., M.Sc.		
	13.00 – 13.30	Invited Speaker: Dr. Raden Bagus Fajriya Hakim “Decentralized Prediction Systems: Integration of Blockchain, AI, and Statistics”		
1	13.30 – 13.40	40610	Shazia Ayesha Azzahra	Analysis of Online Gender-Based Violence Using Contextual Word Embedding and Bidirectional LSTM
2	13.40 – 13.50	42159	Muhammad Hasan Sidiq Kurniawan	Estimating Change Point Of Albumin In Cirrhosis Patients Via Koziol-Green Martingale Residuals
3	13.50 – 14.00	42370	Miftahul Jannah	Optimizing Value-at-Risk for Correlated Aggregate Expected Risk Models with Copula Dependence and Credibility Theory
4	14.00 – 14.10	42383	Ardiansyah Kurniawan	Computational Modeling of Phylogeographic Structure and Genetic Connectivity in Osteochilus spilurus Populations Across the Sunda Shelf
5	14.10 – 14.20	42385	Eny Khoirunnisa	A Structural Approach to Analyzing Open Unemployment: Logistic Regression-Based Path Analysis in Yogyakarta
6	14.20 – 14.30	42402	Muhammad Riefky	Analysis of Public Sentiment on X Regarding the Performance of the Indonesian Soccer National Team's First Match Under Patrick Kluivert's Coaching: A Machine Learning Approach with SMOTE and SHAP Interpretation
7	14.30 – 14.40	42429	Idhia Sriliana	Truncated Spline Bi-Response Nonparametric Regression for Poverty Data Modeling in the Sumatra Region
8	14.40 – 14.50	42431	Pepi Novianti	Application of Bivariate Geographically Weighted Regression for Poverty Percentage and Poverty Gap Index Modeling In Sumatra
9	14.50 – 15.00	42982	Suliyanto	Vector Autoregressive Method in Modeling Stock Prices of Major Banks in Indonesia Towards an Inclusive Economy
10	15.00 – 15.10	43113	M. Fariz Fadillah Mardianto	Exchange Rate Prediction of BRICS Countries Against US Dollar based on Multiresponse Fourier Series Estimator
11	15.10 – 15.20	43124	Dita Amelia	Bank Profitability Modeling in the Digitalization Era Using a Panel Data Regression Approach on Nine Major Banks in Indonesia
12	15.20 – 15.30	43130	Elly Pusporani	Comparison of Autoregressive Integrated Moving Average (ARIMA) and Multilayer Perceptron (MLP) Model in Predicting S.M. Entertainment Stok Prices
13	15.30 - 15.40	43133	Idrus Syahzaqi	Comparative Forecasting of the Rupiah-US Dollar Exchange Rate using Fourier Series and Support Vector Regression: Foreign Exchange Risk Implications

**Room 2 – (Offline) : Library (Perpustakaan) 2nd Floor**

No	Time	Moderator: Ghiffary Ahnaf Windu, M.Sc.		
1	13.00 – 13.10	43128	Nur Chamidah	Modelling Of Coronary Heart Disease Risk In Hypertension Sufferers Based On Binary Semiparametric Logistic Regression With Penalized Spline Estimator
2	13.10 - 13.20	43137	Verina Tita Nabila	Prediction of Hypertension Risk Based on Lifestyle and Biological Factors Using Machine Learning Approach and Feature Selection
3	13.20 - 13.30	43148	Ardi Kurniawan	Survival Time Modeling of HIV/AIDS Patients Using The Extended Cox Regression Approach
4	13.30 – 13.40	43153	Marisa Rifada	Improved risk modeling for concurrent diabetes and hypertension: a biresponse nonparametric logistic regression approach
5	13.40 – 13.50	43154	Elly Ana	Hypertension risk modeling with Multivariate Adaptive Regression Splines (MARS) for ordinal scale data
6	13.50 – 14.00	43155	Nur Chamidah	Modelling of Coronary Heart Disease Risk Using Semiparametric Binary Logistic Regression Based on Least Square Spline
7	14.00 – 14.10	43018	Paringga Fakhri Ashim	A Comparative Study Of Dimensional Reduction Strategies For Unsupervised Clustering Of Aerial Landscape Images With Deep Feature Extraction
8	14.10 – 14.20	42435	Arief Rahman Hakim	Directional Predictability of Financial Stability in the Presence of Climate Transition Risk
9	14.20 – 14.30	42511	Muhammad Khahfi Zuhanda	A Multi-Objective Optimization Framework for the Green Vehicle Routing Problem with Shipment Consolidation Using the Artificial Immune System
10	14.30 – 14.40	42512	Muhammad Khahfi Zuhanda	A Two-Stage Stochastic Multi-Objective Optimization Model for Earthquake Emergency Logistics Planning under Scenario-Based Uncertainty
11	14.40 – 14.50	42949	Seno Lamsir	Recent Breakthrough in Science Technology & Data Sets Computational Insights into Peter Handke: Intertextuality, Hybrid Poetics, and Cultural Innovation
12	14.50 – 15.00	43146	Muhammad Bayu Nirwana	Application of Proportional Hazard and Additive Models in the Survival Analysis of Breast Cancer Patients

Room 3 – (Offline) : DPPM 3rd Floor

No	Time	Moderator: apt. Azizah Amin, M.Pharm.sci.		
	13.00 – 13.30	Invited Speaker: Dr. apt. Oktavia Indrati, M.Sc. <i>“Advancing Transdermal Delivery of Andrographolide Through Nanotechnology and Synthetic Membrane Modeling”</i>		
1	13.30 – 13.40	42393	Mellisa Yohana Surya	Assessment of Pre-hospital Delay and Short-Term Treatment Outcome in Ischemic Stroke Patients at Royal Prima Hospital Medan
2	13.40 – 13.50	42411	Hidayah Karuniawati	Identification of Potentially Inappropriate Medications (PIMs) and Their Effect on Fall Risk In Geriatric Diabetes Mellitus Outpatient at Dr. Moewardi Hospital, Surakarta, Indonesia
3	13.50 – 14.00	42980	Tista Ayu Fortuna	Factors That Influence Medication Compliance In Pulmonary Tuberculosis Patients At Surakarta General Hospital
4	14.00 – 14.10	43086	Juwita Rahmawati	Soursop Leaf (<i>Annona muricata L.</i>) Extract Gel: Formulation and Effectiveness against <i>Microsporum canis</i>
5	14.10 – 14.20	43094	Asti Arum Sari	Phytochemical Screening and Antioxidant Activity of Methanolic Extract of <i>Vernonia elaeagnifolia</i> Leaves Using ABTS and DPPH Assays
6	14.20 – 14.30	43118	Ahmad Fauzi	Development and Evaluation of Oral Suspension of Golden Sea Cucumber (<i>Stichopus hermannii</i>) Extract and Determination of Protein Content
7	14.30 – 14.40	43132	Zakky Cholisoh	Analysis of Adverse Drug Reactions to First-Line Antiretroviral Therapy in Melanesian HIV/AIDS Patients: Type, Causality, Severity, and Management as a Foundation for Big Data Pharmacovigilance
8	14.40 – 14.50	43334	Putri Ananditia	Perspectives, Attitudes, and Practices of Health Workers about Cosmetovigilance in the Samarinda City Area
9	14.50 – 15.00	43336	M. Rifqi Fadillah Muslim	Nanohydrogel Preparation from Kelakai Leaf Extract (<i>Stenochlaena palustris</i> (Burm.f) Bedd.) As Antibacterial
10	15.00 – 15.10	43350	Aldyba Syaquilla Hafifah	Green Nanomedicine Approach for Antidiabetic: A Review Articles



Room 4 – (Offline) : Auditorium Prof. K.H. Abdul Kahar Muzakkir

No	Time	Moderator: Wiyogo Prio Wicaksono, M.Si., Ph.D.		
	13.00 – 13.30	Invited Speaker Assoc. Prof. ChM. Dr. Normah binti Awang “Organotin(IV) Alkylbenzyl Dithiocarbamates: Synthesis and Anti-Cancer Activity on A549 Lung Cells”		
1	13.30 – 13.40	42186	Alfiana Adhitasari Adhitasari	Effect of Tofu Wastewater Concentration on Lipid Content of <i>Chlorella vulgaris</i>
2	13.40 – 13.50	42200	Shela Pratiwi	Study Of The Effect Of Polyol Concentration Variations On The Physical Properties And Characterization Of Soybean Oil Based Alkyd Resin
3	13.50 – 14.00	42241	Putri Sholihah Pertiwi Abidin	Synthesis And Activity Testing Of Chalcone Derivative Compounds (E)-1-(4-(Allyloxy) Phenyl)-3-(3,5-Dimethoxyphenyl) Prop-2-En-1-One As Antimalarial Agent
4	14.00 – 14.10	42434	Ahmad Fikri	The Effect Of Volume Fraction On Hybrid Composites With Fiber And Trunk Powder Coconut Filler
5	14.10 – 14.20	42445	Rosanina Kartika Santana	NaOH-Modified Activated Carbon from Corncobs as Heterogeneous Catalyst: Synthesis and Application in Ultrasound-Enhanced Transesterification of Used Cooking Oil
6	14.20 – 14.30	42448	Azzahra Nur Kholifah	Exploration of thiomethyl-modified benzylideneacetophenone compounds: an innovative pharmacological study through in silico and in vitro approaches in the discovery of new antimalarial agents
7	14.30 – 14.40	42494	Candra Yulius Tahya	Antioxidant Assay and Component Identification Using LC-HRMS of Ecoenzyme Products from Sandoricum koetjape and Pometia pinnata Fruit Peel Waste
8	14.40 – 14.50	42973	Amalia Qurrata A'yun	Purification of Crude Glycerol using KOH-Activated Corncob Carbon and Its Utilization as A Moisturizing Agent in Liquid Soap
9	14.50 – 15.00	43070	Muhammad Azhar Faqih	Determination of Carotene Content of Crude Palm Oil Using Raman Spectroscopy
10	15.00 – 15.10	43131	Izzaty Fauziya Salwa	Synthesis of ZnO and SnO ₂ Catalysts Using Roselle Flower Extract for Biodiesel Production from Waste Cooking Oil
11	15.10 – 15.20	43156	Nur Raisah Maddeppungeng	Synthesis of Mg/Al-NO ₃ Hydrotalcite Immobilized by Citric Acid for [AuCl ₄] ⁻ Adsorption
12	15.20 – 15.30	43374	Aida Rumiki	Bioactivity Assessment: Antibacterial and Anticancer Activity of Ethanol Extract and Fractions (n-Hexane, Ethyl Acetate, Methanol) from Houttuynia cordata Leaves and Rhizomes.
13	15.30 - 15.40	42450	Najwa Luthfikal Mahpud	Unlocking the Potential of Non-Resinous Agarwood: Effect of Pretreatment on Physicochemical Properties
14	15.40 - 15.50	42444	Apriyadi Pramana	Fractionation of methanolic extract of guava leaves (<i>Psidium guajava</i> L.) and evaluation of antimalarial activity of the n-hexane and ethyl acetate fraction via heme polymerization inhibition and Plasmodium falciparum inhibition assays



Room 5 – (Online) : uii.id/ISSTECRoom5 (Zoom Meeting ID: 977 1153 1752)

No	Time	Moderator		Sekti Kartika Dini, S.Si., M.Si.
	13.00 – 13.30	Invited Speaker		Ayundyah Kesumawati, S.Si., M.Si. <i>“Identification of Sexual Harrasment Comments on The Tiktok Platform Using Indobert Embedding and Long Short-Term Memory”</i>
1	13.30 – 13.40	42368	Afnan Syukri Anwar Abdullah	Comparison Of LDA And LLM For Topic Modelling on Indonesian Health News Headlines and Articles
2	13.40 – 13.50	42384	Hadi Farid	Analysis of Students' Mathematical Communication Skills, Self-Regulated Learning, and Their Interrelationships
3	13.50 – 14.00	42408	Sulistiyono	Hydrocarbon Play Model of the Klantung Oil Field, Kendal Sub-basin, Central Java: Implications for Oil and Gas Exploration
4	14.00 – 14.10	42418	Ani Sulistyani	Daily Energy Consumption Pattern Analysis In Distributed PV Buildings Using Dimensionality Reduction And Clustering
5	14.10 – 14.20	42423	Syafruddin Kaliky	Mathematical problem-solving ability viewed from self-emotions: Case study through problem-based learning (PBL)
6	14.20 – 14.30	42443	Rahma Soedarnadi	A Hybrid CNN-LSTM Model For Predicting Accident Frequencies In Qatar
7	14.30 – 14.40	42490	Nina Sariana	Sentiment Analysis of Google Play Store User Reviews Of Alfagift And Klikindomaret Apps Using Term Frequency-Inverse Document Frequency And Support Vector Machine
8	14.40 – 14.50	42507	Dodi Hariyanto	The Crucial Role of Business Process Harmonization and Digital System Integration in Shaping National Logistics Competitiveness: A Ministerial/Institutional Perspective
9	14.50 – 15.00	42969	Sandy Noviandy	Analysis Of The Influence Of Digital Technology And Human Resource Competencies On Transportation Modes And Their Impact On Sustainable Supply Chain Distribution: A Study At PT Pos Indonesia (Persero)
10	15.00 – 15.10	43067	Ririn Dwi Agustin	Development Of Interactive Digital Media Child-Friendly Digital-Based Tasks



Room 6 – (Online) : uii.id/ISSTECRoom6 (Zoom Meeting ID: 978 6141 8914)

No	Time	Moderator: Purnama Akbar, S.Si., M.Si.		
1	13.00 – 13.10	43108	Dina Tri Utari	Predicting Stock Prices In Emerging Markets: Cnn-Lstm Application To Indonesia's Energy Sector
2	13.10 – 13.20	43109	Dina Tri Utari	Optimizing Cryptocurrency Portfolios In Indonesia: A Hybrid Approach Using Lstm And Markowitz Analysis
3	13.40 – 13.50	43138	Didin Dwi Novianto	Quantitative Retail Sales Optimization Using Hierarchical Analysis, Association Mining, And Supervised Classification
4	13.50 – 14.00	43139	Citrawani Marthabakti	Comparative Study of Conventional and Spatial Panel Models in Analyzing the Information and Communication Technology Development Index
5	14.00 – 14.10	43141	Imam Al Maksur	Clustering Analysis of DKI Jakarta Criminal Cases in 2024 Using K-Prototype on Mixed Data
6	14.10 – 14.20	43145	Nur Laily H	Data-Driven Mathematical Optimization For MSMES: Leveraging Multi Method Analytical Framework In Batik Marketing
7	14.20 – 14.30	43147	Diana Nurlaily	Sentiment Analysis of Balikpapan City Trans (BACITRA) using Lexicon Based and K-Nearest Neighbor (KNN)
8	14.30 – 14.40	43149	Erland Rachmad Ramadhan	Exploring the Potential of Kolmogorov-Arnold Networks to Approximate the Universal Exchange-Correlation Functional in Density Functional Theory
9	14.40 – 14.50	43150	Rudhy Akhwady	Modelling of Ocean Hydrodynamics in Sumbawa Waters, West Nusa Tenggara
10	14.50 – 15.00	43365	King Amil Hamzah Al Hakim Shodikin	The Implementation of Corporate Social Responsibility Based on Renewable Energy Through the Development of a Hybrid Power Plant in Bondan Hamlet



Room 7 – (Online) : uii.id/ISSTECRoom7 (Zoom Meeting ID: 986 3837 4007)

No	Time	Moderator: apt. Fajar Aji Lumakso, M.Pharm.sci.		
	13.00 – 13.30	Invited Speaker: Dr. apt. Aris Perdana Kusuma, M.Sc. <i>“Intermolecular Hydrogen Bond Domination on Phenylacetic Acid – nicotinamide cocrystals”</i>		
1	13.30 – 13.40	41630	La Ode Muhammad Anwar	Target Prediction And Pharmacokinetics Of Black Cumin Seed Compounds (Nigella Sativa) Using Swiss target prediction And Swissadme
2	13.40 – 13.50	42211	Retno Lisnawati	Analysis of the Association Between Prehospital Delay and Mortality in Ischemic Stroke Patients: Implications for Thrombolytic Therapy
3	13.50 – 14.00	42309	Nining	Solubility Enhancement of Ivermectin Using Deep Eutectic Solvents: A Preformulation Study with Hydrophilic and Hydrophobic DES Systems
4	14.00 – 14.10	42338	Bayu Eko Prasetyo	Optimization of Gelatin Preparation by Acid Method from Muscovy Duck (Cairina moschata) Bones and Characterization as a Pharmaceutical Excipients
5	14.10 – 14.20	42413	Luthfi Muchlashi	Synthesis and Molecular Docking Studies of Nitro-Substituted 1-Allyl-3-Benzylidenethiourea Derivatives as Antibacterial Candidates Against Staphylococcus aureus and Pseudomonas aeruginos
6	14.20 – 14.30	42629	Didik Priyandoko	Anti-Inflammatory Activity of Moringa Leaf Extract Nanocrystal and its Anti-Cancer on MCF-7 Cells
7	14.30 – 14.40	43035	Ersalina Nidianti	The Impact of Daily Cigarette Consumption on Creatinine Levels In Active Smokers Using Jaffe Reaction Method
8	14.40 – 14.50	43110	Reza Rahmawati Rahmawati	Evaluating the Impact of Medication Adherence on Therapeutic Effectiveness in Chronic Obstructive Pulmonary Disease (COPD) Patients in Bengkulu
9	14.50 – 15.00	43129	Valentina Yurina	Development of Recombinant Human LOX-1 Protein Vaccine Based on Chitosan Nanoparticles by the Ionic Gelation Method
10	15.00 – 15.10	43158	Siwi Nurbaiti	Formulation Of Dissolving Microneedle With Rapet Wood Extract (Parameria Laevigata) As An Antioxidant And Anti- Acne Agent
11	15.10 – 15.20	43268	Taufik Muhammad Fakhri	Structure-Based Docking Analysis of Rhenium-Hesperidin Complexes for Breast Cancer Radiopharmaceutical Applications



Room 8 – (Online) : uii.id/ISSTECRoom8 (Zoom Meeting ID: 922 6896 1376)

No	Time	Moderator: Nurcahyo Iman Prakoso, Ph,D		
	13.00 – 13.30	Invited Speaker: Dr. Sci. Dhina Fitriastuti, Sci. M.Sc. <i>"Identification of Niclosamide as an Inhibitor of the p300/Transcription Factor Protein-Protein Interactions"</i>		
1	13.30 – 13.40	40788	Devyani Diah Wulansari	Chemical Profiling and In Silico Docking of Phytoconstituents as Prospective Immune Modulating Agents: Investigating The Therapeutic Potential of Fermented Garlic Honey
2	13.40 – 13.50	41660	Steviani Yolanda	Biofortification Iron (Fe) in Rice (<i>Oryza sativa</i>) Through Seed Priming Method to Combat Micronutrient Deficiencies
3	13.50 – 14.00	41973	Asmida Herawati	Influence of Site-Dependent Mg Doping on the Photophysical Behavior of LaFeO ₃ Perovskites
4	14.00 – 14.10	42021	Nabila Eka Yuningsih	Utilization of Sugarcane Bagasse on the Efficiency of Phosphate Ion Adsorption: Optimization with BBD-RSM
5	14.10 – 14.20	42048	Muzayyinul Arifin	Magnetic Covalent Triazine Framework for Dye adsorption
6	14.20 – 14.30	42066	Suprpto	Analysis of Thermal Radiation Shielding of Vacuum Furnace for Brazing and Bake-out of Accelerator Components
7	14.30 – 14.40	42140	Agus Purwadi	Calculation and measurement of the electron emission current on the plasma generator tube for the pulse electron irradiator
8	14.40 – 14.50	42319	Kokom Komariyah Muhamad Amin	Characterization of Pixell Arabica and Robusta Coffee Varieties: Physicochemical Properties and Antioxidant
9	14.50 – 15.00	42329	Dina Fitriana	Chitosan-Impregnated Activated Carbon Derived from Sugarcane Bagasse for Alizarin Red S Adsorption
10	15.00 – 15.10	42374	Betti Rosita Betti	Colorimetric Detection of Glucose Using Silver–Chitosan Nanocomposites Synthesized from Shrimp Waste
11	15.10 – 15.20	42417	Rinaldi Medali Rachman	Reinforcement of Starch-PVA Biocomposite Structure with Microcrystalline Cellulose Isolate from Oil Palm Empty Fruit Bunches



Room 9 – (Online) : uii.id/ISSTECRoom9 (Zoom Meeting ID: 986 0954 3519)

No	Time	Moderator: Dr. Maisari Utami.		
1	13.00 – 13.30	42439	Mustafiah	Kinetic Study of Essential Oil Extraction from Nutmeg Seeds (<i>Myristica fragrans</i> Houtt) using Microwave Air-Hydrodistillation (MAHD)
2	13.30 – 13.40	42440	Citra Wahyu Rizkita	Unlocking Green Efficiency: Optimized Solvent Free Microwave Extraction of Essential Oils from <i>Zingiber officinale</i> var. (Giant Ginger)
3	13.40 – 13.50	43007	Muliadi Ramli	Inorganic Oxide Synthesis from Aceh Bovine Bone Through Precipitation for Palm Oil Transesterification Into Biodiesel.
4	13.50 – 14.00	43083	Grace Tjungirai Sulungbudi	A Reproducible Sol-Gel Synthesis of Magnetic-Coated Silica Nanoparticles for Reliable SARS-CoV-2 RNA Extraction
5	14.00 – 14.10	43098	Elis Agustiana	Fabrication of Reusable and Low-Cost SERS Substrate for Explosives Detection
6	14.10 – 14.20	43105	Dwi Setyaningsih	Immersion time effects on composite propellant burn rate
7	14.20 – 14.30	43126	Lisendra Marbelia	Optimizing Ozone Solubility for Effective Surfactant Removal and COD Reduction in Synthetic Laundry Wastewater
8	14.30 – 14.40	43134	Ni Luh Putu Ardini Astina Putri	Optical and Magnetic Properties of the Green Synthesized $\text{CoFe}_2\text{O}_4/\text{Ag}$ Nanoferrites
9	14.40 – 14.50	43188	Sri Nengsih	Photocatalytic Degradation of Methylene Blue Using $\text{Fe}_3\text{O}_4/\text{TiO}_2$ Under The Influence of TiO_2 Type and Irradiance Intensity
10	14.50 – 15.00	42433	Asri Eka Putra	Performance Evaluation Of 119.88 KWP IOT Based On-Grid Solar System at Admin Building Grissik



ISSTEC

5th International Seminar
on Science and Technology 2025

Poster Presentation

Field : Chemistry, Pharmacy & Statistic

September 23, 2025

Auditorium Prof. K.H. Abdul Kahar Muzakkir
Universitas Islam Indonesia, Yogyakarta





Poster Presentation

5th International Seminar on Science and Technology (5th ISSTEC 2025)*“Recent Breakthroughs in Science, Technology, & Data Analysis”*

Tuesday, September 23, 2025, 08.00-16.30 (West Indonesian Time)

Field – Chemistry

No	ID Paper	Name	Title
1	42102	Prof. Dr. Is Fatimah	Physicochemical character and Photocatalytic Activity of NiFe ₂ O ₄ /Biochar Nanocomposite prepared from Coconut Peat toward Rhodamine B
2	42104	Prof. Dr. Is Fatimah	Plant Mediated-Synthesis of Co(OH) ₂ /Co ₃ O ₄ : Physicochemical characteristics and Photocatalytic Activity Towards Rhodamine B
3	42112	Gani Purwiandono	Formulation and evaluation of aromatherapy candles incorporating fennel leaf (<i>Foeniculum vulgare</i>) essential oil for stress relief: a comparative study of soy wax and paraffin wax
4	42254	Iqbal Annur Eka Setyaputra	Synthesis and Characterization of Alumunium (III)- Benzenedicarboxylate/Zeolite (Al-BDC/Z) Composite For Remediation Agents
5	42358	Orryza Mutiara Illahi	Development and Activity Test of Antinociceptive Nanoemulsion Gel Containing Nutmeg Essential Oil (<i>Myristica Fragrans</i> Houtt.) as A Topical Delivery System
6	42416	Wiyogo Prio Wicaksono	Fabrication of a highly sensitive and selective electrochemical sensor using green-synthesized Ag coated on NiO nanoparticles for glucose detection
7	42432	Novy Fitri Yanti	Quantitative elemental analysis of construction materials for radioactive waste containment using X-Ray Fluorescence (XRF)
8	42760	Inas Marwaa Dzakiya	Crystal Structure Analysis of Natural Materials in Building Materials Using XRD (X-Ray Diffraction)
9	43111	Yuniar Ponco Prananto	Mn(II)-Nicotinamide-Dicyanamido Complex: Synthesis, Crystal Structure, Magnetism, and Antibacterial Activity
10	43114	Gani Purwiandono	Examining Active Compounds in Ginger as a Potential Treatment for Respiratory Syndrome: A Molecular Docking and Dynamics Study
11	43169	Yulia Sukmawardani	Corncob-Based Adsorbent: an Eco-Friendly Approach to Reduce Impurities in Recycled Cooking Oil
12	43228	Garnadi Jafar	Formulation, Evaluation, And Activity Test of Nanostructured Lipid Carrier (NLC) Curcumin Gel as an Anti-Acne Agent
13	43306	Salmahaminati	Fungal Exploration and Viability Testing of Oil Palm Pollen in the Belitung Islands Region, Indonesia
14	43342	Salmahaminati	Coumarin Compounds with Potential as Sunscreens Through TD-DFT (Time Dependent Density Functional Theory) Analysis
15	43358	Riyanto	Remediation of Contaminated Soil with Crude Oil Using Solvent Extraction Method



Field – Pharmacy

No	ID Paper	Name	Title
1	42016	Arinda Utami	Pengaruh Edukasi Dan Homecare Oleh Apoteker Terhadap Pengetahuan, Kepatuhan Dan Outcome Terapi Pasien Dm Tipe Ii Di Puskesmas Tebet
2	42036	Sitti Noer Athiyah	Anti-Inflammatory Potential of Gelatin Peptides from Tilapia Fish (<i>Oreochromis niloticus</i>) Scales on the Reduction of Nuclear Factor-Kappa B (NF- κ B) and Myeloperoxidase (MPO) Levels in Rats Induced with Complete Freund's Adjuvant (CFA)
3	42141	Abdul Rozak	Economic Value Estimation Of Unused Medications And Their Contributing Factors In Households Of Cibirusah Subdistrict, Bekasi Regency
4	42302	Yudi Agus Saputra	Optimization Crude Protein Hydrolysis from Waste Skin Robusta Coffee Beans (<i>Coffea canephora</i> P.) in Bengkulu Province with Protease Enzyme Uses Response Surface Methodology (RSM)
5	42357	Agil Restudiarti	Sunscreen Gel Potential Of Black Garlic (<i>Allium sativum</i>) Extract With Variation HPMC Concentrations
6	42392	Anita Dwi Puspitasari	Green synthesis and in vitro antioxidant activity investigation of curcumin monoketone analogs from 4-methoxybenzaldehyde compounds
7	42396	Yulias Ninik	Comparative Dissolution Study and Characterization of Refined Liquisolid System of Fenofibric Acid Using Various Solvents and Neusilin® as Adsorbent
8	42404	Ririn Lispita Wulandari	Anti-inflammatory Effect and Irritation Test of Celecoxib Emulgel with Sodium Lauryl Sulfate as Surfactant
9	42405	Ibrahim Arifin	Effect Of Addition Watermelon Juice (<i>Citrullus vulgaris</i> Schard.) on The Interference Of Determination Protein Concentration with The Lowry Method
10	42410	Khoirul Anwar	Optimization of Temperature and Time of Microwave Assisted Extraction of Dewandaru Leaves (<i>Eugenia uniflora</i> L.) on Antioxidant Activity and Its Application in Body Scrub
11	42463	Ady Candra	Optimization of Protein Isolates from Edamame Skin Waste (<i>Glycine max</i> L. Merill) with the Response Surface Method
12	42475	Faris Rega Riswana	Biosensor Technologies for Parasitic Infections: A Systematic Review of Analytical Performance and Applicability
13	43103	Siti Amalia	Monitoring Tacrolimus Blood Levels and Correlation with eGFR in Patients After Kidney Transplant
14	43152	Maulidia Rahmah	DNA Extraction Approaches in Soft and Hard Capsule Shells for Porcine (<i>Sus scrofa</i>) Detection Using Real-Time PCR targeted 12S rRNA
15	43182	Anton Kustanto	Cost Effectiveness Analysis Penggunaan Cefazolin, Ceftriaxone, dan Ceftriaxon Sebagai Antibiotik Profilaksis Terhadap Infeksi Luka Operasi Pasien Sectio Caesarea di Rumah Sakit Bhakti Medicare
16	43185	Patonah Hasimun	Characterization of Turmeric–Gotu Kola Nanophytosome for Arterial Stiffness in Hypertension
17	43183	Herni Kusriani	Development and Characterization of Nanoliposomes Containing Turmeric (<i>Curcuma longa</i> L.) and Gotu Kola (<i>Centella asiatica</i> L.) Extracts for Enhanced Stability and Bioavailability



No	ID Paper	Name	Title
18	43227	Yani Mulyani	Development of Effervescent Antidiabetic Granules from a Combination of Binahong Extract and Life Graft: In Vitro Activity and Toxicity Test
19	43242	Ika Kurnia Sukmawati	Antimicrobial Activity of Ethanol Extract of Sungkai Leaves (<i>peronema canescens</i> jack) Against Bacteria <i>Streptococcus mutans</i>
20	43301	Rahmat Santoso	Phytochemical Screening and Metabolite Profiling <i>Sechium edule</i> , <i>Syzygium polyanthum</i> , <i>Cucumis sativus</i>
21	43362	Tricia Andini Richard	Knowledge and Attitudes on Information of Beyond Use Date (Bud) Medicines in Pharmacies in The Poso Regency: Study in Pharmacists and Patients
22	43368	Annisa Fitria	Exploration of Endophytic Fungus <i>Meyerozyma guilliermondii</i> and Its Bioactive Potential Isolated from <i>Ficus carica</i>
23	43371	Annisa Fitria	Antimicrobial Efficacy and Time-Kill Study of <i>Curcuma aeruginosa</i> Roxb. Against Respiratory Tract Pathogens

Field – Statistic

No	ID Paper	Name	Title
1	42346	Haris Ridwan Jihaudin	Design and Construction of a Prototype of an IoT-Based Waste Monitoring and Notification System for Water Channels
2	42472	Kariyam	Grouping Of Oil and Gas Pipeline Sectors with Block Based K-Medoids Method
3	43097	Edy Subowo	Multi-Label Figurative Language Detection in Indonesian E-Commerce Reviews Using Hybrid Deep Learning
4	43119	Anggun Puspita Sari	Classification of Road Damage Types using Convolutional Neural Networks Based on Digital Images in Sleman Regency
5	43122	Zahara Intan Wigathie	Mathematical Integration of AHP, Clustering, AR-MBA, and Classification Models for Optimizing Customer Loyalty and Profit in SMEs
6	42504	Hartono	Hybrid Approach for Class Imbalance Handling Using Adaptive Weighted Oversampling and Instance Hardness-Based Undersampling



ISSTEC

5th International Seminar
on Science and Technology 2025

ABSTRACT BOOK ***Keynote Speakers***

September 23, 2025

Auditorium Prof. K.H. Abdul Kahar Muzakkir
Universitas Islam Indonesia, Yogyakarta





Markov Chain Modeling of a Limit Order Book with Limit and Market Order Arrivals Deviating from Poisson Processes

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Abstract. This study considers a limit order book (LOB) queueing system where limit order and market order arrivals do not follow fundamental Poisson processes. We first assume that limit orders are generated by Markov modulated Poisson processes (MMPP) to reflect their clustered nature. The queueing dynamics are modeled by a multi- dimensional, birth-death type Markov chain, for which the probability distributions of the state variables can be obtained by matrix computing procedures for Markov chains. By properly adjusting the Markov chain structure and assigning parts of the states to be absorbing, we are able to compute two conditional probabilities that are relevant to high frequency trading: (1) the probability of midprice going up, and (2) the probability of order execution before midprice moves. We then show that this approach can also be used to incorporate more generalized market order arrivals in which the interarrival times follow nonexponential distributions to reflect increasing or decreasing failure rates. Our numerical analysis demonstrates that the deviations significantly influence the key probabilities and provides a justification for our proposed extensions

Keywords: limit order book (LOB), queueing system, Markov modulated Poisson process (MMPP), Markov chain, absorbing state, failure rate



Next-Generation Agents for BNCT: Toward Precision Cancer Therapy

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Abstract. Boron neutron capture therapy (BNCT), which utilizes alpha particles generated by the thermal neutron capture reaction of boron-10, is attracting attention as a minimally invasive treatment for cancer. In March 2020, Japan became the first country in the world to approve BNCT for the treatment of head and neck cancer. In this talk, I will outline the path leading to this approval and present our recent progress in developing new therapeutic agents for the treatment of malignant brain tumors



Plant-derived Natural Products and Their Mechanistic Roles in Combating Antimicrobial Resistant Pathogens

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Abstract. Antimicrobial resistance (AMR) has become an escalating global health crisis, threatening the efficacy of current treatment regimens and challenging healthcare systems worldwide. The rise of drug-resistant bacteria is primarily driven by the indiscriminate and excessive use of antimicrobials across human, veterinary, and agricultural sectors. Consequences include not only increased morbidity and mortality but also prolonged hospitalizations, higher healthcare expenditures, and a substantial economic burden on both developing and developed nations. Compounding the issue is the limited pipeline of new antibiotics, making the search for alternative therapeutic strategies more urgent than ever. Among the mechanisms by which bacteria evade antimicrobial agents, biofilm formation is particularly concerning. Biofilms provide a protective niche that enables bacteria to survive hostile environments and resist conventional treatments. This process is intricately regulated by quorum sensing (QS) which is chemical communication system that facilitates bacterial coordination and regulates virulence, persistence, and biofilm development. Targeting QS and biofilm-associated pathways offers a promising approach to combat resistant infections more effectively. Plant-derived natural products long used in traditional medicine for their antimicrobial properties have emerged as promising candidates. These phytochemicals are known to exhibit multi-targeted activities, including the ability to inhibit QS systems, disrupt biofilm integrity, and reduce bacterial virulence, often with fewer side effects and lower cost compared to synthetic drugs. We explore the significance of AMR and the role of biofilm formation in drug-resistant bacteria and further highlight the potential of phytochemical agents as anti-biofilm therapeutics. Emphasis will be placed on the need for integrative approaches and translational research to harness plant-based compounds as part of future antimicrobial strategies.



Peptide as a Targeted Drug Delivery System

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Abstract. More than 70 peptides have been approved as therapeutic agents by the Food Drug Administration (FDA) in the past two decades. This is due to the advancement in peptide synthesis, formulation, and delivery technologies. Recently, peptides have been used to target drugs to a specific cell or tissue by designing peptide-drug conjugates. Our group discovered ICAM-1 peptides (i.e., cIBR peptide and its derivatives) that target LFA-1 receptor on the surface T cells; these peptides have been conjugated to drugs (i.e., methotrexate; MTX) to suppress the activation of inflammatory T cells in autoimmune diseases such as rheumatoid arthritis (RA). Here, the discovery of cIBR peptide and its derivatives will be described. The mechanism of binding between cIBR peptide and LFA-1 receptor on the surface of T cells will be elucidated. We also showed that cIBR peptide binds to the I-domain of LFA-1. MTX was conjugated to cIBR to make MTX-cIBR conjugate and this conjugate effectively suppressed RA in the animal model. Overall, peptide-drug conjugates have been used to delivery therapeutic and diagnostic agents to a specific cell or tissue. It is predicted that many peptide-drug conjugates will be used as therapeutic and diagnostic agents in the future.



ISSTEC

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ABSTRACT BOOK

Invited Speakers

September 23, 2025

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Universitas Islam Indonesia, Yogyakarta





Identification of Sexual Harrasment Comments on The Tiktok Platform Using Indobert Embedding and Long Short-Term Memory

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Abstract. The development of information technology, particularly social media, has transformed the way people communicate and interact. While offering many benefits such as easy access to information and business opportunities, social media also presents new challenges, one of which is the rise of negative comments and sexual harassment. One popular platform is TikTok, which allows users to share short videos and receive comments from others. Manually identifying comments containing sexual harassment is difficult due to the high volume of comments, informal language, and often implicit or hidden meanings. To address this issue, this study aims to develop a model for detecting sexually harassing comments on TikTok by utilizing a combination of IndoBERT embeddings and the Long Short-Term Memory (LSTM) algorithm. IndoBERT is chosen for its ability to understand the context of the Indonesian language, while LSTM is effective in capturing the sequential patterns in text. Additionally, to handle class imbalance, this study compares the performance of the LSTM model in text classification before and after applying SMOTE. Without SMOTE, the model shows high accuracy but performs poorly in recognizing the minority class. After applying SMOTE, the performance for the minority class improves, although the overall accuracy slightly decreases. These results indicate that SMOTE can help address data imbalance, though its effectiveness depends on the context

Keywords: IndoBERT Embedding, LSTM, Sexual Harassment, SMOTE, Text Analysis



Decentralized Prediction Systems: Integration of Blockchain, AI, and Statistics

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Abstract. The integration of Artificial Intelligence (AI) and blockchain holds promise for developing intelligent, transparent, and secure predictive systems. However, scientific accountability remains challenged by issues such as data quality, algorithmic bias, and limited model interpretability. This paper proposes a three-layer conceptual framework—Blockchain (Data Layer), AI/ML (Prediction Layer), and Statistics (Validation Layer)—positioning statistical methods as the core mechanism for validating data integrity and predictive reliability. Through a systematic literature review and conceptual analysis, we demonstrate how statistical techniques enable anomaly detection, performance evaluation (including confidence intervals and metrics), bias mitigation, and auditable validation via smart contracts. Our key contribution is establishing statistics as the foundational layer for trustworthy inference in decentralized ecosystems, while identifying emerging research directions such as statistical consensus mechanisms and blockchain-enabled federated learning. Practical applications span finance, healthcare, and public governance, enabling auditable and scientifically robust predictive systems

Keywords: Blockchain; Artificial Intelligence; Statistics; Decentralized Prediction; Model Validation



Advancing Transdermal Delivery of Andrographolide Through Nanotechnology and Synthetic Membrane Modeling

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Abstract. Andrographolide, the bioactive compound from *Andrographis paniculata*, has therapeutic potential but is limited by poor water solubility and extensive first-pass metabolism, resulting in low oral bioavailability. An alternate method of getting over these obstacles is the transdermal drug delivery system, particularly when using formulations based on nanotechnology. This study aimed to develop a nanoemulgel system of andrographolide for transdermal application and to evaluate its permeation using a Strat-M® synthetic membrane model. Nanoemulsions were optimized through surfactant and co-surfactant screening followed by self-nanoemulsifying drug delivery system (SNEDDS) design. The optimized formulation demonstrated rapid emulsification, nanoscale droplet size, and sufficient drug loading capacity. Incorporation of the nanoemulsion into a carbopol-based gel produced a stable nanoemulgel with favorable pH, viscosity, and release characteristics. In vitro permeation testing of Strat-M® membranes confirmed the ability of andrographolide to be released from the preparation and penetrate the membrane, supporting the utility of synthetic membranes as a predictive tool in transdermal research. These results demonstrate how andrographolide transdermal delivery systems can be advanced by integrating nanotechnology and synthetic membrane assessment, providing a route to increased therapeutic efficacy of this bioactive substance

Keywords: andrographolide, formulation, nanotechnology, transdermal, synthetic membrane



Intermolecular Hydrogen Bond Domination on Phenylacetic Acid – nicotinamide cocrystals

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Abstract. Carboxylic acid – pyridine heterosynthon (CPHS) is one of the most common synthons found in cocrystal packing. Phenylacetic acid (PYC)– nicotinamide (NIC) (PYCNIC) cocrystals were used as a computational model to assess the most important factor in the emergence of the synthon. Geometry optimization was carried out on every possible two molecules of PYC – NIC conformation based on B3LYP-D3BJ/6-311G (d,p). Various energetic parameters, including total energy, interaction energy, and hydrogen bond energy, were used to compare the existing conformation to the putative conformation. The conformation with CPHS has -53.87 kJ mol⁻¹ of single intermolecular hydrogen bond energy (EHB), which is the strongest of all. It turns out that there is no other parameter better than EHB to describe the superiority of CPHS in PYCNIC

Keywords: cocrystal, synthon, hydrogen bond, phenylacetic acid, B3LYP



Identification of Niclosamide as an Inhibitor of the p300/Transcription Factor Protein-Protein Interactions

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Abstract. Protein–protein interactions (PPIs) are essential for many biological processes and represent attractive targets for drug discovery. In this study, we identified niclosamide as a novel inhibitor of the interaction between hypoxia-inducible factor 1 α (HIF-1 α) and p300, selected from the RIKEN NPDepo compound library through a fluorescence anisotropy-based screening approach. To investigate the binding mechanism, we synthesized niclosamide azide as a photoaffinity probe to locate its binding site on p300 and confirmed this through photoaffinity labeling experiments combined with molecular docking analysis. Furthermore, our findings revealed that niclosamide not only disrupted HIF-1 α /p300 binding but also interfered with p300's interactions with other transcription factors, such as p53 and STAT3, leading to reduced expression of BAX and c-MYC

Keywords: HIF-1 α , screening assay, PPI inhibitor



Organotin(IV) Alkylbenzyl Dithiocarbamates: Synthesis and Anti-Cancer Activity on A549 Lung Cells

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Abstract. Cisplatin remains a standard chemotherapeutic agent for lung cancer but is often limited by severe side effects and drug resistance. Organotin(IV) dithiocarbamates have emerged as promising alternatives, though their mechanisms of action remain underexplored. In Phase 1 of this study, nine novel organotin(IV) N-alkyl-N-benzyl dithiocarbamate compounds were synthesized via an in situ method, yielding molecular formulas $R_nSn[S_2CN(L)]_{4-n}$ ($L = CH_3(C_6H_5)$ or $CH_2CH_3(C_6H_5)$; $n = 2-3$). The compounds exhibited satisfactory yields (32–89%) and were characterized through elemental analysis, FT-IR, and NMR spectroscopy. FT-IR confirmed thioureide ($\nu(C=N)$: 1475–1497 cm^{-1} ; $\nu(C-S)$: 950–1001 cm^{-1}) and ^{13}C NMR indicated thioureide carbon signals (δ 197–201 ppm). Single-crystal X-ray diffraction revealed diverse coordination geometries, including trigonal bipyramidal and pentagonal bipyramidal. In Phase 2, cytotoxicity and mechanistic evaluations were conducted against human lung adenocarcinoma cells (A549). MTT assays demonstrated that seven out of nine compounds exhibited potent cytotoxicity with IC_{50} values ranging from 0.52 to 3.9 μM . All compounds induced apoptosis (37–91%), as confirmed by Annexin V-FITC/PI staining. Notably, diphenyltin(IV) N-methyl-N-benzyl dithiocarbamate (compound 3) showed the strongest anticancer activity ($IC_{50} = 1.86 \mu M$) and high selectivity toward cancer cells ($SI > 6$) compared to normal lung fibroblasts (MRC-5). These findings support the potential of organotin(IV) dithiocarbamates as selective lung cancer therapeutics

Keywords: A549 cell line, Anticancer, Cytotoxicity, Organotin, Dithiocarbamate



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ABSTRACT BOOK

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Analysis of Online Gender-Based Violence Using Contextual Word Embedding and *Bidirectional* LSTM

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Abstract. The rise of Online Gender-Based Violence (OGBV) on social media, particularly sexual harassment, poses a major online safety issue. According to UNHCR, sexual harassment is unwanted sexual behavior and is legally classified as a crime. Although OGBV cases dropped by 25% compared to the previous year, the threat remains significant. The effort of creating model to automatically detect the intention of OGBV will help people avoiding such comment and educate the perpetrator. This study uses a bidirectional Long Short-Term Memory (BiLSTM) classification method with contextual embedding to analyze OGBV patterns on Instagram. BiLSTM captures both past and future context, while Word2Vec represents words based on their context to improve understanding. The analysis indicates that comments related to OGBV are often characterized by abusive language. The BiLSTM model utilizing Skipgram embedding achieved the highest performance, reaching 80% accuracy on the test data. This model proves effective in identifying OGBV comments, despite facing challenges such as ambiguous comment contexts and limitations in the corpus. Additionally, hyperparameter tuning using Hyperband significantly enhanced the model's efficiency and performance

Keywords: BiLSTM, Contextual Embedding, Online Gender-Based Violence Classification, Skipgram, Word2Vec



Chemical Profiling and In Silico Docking of Phytoconstituents as Prospective Immune Modulating Agents: Investigating The Therapeutic Potential of Fermented Garlic Honey

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Abstract. Fermented Garlic Honey is a combination of honey and garlic (*Allium sativum* L.) that undergoes extraction and fermentation with varied soaking times. The combination of these two herbs will likely have a synergistic therapeutic effect that can be used as a functional food to promote a healthy lifestyle. This method evaluates chemicals in a sample based on the length of fermentation time, allowing it to predict the compounds that contribute to its biological activity. FTIR and LC-HRMS were used to identify secondary metabolites in Fermented Garlic Honey. Principal component analysis (PCA) may easily distinguish between samples based on the extraction solvent. LC-HRMS is an advanced analytical technique identifying 29 compounds in raw honey and 31, 34, and 34 compounds in the 2-, 4-, and 6-week fermented garlic honey samples, respectively. The bioactive substances meglutol, Gamma Glutamyl-S-Methylcysteine, Gamma Glutamyl-S-Allylcysteine, and S-Allylcysteine were found in the four samples and have been suggested to have therapeutic benefits as immunomodulating agents. Furthermore, Molegro Virtual Docker 7 has been utilized to predict the possible mode of action of the selected bioactive compounds. Among the compounds tested, Gamma-glutamyl-S-allylcysteine exhibited the most optimal interaction in three receptors (Caspase-1, INOS, and IL-1 β). Our results imply that these bioactive compounds may actively function as antilipemic drugs in addition to their immunomodulatory capabilities.

Keywords: *Honey; Garlic; Obesity; Diabetes; Healthy lifestyle; S-Allylcysteine*



Target Prediction And Famacokinetics Of Black Cumin Seed Compounds (Nigella sativa) using SwissTargetPrediction AND SwissADME

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Abstract. Black cumin seeds (*Nigella sativa*) exhibit significant potential as a source of bioactive compounds with medicinal applications, particularly in the treatment of various diseases. A systematic development strategy requires elucidation of the molecular targets of these compounds and a comprehensive evaluation of their pharmacokinetic properties. SwissTargetPrediction and SwissADME are computational tools that facilitate the identification of molecular targets and the assessment of pharmacokinetic profiles for candidate compounds. This study aimed to investigate the molecular targets of compounds derived from *Nigella sativa* seeds using SwissTargetPrediction and to evaluate their pharmacokinetic properties through SwissADME. The chemical structures of the compounds were obtained from a curated plant database, and each was represented using its unique Simplified Molecular Input Line Entry System (SMILES) code. The SMILES codes were analyzed via the SwissTargetPrediction platform to predict the molecular targets and subsequently evaluated using the SwissADME platform to determine key pharmacokinetic parameters. These results showed that bioactive compounds derived from *Nigella sativa* seeds exhibited interactions with 14 molecular targets, indicating their potential involvement in diverse biological pathways. In addition, SwissADME analysis revealed that 12 compounds showed high water solubility, while 1 compound was classified as slightly water soluble and 2 compounds were less water soluble. In addition, 15 compounds met the lipophilicity criteria, 9 showed rapid gastrointestinal absorption, and 7 showed slower absorption rates. Notably, 15 compounds were identified to be free of interfering molecular interactions. This study introduces a novel integrative approach for characterizing the mode of action and pharmacokinetic profiles of bioactive compounds, providing a robust foundation for subsequent stages of drug discovery and development

Keywords: *black cumin, nigella sativa, famacokinetics, SwissTargetPrediction, SwissADME, Target Compound*



Biofortification Iron (Fe) in Rice (*Oryza sativa*) Through Seed Priming Method to Combat Micronutrient Deficiencies

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Abstract. Rice (*Oryza sativa* L.) serves as a vital staple food crop, with approximately 90% of global production occurring in Asia, including Indonesia. However, rice grains naturally contain low levels of iron (Fe), an essential micronutrient crucial for human health. Iron deficiency remains a significant public health challenge globally. While modern techniques such as genetic engineering and plant breeding are often costly and time-consuming. In contrast, conventional approaches like biofortification through seed priming provide a practical and effective solution to enhance Fe content in rice and combat this critical nutritional issue efficiently. In this study, we examined the effectiveness of seed priming in enhancing iron (Fe) content in three rice cultivars with varying baseline Fe levels: low, medium, and high. Three rice cultivars with varying inherent Fe content were selected for further examination. IR64 (high Fe content), Sintanur (medium Fe content), and Ciherang (low Fe content). Seed priming was carried out using FeSO₄ solutions at varying concentrations of 0.25 g/L, 0.50 g/L, 0.75 g/L, and 1.00 g/L prior to germination. Seed priming effectively enhance germination rate across all cultivars and had distinct effects on vegetative growth performance. In Sintanur, there were significant increases in both plant height and the number of tillers. Furthermore, the Iron content in the grains showed a notable improvement compared to the control, particularly in IR64 and Ciherang. Ciherang, a cultivar characterized by its low inherent iron content, demonstrated significant increases in grain Iron concentration at all FeSO₄ priming concentrations. In IR64, notable increases were observed at 0.50 g/L, 0.75 g/L, and 1.00 g/L. These findings demonstrate that seed priming effectively enhances Fe content in rice, particularly those with initially low iron levels

Keywords: *Biofortification, Rice (Oryza sativa L.), Seed priming, Iron (Fe)*



Influence of Site-Dependent Mg Doping on the Photophysical Behavior of LaFeO₃ Perovskites

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Abstract. Lanthanum ferrite (LaFeO₃) perovskite has attracted significant attention for optoelectronic and photocatalytic applications due to its moderate band gap, strong visible-light absorption, and high stability. However, its efficiency is often hindered by charge recombination rates and the presence of trap states. Doping strategies, particularly with magnesium (Mg), have been explored to modify the electronic structure and enhance charge transport. Despite these advancements, the impact of Mg doping on photophysical properties and photon-induced trap deactivation in LaFeO₃ remains insufficiently understood. This study systematically investigates the effects of Mg doping at both the La-site and Fe-site on the photophysical properties and trap state dynamics of LaFeO₃. Our results reveal that 0.1 Mg doping at the A-site increases non-radiative recombination compared to pristine LaFeO₃, whereas 0.1 Mg doping at the B-site reduces non-radiative recombination. However, increasing the Mg content to 0.3 at the B-site enhances free-to-bound recombination. These findings provide valuable insights into defect passivation mechanisms in LaFeO₃-based materials, offering a pathway for optimizing their performance in energy conversion and optoelectronic applications



Pengaruh Edukasi Dan Homecare Oleh Apoteker Terhadap Pengetahuan, Kepatuhan Dan Outcome Terapi Pasien DM Tipe II di Puskesmas Tebet

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Abstract. Increasing knowledge and compliance of type 2 DM patients must be supported by pharmaceutical services in the form of education and homecare. This study aims to determine the effect of the implementation of pharmacy services in improving knowledge and compliance of type 2 DM patients so that blood sugar levels can be well controlled. This study was prospective with a pretest and posttest control group design. Respondents totaling 108 people were divided into 3 groups: the control group, the education group which was given education twice using booklets, and the education and homecare group which was given education and homecare by pharmacists twice each. The results showed that in the control group, PDB levels decreased from an average of 146.28 mg/dL to 136.89 mg/dL ($p < 0.05$), indicating a significant decrease. However, the increase in compliance scores from 3.94 to 4.50 ($p > 0.05$) and knowledge scores from 59.86 to 60.72 ($p > 0.05$) were not statistically significant

Keywords: knowledge, compliance, fasting blood sugar, education, homecare



Utilization of Sugarcane Bagasse on the Efficiency of Phosphate Ion Adsorption: Optimization with BBD-RSM

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Abstract. Sugarcane bagasse waste increases every year, so it must be processed properly to prevent environmental pollution. One product resulting from the utilization of sugarcane bagasse waste is activated carbon. Sugarcane bagasse is used as activated carbon because it has a high silica content, is environmentally friendly, and has a high surface area. Phosphate waste is hazardous and toxic waste because it produces toxins produced by cyanobacteria that can kill other organisms. Therefore, a phosphate waste treatment method is needed that can reduce phosphate levels in wastewater. One of the most widely chosen treatment methods is the adsorption method, where activated carbon from sugarcane bagasse waste can be applied as an adsorbent for phosphate waste. The adsorption process can take place optimally by optimizing parameters that affect adsorbent performance. Parameters that affect adsorption include: adsorbent mass, contact time, and initial concentration of phosphate solution. RSM is the only optimization method capable of explaining the interactions between parameters. Phosphate levels were measured using the voltammetry method. Based on this, this study aims to identify the carbon adsorption capacity of bagasse waste on phosphate waste and its optimum conditions, reviewed through the RSM method with the BBD



Anti-Inflammatory Potential of Gelatin Peptides from Tilapia Fish (*Oreochromis niloticus*) Scales on the Reduction of Nuclear Factor-Kappa B (NF- κ B) and Myeloperoxidase (MPO) Levels in Rats Induced with Complete Freund's Adjuvant (CFA)

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Abstract. Rheumatoid arthritis (RA) is a chronic autoimmune disorder characterized by persistent inflammation of the joints, leading to progressive tissue damage, pain, and functional impairment. One of the hallmark features of RA is the overexpression of pro-inflammatory mediators such as Nuclear Factor-kappa B (NF- κ B) and Myeloperoxidase (MPO), which play key roles in initiating and sustaining the inflammatory response. In recent years, the search for alternative natural anti-inflammatory agents has garnered attention, including those derived from marine and aquatic resources. Nile tilapia (*Oreochromis niloticus*) scales, which are often discarded as waste, have been found to contain bioactive peptides, including proline-rich gelatin peptides, that may possess therapeutic potential. Objective: This study aimed to investigate the anti-inflammatory potential of gelatin peptides derived from Nile tilapia (*Oreochromis niloticus*) scales by evaluating their effect on NF- κ B and MPO levels in male Wistar rats induced with Complete Freund's Adjuvant (CFA). Methods: This study aimed to evaluate the anti-inflammatory activity of gelatin peptides extracted from Nile tilapia scales by assessing their ability to modulate NF- κ B and MPO levels in male Wistar rats induced with Complete Freund's Adjuvant (CFA) to model rheumatoid arthritis. An in vivo experimental design was employed involving six groups: a normal control group, a negative control group (CFA-induced without treatment), a positive control group treated with diclofenac sodium, and three test groups administered gelatin peptides at three different dose levels (Dose I, II, and III). Blood samples were collected and analyzed using enzyme-linked immunosorbent assay (ELISA) to determine serum concentrations of NF- κ B and MPO as inflammatory biomarkers. Results: The results demonstrated that CFA induction significantly elevated NF- κ B and MPO levels compared to the normal control group ($p < 0.05$), confirming the induction of inflammation. Treatment with gelatin peptides resulted in a dose-dependent reduction of both NF- κ B and MPO levels, with Dose III exhibiting the most pronounced effect. The reductions observed at Dose III were statistically comparable to those achieved with the positive control (diclofenac), indicating that gelatin peptides at this dose were similarly effective in mitigating the inflammatory response. Conclusion: In conclusion, gelatin peptides derived from Nile tilapia scales exhibit promising anti-inflammatory properties by downregulating key inflammatory mediators involved in rheumatoid arthritis. These findings support their potential development as a natural and sustainable therapeutic alternative for managing chronic inflammatory diseases.

Keywords: gelatin peptides, tilapia scales, NF- κ B, MPO, rheumatoid arthritis, anti-inflammatory



Magnetic Covalent Triazine Framework for Dye adsorption

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Abstract. Covalent triazine framework are known for its high surface area and porous properties that beneficial in adsorption application. This work aims to synthesize modified magnetic properties of CTFs that has high specific surface area as an adsorbent. The modified Ionothermal using combination of FeCl₃ as magnetic active material and ZnCl₂ as ion solvent. The Fe-CTFs was used to adsorb methylene blue (MB) dyes as synthetic pollutant in the aqueous media. The adsorption kinetics well fitted with pseudo-second-order. Maximum adsorption capacity (Q_{max}) of Fe-CFTS obtained is 19.99 mg/g. Isotherm of the FE-CTFs adsorption is in accordance to Langmuir model. the characterization of the Fe-CTFs was studied by various instruments such as (SEM, VSM, BET, FTIR, and XPS)

Keywords: Adsorption, CTF, Dyes, Magnetic



Analysis of Thermal Radiation Shielding of Vacuum Furnace for Brazing and Bake-out of Accelerator Components

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Abstract. An accelerator is a device that accelerates and guides charged particles to high energies. It comprises several key components, including accelerating tubes and accelerating and coupling cavities. These components require specialized manufacturing processes, including brazing and bake-out, which must be carried out in a vacuum furnace at a pressure of 10⁻⁵ mbar. As there are no domestic vacuum furnaces capable of processing these specific accelerator components, constructing such a furnace is crucial. Construction began with the initial analysis of thermal radiation shielding of the vacuum furnace. This analysis for the vacuum furnace, which has a 105 cm diameter and a 150 cm length vessel, was carried out using analytical calculations for steady-state conditions, both with and without shielding. Simulations were also performed using ANSYS software for three layers of shielding under both steady-state and transient conditions. The results show that using three thermal radiation shields can significantly reduce the electrical power supply and the vessel wall temperature in steady-state conditions, namely from 40,657 kW and 306.9°C to 9,869 kW and 141.3°C for analytical calculations and 10,149 kW and 140.45°C for simulations using ANSYS software. Transient analysis confirms that the heating power supply required for the brazing process, which requires a heating rate of around 40°C/min, is 25 kW. This analysis provides valuable insights into the construction of a specialized vacuum furnace for brazing and bake-out processes for accelerator components, which are required for manufacturing purposes in Indonesia

Keywords: shielding, vacuum furnace, brazing, bake-out, accelerator components



Physicochemical character and Photocatalytic Activity of NiFe₂O₄/Biochar Nanocomposite prepared from Coconut Peat toward Rhodamine B

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Abstract. Nanocomposite of NiFe₂O₄ supported on biochar derived from coconut peat high photocatalytic properties has been prepared. The material was prepared in one-pot synthesis technique by direct pyrolysis to the metal precursors-loaded coconut peat. Various instrumental analytic methods consist of X-ray diffraction, diffuse reflectance UV-Visible (UV-DRS), and vibration magnetometer (VSM) were conducted to investigate the physicochemical characteristics. From XRD analysis, it is obtained that the nanocomposite composed by the crystalline NiFe₂O₄ with a crystallite size of 31.5 nm. The band gap energy of 1.7 eV supported photocatalytic potential as expressed by the degradation efficiency of rhodamine B of 96.59% was gained on photocatalytic degradation under UV light illumination

Keywords: Biochar; Photocatalyst; NiFe₂O₄



Plant Mediated-Synthesis of $\text{Co}(\text{OH})_2/\text{Co}_3\text{O}_4$: Physicochemical characteristics and Photocatalytic Activity Towards Rhodamine B

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Abstract. Plant-mediated synthesis of nanocomposite of $\text{Co}(\text{OH})_2/\text{Co}_3\text{O}_4$ has been conducted using Mimosa pudica leaves extract (MPE). Research was aimed to optimize the bioreduction condition of MPE to Co^{3+} ratio in the formation of surface plasmon resonance of Co nanoparticles (CO NPs). The obtained NPs was converted by calcination at 400°C . The material characterization using X-ray diffraction (XRD) revealed a composite of into $\text{Co}(\text{OH})_2/\text{Co}_3\text{O}_4$, and scanning electron microscopy (SEM) analysis revealed a cubic-form of the nanocomposite. The determined band gap energy by diffuse reflectance UV-Visible is 2.5 eV. The band gap energy supported photocatalytic activity as confirmed by the degradation efficiency towards rhodamine B of 65.80 % gained under photocatalytic degradation with UV light illumination for 120 min

Keywords: Biochar; Photocatalyst; NiFe_2O_4



Formulation and evaluation of Aromatherapy Candles Incorporating Fennel Leaf (*Foeniculum vulgare*) Essential Oil for Stress Relief: a Comparative Study of Soy Wax and Paraffin Wax

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Abstract. This study explores the formulation of aromatherapy candles using fennel leaf (*Foeniculum vulgare*) essential oil with soy and paraffin wax bases. The essential oil, extracted by steam-water distillation and analyzed by GC-MS, was found to contain α -phellandrene (62.27%) as the main stress-relieving compound. Candles were made using three different wax-to-citric acid ratios and tested for aroma preference and stress-relief effectiveness. Physical properties of the oil were also evaluated based on Food Chemical Codex standards. A 1:1 ratio (15 g wax : 15 g citric acid) showed the best results, with soy wax candles receiving the highest approval for scent and long-lasting calming effects. Although paraffin candles had a stronger initial aroma, their effect faded faster. Overall, soy wax proved to be a cleaner-burning and more effective base for stress-relief aromatherapy candles. Further research should optimize the formulation and assess commercial potential for sustainable products



Calculation and Measurement of Electron Emission Current On Plasma Generator Tube For The Pulse Electron Irradiator

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Abstract. Calculation and measurement of electron emission current in Plasma Generaor Tube (PGT) especially for electron pulse irradiation has been done. After leaving the plasma surface through the emission window, electrons travel through the foil window on the vacuum chamber wall before entering the acceleration area. The extraction voltage U_a given to the plasma electron source device affects the current formation process I_e (electron extraction/emission beam energy) whereas the thermal electron emission current I_{e0} 's magnitude is influenced by the PGT's size. The shape and dimensions of the PGT that produces electron emission current have been determined using the size of the intended plasma arc discharge current for a specific plasma density. At an electron density of $n_e = 1017 \text{ m}^{-3}$, plasma temperature $T_e = 7 \text{ eV}$, and arc discharge current $I_d = 80 \text{ A}$ (pulse width $\tau = 100 \text{ }\mu\text{s}$), the measurements and computations show that the electron emission currents are 29.4 A and 29.8 A respectively, in the form of pulses. Because the current was alternating and in the form of pulses, it was able to enter the first cavity in the linear accelerator (Linac) experiment directly. As a result, it has passed through the grid and may be able to replace the electron buncher. On the PGT surface coated with a square SS grid/gauze, the emission window area measures $(600 \times 15) \text{ mm}^2$ with a grid radius of 0.3 mm and a grid distance of 0.25 mm. Apart from contributing to the plasma characteristics, the size of the grid holes also affects the electron emission current I_e . PGT grid holes are best shaped and sized as squares with side lengths of $p \approx 0.5 \text{ mm}$. The electron emission current is influenced by the plasma properties as well as the grid hole size. The optimal size and shape of grid holes for the PGT are those with a grid radius of $r_e = 0.3 \text{ mm}$

Keywords: Plasma Generator Tube (PGT), emission current density, electron extraction/emission.



Economic Value Estimation Of Unused Medications And Their Contributing Factors In Households Of Cibusah Subdistrict, Bekasi Regency

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Abstract. Unused medications stored in households pose significant risks in terms of economic loss, public health, and environmental safety. This study aims to estimate the economic value of unused medications and to identify the contributing factors to their accumulation in households within the Cibusah Subdistrict, Bekasi Regency. The research was conducted as an observational study with a cross-sectional design, using structured questionnaires administered through direct interviews with 354 household representatives selected through convenience sampling. The results showed that 253 households (42.4%) stored unused medications, with a total estimated economic value of IDR 25,271,179 (average per household: IDR 99,886). Expired medications accounted for 17% of the total, with an estimated value of IDR 13,209,776. The most common reason for unused medications was recovery from illness before completing the medication regimen (70.9%), followed by perceived ineffectiveness of the medication (15.8%) and the presence of expired drugs (28.5%). The therapeutic classes most commonly associated with unused medications included analgesics, gastrointestinal drugs, and vitamins/minerals. These findings indicate a substantial economic burden resulting from improper medication management at the household level. This study highlights the need for public education and policy interventions, including medication take-back programs and stricter prescription regulations, to promote rational and efficient medication use

Keywords: unused medications; economic value; household; Cibusah, medication waste



Estimating Change Point of Albumin in Cirrhosis Patients Via Koziol-Green Martingale Residuals

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Abstract. In monitoring patients with cirrhosis, serum albumin levels are observed as they indicate whether the liver is still functioning properly. A change in albumin level at a certain point may lead to a drastic shift in the patients' risk. This certain point is referred to as a change point. This study aims to estimate the change point in albumin levels to investigate whether the clinically established change points aligns with empirical data. The change point estimation is conducted using the martingale residuals from the Cox Proportional Hazard (PH) model, modified through the Koziol-Green model. Detection and estimation of the change point are based on the empirical likelihood ratio derived from the residuals. Each value of albumin is considered as a candidate change point, and the Cox-PH model is segmented into two parts based on that point. For each segment, the modified martingale residuals are calculated, and a test is conducted using the empirical likelihood ratio. If a significant difference is observed between the residuals of the two segments, the point is considered valid as a change point. To identify subsequent change points, the same approach is applied to each segment based on the previously detected change point. The dataset used in this study is the Primary Biliary Cirrhosis (PBC) dataset. The findings show that the statistically estimated change point closely approximates the clinically defined change point

Keywords: albumin, change point, cox proportional hazard, martingale, Koziol-Green, empirical likelihood



Effect of Tofu Wastewater Concentration on Lipid Content of *Chlorella vulgaris*

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Abstract. *Chlorella vulgaris* has emerged as a promising microalgal species for alternative energy development due to its ability to accumulate lipids ranging from 5% to 40% of its dry biomass. In this study, tofu wastewater was employed as a cultivation medium, given its rich content of essential nutrients including nitrogen, phosphate (P_2O_5), potassium (K_2O), and organic carbon, which are critical for supporting microalgal growth. Beyond nutrient composition, light wavelength is also recognized as a key factor influencing photosynthetic energy absorption, thereby affecting both growth performance and lipid productivity. The objective of this research was to identify the optimal concentration of tofu wastewater and light wavelength for maximizing the growth and lipid content of *Chlorella vulgaris*. Cultivation experiments were conducted over a 10-day period using tofu wastewater concentrations of 0%, 10%, 15%, and 20%. Biomass growth was evaluated via gravimetric dry weight analysis, and lipid accumulation was quantified using the Bligh–Dyer method. Results indicated that a 15% tofu wastewater concentration yielded the highest biomass (2.054 g/L), with a specific growth rate of 0.354 day^{-1} and a lipid content of 10.23%, suggesting that moderate nutrient enrichment supports optimal microalgal productivity.

Keywords: *Chlorella vulgaris*, tofu wastewater, wavelength, biomass concentration, lipid content



Study of The Effect of Polyol Concentration Variations on The Physical Properties and Characterization of Soybean Oil Based Alkyd Resin

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Abstract. Research on the effect of polyol concentration variation on the physical properties and characterization of soybean oil-based alkyd resin has been conducted. The goal was to determine how polyol concentration affects the resin's physical properties, analyze FTIR and TG-DSC characterization results, and identify the optimal polyol concentration for the best physical properties. Alkyd resin polymerization occurs in two stages: alcoholysis and polyesterification. Four polyol ratios were tested: MA1 (100% glycerol), MA2 (90% glycerol: 10% pentaerythritol), MA3 (80% glycerol: 20% pentaerythritol), and MA4 (75% glycerol: 25% pentaerythritol). Characterization included FTIR, TG-DSC, viscosity, acid content, color, non-volatile percentage (NV), drying time, hardness, color strength, total solid, and gloss. The results revealed that the alkyd resin was a gel and yellow in color. The MA3 formulation showed the best physical properties with a viscosity of Z9, acid content of 4.8 mg KOH/g, and NV of 69.33%. For the resin film, drying time was 60 minutes, hardness was 53 (osc), gloss was 88.2%, viscosity was 86.1 (KU), and total solid content was 45.72%. FTIR analysis showed ester groups at 1730.76 cm^{-1} , confirming successful polyesterification, and TG-DSC indicated thermal degradation between 300°C and 500°C.

Keywords: Alkyd resin, glycerol, pentaerythritol, soybean oil, characterization



Prehospital Delay and in-Hospital Mortality of Patient with Ischemic Stroke: Implications for Thrombolytic Therapy

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Abstract. Ischemic stroke is one of the leading causes of death and long-term disability worldwide. Prompt and appropriate management, especially through effective thrombolytic therapy, has been proven to reduce mortality and disability rates. However, prehospital delay often serves as a major barrier to timely therapy. This study aims to analyse the association between prehospital delay and mortality in ischemic stroke patient and its implications for thrombolytic therapy. A retrospective observational study was conducted using secondary data from 474 patients admitted to Buleleng General Hospital. The association was analyzed using the Chi-Square test. Among the patients, 52.95% were non-productive age, and 61.18% were male. Only 29.54% arrived within <4.5 hours of symptom onset, resulting a very low thrombolytic therapy rate of 2.11%. Mortality was 16.17%, in the delay group versus 20.71% in the non-delay group. Chi-Square test showed no significant association between prehospital delay and mortality ($p = 0.291$). Although not directly associated with mortality was found, prehospital delay significantly limits access to thrombolytic therapy, underscoring the need for an improved stroke response system

Keywords: ischemic stroke, patient mortality, prehospital delay , thrombolytic therapy



Synthesis and Activity Testing of Chalcone Derivative Compounds (E)-1-(4-(Allyloxy) Phenyl)-3-(3,5-Dimethoxyphenyl) Prop-2-En-1-one as Antimalarial Agent

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Abstract. Malaria, caused by the parasite *Plasmodium falciparum*, is an infectious disease that poses a significant health problem due to increasing drug resistance. This research aimed to synthesize a chalcone derivative, (E)-1-(4-(allyloxy)phenyl)-3-(3,5-dimethoxyphenyl)prop-2-en-1-one, and to test its activity as an antimalarial agent. The synthesis was performed via the Claisen-Schmidt condensation reaction. The compound was characterized using FTIR, ¹H-NMR, ¹³C-NMR, and GC-MS. Antimalarial activity was evaluated in vitro against the chloroquine-resistant FCR3 strain of *P. falciparum*, and also analyzed in silico through molecular docking. The synthesis yielded the target compound at 91%, confirmed to have the molecular formula C₂₀H₂₀O₄ and a molecular weight of 324 g/mol. Molecular docking results showed that the synthesized compound has a higher binding affinity (-9.20 kkal/mol) compared to chloroquine. The in vitro test demonstrated that the compound has active antimalarial activity with an IC₅₀ value of 20.706 µg/mL. In conclusion, the synthesized chalcone derivative was successfully produced and possesses active antimalarial properties, making it a potential candidate for further development as a new antimalarial drug

Keywords: Chalcone, Claisen-Schmidt condensation, molecular docking, in vitro, *Plasmodium falciparum*



Synthesis and Characterization of Alumunium(III)- Benzenedicarboxylate/Zeolite (Al-BDC/Z) Composite For Remediation Agents

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Abstract. This study aims to prepare and characterize Al-BDC/zeolite composite made by wet impregnation at room temperature. The Al-BDC was firstly made by solvothermal reaction at 150°C for 24 hrs, while the zeolite was firstly prepared by HCl activation. The Al-BDC/zeolite composite was prepared in a mass ratio of 3:5 (Al-BDC/Zeolite) in ethanolic solution. The composite was then characterized by ATR-IR, Powder XRD, and UV-Vis DRS. Experimental data shows that the infrared spectra of the composite display a broad peak of the zeolite Si-O-Si ($1115-988\text{ cm}^{-1}$) and the sharp peaks of BDC ligand (1577 cm^{-1} ; 1413 cm^{-1}), which suggest that the Al-BDC was successfully dispersed on the zeolite surface. Powder XRD data shows peaks that correspond to both activated zeolite and Al-BDC with a crystallinity degree of 27%. UV-Vis DRS results in a lower band gap energy level do to zeolite addition, with a value of 3.52 eV. The Al-BDC/Z composite will then be used for remediation of naphthol blue black (NBB) dyes in solution

Keywords: Al-BDC, activated zeolite, composite, wet impregnation, remediation agent



Optimization Crude Protein Hydrolysis from Waste Skin Robusta Coffee Beans (*Coffea canephora P.*) in Bengkulu Province with Protease Enzyme Uses Response Surface Methodology (RSM)

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Abstract. Waste skin robusta coffee beans (*Coffea canephora P.*) produced in Bengkulu Province contains compound wrong primary metabolite the only one namely protein. Protein is obtained through the hydrolysis process in a way enzymatic with use protease enzymes so that obtained protein hydrolysate. Purpose: This study aim for optimizing the crude protein hydrolysis process from waste skin robusta coffee beans use protease enzymes through approach Response Surface Methodology (RSM). Method: Optimized process variables covering concentration enzymes, temperature, and time incubation, with design test use Box Behnken Design (BBD). The main parameters observed is degrees hydrolysis (DH) as indicator efficiency of the hydrolysis process. Results: Based on method isolation, DH varies between 50.33 % and 80.53%. The equation that characterizes variables And DH correlation is $DH = + 78.13 - 3.31A - 0.3163B + 1.03C - 2.01AB + 0.1450AC + 1.73BC - 17.01A^2 - 5.43B^2 - 3.66C^2$. A, B, and C are E/S concentration, temperature, and time. Results analysis show that all variables influential significant to DH value ($p < 0.05$), and the resulting RSM model fulfil criteria validity statistics with high R^2 value (0.9725). Conclusion: Optimum conditions are obtained on concentration 1% enzyme, temperature 55°C, and time 65 minute incubation with DH value of 88.1%. Optimization this show that waste skin robusta coffee beans (*Coffea canephora P.*) in Bengkulu Province has the potential as source peptide bioactive which can developed more further in the field pharmaceutical research. This also support utilization waste agriculture local in a way sustainable and worth plus.

Keywords: Waste skin Robusta coffee beans; Crude protein; Protease enzyme; Optimization; Response Surface Methodology



Solubility Enhancement of Ivermectin using Deep Eutectic Solvents: A Preformulation Study with Hydrophilic and Hydrophobic DES Systems

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Abstract. Ivermectin (IVM), a broad-spectrum endectocide, suffers from extremely poor aqueous solubility, presenting significant challenges in pharmaceutical formulation development. Deep eutectic solvents (DES) have emerged as alternative solubilizing systems due to their structural flexibility, low toxicity, and potential compatibility with various active pharmaceutical ingredients. This study investigated the use of two distinct DES systems—choline chloride:1,2-propanediol (hydrophilic) and menthol:myristic acid (hydrophobic)—to enhance the solubility of IVM as part of a preformulation strategy. Each DES system was prepared at optimized molar ratios and characterized for physicochemical properties, including viscosity, rheology, density, polarity, thermal behavior, conductivity, hydrophobicity, surface tension, pH, and structural features via FTIR analysis. The solubility of IVM in each DES was evaluated and compared with that in water and conventional organic solvents. Results demonstrated that both DES systems significantly enhanced IVM solubility, with the hydrophobic menthol-based DES exhibiting higher solubilizing capacity. These findings support the rational use of DES as functional excipients in the early-stage formulation design, particularly for lipophilic drugs intended for long-acting or depot drug delivery systems

Keywords: Ivermectin, deep eutectic solvent, choline chloride, menthol, solubility enhancement, preformulation, drug delivery system



Characterization of Pixell Arabica and Robusta Coffee Varieties: Physicochemical Properties and Antioxidant

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Abstract. Coffee is one of the most widely consumed beverages globally, with Arabica (*Coffea arabica*) and Robusta (*Coffea canephora*) being the two main commercial species. In recent years, the Pixell varieties of Arabica and Robusta have gained attention due to their unique characteristics and potential for specialty coffee markets. This research aims to investigate the physicochemical characteristics of Pixell Arabica and Robusta coffee varieties by analyzing their color profile, moisture content, ash content, texture properties, fat content, friction values, antioxidant activity, and total phenolic content. Standardized methods were applied to ensure accurate and reproducible measurements. The results indicated that Pixell Arabica coffee exhibited lighter color values, lower moisture and ash contents, softer texture, lower fat levels, and reduced friction values compared to Robusta. Additionally, Arabica samples showed higher antioxidant activity and total phenolic content than Robusta samples. In contrast, Pixell Robusta coffee demonstrated darker color, higher moisture and ash contents, firmer texture, greater fat concentration, higher friction coefficients, but relatively lower antioxidant and phenolic levels. These findings highlight the distinctive quality attributes of each variety and provide valuable insights for the development of high-value coffee products and optimized processing techniques.



Chitosan-Impregnated Activated Carbon Derived from Sugarcane Bagasse for Alizarin Red S Adsorption

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Abstract. In the present study, a chitosan-impregnated activated carbon derived from sugarcane bagasse (Cs-Act SB) has been synthesized for Alizarin Red S (ARS) dye removal from an aqueous solution. The dried sugarcane bagasse sample was rinsed with 0.5% HCl to eliminate impurities and subsequently dried overnight at 110 °C. Thereafter, it was subjected to carbonization in a furnace at 600 °C for 2 h to produce sugarcane bagasse biochar (SB). The sugarcane bagasse biochar (SB) was then activated chemically using NaOH and physically using a muffle furnace at 750 °C for 2 h to produce activated carbon (Act-SB). The obtained Act-SB was then modified using chitosan to yield Cs-Act SB biocomposite. The Act-SB and Cs-Act SB were characterized on the basis of physico-chemical studies, pH point of zero charge (pHPZC), FT-IR, SEM-EDX, and TGA-DTA analysis. Based on physico-chemical studies, the Cs-Act SB has moisture content and ash content of 4.0% and 3.40%, respectively. The ARS removal was conducted on Cs-Act SB using batch experiment under various parameter of pH (2-8) using adsorbent dose of 0.05 g, contact time of 60 min, and initial dye concentration of 150 mg L⁻¹. Furthermore, the effect of adsorbent dosage were examined under range of 0.01-0.08 g. The result shows that the adsorbent process is desired at low pH under acidic solutions (pH 2) with the pHPZC of 4.58. The optimum adsorbent dosage was achieved at 0.02 g under optimum pH of 2, contact time of 60 min, and initial dye concentration of 150 mg L⁻¹

Keywords: adsorption; alizarin red; activated carbon; sugarcane bagasse; chitosan



Optimization of Gelatin Preparation by Acid Method from Muscovy Duck (*Cairina moschata*) Bones and Characterization as a Pharmaceutical Excipients

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Abstract. Gelatin is one of the pharmaceutical excipients with high demand in Indonesia. The main source of gelatin on the market comes from pigs and cows, which has caused some problems related to religious or health issues, therefore, it is necessary to search for other alternative sources. One of the alternative sources of gelatin that can be developed is using poultry, such as Muscovy duck (*Cairina moschata*). The aim of this study was to optimize and evaluate gelatin produced from Muscovy duck bones using acid method. Gelatin production was carried out using 5% HCl with variation in soaking time between 6 to 24 hours, while the hydrolysis process was carried out at 70oC for 4 hours. The evaluation carried out on the gelatin produced included the determination of the yield value, organoleptic test, proximate parameters, pH, gel strength, viscosity, heavy metal contamination, FTIR test and XRD analysis. The results showed that the gelatin produced had yield value 10.27-10.43%, pale yellowish white color with a distinctive smell of gelatin, moisture content 2.26-3.14%, ash content 0.84-1.52%, fat content 0.24-1.15%, total protein content 71.05-75.50%, pH 4.2-4.9, gel strength 69.88-72.63 Bloom, viscosity 6.18-7.47 cP, and metal content Cu and Zn that meet the requirements of SNI 06-3735-1995 on gelatin quality. FTIR analysis and XRD tests showed the produced gelatin had functional groups and XRD profile that matched the profile of commercial gelatin. Gelatin from Muscovy duck bones using acid method with soaking for 6 hours showing the best results and has the potential to be developed as a pharmaceutical excipient.

Keywords: Muscovy duck, *Cairina moschata*, gelatin, acid method



Design and Construction of a Prototype of an IoT-Based Waste Monitoring and Notification System for Water Channels

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Abstract. Uncontrolled water pollution in open channels from domestic waste and industrial activities poses serious risks to the environment and public health. This study presents the design and development of an Internet of Things (IoT)-based water pollution detection system for real-time monitoring of water quality parameters, including pH, turbidity, total dissolved solids (TDS), and water depth. The system employs an ESP32 microcontroller integrated with pH, turbidity, TDS, and ultrasonic sensors, and uses the SIM800L module to transmit data to the Firebase Realtime Database. A mobile application was developed to visualize the data and provide real-time monitoring through Android devices. Warning notifications are sent via Telegram when any parameter exceeds its threshold. Field testing was conducted in both static and flowing water at various drainage sites. The system successfully differentiated water characteristics with pH values from 5.94 to 8.1, TDS from 145 to 314 ppm, and turbidity from 35 to 69 NTU. Sensor accuracy remained within 1% error compared to calibrated instruments. The system also demonstrated stable and accurate data transmission. Although limited by battery endurance, the prototype offers an effective and automated solution for water quality monitoring and early pollution detection



Sunscreen Gel Potential Of Black Garlic (*Allium sativum*) Extract With Variation HPMC Concentrations

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Abstract. The high level of ultraviolet (UV) radiation exposure in Indonesia can induced oxidative stress and lead to skin damage, which contributes to premature aging and hyperpigmentation. Using sunscreen is an essential measure to protect the skin from UV radiation. Black garlic extract had been proven to have antioxidant activity which can protect damage caused by free radicals on the skin. HPMC is a hydrophilic gelling agent which can retain moisture in formulations. This study aims to formulate black garlic extract in gel preparation using HPMC as gelling agent, and to test the antioxidant activity and SPF value. This type of research is experimental, black garlic extract gel was prepared in 3 formulas with varying HPMC concentrations of 1% (F1), 2% (F2), and 3% (F3). Physical stability was evaluated for 12 weeks. Evaluation of physical properties included organoleptic, homogeneity, pH, spreadability, adhesion, viscosity, and gel phase separation using the freeze-thaw method. Antioxidant activity testing was conducted using the DPPH (1,1-diphenyl-2-pyridinehydrazine) method and in vitro test of SPF value (UV-Visible Spectrophotometry). The result showed that all formulas gel were stable during 12 weeks storage. Antioxidant activity showed IC50 were 50.15 µg/ml (F1), 47.26 µg/ml (F2) and 49.68 µg/ml (F3) and SPF Value of F1, F2, and F3 were 7.88 ± 0.03 , 8.12 ± 0.09 and 7.97 ± 0.03 . It can be concluded that variations in HPMC concentration did not result in significant differences in the physical stability of the black garlic gel. The highest antioxidant activity and SPF value were found in Formula 2.

Keywords: Black Garlic Extract; Sunscreen Gel; HPMC; Antioxidant; SPF



Development and Activity Test of Antinociceptive Nanoemulsion Gel Containing Nutmeg Essential Oil (*Myristica Fragrans Houtt.*) as A Topical Delivery System

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Abstract. Pain is a physiological response to harmful stimuli that involves the nociceptive pathway. The use of conventional analgesics such as opioids and NSAIDs often causes serious side effects, so safer and more effective alternative therapies are needed. This study aims to evaluate the antinociceptive activity of a nanoemulgel preparation containing nutmeg essential oil (*Myristica fragrans Houtt.*) as a topical therapy candidate. The nanoemulgel formulation was developed using varying concentrations of nutmeg essential oil (1%, 1.5%, and 2%) in combination with methyl salicylate, Tween 80, propylene glycol, and a carbopol gel base. Particle characterization was performed using a Particle Size Analyzer (PSA) and transmittance testing using UV-Vis. Antinociceptive activity testing was conducted on mice using the hot plate method, with latency time observed and antinociceptive potency percentage calculated

Keywords: antinociception, nanoemulgel, nutmeg essential oil, pain, hot plate, *Myristica fragrans Houtt.*



Comparison of LDA and LLM for Topic Modelling on Indonesian Health News Headlines and Articles

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Abstract. This study explores topic modeling on Indonesian health news using three methods: Latent Dirichlet Allocation (LDA), BERTopic, and GPT-4o. A total of 4,376 news headlines and articles were collected from Indonesia News Article published from January to December 2024. As the preprocessing step, standard text cleaning such as case folding, punctuation removal, and stopword removal were applied. The preprocessed data applied only for the LDA model. In contrast, BERTopic and GPT-4o were applied to the raw dataset because both have advanced contextual understanding. The number of topics for each model to extract are 5 and 10 topics from two types of input headlines and full article content. To evaluate the quality and interpretability of the generated topics, the study employed the cv topic coherence metric. The result of this study is GPT-4o consistently outperforms both LDA and BERTopic across all configurations, achieving the highest coherence score of 0.6737 on full articles and 0.5002 on headlines with 10 topics. Additionally, the findings show that longer documents or full articles improved the coherence scores indicating more meaningful and semantically rich topic representation

Keywords: Coherence; BERTopic; GPT-4o; LDA; Topic modelling



Optimizing Value-at-Risk for Correlated Aggregate Expected Risk Models with Copula Dependence and Credibility Theory

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Abstract. Accurate risk measurement is becoming increasingly important across various fields, particularly in financial risk management and actuarial science. One of the most widely used risk measures is Value-at-Risk (VaR), which quantifies the potential maximum loss at a given confidence level. This study proposes a novel approach to predicting and optimizing VaR for mean random variables by integrating two principal approaches in risk prediction: credibility theory and copula-based dependence structures. Credibility theory is employed to enhance risk prediction by combining individual historical data with collective information, resulting in risk measures that are more robust and reflective of fluctuating market conditions. On the other hand, the copula approach is used to model multivariate dependence among mean random variables that cannot be accurately captured by normality assumptions or linear correlations. By combining these two approaches, this study develops an analytical model capable of representing aggregate risk structures more realistically, particularly in dynamic and complex systems

Keywords: value-at-risk, expected risk model, credible risk measure, copula, risk aggregation



Colorimetric Detection of Glucose using Silver–Chitosan Nanocomposites Synthesized from Shrimp Waste

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Abstract. Glucose is the primary energy source for cells and plays a crucial role in various biological processes and cellular signal transduction. Accurate and rapid glucose detection is essential, especially in glucosuria conditions commonly observed in diabetic patients. This study aims to develop a non-enzymatic glucose sensor based on silver–chitosan nanocomposites (Ag-CS NCs) using a simple colorimetric method. Chitosan was derived from *Litopenaeus vannamei* shrimp shell waste and combined with silver nanoparticles through a green synthesis approach. The Ag-CS NCs were characterized by UV-Vis spectroscopy, FTIR, XRD, and SEM-EDX. The results showed a strong surface plasmon resonance peak at 413 nm, which gradually disappeared with increasing glucose concentration, accompanied by a color change. This system detected glucose within a range of 5–100 mM, with a detection limit of 5 mM and a strong linear correlation ($R^2 = 0.974$). These findings suggest that Ag-CS NCs are promising as a simple, sensitive, and low-cost non-enzymatic glucose sensor.

Keywords: Glucose, non-enzymatic sensor, silver nanoparticles, chitosan, nanocomposite, colorimetry



Computational Modeling of Phylogeographic Structure and Genetic Connectivity in *Osteochilus spilurus* Populations Across the Sunda Shelf

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Abstract. Understanding the evolutionary history and biogeographic distribution of freshwater species requires an integrative approach combining molecular genetics and computational analysis. This study presents a comprehensive phylogeographic analysis of *Osteochilus spilurus* (Cempedik fish) populations distributed across the Sunda Shelf, particularly in Bangka, Belitung, and Kalimantan. Mitochondrial DNA markers on COI were sequenced and analyzed from multiple sampling sites, followed by the construction of haplotype networks using computational tools including NETWORK, BEAST 2.6.3, and PhyML. To visualize genetic connectivity and historical dispersal routes, median-joining network analysis and divergence time estimation were employed, revealing distinct genetic clusters corresponding to major island groups. Computational models suggest historical gene flow was shaped by Pleistocene sea-level fluctuations, with riverine corridors acting as biogeographic bridges. This study demonstrates the power of combining bioinformatics tools and evolutionary models to reconstruct phylogeographic patterns and infer historical demographic processes in freshwater fishes. The computational framework presented here can be adapted for other taxa and regions with complex biogeographic histories



Analysis of Students' Mathematical Communication Skills, Self-Regulated Learning, and Their Interrelationships

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Abstract. This study aims to identify the relationship between mathematical communication skills and the level of learning independence (self-regulated learning/SRL) in MTsN students in one of the districts in Majalengka as an effort to understand the influence of individual characteristics in mathematics learning. This study used a descriptive qualitative approach with a purposive sampling method on 24 students. The main instrument was a 20-item SRL questionnaire to group students into three categories: low, medium, and high SRL. From each category, two students were selected for in-depth interviews to reveal the achievement of mathematical communication indicators. Data analysis was conducted using NVIVO 12 software. The results of the study showed that students with a high level of Self-Regulated Learning (SRL) were able to meet all indicators of mathematical communication, both in conveying ideas, understanding questions, and explaining solutions logically. Students with moderate SRL were generally able to meet most indicators, although there were still some aspects that were not optimally achieved. In contrast, students with low SRL were only able to meet a small number of indicators of mathematical communication. These findings provide a clear picture that the level of student learning independence contributes significantly to the achievement of mathematical communication skills in the learning process. This research provides a new contribution to the development of individual-based mathematics learning, particularly in strengthening Self-Regulated Learning (SRL) to improve students' mathematical communication skills. The results of this study are useful for teachers, researchers, and curriculum developers in designing learning strategies that are more adaptive, responsive, and appropriate to students' level of learning independence to support optimal competency achievement

Keywords: Mathematical Communication, Self-Regulated Learning, NVIVO 12



A Structural Approach to Analyzing Open Unemployment: Logistic Regression-Based Path Analysis in Yogyakarta

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Abstract. The highest unemployment rate in Daerah Istimewa Yogyakarta (DIY) based on the National Labor Force Survey (SAKERNAS) was in the August 2018 for the last three years. This study aims to analyze factors that affect the unemployment rate in DIY using a path analysis with logistic regression. This article investigates the direct or indirect causal relationships of an endogenous variable and two or more exogenous variables through a path diagram. The data in this study are secondary data from SAKERNAS in August 2018. The binary endogenous variables in this study are desire to work (yes/ no) and employment status (yes/no). The exogenous variables are binary variables of residence (rural/ urban), relationship with head of household (head of household/ not), gender (female/ male), marital status (married/ not), ownership certificate of expertise (yes/ no), disability (yes/no), work experience (yes/no), educational level (low, medium, high), and a continuous variable of age in years. The results of the path analysis with logistic regression showed that the desire to work had a negative effect on the level of unemployment rate in DIY. The workforce that has the potential to become unemployed is the labor force who live in rural areas, not the head of the household, female, young, unmarried, low educated, doesn't have a certificate of expertise, has special needs, doesn't have work experience, and does not want a job

Keywords: logistic regression, path analysis, unemployment rate, National Labor Force Survey (SAKERNAS)



Green synthesis and in vitro antioxidant activity investigation of curcumin monoketone analogs from 4-methoxybenzaldehyde compounds

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Abstract. Monoketone curcumin derivatives have a modified chemical structure that increases their stability and free radical scavenging ability, making them more effective as antioxidants than natural curcumin. In addition, hydrogenation and changes in the central chain of the molecule increase the number of peroxy radicals that can be neutralized, so that its antioxidant activity is higher than that of natural curcumin. This study aims to synthesize curcumin monoketone analogs from 4-methoxybenzaldehyde compounds and test their antioxidant activity in vitro using the DPPH method. The synthesis of curcumin derivatives was carried out by reacting 4-methoxybenzaldehyde with acetone, cyclopentanone, and cyclohexanone in an ethanol solvent, using a NaOH catalyst, and employing with ultrasonic methods to obtain (1E,4E)-1,5-bis(4-methoxyphenyl)penta-1,4-dien-3-one (compound A), 2,5-bis (4-methoxybenzyliden) cyclopentanone (compound B) and (2E,6E)-2,6-Bis(4-Methoxybenzylidene) Cyclohexanone (compound C). The synthesized compounds were characterized using UV-Vis, IR, MS, ¹H NMR, and ¹³C NMR spectrometers. Antioxidant activity was tested using the DPPH method with vitamin C as a comparison. The synthesized compounds A, B, and C were obtained as yellow crystalline solids with melting points of 180–181°C, 220–221°C, and 130–131°C, respectively. The yields obtained from compounds A, B, and C were 96.48%, 80.33% and 67.21%. The antioxidant activity test of compounds A, B, and C obtained IC₅₀ values of 47.51 ± 1.23, 92.88 ± 3.45, and 75.48 ± 2.36 ppm. Vitamin C, as a comparison, obtained an IC₅₀ value of 4.67 ± 0.36 ppm. Compounds A, B, and C exhibit strong antioxidant activity.

Keywords: antioxidant, ultrasonic, green synthesis, curcumin monoketone, DPPH method



Assessment of Pre-Hospital Delay and Short-Term Treatment Outcome In Ischemic Stroke Patients at Royal Prima Hospital Medan

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Abstract. Stroke is the second leading cardiovascular disease to death worldwide. Pre-hospital delay (PHD) is the primary factor that prevents patient from receiving recombinant therapy. This study aims to investigate the factors contributing to pre-hospital delay in ischemic stroke patients and analyze the short outcome therapy provided to these patients. This research was conducted observationally using a retrospective study at the Medical Record Room at Royal Prima Hospital on March-April 2025. We collected data from medical records of patient from September 2022 to December 2024 whom diagnosed with ischemic stroke at Royal Prima Hospital. 260 medical records were collected from 2024, 233 medical records from 2023 and 90 medical records from 2022. All medical records with ICD 10-I63 diagnose were included. The descriptive data were analysed using excel formula. The categorical data was analysed using a non-parametric statistical analysis, the Chi-Square test. There were 57.46% male and 42.37% female patients in this study, 53.69% were below 64 years old and 46.31% were more than 64 years old. The most symptoms occurred were hemiplegia and hemiparesis (68.44%). This cross-sectional study found that there were 97.43% of patients arrived delayed at the hospital. In this study, more than half of the ischemic stroke patients (60%) were discharged with a good outcome. The p value of the Chi-square test is 0.2942 shown that was no statistically significant difference between the two variables

Keywords: ischemic stroke, prehospital delay, short-term outcome, Royal Prima Hospital Medan



Comparative Dissolution Study and Characterization of Refined Liquisolid System of Fenofibric Acid Using Various Solvents and Neusilin® as Adsorbent

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Abstract. Fenofibric acid, the active metabolite of fenofibrate, is an antihyperlipidemic agent whose patent will expire in 2027. As a Biopharmaceutical Classification System (BCS) class II compound, fenofibric acid exhibits poor aqueous solubility, leading to inconsistent and variable therapeutic outcomes. Therefore, it is essential to develop a generic formulation that is comparable to the innovator product, Fibracor®. In this study, the authors evaluated the feasibility of a refined liquisolid system (RLS)-based tablet formulation of fenofibric acid and compared its drug release profile with that of the reference brand. Nine formulations of RLS fenofibric acid tablets were prepared using conventional techniques, employing various solvents and Neusilin® as the adsorbent. Different ratios of adsorbent to active pharmaceutical ingredient (API) were utilized, and the mixtures were compressed by direct compression to achieve uniform tablet weights. A comparative dissolution study was performed in three simulated gastrointestinal media (pH 1.2, 4.5, and 6.8), and the optimal formulation was further characterized using various analytical instruments. The similarity factor (f_2) was applied to assess the equivalence of dissolution profiles between the test formulations and the reference product. Additionally, potential changes in the crystal structure of fenofibric acid were analyzed relative to the original compound. Fenofibric acid tablets can be successfully developed using the RLS approach, with propylene glycol, polyethylene glycol 400, and polysorbate 80 as non-volatile solvents and Neusilin® as the adsorbent. The dissolution profiles of RLS-formulated tablets were comparable to those of the innovator brand in pH 1.2 and pH 6.8 media, as indicated by similarity factor (f_2) values exceeding 50. However, in pH 4.5 medium, no similarity was observed because the RLS formulations exhibited significantly higher dissolution rates than the innovator. This enhanced dissolution was attributed to changes in the crystallinity of fenofibric acid and the formation of an amorphous structure within the RLS system.

Keywords: comparative dissolution study, fenofibric acid, refined liquisolid system



Analysis of Public Sentiment on X Regarding the Performance of the Indonesian Soccer National Team's First Match Under Patrick Kluivert's Coaching: A Machine Learning Approach with SMOTE and SHAP Interpretation

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Abstract. The hashtags #TimnasDay and #KluivertOut frequently appeared as trending topics in social media platform X on March 20, 2025, where X netizens expressed disappointment with the performance of Indonesian national football team after being defeated by Australia in the first match under Patrick Kluivert's leadership. The aim of this research is for analyzing public sentiment towards the performance of the Indonesian national football team in the first match under Patrick Kluivert's leadership, using machine learning based on the SMOTE and SHAP interpretive approaches. The secondary data obtained from crawling netizen comments on X regarding the performance of Indonesian national football team, with a total of 359 tweets collected from March 20, 2025, 00:00 WIB to 23:59 WIB, which were classified into positive, negative, and neutral sentiments using the CART and Extreme Gradient Boosting approaches based on SMOTE and interpretable SHAP. The analysis results show that the words "TimnasDay", "Timnas", and "KluivertOut" are the most frequently appearing words in the wordcloud visualization and word frequency bar chart, and CART model shows the best classification performance with an accuracy score of 64.45%, with interpretable SHAP showing that "TimnasDay" contains both positive and negative sentiments, while "KluivertOut" and "Timnas" contain negative sentiments

Keywords: CART, Extreme Gradient Boosting, SHAP, SMOTE, Soccer



Anti-inflammatory Effect and Irritation Test of Celecoxib Emulgel with Sodium Lauryl Sulfate as Surfactant

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Abstract. Celecoxib is an anti-inflammatory drug indicated for the treatment of rheumatoid arthritis or osteoarthritis. The drug has low bioavailability and first-pass metabolism upon oral administration. Topical preparations can be developed to avoid these problems. The aim of this study was to formulate celecoxib emulgel using sodium lauryl sulfate (NLS) as a surfactant, to determine its physical characteristics, permeability, anti-inflammatory and irritant effects. The emulgel was made into 3 formulas with NLS concentrations F1 (0.75%), F2 (1%), and F3 (1.25%) then evaluated for organoleptic, homogeneous, pH, viscosity, adhesiveness, and spreadability. Permeation tests were performed using the Franz diffusion cell method. Anti-inflammatory tests were carried out on rats induced by carrageenan, then given food and drink (negative control), emulgel without NLS (FTS), emulgel F1, F2, and F3. Paw volume was measured every hour for 6 hours. The parameters described were the area under the curve (AUC) and anti-inflammatory activity (DAI). Irritation tests on rabbits observed edema and erythema reactions from 1 to 72 hours to determine the irritation index. All formulas were white, soft in texture, odorless, homogeneous, had normal pH and viscosity, and had good adhesion and spreadability. The results of the permeation test obtained that the Q350 value of F1 was 124.1265; F2 306.6608; F3 397.3399 $\mu\text{g}/\text{cm}^2$. The flux value of F1 was 21.401; F2 52.570; F3 68.115 $\mu\text{g}/\text{cm}^2\cdot\text{hour}$. The AUC results of the negative control (115.72 $\mu\text{g hour/mL}$), FTS (108.52 $\mu\text{g hour/mL}$), F1 (100.52 $\mu\text{g hour/mL}$), F2 (94.65 $\mu\text{g hour/mL}$), F3 (84.15 $\mu\text{g hour/mL}$). The anti-inflammatory power of F3 was the highest (34.014%). The three formulas did not show edema and erythema, with an irritation index of 0. The test results concluded that the higher the concentration of NLS in the emulgel, the greater the permeability and anti-inflammatory effect, and it does not irritate the skin

Keywords: anti-inflammatory, celecoxib, emulgel, irritation test, sodium lauryl sulfate



Effect Of Addition Watermelon Juice (*Citrullus vulgaris* Schard.) on The Interference Of Determination Protein Concentration with The Lowry Method

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Abstract. Watermelon contains reducing agent such as vitamin C and flavonoid. Content of two compound will affect determination of protein concentration with Lowry method. The Lowry method is easily subject to interference due to presence of reducing agent. This study aims to determine the effect of addition watermelon juice which can interference determination of protein content using the Lowry method. Identification of reducing agent was carried out by phytochemical screening vitamin C and flavonoid. The standard protein used Bovine Serum Albumin (BSA) made concentrations of 0, 100, 200, 300, 400, 500, 600 µg/ml, added watermelon juice made concentrations of 20,000, 40,000, 60,000, 80,000, 100,000, 120,000 µg/ml. A mixture of BSA and watermelon juice added reagent C and lowry method reagent (Folin-Ciocalteu) then read the absorbance with spectrophotometer. Measurement of protein content is calculated using linear regression from the standard curve equation while the interference pattern is determined using multiple linear regression. The result showed that watermelon juice was proven to contains vitamin C and flavonoids. Two compound are able to interference with determination of protein content using the Lowry method with dependent analyte interference pattern.

Keywords: Interference, Protein Concentrations, Lowry Method, Watermelon Juice



Hydrocarbon Play Model of the Klantung Oil Field, Kendal Sub-basin, Central Java: Implications for Oil and Gas Exploration

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Abstract. The Klantung Oil Field, situated in the Kendal Sub-basin of Central Java, exhibits promising hydrocarbon potential, as evidenced by surface oil seeps and historical exploration drilling. This study aims to develop a hydrocarbon play model and understand the petroleum system controlling hydrocarbon accumulation in the area. The methodology integrates regional geological interpretation with subsurface analysis, including biostratigraphy, seismic data interpretation, and well log correlation. The tectonic evolution of the basin, influenced by three major phases from the Eocene to the Pliocene age. Starting from the Middle Eocene age, in the form of rifting trending Northeast-Southwest, the Middle Miocene age saw North-South compression, and this trend continued into the Plio-Pleistocene age, characterized by increasing compression intensity, resulting in folding and faulting paths. Hydrocarbon generation is interpreted to originate from organic-rich shale of the Lower Cibulakan equivalent, followed by vertical migration through fault zones and lateral migration within porous reservoir rocks. The study identifies four main reservoir units: Lower Cibulakan sandstone, Middle Cibulakan limestone, Parigi carbonate, and Intra-Cisubuh sandstone. Hydrocarbon entrapment occurs in both structural traps, such as thrust anticlines, horst blocks, and fault-related folds, and stratigraphic traps, including pinch-outs and carbonate buildups. The resulting play model enhances understanding of petroleum system dynamics in this underexplored back-arc thrust setting and supports further oil and gas exploration strategies in the region



Optimization of Temperature and Time of Microwave Assisted Extraction of Dewandaru Leaves (*Eugenia uniflora* L.) on Antioxidant Activity and Its Application in Body Scrub

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Abstract. The leaves of Dewandaru (*Eugenia uniflora* L.) contain flavonoids that have potential as antioxidants. Antioxidant compounds are beneficial for neutralizing free radicals, which can trigger various degenerative diseases and premature aging. This study aims to determine the effect of extraction temperature and time using the Microwave-Assisted Extraction (MAE) method on the in vitro antioxidant activity of ethanol extracts from Dewandaru (*Eugenia uniflora* L.) leaves.

The study was conducted using 13 experimental designs with Design Expert 13.0 software, with temperature variations of 40°C, 60°C, and 80°C and extraction times of 10, 20, and 30 minutes. Phytochemical screening results showed the presence of flavonoids, phenols, and saponins in the extract. The IC₅₀ value was used to measure antioxidant activity, where a lower IC₅₀ value indicates higher antioxidant activity. Based on the analysis, extraction temperature and time significantly affected the yield and antioxidant activity.

The combination of 60°C and 30 minutes resulted in the highest antioxidant activity with an IC₅₀ value of 67.38 ppm, which is classified as vigorous antioxidant activity. Optimization at 63°C and 30 minutes is predicted to yield an extract percentage of 24.794% with an IC₅₀ value of 70.325 ppm. This study demonstrates that the MAE method effectively extracts bioactive compounds from Dewandaru leaves and can be used as an alternative to produce natural antioxidants

Keywords: Dewandaru, MAE, flavonoids, antioxidant, IC₅₀



Identification Of Potentially Inappropriate Medications (PIMs) and Their Effect On Fall Risk In Geriatric Diabetes Mellitus Outpatient at Dr. Moewardi Hospital, Surakarta, Indonesia

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Abstract. Potentially Inappropriate Medications (PIMs) in elderly with diabetes mellitus can cause side effects such as hypoglycemia, balance disorders, and muscle weakness that are predicted to increase the risk of falls. This study aims to identify the incidence of PIMs based on the 2023 Beers criteria and evaluate their influence on the risk of falls in geriatric diabetes mellitus outpatients at Dr. Moewardi Regional General Hospital in 2024. Methods: This study used a retrospective cross-sectional design to examine the comparative relationship between risk factors and their consequences. The sample used was geriatric diabetes mellitus patients. The sampling technique used was purposive sampling. Identification of PIMs was carried out through a review of medical records, while fall risk assessment used the Morse Fall Scale (MFS) instrument. Validity and reliability tests were used to assess the quality and reliability of the questionnaire. Bivariate analysis using the Mann-Whitney test or the Kruskal-Wallis test was conducted to examine the relationship between PIMs and fall risk. Results: A total of 201 elderly patients met the inclusion criteria, namely those aged ≥ 60 years and diagnosed with diabetes mellitus. The majority of patients were aged 60–74 years (89%) and male (52%). A total of 36 patients (20%) were known to be using Potentially Inappropriate Medications (PIMs), with sulfonylureas and rapid-acting insulin being the most commonly used. Based on the assessment using the Morse Fall Scale, 63% of patients were included in the high fall risk category. The results of statistical analysis showed that the use of PIMs had no significant relationship with the risk of falls ($p = 0.501$), and the results of the Spearman correlation test showed no significant correlation between the number of PIMs used and the risk of falls ($p = 0.537$). Conclusion: Although in general there was no statistically significant relationship between PIMs and risk, the use of PIMs needs to be considered in prescribing to prevent falls.

Keywords: diabetes mellitus, geriatric patients, risk of falls, Beers Criteria, Potentially Inappropriate Medications



Synthesis and Molecular Docking Studies of Nitro-Substituted 1-Allyl-3-Benzylidenethiourea Derivatives as Antibacterial Candidates Against *Staphylococcus aureus* and *Pseudomonas aeruginos*

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Abstract. The rise of antibiotic-resistant pathogens, particularly *Staphylococcus aureus* and *Pseudomonas aeruginosa*, calls for the development of novel antimicrobial agents. In this study, we synthesized and evaluated four thiourea-based Schiff base derivatives, with various nitro substituents (ortho-, meta-, para-) on the benzylidene ring, aiming to elucidate their structure-activity relationship as potential antibacterial compounds. The derivatives were synthesized via conventional reflux combine with Dean-Stark methods and characterized using FTIR, NMR, and mass spectrometry. The reaction yields and completion times were found to vary based on the position of the nitro substituent, with para-substitution yielding the highest efficiency. Molecular docking was conducted on multiple bacterial target proteins, including 7U9K and transpeptidase, showing enhanced binding affinities (up to -6.3 kcal/mol) compared to standard antibiotics like fosfomycin and cycloserine. The ortho-substituted and para-substituted compounds demonstrated notable affinity and synthetic efficiency, indicating potential as lead compounds for further antibacterial drug development. This research highlights the promise of nitro-substituted thiourea derivatives in overcoming bacterial resistance through rational molecular design

Keywords: thiourea, Schiff base, synthesis, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, molecular docking



Fabrication Of A Highly Sensitive and Selective Electrochemical Sensor using Green-Synthesized Ag Coated on NiO Nanoparticles for Glucose Detection

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Abstract. This work presents the green synthesis of a silver-coated nickel oxide nanoparticle (Ag/NiO NPs) composite assisted by orange (*Citrus sinensis*) peel extract (OPE) as a bio-reducing and stabilizing agent. Initially, Ni²⁺ ions from the nickel nitrate precursor were reduced to form Ni⁰ under the reflux system, subsequently calcinated to form NiO NPs. Afterward, the silver nitrate precursor was coated on the NiO NPs by slowly adding the OPE, followed by a calcination process to create the Ag/NiO NPs composite. The prepared Ag/NiO NPs were then immobilized on a graphite paste electrode (GPE) for electrochemical detection of glucose molecules. The UV band at ~316 nm shows a characteristic peak for flavonoid content in the OPE. Meanwhile, the FTIR spectra at 417 cm⁻¹ represent absorption for the Ni-O group. Moreover, the SEM-EDX profiles reveal that the sponge-like morphology of Ag/NiO NPs was successfully formed. The XRD patterns also confirmed that the Ag was coated on the surface of NiO NPs with a crystallite size of ~37 nm. The fabricated Ag/NiO NPs electrode exhibits a remarkable electrocatalytic performance with a linearity range from 0.1 to 1 mM, a low detection limit (LOD) of 0.28 mM, a relative standard deviation (%RSD) of ~2.8%, and a high selectivity toward glucose in the presence of uric and ascorbic acids interference. The orange peel waste presents a promising source for preparing composite nanoparticles used in numerous sensing applications

Keywords: green synthesis; orange peel extract; Ag/NiO nanoparticles; electrocatalyst; glucose detection



Reinforcement of Starch-PVA Biocomposite with Crystalline-Cellulose Isolate from Oil Palm Empty Fruit Bunches

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Abstract. This study investigates the reinforcement of starch-PVA biocomposites with crystalline-cellulose isolate derived from the abundant empty oil palm bunch biowaste. The objective is to evaluate the effect of glycerol and cellulose composition on mechanical properties, including tensile strength, elongation, and water absorption. Biocomposite films were synthesized using starch and PVA blends with varying glycerol (15, 20, 25, and 30-wt%) and crystalline cellulose (5, 10, 15-wt%) contents. Cellulose was extracted via alkaline treatment and bleaching. The synthesized biocomposites indicate that tensile strength increases proportionally with cellulose content but decreases with higher glycerol levels, whereas elongation exhibits an inverse trend. Water resistance improves with increasing cellulose concentration. The sample containing 15-wt% cellulose and 15-wt% glycerol demonstrated optimal tensile strength (7.69 MPa) and water absorption (47.04%), while the highest elongation was observed in the sample with 5-wt% cellulose and 25-wt% glycerol.

Keywords: biocomposite, crystalline cellulose, starch, opefb



DAILY ENERGY CONSUMPTION PATTERN ANALYSIS IN DISTRIBUTED PV BUILDINGS USING DIMENSIONALITY REDUCTION AND CLUSTERING

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Abstract. This study investigates daily energy consumption patterns in buildings equipped with distributed photovoltaic (PV) systems by applying a multivariate data analysis approach based on environmental temperature and humidity. Using Principal Component Analysis (PCA), nine correlated temperature and humidity features were reduced to two uncorrelated principal components, so the information is not overlapping. These two components collectively explain more than 60% of the variation in the dataset. These components were then utilized as input features in k-means clustering to uncover consumption patterns for both total energy and lighting usage. The classification was conducted using two categorical schemes—one based on temperature and the other on humidity— result the same members in each cluster. This consistency across both temperature- and humidity-based clusters demonstrates the reliability of this approach, not only simplifies complex environmental data but also supports real-time insights for energy management. These findings highlight the potential of combining PCA and clustering as a practical approach to support adaptive energy management and smart building automation in response to environmental conditions

Keywords: energy usage, k-means clustering, multivariate feature, principal component analysis, time series analysis



Mathematical Problem-Solving Ability Viewed From Self-Emotions: Case Study Through *Problem-Based Learning* (PBL)

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Abstract. The ability to solve problems is a crucial skill that individuals must possess in the processes of planning, developing strategies, executing plans, and reflecting on the validity of the solutions obtained. Nevertheless, many students still encounter difficulties when faced with problems to solve. Self-emotion is a significant factor in problem-solving, as it relates to both positive and negative emotions in responding to the given questions. To stimulate problem-solving abilities and manage self-emotion, a Problem-Based Learning (PBL) model has been implemented. The objectives of this research are (1) to describe the problem-solving abilities of students about self-emotion through the PBL model, and (2) to correlate mathematical problem-solving abilities with students' self-emotion. The study was conducted at a junior high school, specifically class VIII-H in West Bandung, Indonesia, with a total of 33 students. Data collection methods included self-emotion questionnaires, test questions, and semi-structured interviews. Data analysis was performed using SPSS 24 and NVIVO 12 software. The findings indicate that through the problem-based learning model, negative emotions can be controlled, thereby enhancing problem-solving outcomes. This is evidenced by an increase in problem-solving scores from the pre-test to the post-test. Furthermore, qualitatively, students with positive emotions who engaged with the problem-based learning model were able to meet all indicators at each stage of problem-solving as outlined by Polya. In contrast, students categorized as experiencing negative emotions were only able to fulfill some of the indicators, including understanding the problem-which encompasses the ability to articulate known information and what is being asked; formulating a plan-which includes establishing relationships, utilizing formulas, and recognizing the same problem presented in different forms; executing the plan-which involves carrying out the strategy to reach a solution and identifying whether the steps taken are correct; and reflecting-which includes verifying the final results.

Keywords: Problem solving ability; Self-emotions; Problem-based learning



Truncated Spline Bi-Response Nonparametric Regression for Poverty Data Modeling in the Sumatra Region

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Abstract. This study aims to model two poverty indicators in the Sumatra region: percentage of poor population and poverty gap index, using a truncated spline bi-response nonparametric regression approach. This model is selected due to its ability to capture complex relationships among variables without assuming a specific functional form and for considering the correlation between two response variables. The study utilizes cross-sectional data from 2024, covering 154 regency/municipality in Sumatra. Seven predictor variables are used, representing aspects of education, health, labor, and economy. The analytical steps include data exploration, Pearson correlation testing, construction of a weighting matrix, optimal knot selection using Generalized Cross Validation (GCV), and parameter estimation through Weighted Least Squares (WLS) optimization. The results show that the best model is obtained using a linear spline with three knots, yielding a GCV value of 13.0003, a coefficient of determination (R^2) of 84.22%, and a Root Mean Square Error (RMSE) of 0.0234. These findings indicate high model accuracy in explaining data variation and its usefulness for policy development in poverty reduction. This study contributes to the application of adaptive statistical methods in regional socio-economic research

Keywords: Biresponse, Generalized Cross Validation, Nonparametric Regression, Poverty, Truncated Spline



Application of Bivariate Geographically Weighted Regression for Poverty Percentage and Poverty Gap Index Modeling in Sumatra

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Abstract. Poverty is a complex issue that requires an in-depth analysis of its underlying causes and distribution. This study aims to model the percentage of poor population and the poverty depth index simultaneously while accounting for spatial variation using the Bivariate Geographically Weighted Regression (BGWR) method. The data used are secondary data from 2024 published by Statistics Indonesia, covering 154 districts/cities on Sumatra Island, consisting of two response variables and six predictor variables: average years of schooling, open unemployment rate, labor force participation rate, life expectancy, access to proper sanitation, and the percentage of BPJS-PBI beneficiaries. The analysis was conducted through descriptive statistics, correlation tests between responses, spatial assumption testing, selection of weighting matrix and bandwidth, parameter estimation, and model performance evaluation. The results indicate significant spatial autocorrelation and heterogeneity, suggesting that the BGWR model is more appropriate than the global bivariate regression. Furthermore, BGWR achieved a higher coefficient of determination and a lower MSE, demonstrating superior performance in explaining poverty variation in Sumatra. These findings underscore the importance of adopting spatial approaches to formulate more targeted poverty alleviation policies



Quantitative Elemental Analysis of Construction Materials for Radioactive Waste Containment using X-Ray Fluorescence (XRF)

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Abstract. This study analyzed four building materials, such as brick, lightweight brick, sand, and cement, for their suitability in radioactive waste cementation. Samples were collected from various locations across Indonesia and analyzed using X-ray fluorescence (XRF) to determine their chemical compositions, focusing on elements such as Al_2O_3 , SiO_2 , Fe_2O_3 , and CaO . The data were then analyzed using Kruskal-Wallis tests. The results indicated that Serang brick, Jakarta lightweight brick, Bogor sand, and Bogor cement are the best materials for constructing durable, radiation-resistant structures due to their optimal chemical compositions. High levels of CaO and SiO_2 enhance structural integrity, stability, and radiation shielding. These properties make them particularly suitable for environments exposed to radioactive materials, offering superior binding strength, reduced radionuclide mobility, and enhanced resistance to environmental degradation. Cement's composition aligns with ASTM standards, highlighting its superior performance for radioactive waste management compared to the other materials tested



Performance Evaluation Of 119.88 KWP IOT Based On-Grid Solar System at Admin Building Grissik

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Abstract. The global increase in carbon emissions drives the need for the utilization of environmentally friendly and sustainable renewable energy. Solar panels represent an alternative for electricity generation. Therefore, this study was conducted to evaluate the performance of a 119.88 kWp monocrystalline solar panel system integrated with an IoT-based on-grid system at the administrative building in the Grissik area. After 30 days of observation, the solar panels were able to supply an average of 432 kWh/day, approximately 72.07% of the installed capacity, reducing fuel gas consumption by 0.19 MMSCFD and lowering CO₂ emissions by 10.38 Ton CO₂. The system efficiency reached more than 80% under optimal irradiation conditions. The use of an IoT-based monitoring system also provides advantages in real-time performance monitoring and operational decision-making. This study demonstrates that the integration of PV systems with IoT contributes positively to supporting the clean energy transition and operational efficiency in the oil and gas sector

Keywords: monocrystalline solar panel; on-grid system; IoT; CO₂ emissions; renewable energy



The Effect of Volume Fraction on Hybrid Composites with Fiber and Trunk Powder Coconut Filler

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Abstract. Hybrid composites are composites composed of multiple matrices and fibers, where the types of fibers include both aligned and randomly oriented fibers. The objective of this study is to investigate the effect of volume fraction variations on the mechanical properties of composites reinforced with a mixture of coconut fiber and coconut trunk powder, in order to obtain a hybrid composite with optimal mechanical characteristics. The materials used for the fabrication of the hybrid composite include coconut fiber, coconut trunk powder, polyester resin, and catalyst. The volume fraction variations of fiber and powder were set at 25%:5%, 20%:10%, 15%:15%, 10%:20%, and 5%:25%, with a constant resin content of 70%. Specimen fabrication and testing procedures followed ASTM D3039 for tensile testing and ASTM D256-03 for impact testing. The tests conducted in this study include tensile test, impact test, and Scanning Electron Microscopy (SEM) analysis. The results showed that the highest impact and tensile strength were 0.0087 J/mm² and 14,06 MPa for the composition of 70% resin, 25% fiber, and 5% powder. The morphology of the hybrid composite shows a closed surface structure and a fiber diameter of 10 µm. The bonding between the filler and the fiber is formed



Directional Predictability of Financial Stability in the Presence of Climate Transition Risk

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Abstract. Global warming and climate change have become critical issues faced by all countries, including Indonesia, leading them to transition from fossil/brown energy towards clean/green one. Unfortunately, when a sudden change in climate policies cannot be fully anticipated by financial actors, this situation can trigger the so-called climate transition risk. This new type of risk implies a decrease in the profitability of brown companies and an increase in the profitability of green ones, thereby possibly affecting financial stability. In this research, we aim to examine whether financial stability is directionally predictable in the presence of climate transition risk. We accomplish this by proposing a modified version of what so-called cross-quantilogram, which measures directional predictability between two variables at different time points. In particular, we consider a financial stability proxy and the stock return of brown/green companies to be the variables under study



Kinetic Study of Essential Oil Extraction from Nutmeg Seeds (*Myristica fragrans* Houtt) using Microwave Air-Hydrodistillation (MAHD)

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Abstract. The extraction of essential oil from *Myristica fragrans* Houtt (nutmeg) seeds has gained increasing interest due to its pharmacological and industrial applications. This study investigates the extraction kinetics of nutmeg seed essential oil using Microwave Air-Hydrodistillation (MAHD) and compares the performance of five mathematical models: first-order, second-order, power law, Elovich, and Weibull's. Experimental extractions were performed at two microwave power levels (300 W and 450 W) with solid to liquid ratios of 0.20, 0.25, and 0.30 g/mL. Kinetic parameters were determined by fitting each model's equation to the experimental yield data, and model performance was evaluated using the coefficient of determination (R^2) and root mean square error (RMSE). Among all models, the Weibull's model provided the best fit, with the highest $R^2=0.9990$ and lowest RMSE=0.0014, accurately capturing both the initial rapid extraction phase and the later diffusion-controlled phase. These findings confirm that the Weibull model offers a robust predictive framework for MAHD, supporting process optimization and scale-up of nutmeg essential oil extraction systems while preserving oil quality

Keywords: Extraction kinetics; Mathematical modeling; Microwave Air-Hydrodistillation; Nutmeg seed essential oil



Unlocking Green Efficiency: Optimized Solvent Free Microwave Extraction of Essential Oils from *Zingiber officinale* var. (Giant Ginger)

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Abstract. This study focused on optimizing Solvent-Free Microwave Extraction (SFME) for extracting essential oil from *Zingiber officinale* (giant ginger), using RSM for robust statistical modeling. A Box-Behnken Design was applied to assess the influence of parameters: microwave power (300–600 W), F/D ratio (100–300 g), and extraction time (60–180 minutes). Yields varied considerably, ranging from 0.7269% to 2.0788%, underscoring the sensitivity of the SFME process to parameter variations. A second-order polynomial regression model demonstrated excellent predictive performance, with an R^2 of 0.9812 and an adjusted R^2 of 0.9649, while the lack-of-fit was statistically insignificant, affirming the model's reliability. Among the variables studied, the F/D ratio and extraction time exerted the most substantial influence on oil yield. In contrast, microwave power showed relatively minor effects within the experimental range. Numerical optimization identified the optimal conditions as 447 W of microwave power, 102 g of ginger mass, and 172 minutes of extraction time, yielding an experimentally validated oil recovery of 2.11%. These results highlight SFME as a promising green extraction technique, particularly suited for high-moisture plant matrices. Furthermore, the method's solvent-free nature, operational simplicity, and potential scalability support its relevance for sustainable industrial applications in the recovery of natural bioactive compounds.

Keywords: Solvent-Free Microwave Extraction, *Zingiber officinale*, Essential Oil, Response Surface Methodology (RSM), Green Extraction Technology



A Hybrid CNN-LSTM Model For Predicting Accident Frequencies In Qatar

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Abstract. Accurate forecasting of traffic accident frequencies is essential for improving road safety and informing policy decisions. While recent studies have introduced advanced architectures such as transformers, their reliance on large datasets and high computational complexity can limit practical applicability. In this study, we propose a hybrid Convolutional Neural Network–Long Short-Term Memory (CNN-LSTM) model to predict monthly traffic accident frequencies in Qatar using a small-scale public dataset. The model’s performance is compared against traditional deep learning baselines including Multilayer Perceptron (MLP), LSTM, and Parallel CNN-LSTM architectures. Prior to modeling, we conducted exploratory data analysis (EDA) to examine the influence of selected weather variables (dew point depression, wind speed, and atmospheric pressure) and categorical features (gender and accident severity) on traffic accident trends. These insights informed our feature selection and helped contextualize observed accident patterns. The CNN-LSTM model architecture consisted of two 1D convolutional layers, followed by LSTM layers and a final dense output layer. Trained using the Adam optimizer, the model achieved an R^2 of 0.8156 and MAPE of 7.05%, outperforming the other architectures. The results underscore the value of combining local spatial feature extraction and temporal sequence modeling, even with limited data, and demonstrate the potential of CNN-LSTM models for traffic accident forecasting in data-constrained environments.

Keywords: Hybrid CNN-LSTM, Traffic Accident Analysis, Accident Frequency, Prediction, Comparative Analysis



Fractionation of Methanolic Extract Of Guava Leaves (*Psidium guajava* L.) and Evaluation of Antimalarial Activity of The N-Hexane and Ethyl Acetate Fraction via Heme Polymerization Inhibition and *Plasmodium falciparum* Inhibition Assays

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Abstract. This study aimed to evaluate the potential of the n-hexane dan ethyl acetate fraction from the methanolic extract of guava leaves (*Psidium guajava* L.) as an antimalarial agent through both in vitro and in silico approaches, supported by LC-MS/MS characterization and phytochemical analysis to identify the secondary metabolites present. Phytochemical analysis revealed that the fraction contains flavonoids, phenolics, and terpenoids. LC-MS/MS identified four dominant compounds in n-hexane fraction, namely 3-tert-butyl-4-methoxyphenol, hyptatic acid, petasitolone, and stigmastane-3,6-dione, dan two dominant compounds in ethyl acetate fraction, namely quercetin and quercetin-3-O- α -L-arabinopyranoside which were further evaluated using molecular docking. The hem polymerization inhibition assay yielded a value of 3.742 and 4.49 mg/mL, which was lower than that of chloroquine diphosphate, indicating good inhibitory potential. However, the antiplasmodial assay resulted in a value of 66.671 and 34.48 μ g/mL, indicating weak activity. Molecular docking analysis showed that several compounds exhibited favorable binding affinities, suggesting their potential for further investigation. Overall, the n-hexane and ethyl acetate fraction of the methanolic extract of guava leaves (*Psidium guajava* L.) shows promise as an antimalarial candidate, warranting further isolation and study.

Keywords: *Psidium guajava* L., *Plasmodium falciparum*, fraction, in silico, in vitro



NaOH-Modified Activated Carbon from Corncobs as Heterogeneous Catalyst: Synthesis and Application in Ultrasound-Enhanced Transesterification of used Cooking Oil

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Abstract. Biodiesel is an alternative fuel in the form of fatty acid methyl esters that can be synthesized from renewable sources, offering lower combustion emissions compared to fossil fuels. In this study, biodiesel was synthesized via a transesterification reaction using a basic heterogeneous catalyst derived from corncob carbon. The corncob carbon underwent activation and surface modification with NaOH to form active sites Na_2CO_3 . Used cooking oil was used as the triglyceride source after undergoing degumming, neutralization, and adsorption processes to reduce the free fatty acid content. The transesterification reaction was carried out in an ultrasonic water bath using the reflux method at 60 °C with an oil-to-methanol molar ratio of 1:12. The optimum reaction condition was achieved using 0,5% (wt%) catalyst and a reaction time of 120 minutes, resulting in a biodiesel yield of 73.15%. The quality of the biodiesel at optimum conditions was evaluated through density, viscosity, acid value, and calorific value tests, were respectively 857 kg/m³, 3,8743 cSt, 0,2504 mgKOH/g, and 11.168 cal/g, respectively. These values meet the quality standards specified in SNI 04-7182-2015 for biodiesel. GC-MS analysis confirmed that the main components of the biodiesel produced were methyl oleate and methyl palmitate

Keywords: Biodiesel, Used Cooking Oil, Corncobs, Active Carbon, Catalyst



Exploration of Thiomethyl-Modified Benzylideneacetophenone Compounds: an Innovative Pharmacological Study Through in Silico and In Vitro Approaches in The Discovery of New Antimalarial Agents

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Abstract. Malaria, an infectious disease triggered by the *Plasmodium falciparum* parasite, remains a major health concern as drug resistance continues to rise. This research aimed to synthesize a benzylideneacetophenone derivative modified with thiomethyl and methoxy group as a new antimalarial and the compound was then characterized using FTIR, ¹H-NMR, ¹³C-NMR, and GC-MS. Before synthesis, the compound needs to undergo in silico analysis first, the molecular docking results showed that the compound to be synthesized exhibited promising results. In the dimethoxy-substituted compound, the synthesis yielded the target compound at 87%, confirmed to have the molecular formula C₁₈H₁₈O₃S and a molecular weight of 314 g/mol. In the trimethoxy-substituted compound, the synthesis yielded the target compound at 95%, confirmed to have the molecular formula C₁₉H₂₀O₄S and a molecular weight of 344 g/mol. The in vitro test demonstrated that the compound has active antimalarial activity with an IC₅₀ value of 2.784 µg/mL in the trimethoxy-substituted compound and 0.089 µg/mL in the dimethoxy-substituted compound. In summary, the synthesized benzylideneacetophenone derivative was successfully obtained and exhibits promising antimalarial activity, indicating its potential for further development as a novel antimalarial agent

Keywords: benzylideneacetophenone, Claisen-Schmidt, *Plasmodium falciparum*, in silico, in vitro



Unlocking the Potential of Non-Resinous Agarwood: Effect of Pretreatment on Physicochemical Properties

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Abstract. Agarwood is a fragrant resin produced by *Aquilaria* trees in response to physical, chemical, and biological stressors. This study examines the feasibility of healthy agarwood (non-resinous) as a renewable resource for creating natural fragrances. This research examines how fermentation and maceration affect the extract yield, sensory properties, physical features, and chemical compound profile. The experimental stages include wood size reduction, pretreatment fermentation with *Rhizopus oligosporus*, solvent-based maceration with ethyl acetate and ethanol, physicochemical analysis, and GC-MS profiling. The results show that fermentation and particle size reduction increase the extract yield (up to 0.0018%). Extraction with ethyl acetate yielded a higher percentage of extract (0.0033%) than ethanol (0.0030%). GC-MS analysis revealed the presence of sesquiterpenes, such as 10-epi- γ -eudesmol and α -eudesmol. Increased fungal inoculum levels affected extract properties, resulting in stronger woody and acidic aromas, darker color, and better yields with maximum yields observed at a sample-to-inoculum ratio of 10:1. Increasing solvent volume reduced extract density but did not alter the refractive index. Optical rotation analysis failed to produce interpretable values



Optimization of Protein Isolates from Edamame Skin Waste (*Glycine max L. Merrill*) with the *Response Surface Method*

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Abstract. Edamame skin waste (*Glycine max L. Merrill*) contains protein that has the potential to be used as a bioactive peptide. In order to obtain optimal protein content, the protein isolation process can be optimized with an appropriate method. This study aims to optimize the process of protein isolation from edamame skin waste through the Response Surface Methodology (RSM) approach. Optimized process variables include pH, time, and the amount of solvent with flour, with a design test using Box Behnken Design (BBD). The main parameter observed is the result of protein isolate optimization as an antioxidant activity. Based on the results of the 15 isolation point experiments, an ANOVA linear model with the equation $\text{Yield} = 1.21 + 0.3000A - 0.2625B + 0.1125C$. The optimization results obtained are pH 12, time 30 minutes, and the amount of solvent with flour 60. Furthermore, confirmation was carried out, and the yield was obtained 1,1%. Edamame skin waste (*Glycine max L. Merrill*) has the potential to be a source of peptides that can be useful as a source of bioactive peptides.

Keywords: Glycine max L.Merill, Skin waste, Crude protein, Optimization, Response Surface method.



Grouping Of Oil And Gas Pipeline Sectors with Block Based K-Medoids Method

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Abstract. Effective oil and gas pipeline management requires a data-driven approach to identify segments with varying risk characteristics. This study aims to cluster pipeline segments based on the condition of protective infrastructure using the Block-Based K-Medoids method. The analysis includes variables such as Pipeline Burial, Pipe Along Road, Pipe Guards, Berm/Rail/Guard Condition, Public Road, and ROW HCA along a 59-kilometer pipeline. The clustering process involves data transformation, determining the optimal number of clusters using the Deviation Ratio Index Medoid (DRIM), and grouping the data into three clusters. The results reveal distinct characteristics among the clusters, with each group reflecting a unique combination of factors, including burial depth, proximity to public roads, presence of pipe guards, and HCA zone exposure. Visualization of the clusters on a pipeline map illustrates the spatial distribution of infrastructure conditions. These findings offer structured insights to prioritize inspections, enhance maintenance planning, and strengthen pipeline risk mitigation strategies

Keywords: Pipeline, Pipeline protection, Clustering, Block-based K-Medoids, Deviation Ratio Index



Biosensor Technologies for Parasitic Infections: A Systematic Review of Analytical Performance and Applicability

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Abstract. Parasitic infections remain a significant global health burden, and diagnosis often relies on conventional methods that can be time-consuming and require specialized expertise. Biosensor technologies offer a promising alternative, and this systematic review aimed to evaluate the analytical performance and applicability of recently developed biosensors for diagnosing these infections. Following a systematic search of Scopus, PubMed, and Google Scholar, a final selection of 12 studies was analyzed. The review identified a diverse range of platforms, including LAMP, RPA, microfluidic chips, QCM sensors, flow cytometry, ELISA based on recombinant antigens, CRISPR-Cas12a, and ddPCR. These technologies successfully detected various parasites such as *Plasmodium* spp., *Leishmania* spp., *Trypanosoma cruzi*, *Toxoplasma gondii*, *Strongyloides stercoralis*, *Echinococcus*, and *Entamoeba histolytica*, using clinical samples like blood, serum, urine, and stool. A key finding was the high analytical performance, with sensitivity and specificity values frequently exceeding 95%, accuracy 100%, and rapid detection times ranging up to 15 minutes. Many of the reviewed technologies showed strong potential for point-of-care and field-based applications. In conclusion, biosensors represent a powerful tool for parasitic disease diagnosis, offering high accuracy and speed that could significantly improve patient management, particularly in resource-limited settings. Further large-scale validation is warranted to facilitate their transition into routine clinical practice

Keywords: biosensor; diagnostic performance; parasitic infections



Sentiment Analysis of Google Play Store User Reviews of Alfagift and KlikIndomaret Apps using Term Frequency-Inverse Document Frequency and Support Vector Machine

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Abstract. The advancement of digital technology has driven the growth of e-commerce in Indonesia, with applications such as Alfagift and KlikIndomaret becoming popular choices for meeting daily needs. This study aims to analyze user sentiment toward both applications based on reviews from the Google Play Store, in order to evaluate user perception and service quality from the users' perspective. The methodology involves a Text Mining and Natural Language Processing (NLP) approach, with preprocessing stages such as text cleaning, tokenization, stopword removal, and stemming using the Sastrawi library. Text representation is conducted using Term Frequency-Inverse Document Frequency (TF-IDF), followed by classification using the Support Vector Machine (SVM) algorithm. Data were obtained through web scraping techniques from Google Play, resulting in 42,372 reviews for Alfagift and 29,748 reviews for KlikIndomaret. The SVM model demonstrated strong classification performance, with an accuracy of 93.46% for Alfagift and 92.64% for KlikIndomaret, yielding an overall average accuracy of 93.05%. The analysis revealed that positive sentiment dominates; however, technical complaints remain significant, such as system disruptions, out-of-stock issues, and login problems. This research confirms that the combination of Term Frequency-Inverse Document Frequency (TF-IDF) and Support Vector Machine is effective for sentiment analysis based on user review texts. These findings can assist app developers in improving service quality and developing features that are more responsive to user needs. Future research prospects include the integration of deep learning models and aspect-based sentiment analysis of specific service elements

Keywords: Sentiment Analysis, TF-IDF, Support Vector Machine, Natural Language Processing, Artificial Intelligence



Antioxidant Assay and Component Identification Using LC-HRMS of Ecoenzyme Products from *Sandoricum koetjape* and *Pometia pinnata* Fruit Peel Waste

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Abstract. Kecapi (*Sandoricum koetjape*) fruit peel and matoa (*Pometia pinnata*) fruit peel, which are often considered as waste, have the potential as a source of natural antioxidants. This study examines the antioxidant potential of kecapi fruit peel and matoa fruit peel using the DPPH method and reducing power using the FRAP method. The chemical content in the ecoenzyme sample was also identified using LC-HRMS. The EcoE-2 sample had the highest total phenolic content of 1613.962 ppm eq. gallic acid and also the highest total flavonoid content of 66.653 ppm eq. quercetin. The antioxidant power using the DPPH method for the EcoE-2 product was also greater than EcoE-1, the IC₅₀ value is 2633.0 ppm, the IC₅₀ for the EcoE-2 paste (without water/ethanol) was 119.3 ppm. For the reduction power with the FRAP method, data obtained that EcoE-2 also has a better reduction power than EcoE-1. Based on this, it can be concluded that the higher content of matoa fruit peel will increase the antioxidant power of this ecoenzyme product. There are 10 putative chemical substances identified from the EcoE-2 sample. These chemical components were identified by LC-HRMS based on the similarity of molecular weight with the database using the Compound Discoverer 3.2 application. Based on the chemical content (putative) and antioxidant power data, we recommend that the EcoE-2 ecoenzyme product is better used for cleaning products such as floor or glass cleaners and not for food-related goods/materials



Hybrid Approach for Class Imbalance Handling Using Adaptive Weighted Oversampling and Instance Hardness-Based Undersampling

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Abstract. Class imbalance is a pervasive challenge in supervised learning that can significantly degrade classification performance, especially in domains where minority instances are critical. This paper proposes a novel hybrid resampling framework called Adaptive Weighted Oversampling and Instance Hardness-Based Undersampling (AWO-IHU) to address this issue in multi-class datasets. The method combines adaptive oversampling, inspired by the MWMOTE algorithm, with instance hardness-based majority class reduction. The oversampling phase generates synthetic minority instances near decision boundaries by assigning weights based on closeness and density factors, while the undersampling phase selectively removes easily classified majority instances using hardness scores computed from an ensemble of decision forests. Experiments conducted on five UCI benchmark datasets demonstrate that AWO-IHU consistently outperforms traditional methods such as SMOTE, Random Undersampling, and Hybrid Sampling. The proposed method achieves higher accuracy, precision, recall, and Cohen's Kappa values across all datasets. These results validate the effectiveness of the proposed approach in improving minority class detection while maintaining overall classification performance, offering a robust and scalable solution for real-world imbalanced learning problems

Keywords: Class Imbalance, Classification Performance, Hybrid Resampling, Adaptive Weighted Oversampling, Instance Hardness-Based Undersampling



The Crucial Role of Business Process Harmonization and Digital System Integration in Shaping National Logistics Competitiveness: A Ministerial/ Institutional Perspective

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Abstract. This research investigates the extent to which inter-agency business process harmonization and cross-ministerial digital system integration contribute to enhancing Indonesia's national logistics competitiveness. Utilizing a quantitative methodology within an explanatory research framework, primary data were collected through a cross-sectional survey involving stakeholders actively engaged in intergovernmental logistics systems. Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM). The empirical results demonstrate that both business process harmonization ($\beta = 0.532$) and digital system integration ($\beta = 0.313$) exert statistically significant and positive effects on logistics competitiveness. Furthermore, the coefficient of determination ($R^2 = 0.629$) suggests that these constructs jointly explain 62.9% of the variance in the dependent variable. These findings underscore the strategic importance of institutional synergy and digital interoperability in fostering efficiency and resilience within public-sector logistics. The study contributes theoretically by reinforcing the applicability of institutional coordination models in the logistics policy domain and offers actionable insights for policymakers seeking to advance digitally integrated national logistics frameworks

Keywords: Business Process Harmonization, Digital System Integration, Logistics Competitiveness, PLS-SEM, Institutional Coordination



A Multi-Objective Optimization Framework for the Green Vehicle Routing Problem with Shipment Consolidation Using the Artificial Immune System

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Abstract. This study examines the application of the Artificial Immune System (AIS) algorithm to the Green Vehicle Routing Problem with Shipment Consolidation (GVRPSC), aiming to optimize fuel consumption, fuel costs, and emissions for mini trucks using gasoline and diesel. The GVRPSC, a variant of the traditional vehicle routing problem, incorporates environmental concerns and allows for the consolidation of shipments from multiple customers into single routes, reducing the number of trips and improving efficiency. Fuel consumption directly impacts operational costs and contributes to greenhouse gas emissions, making optimization crucial for sustainable logistics. The AIS algorithm, known for its adaptive metaheuristic nature, was chosen for its ability to explore various routing possibilities and find optimal solutions in complex optimization problems. The methodology involved initializing potential solutions and iteratively improving them through cloning and mutation, with a fitness function minimizing total distance and fuel consumption. The results showed that AIS-optimized routes significantly reduced operational costs and environmental impact. Diesel trucks, while cheaper in fuel cost, consumed more fuel and emitted higher CO₂ levels than gasoline trucks. The AIS algorithm effectively reduced both fuel consumption and emissions, highlighting its potential to achieve sustainable logistics solutions by balancing fuel efficiency, cost, and environmental impact in solving GVRPSC challenges

Keywords: Artificial Immune System, Green Vehicle Routing Problem, Multi-Objective Optimization, Environmental Impact, Shipment Consolidation



A Two-Stage Stochastic Multi-Objective Optimization Model for Earthquake Emergency Logistics Planning under Scenario-Based Uncertainty

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Abstract. Indonesia, as a seismically active region, faces significant challenges in emergency logistics planning due to infrastructure damage and post-disaster uncertainty. This study proposes a two-stage stochastic model to design a resilient emergency logistics network under multiple earthquake scenarios. The model integrates strategic decisions (facility location and vehicle allocation) and operational decisions (relief distribution) while simultaneously optimizing three objectives: minimizing total cost, minimizing delivery time, and maximizing route reliability. It accounts for uncertainties in demand, travel time, and route disruptions using scenario-based probabilities. Results show that increasing the reliability threshold (θ) raises both cost and dispatched flow, with the most efficient performance achieved through flexible vehicle capacities and optimized facility configurations. For moderate reliability levels, a three-center setup with flexible fleets offers the best cost-performance balance. In contrast, high-reliability scenarios require five centers and adaptable fleets to maintain effective relief delivery. The model provides valuable insights for policymakers and disaster managers by bridging pre-disaster strategic planning with post-disaster operational response, offering a comprehensive, data-driven tool for logistics decision-making in earthquake-prone regions

Keywords: Emergency logistics, two-stage stochastic model, multi-objective optimization, facility location, humanitarian logistics



Anti-Inflammatory Activity of Moringa Leaf Extract Nanocrystal and its Anti-Cancer on MCF-7 Cells

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Abstract. Moringa leaves are known as a source rich in antioxidants and are often utilized as an anti-diabetic, anti-inflammatory, and even as an anti-cancer agent. Breast cancer is the most commonly diagnosed cancer worldwide, with an increasing number of cases each year. Additionally, one of the side effects of current breast cancer therapies is caused by the high levels of oxidative stress production. The use of herbal materials such as moringa leaves is believed to be more effective due to their higher content of bioactive compounds as anti-cancer agents without harming normal cells. However, the use of these herbal materials has low bioviability, so the moringa leaf extract was made in the form of nanocrystals (NcLM) to enhance its bioviability as an anti-cancer and anti-inflammatory agent using the top-down method. The anti-cancer activity was assessed by examining cytotoxicity, senescence, and cell cycle distribution occurring in MCF-7 cells. NcLM was toxic to 11% of MCF-7 cells at a concentration of 1 mg/mL and induced senescence by 76.05%. This was also evident in the cell cycle distribution, which showed cell cycle arrest at the G2/M phase. The anti-inflammatory activity was observed through antioxidant activity with the DPPH test, which showed 43.68% inhibition at a concentration of 4 mg/mL, and at the same concentration, it inhibited BSA denaturation by 85.65%. Thus, the moringa leaf extract in the form of nanocrystals exhibits anti-cancer activity against MCF-7 cells without harming normal cells, along with its anti-inflammatory activity

Keywords: Moringa leaves; MCF-7; nanocrystals, anti-cancer; anti-inflammatory



Crystal Structure Analysis of Natural Materials in Building Materials Using XRD (X-Ray Diffraction)

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Abstract. This research focuses on analyzing the crystal structure of natural materials used in construction through XRD techniques. The materials used in this research include cement, sand, bricks, and lightweight bricks sourced from various regions such as Jakarta, Bogor, Depok, Tangerang, Bekasi, Serang, Jepara, and Kudus. The main objectives are to identify the crystalline phases in these natural building materials, analyze changes in their crystal structure, and determine diffraction patterns relevant to their crystallographic properties. The data obtained from the XRD analysis were analyzed using Match! 4.0 software to identify the crystalline phases present in the building materials. The results showed that the dominant crystal structure in the cement, brick, and lightweight brick samples is the monoclinic crystal system. In the sand samples, the crystal structure is predominantly orthorhombic. The resulting database provides valuable information on the crystallographic properties of these materials, which can be used to improve the design and application of safer and more efficient building materials. Overall, this research contributes to a better understanding of the characteristics of natural materials used in construction and supports the development of more sustainable and environmentally friendly building technologies



Recent Breakthrough in Science Technology & Data Sets Computational Insights into Peter Handke: Intertextuality, Hybrid Poetics, and Cultural Innovation

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Abstract. This article introduces an innovative Hybrid Poetological Model for analyzing Peter Handke's literary works, focusing on the dynamic interaction between semiotic and symbolic registers. The semiotic register encompasses rhythm, sound, figurative language, and unconventional structures, while the symbolic register reflects social norms, cultural identities, and historical contexts. Applied to works such as *The Lesson of Mont Sainte-Victoire*, *Repetition*, *Crossing the Sierra de Gredos*, *The Moravian Night*, and *Storm Still*, the model demonstrates how linguistic experimentation, intercultural references, and socio-critical strategies generate hybrid spaces of meaning. By illuminating processes of transculturality, polyphony, and socio-critical engagement, the model not only enriches the understanding of Handke's oeuvre but also offers a methodological framework that can be applied to other hybrid literary works within contemporary literature

Keywords: Peter Handke, Hybrid Poetics, Intertextuality, Transculturality, Cultural Innovation, Literary Analysis



Analysis of The Influence of Digital Technology and Human Resource Competencies on Transportation Modes and Their Impact on Sustainable Supply Chain Distribution: A Study at PT Pos Indonesia (Persero)

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Abstract. The logistics sector is increasingly shaped by digital transformation and sustainability demands, pushing companies to optimize their distribution systems through more effective transportation modes. PT Pos Indonesia (Persero), as a state-owned enterprise, is expected to enhance its distribution performance by adopting digital technologies and strengthening the competencies of its human resources. Nevertheless, the company faces challenges in integrating digital solutions into existing transportation systems and addressing the diverse skill levels of employees. This study seeks to examine how digital technology and human resource competencies influence transportation modes and, in turn, affect sustainable supply chain distribution. A quantitative, causal-associative method was applied, with data collected via structured questionnaires from 100 respondents in the Operations Division of PT Pos Indonesia (Persero). The analysis was conducted using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach with SMARTPLS 4.0 software. Findings show that human resource competence significantly impacts both transportation modes and sustainable distribution, while digital technology affects only supply chain distribution, not transportation modes. Furthermore, transportation modes were proven to significantly influence supply chain sustainability and serve as a partial mediator between other variables. In conclusion, sustainable supply chain distribution relies heavily on the synergy between skilled human resources and efficient transportation management, while the role of digital technology in transportation integration requires further development

Keywords: Digital Technology; Human Resource Competencies; Sustainable Supply Chain; Transportation Mode



Purification of Crude Glycerol using KOH-Activated Corncob Carbon and Its Utilization as A Moisturizing Agent in Liquid Soap

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Abstract. Purification of crude glycerol was carried out through an antisolvent treatment process followed by adsorption. Antisolvent treatment using methanol and adsorption utilizing corn cob biomass waste. Corn cob carbon was activated with 20% KOH followed by calcination at 400oC for 2 hours. The IR spectrum of activated carbon shows the presence of functional groups -C=C and -C-H. The diffraction pattern of activated carbon with peaks of $2\theta = 23.3^\circ$ and 41.3° indicates an amorphous and crystalline structure of graphite but not perfect. The antisolvent treatment process includes the addition of methanol to crude glycerol with a ratio of 3:1, vacuum filtration and evaporation. The adsorption process for crude glycerol was carried out with 0.5 grams of activated carbon for 75 minutes which produced glycerol with a content of 96.29%; water content of 3.21%; ash content of 6.05% and FFA content of 0.21% and was in accordance with SNI 06-1564-1989 concerning crude glycerol and SNI 06-2570-1992 concerning technical glycerol. The IR spectrum of glycerol shows typical peaks, namely -O-H and -C-H. The obtained glycerol is used as a moisturizing agent for liquid soap. The resulting liquid soap has a pH in the range of 5.20-5.67 and FFA in the range of 5.20-5.67 which is in accordance with SNI-2588-2017 concerning liquid hand sanitizer soap

Keywords: Crude Glycerol, Corn Cobs, Antisolvent Treatment, Adsorption, Liquid Soap



Factors That Influence Medication Compliance in Pulmonary Tuberculosis Patients at Surakarta General Hospital

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Abstract. Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis*. The incidence of TB increased by 3.9% between 2020 and 2022. Based on the increasing trend of cases, tuberculosis remains a global public health problem. Furthermore, the success rate of TB treatment in Indonesia has decreased to 79% in 2024 (TB Dashboard, 2024). Treatment adherence influences the success of TB treatment in relation to the achievement of clinical outcomes for TB patients. The aim of this study was to examine factors influencing adherence in pulmonary tuberculosis patients. The present investigation was an analytical study with a cross-sectional design and purposive sampling technique. Inclusion criteria were patients aged ≥ 16 years undergoing pulmonary TB treatment at Surakarta General Hospital with or without comorbidities and patients with complete medical records. Exclusion criteria were patients with conditions that prevented them from being interviewed, such as being mute or deaf. Data were analyzed univariately, bivariately using the chi-square test, and multivariately using multiple logistic regression. Based on univariate analysis, it was found that there were more female patients than male patients. There were 83 patients aged 16-50 years and 51 patients with a low BMI ($<18.5 \text{ kg/m}^2$). Factors associated with adherence to pulmonary TB treatment were body mass index (BMI) ($p=0.004$; $OR=5.220$) and distance to health facilities ($p=0.032$; $OR=3.416$)



Vector Autoregressive Method in Modeling Stock Prices of Major Banks in Indonesia Towards an Inclusive Economy

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Abstract. The stability of the financial sector is essential for supporting sustainable economic growth. In Indonesia, banking stock prices are highly interconnected and influenced by macroeconomic fluctuations. This study analyzes the long-run and short-run dynamics of stock prices of three major banks BCA, BRI, and BNI using monthly data from 2015 to 2023. Exogenous variables include crude oil prices, Dow Jones Index, inflation, industrial production index (IPI), and exchange rate. The methodology applies Vector Autoregressive (VAR) and Vector Error Correction Model (VECM), complemented by unit root testing, Johansen cointegration, impulse response function (IRF), and variance decomposition. The Johansen test confirmed at least one cointegration vector (trace statistic = 152.47, $p < 0.01$), suggesting long-run equilibrium among the variables. Short-run results indicated bidirectional causality between BRI and BNI, while BCA was primarily affected by exchange rate volatility. The IRF showed that a one standard deviation shock in the exchange rate reduced BCA's stock price by 3.4% after two months, while the Dow Jones Index accounted for 28% of the forecast error variance in BNI's stock. These findings underscore the importance of global financial indicators and exchange rate stability, with policy implications for strengthening macroeconomic coordination and mitigating external shocks



Inorganic Oxide Synthesis from Aceh Bovine Bone Through Precipitation for Palm Oil Transesterification Into Biodiesel

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Abstract. Inorganic oxide nanoparticles synthesized from Aceh bovine bone were successfully prepared using the precipitation method, with pH variations of 8 and 10 adjusted using NH_4OH as both the precipitating agent and pH regulator. The obtained nanocatalysts were characterized using XRD, FTIR, and SEM-EDX, and their catalytic activity was evaluated through the transesterification of RBDPO. XRD and FTIR analyses confirmed the presence of hydroxyapatite ($\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$), calcium oxide (CaO), and calcium carbonate (CaCO_3) as the main components in both catalysts synthesized at pH 8 and pH 10. SEM micrographs revealed spherical particle morphology, while EDX analysis showed calcium as the dominant element, with contents of 55.44% and 57.19%, respectively. The average crystallite sizes, calculated using the Debye-Scherrer equation, were 31.63 nm (CB-P8C) and 31.31 nm (CB-P10C). Catalytic activity tests demonstrated that the catalyst synthesized at pH 10 exhibited higher performance, achieving a biodiesel yield of 98.11%, compared to 92.66% for the catalyst synthesized at pH 8. Quality assessment of both biodiesel samples confirmed that their acid values, density, and viscosity complied with the Indonesian National Standard (SNI 04-7182-2015)

Keywords: nanocatalyst, inorganic oxide, bovine bone, biodiesel



A Comparative Study of Dimensional Reduction Strategies for Unsupervised Clustering of Aerial Landscape Images with Deep Feature Extraction

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Abstract. The rapid growth of aerial imagery demands scalable, label-free methods for land cover analysis, where unsupervised clustering combined with deep feature extraction has shown promise. This study compares dimensional reduction strategies: Principal Component Analysis (PCA), Uniform Manifold Approximation and Projection (UMAP), and a hybrid PCA+UMAP approach for clustering aerial landscape images. A dataset of 12,000 images across 15 categories was processed using deep features from a pretrained MobileNetV2, followed by dimensionality reduction and K-Means clustering. Performance was evaluated with Adjusted Rand Index (ARI), Normalized Mutual Information (NMI), and confusion matrix. Results show that PCA gave consistent and balanced performance, and UMAP consistently outperformed PCA on ARI and NMI by preserving nonlinear manifold structures. However, UMAP completely failed to recover the “port” category, showing its vulnerability to visually heterogeneous or minority classes. Hybrid PCA (80%) + UMAP (25) achieved the best overall scores but failed to eliminate UMAP's weakness. These observations suggest PCA remains a good baseline for large-scale aerial image clustering, and UMAP yields superior performance for compact categories but requires careful parameter tuning. This study offers empirical perspective on the trade-offs between linear and nonlinear reduction methods, fostering cost-effective and scalable approaches to unsupervised land cover monitoring

Keywords: Aerial Imagery, Dimensional Reduction, PCA, UMAP



The Impact of Daily Cigarette Consumption on Creatinine Levels in Active Smokers Using *Jaffe Reaction Method*

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Abstract. Cigarettes are cylindrical objects containing tobacco leaves with a length between 70 and 120. Cigarettes contain various chemical compounds as well as several types of heavy metals such as nicotine, carbon monoxide, arsenic, and cadmium. According to epidemiological research, exposure to the heavy metal cadmium is nephrotoxic so it can damage the kidneys. Kidney organ damage that occurs in the body can be identified by an increase in creatinine levels in the blood. Objective: This study aimed to assess whether the number of cigarettes smoked per day affects blood creatinine levels in active smokers. This research method is experimental research with a one-shot case study design on 27 active smoker respondents. The parameter examined was creatinine levels using the Jaffe reaction examination method which was analyzed using the one-way ANOVA statistical test. The mean creatinine level examination results obtained in group X1 (1-3 Cigarettes) was 1.17 mg/dL. In group X2 (4-6 Cigarettes) it was 1.04 mg/dL. In group X3 (7-12 Cigarettes) it was 1.21 mg/dL. The results of statistical analysis using the one way ANOVA test obtained a P-value > 0.05, which means there is no difference. The number of cigarettes smoked per day did not significantly affect creatinine levels in this group of active smokers

Keywords: Smoking, Cadmium, Creatinine Levels, Kidney Function, Jaffe Reaction



Development of Interactive Digital Media Child-Friendly Digital-Based Tasks

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Abstract. This study aims to develop and evaluate interactive digital media oriented towards “Child-Friendly Digital-Based Tasks.” This study responds to the challenges of traditional assignment methods, which often fail to motivate students and can even cause boredom and stress, especially for Generations Z and Alpha who are accustomed to digital interaction. Using a Research and Development (R&D) approach with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation), this study systematically combines the principles of interactive media with child-friendly design concepts. The Analysis stage revealed the urgent need of teachers and students for a digital assignment platform that is not only visually appealing and interactive, but also easy to navigate. Based on this analysis, the Design phase focused on creating a child-friendly user interface (UI) and user experience (UX) with attractive visuals, easily recognizable icons, and intuitive navigation. In addition, gamification elements and an automatic grading system were designed to increase student motivation and provide instant feedback. During the Development phase, digital content, including learning materials, questions, and interactive activities, is created according to the specified design. The Implementation stage involves field testing the product with small groups of students and teachers, while the Evaluation stage uses formative and summative evaluations, including expert validation, to ensure the quality and effectiveness of the product. The results of the study show that this approach has the potential to increase student motivation and engagement, facilitate independent learning, and develop 21st century skills in a safe and enjoyable learning environment

Keywords: Interactive Digital Media, Child-Friendly



Determination of Carotene Content of Crude Palm Oil Using Raman Spectroscopy

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Abstract. As one of the world's leading palm oil producers, Indonesia regulates its production through the Indonesian National Standard (SNI) to ensure the quality of palm oil available in the market. A key parameter in the SNI standard is the color, odor, free fatty acid (FFA), iodine value, moisture content, and DOBI (Deterioration of Bleachability Index). Beta-carotene, a type of carotenoid, acts as a provitamin A that can be converted into active vitamin A after metabolism in the body. The beta-carotene content in palm oil influences its color and the degree of its clarity. This study examined crude palm oil using 2 types of heating stages. Two methods were employed to determine the carotene content: conventional method and Raman spectroscopy coupled with Partial Least Squares (PLS) as a modern alternative. Raman spectroscopy utilizes a 785 nm wavelength source directed at the sample. The findings indicate that the data obtained from Raman spectroscopy closely align with those from conventional method. The beta-carotene content obtained ranges between 250-2500 ppm



A Reproducible Sol-Gel Synthesis of Magnetic-Coated Silica Nanoparticles for Reliable SARS-CoV-2 RNA Extraction

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Abstract. The development of magnetic-coated silica (MAGSi) nanoparticles has shown significant promise for the efficient extraction of viral RNA in reverse transcription-polymerase chain reaction (RT-PCR) tests, a key method for COVID-19 detection. To facilitate large-scale production, it is crucial to establish a synthesis method that is both high-quality and reproducible. This study investigates the reproducibility of a sol-gel synthesis method, assisted by an ultrasonic bath, for preparing MAGSi nanoparticles and assesses their performance in extracting RNA from the SARS-CoV-2 virus. The synthesis protocol was repeated across five distinct batches, and the resulting nanoparticles were characterized for yield, morphology, crystallite phase, and magnetic moment. The results demonstrated no significant differences in the physical properties or quantity among the replicated batches, confirming the method's good reproducibility. Furthermore, duplicate RNA extraction tests performed on samples from each batch revealed consistent adsorption performance, highlighting the method's efficacy. This work underscores the importance of validating a synthesis method's reproducibility before scaling up production for biomedical applications, such as a cost-effective viral RNA extraction kit



Soursop Leaf (*Annona muricata* L.) Extract Gel: Formulation and Effectiveness against *Microsporum canis*

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Abstract. Soursop (*Annona muricata* L.) leaves contain genistein, steroids, and coumarins, which exhibit potential as natural antifungal agents against *Microsporum canis*, the causative agent of ringworm. This study aimed to formulate a soursop leaf extract gel using Na-CMC and carbopol 940 as gelling agents, optimized through the *Simplex Lattice Design* (SLD) with *Design Expert* version 13, and to evaluate its physical characteristics and antifungal activity. Extraction was carried out by maceration with 96% ethanol. The optimum formula was obtained with 4.3% Na-CMC and 1.7% carbopol 940. The optimized gel exhibited homogeneous texture, characteristic soursop odor, greenish-brown semi-solid appearance, pH of 6.56 ± 0.17 , viscosity of 326 ± 16.73 dPas, spreadability of 3.96 ± 0.43 cm², and adhesiveness of 1.58 ± 0.71 seconds. Antifungal testing using the well diffusion method showed an inhibition zone of 15.33 mm, classified as strong activity. ANOVA analysis revealed a significance value of 0.000 (< 0.05), indicating significant differences among the positive control, negative control, optimized gel, and soursop leaf extract

Keywords: gel, Na-CMC, carbopol 940, *Annona muricata*, antifungal



Phytochemical Screening and Antioxidant Activity of Methanolic Extract of *Vernonia elaeagnifolia* Leaves using ABTS and DPPH Assays

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Abstract. *Vernonia elaeagnifolia*, or Lee Kwan Yew, is a plant from the Asteraceae family known for its free radical scavenging properties, largely attributed to phenolic and flavonoid secondary metabolites. This study aimed to evaluate the phytochemical profile, total phenolic content (TPC), total flavonoid content (TFC), and antioxidant activity of the methanolic leaf extract. Phytochemical screening was performed using tube tests and thin-layer chromatography (TLC). TPC and TFC were determined using the Folin–Ciocalteu and aluminum chloride colorimetric methods, respectively, while antioxidant activity was assessed by ABTS and DPPH radical scavenging assays. The extract contained alkaloids, saponins, flavonoids, and polyphenols. TPC and TFC values were 81.26 mg GAE/g and 54.02 mg QE/g, respectively. The extract exhibited moderate antioxidant activity, with IC₅₀ values of 139.17 µg/mL (ABTS) and 166.62 µg/mL (DPPH), as classified by the Blois method. These findings indicate that *V. elaeagnifolia* leaves are a promising natural source of antioxidants for potential application in nutraceutical or pharmaceutical formulations

Keywords: Lee Kwan Yew, Antioxidant, ABTS, DPPH, Phenolic, Flavonoid



Multi-Label Figurative Language Detection in Indonesian E-Commerce Reviews Using Hybrid Deep Learning

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Abstract. The Internet generates vast data, with e-commerce product reviews offering valuable, personal, and specific insights. Researchers from academia and industry have long utilized online reviews for marketing, event monitoring, and trend analysis, with the primary goal of identifying public sentiment toward products or topics. However, reviews are not always expressed literally; many contain figurative language. Thus, online reviews can be categorized into literal and figurative. Literal reviews use direct expressions, while figurative reviews employ words or phrases whose meanings differ from their surface form. Figurative language can affect the accuracy of sentiment analysis, especially in polarity labeling. This study proposes a figurative language detection model for Indonesian product reviews using a hybrid architecture combining FastText, CNN, BiLSTM, and Attention. The model achieved an accuracy of 94.09%, outperforming prior international studies that typically reported F1-scores between 57% and 67% on English corpora. These findings indicate that the approach effectively detects diverse figurative expressions and is well-suited to the complexity of Indonesian morphology and vocabulary. The model provides both theoretical and practical contributions to the development of automated review analysis systems in Indonesian e-commerce platforms

Keywords: figurative language, sentiment analysis, hybrid deep learning, Indonesian product reviews



Fabrication of Reusable and Low-Cost SERS Substrate for Explosives Detection

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Abstract. Surface-enhanced Raman Spectroscopy (SERS) is a highly sensitive and powerful analytical technique for molecular identification and analysis and is used in various fields. SERS uses the plasmonic effect on the surface of specific substrates, such as grating plasmonic, to enhance the Raman signal of the sample. However, the fabrication of grating structures as substrates is challenging and often comes with high costs. This research presents an approach to address this challenge by developing a low-cost SERS substrate using DVDs as a grating-based substrate coated with gold thin film. The fabricated substrate will be used as a SERS substrate to detect explosives: trinitrotoluene (TNT), Tetryl, Research Department Explosive (RDX), and pentaerythritol tetranitrate (PETN). According to our research, the concentration of explosives that can be detected is up to 0.01M for TNT, PETN, and Tetryl and 0.1M for RDX. Furthermore, a reusability test was conducted for the SERS substrate from DVD by cleaning the substrate using an acetone solution. Based on the results of the reusability test, the substrate can be reused up to three times. The periodicity of grating used is 713 nm, the thickness of the gold thin film used is 50 nm, and the depth of grating is 29.43 nm



Monitoring Tacrolimus Blood Levels and Correlation with eGFR in Patients After Kidney Transplant

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Abstract. Tacrolimus is a primary therapy in post-organ transplant treatment. Tacrolimus has a narrow therapeutic index, necessitating monitoring of drug levels in the blood, as it is associated with side effects such as nephrotoxicity and the risk of rejection after transplantation. Monitoring tacrolimus levels in the blood and kidney function through eGFR values is very important in post-kidney transplant patients. Tacrolimus testing uses the ECLIA method on the cobas e-411 analyser. This study aims to analyse the relationship between tacrolimus levels and eGFR values in post-kidney transplant patients over a period of 24 weeks. The study was observational and involved 63 subjects at a private hospital in South Jakarta. The mean tacrolimus level decreased significantly from the first week to the 24th week (Friedman test, $p < 0.001$). eGFR values showed significant changes throughout the monitoring period (repeated measures ANOVA, $p = 0.007$), with an upward trend at the start of therapy and stabilisation thereafter. No significant correlation was found between tacrolimus levels and eGFR values at any time point (Spearman's correlation $p > 0.05$; Pearson's correlation $p = 0.724$). These results indicate that tacrolimus level variability within the therapeutic range does not directly affect short-term changes in eGFR. Although no statistically significant correlation was found between tacrolimus level fluctuations and eGFR values in the study sample, close monitoring is still necessary to prevent toxicity, optimise dosage, and prevent kidney rejection

Keywords: tacrolimus; kidney transplantation; therapeutic drug monitoring; eGFR; nephrotoxicity



Immersion Time Effects on Composite Propellant Burn Rate

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Abstract. Rocket performance is strongly influenced by the burn rate characteristics of the propellant used. This study aims to measure the burn rate of a composite solid propellant using the Acoustic Emission System (AES) method and to evaluate the effect of water immersion on its burn rate. Immersion is a critical factor, as HTPB-based propellants contain ammonium perchlorate (AP), a water-soluble oxidizer. Propellant samples were tested under three conditions: without immersion (normal condition), after 60 seconds of immersion, and after 120 seconds of immersion. The results showed that the burn rate ranged from 2.85–6.30 mm/s (normal condition), 2.87–6.60 mm/s (60 seconds), and 3.05–6.10 mm/s (120 seconds), at a chamber pressure of 2–6 MPa. Statistical analysis using a one-way ANOVA revealed no significant differences in burn rate among the three conditions. These findings indicate that short-term immersion in water does not significantly affect the combustion performance of the propellant



Predicting Stock Prices In Emerging Markets: CNN-LSTM Application to Indonesia's Energy Sector

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Abstract. PT Adaro Energy Indonesia Tbk is a prominent coal producer with increasing investments in renewable energy. Global energy price variations, company performance, and overarching macroeconomic and geopolitical factors influence the stock price. This research employs a CNN-LSTM model to predict ADARO.JK closing prices from 2020 to 2025. Historical statistics indicate a robust long-term upward trend characterized by significant rally stages, consolidation intervals, and subsequent corrections. The model, trained on 80% of the data with an 8-day lookback period, a batch size of 64, and 100 epochs, successfully represented temporal dependencies. The training and test losses converged to below 0.1 and 0.15, respectively, signifying negligible overfitting. Performance measurements validate robustness, with an R^2 of 0.993 for training and 0.936 for testing. Findings indicate that CNN-LSTM can consistently predict stock price trends, providing significant insights for investors and policymakers managing volatility in the energy industry

Keywords: CNN-LSTM, Stock Price Prediction, ADARO.JK, Deep Learning, Energy Market Volatility



Optimizing Cryptocurrency Portfolios In Indonesia: A Hybrid Approach Using Lstm And Markowitz Analysis

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Abstract. The swift advancement of blockchain technology has altered the worldwide economic framework, presenting both benefits and challenges in contemporary investment methodologies. Cryptocurrency, as a decentralized digital currency, is garnering increasing attention across several businesses, rendering risk management and return maximization essential fields of inquiry. This study seeks to evaluate daily bitcoin return forecasts utilizing the Long Short-Term Memory (LSTM) model and to develop an optimum investment portfolio grounded in Markowitz mean-variance theory. This case study examines the Most-Traded and Greenest Cryptocurrencies in Indonesia for 2024, as determined by articles from cryptonews.com and thecryptobasic.com. The LSTM prediction model attained an average accuracy of 95% and an MAPE under 5%, demonstrating a robust capacity to identify short-term price movement patterns. The optimized portfolio achieved a return of -0.00011% with a volatility of 0.00528%, indicating that investments in Indonesia's most traded and environmentally sustainable cryptocurrencies in 2024 entail relatively low risk but limited reward potential. These findings offer significant insights into the convergence of artificial intelligence, sustainable finance, and cryptocurrency portfolio management in emerging markets

Keywords: Cryptocurrency Portfolio Strategy, LSTM Prediction, Markowitz Mean-Variance Optimization, Green and Sustainable Cryptocurrencies, Machine Learning in Financial Forecasting



Evaluating the Impact of Medication Adherence on Therapeutic Effectiveness in Chronic Obstructive Pulmonary Disease (COPD) Patients in Bengkulu

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Abstract. Chronic Obstructive Pulmonary Disease (COPD) is a non- communicable disease that affects the respiratory tract. COPD is often associated with various risk factors such as smoking, air pollution, age, and others. Patients with chronic diseases such as COPD need to maintain medication adherence to prevent relapse and further complications. Therefore, adherence to medication in COPD patients should be routinely monitored and evaluated to ensure therapeutic effectiveness and support the success of treatment programs. This study aimed to evaluate the relationship between medication adherence and therapeutic effectiveness in patients with Chronic Obstructive Pulmonary Disease (COPD) in Bengkulu City. This research employed an observational descriptive-analytic method with a cross-sectional approach. A total of 119 respondents who met the inclusion criteria were selected using a sampling technique. The results showed that 95.8% of respondents had a high level of medication adherence, and 37% had a CAT score ≥ 10 (moderate classification). Based on the Chi-square test, the obtained p-value = 0.470 indicated that there was no significant relationship between medication adherence and therapeutic effectiveness in COPD patients in Bengkulu City

Keywords: medication adherence, effectiveness, COPD, chronic diseases, respiratory



Mn(II)-Nicotinamide-Dicyanamido Complex: Synthesis, Crystal Structure, Magnetism, and Antibacterial Activity

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Abstract. Indonesia has abundant manganese reserves (49.6 million tons), which mainly been explored for steel production and battery industries. Product derivatization of manganese ore can be developed in many ways, one of which is by converting it into functional material-based Mn complexes, due to their low-toxicity, possible functionality such as porosity, magnetism, and antibacterial activities. In this study, Mn(II) metal complex with mixture ligands of nicotinamide and dicyanamido (Mn-ND) is reported, from the synthesis, crystal structure, magnetic, to antibacterial properties. The Mn-ND was synthesized at room temperature by one-pot reaction in methanolic solution. Rod colourless crystals were obtained upon slow evaporation of the solution mixture. Single crystal XRD analysis confirms that the product has the formula of $\{[\text{Mn}(\text{nicotinamide})_2(\mu_{1,5}\text{-dicyanamido})_2] \cdot \text{nicotinamide}\}_n$, which identical to previously reported compound (CCDC No. 741395). The presence of characteristic functional groups of both ligands (C=N, C-N, -NH₂, C=O) were also confirmed by FTIR analysis. Thermal analysis (DTA-TGA) shows that the complex decomposes slightly above 200 °C. Magnetic measurements showed a magnetization of ± 1.08 emu at $\pm 30,000$ Oe. Furthermore, the Mn-ND complex exhibited antibacterial activity against *E. coli*, *Salmonella* sp., and *S. aureus* at concentrations of 1000–6000 ppm, with zone of inhibitions of 0–11.85 mm; 3.43–13.78 mm; and 0–13.75 mm. These results highlight the potential of Mn-ND complex as easy-to-made material with multifunctional properties.

Keywords: Manganese complex; Nicotinamide; dicyanamido; functional materials; single crystal



Exchange Rate Prediction of BRICS Countries Against US Dollar based on Multiresponse Fourier Series Estimator

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Abstract. The dominance of US dollar (USD) as the global central currency has provided tremendous benefits to the United States (USA) as the owner of the currency. However, the USD's power has been disrupted since the monetary crisis in 2007-2008 which gave rise to an alliance called BRICS. The collective economic power of BRICS countries that currently holds 35% of the world's GDP exceeding the USA creates a spirit to make dedollarization efforts to eliminate the economic disparities of countries in the world. Predicting the USD exchange rate against BRICS currencies is essential to understanding its influence on the global economy. This study uses a multiresponse Fourier series nonparametric regression approach, which can analyze five variables simultaneously while handling fluctuating data patterns. The analysis with this method produces the best estimation model using a sine function without a trend component. The optimal smoothing parameter λ is determined to be 1, based on the minimum GCV value of 0.000702363. The prediction results from the training data yield a MAPE value of 4.7521%, classifying the analysis as highly accurate

Keywords: BRICS, Developing Economy, Exchange Rate, Forecasting, Multiresponse Fourier Series Estimator



Examining Active Compounds in Ginger as a Potential Treatment for Respiratory Syndrome: A Molecular Docking and Dynamics Study

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Abstract. Having a major worldwide influence, respiratory syndrome has caused extensive health problems. Although there is no sure cure for respiratory illness, unconventional therapies including ginger have attracted interest. This research analyzes the prospective interactions between numerous bioactive chemicals in ginger namely zingiberene, zingerone, geraniol, 6-gingerol, and beta-sesquiphellandrene and the major protease linked with respiratory syndrome (PDB ID: 6LU7). Among these, geraniol and 6-gingerol demonstrated the highest binding affinities, with binding energies of -7.12 kcal/mol and -7.22 kcal/mol, respectively. The RMSD analysis indicated that the complex formed between 6-gingerol exhibited highest stability complex. Despite these encouraging in silico results, further laboratory-based validation is necessary to substantiate their therapeutic potential



Development and Evaluation of Oral Suspension of Golden Sea Cucumber (*Stichopus hermanii*) Extract and Determination of Protein Content

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Abstract. Sea cucumber is a species of marine invertebrate with a soft, round and elongated body shape, making it called a sea cucumber. Golden sea cucumber (*Stichopus hermanii*) contains high protein, so it can be used as a building substance and used in the growth process and maintenance of body tissue. Optimization is an approach to achieving the best combination of formula components. The formulation process requires optimization to determine the optimal formulation based on evaluation data from respons. This study aims to determine the optimal formula for the preparation of a suspension of golden sea cucumber extract and has a high protein content. Optimization using Design Expert version 13 with the Simplex Lattice Design (SLD) method. Protein content testing was using the biuret method. The optimal formula results is Na-CMC with a concentration of 0.51% and Citric Acid of 1.29% and the desirability obtained was 1. The optimal formula showed a viscosity value of 303.33cP and a pH value of 3. The results of the protein content test ranged from 30.08-36.14 mg/mL, and the optimum suspension preparation had a protein content of 33.76mg/mL. In the Freeze Thaw Cycling Test results, there was a decrease in the viscosity and pH values, it can be concluded that extreme storage temperatures can affect the physical and chemical properties of the preparation base

Keywords: Golden Sea Cucumber (*Stichopus hermanii*), Formula Optimization, Oral Suspension, Protein



Classification of Road Damage Types using Convolutional Neural Networks Based on Digital Images in Sleman Regency

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Abstract. Road infrastructure is a crucial element in supporting economic development and community mobility. In Sleman Regency, many flexible pavement roads are prone to deterioration caused by traffic loads and weather, with the level of damage increasing annually. Distresses such as Alligator Cracks, Corrugation, and Potholes require serious attention to enhance road safety and transportation efficiency. This study aims to detect and classify types of road damage using digital images through Convolutional Neural Network (CNN) algorithms. Three CNN architectures, namely Xception, InceptionV3, and VGGNet-16, were compared, with performance evaluated using accuracy, precision, recall, and F1-score under a 4-Fold Cross Validation method. A dataset of 600 primary images was collected from five districts in Sleman with the highest road damage levels between January 15, 2025, and March 2, 2025. Image preprocessing, augmentation, and hyperparameter tuning, including convolution, max pooling, dropout, dense layers, and learning rate adjustments, were applied to improve model performance. Experimental results showed that Xception achieved the best performance with an accuracy of 97% and precision, recall, and F1-score of 0.97, outperforming Inception V3 (95%) and VGGNet-16 (91.67%). The classification system was deployed into a web-based platform using FlaskApp, enabling real-time detection and classification of road damage. This research contributes to road infrastructure management by reducing long-term maintenance costs and supporting technological innovations in transportation systems

Keywords: CNN, FlaskApp, Road Damage, Sleman Regency



Mathematical Integration of AHP, Clustering, AR-MBA, and Classification Models for Optimizing Customer Loyalty and Profit in SMEs

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Abstract. The rapid growth of Indonesia's culinary industry has intensified competition, particularly in the coffee shop sector. This study aims to optimize customer loyalty and profitability at Sendiko Kopi through the mathematical integration of Analytical Hierarchy Process (AHP), Clustering, Association Rule-Market Basket Analysis (AR-MBA), and Classification techniques. The Clustering model identified three distinct customer segments, with Cluster 3 exhibiting the highest potential based on purchasing power and frequent visits, enabling targeted marketing. AR-MBA analysis revealed strong product associations, such as concurrent purchases of French fries,Americano, and lychee squash, offering opportunities for optimized bundling promotions. The Classification model quantified factors impacting customer satisfaction, while AHP provided an optimization framework, identifying social media advertising as the most effective promotional strategy. This approach delivers a robust mathematical framework to develop data-driven marketing strategies, enhance customer loyalty, and optimize business performance amid increasing industry competition

Keywords: Analytical Hierarchy Process, Association Rule-Market Basket Analysis, Classification, Clustering, Coffee Shop, Customer Loyalty, Data Mining, Marketing Strategy



Bank Profitability Modeling in the Digitalization Era Using a Panel Data Regression Approach on Nine Major Banks in Indonesia

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Abstract. The digitalization era has brought significant impacts on the banking sector, particularly on profitability, which serves as a key indicator of financial institutions' performance. Changes in customer behavior due to the development of digital services, along with increasing risk complexity, highlight the need for more accurate profitability modeling. This study aims to model banking profitability using a panel data regression approach on nine major banks in Indonesia over the period 2020–2024. Based on the results of the Chow and Hausman tests, the best model selected is the Random Effect Model (REM), as it accommodates heterogeneity across banks. The findings indicate that the model explains 61.15% of the variation in profitability ($R^2 = 0.6115$), with three variables showing a significant influence on Bank Profitability, namely Hedging ($p = 0.0021$), Firm Size ($p = 0.0086$), and Growth Opportunity ($p = 0.0000$). These results demonstrate that panel data regression is effective in identifying the key determinants of banking profitability in the digitalization era. The novelty of this study lies in the scarcity of similar research in Indonesia that specifically integrates the aspect of banking digitalization with profitability analysis using a panel data regression approach. Furthermore, this study contributes to the acceleration of SDG 8 by strengthening the role of the banking sector in fostering inclusive and sustainable economic development



Optimizing Ozone Solubility for Effective Surfactant Removal and COD Reduction in Synthetic Laundry Wastewater

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Abstract. Laundry effluents generally contain high concentrations of surfactants and organic substances that can cause serious environmental and health impacts if discharged untreated. This study investigated ozonation as an alternative chemical treatment for synthetic laundry wastewater, focusing on ozone solubility and pollutant removal. Experiments were conducted in a 5 L reactor containing 1,6 mL of detergent/L wastewater with an ozone supply rate of 3 g/h. Operational parameters, including oxidation–reduction potential (ORP), DO, pH, dissolved ozone concentration, surfactant levels (MBAS), and chemical oxygen demand (COD), were monitored for 150 minutes. Based on Henry's law, the theoretical maximum ozone solubility was 7.14 mg/L, but actual values were lower due to limited solubility, instability, and rapid reactions with water constituent. The 5 L reactor at 3 g/h provided the most stable ozone dissolution with lower ozone consumption. Results showed that MBAS decreased by over 90% within 90 minutes, while COD decreased more slowly, reaching about 40% at 150 minutes. The limited COD reduction suggests the presence of complex organics, particularly from yeast, that are more resistant to ozonation. Overall, ozonation was highly effective for surfactant degradation but less efficient for COD removal, indicating the need for complementary treatments to improve overall wastewater remediation



Modelling of Coronary Heart Disease Risk in Hypertension Sufferers Based on Binary Semiparametric Logistic Regression with Penalized Spline Estimator

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Abstract. This study applies a binary semiparametric logistic regression model with a penalized spline estimator (SLR-PS) to investigate the risk factors of coronary heart disease (CHD). The model achieved a classification accuracy of 70.45%, demonstrating its effectiveness in identifying CHD risk factors. The sensitivity value of 0.778 indicates that the model successfully identifies 77.8% of individuals who truly have CHD, which is particularly important in medical diagnosis where missing true positive cases can lead to severe consequences. The findings reveal a significant nonlinear effect of fatty food intake on CHD risk, emphasizing the critical role of dietary control in cardiovascular disease prevention. In terms of parametric components, the analysis shows that individuals with a history of hypertension are 4.641 times more likely to experience CHD compared to those without such a history, holding other variables constant. Additionally, each incremental unit increase in fatty food intake is associated with a 1.8% increase in the odds of developing CHD. These results underscore the importance of managing hypertension and reducing fatty food consumption to mitigate CHD risk. From a public health perspective, the study reinforces the need for targeted nutritional interventions and awareness campaigns aimed at high-risk populations to encourage healthier eating patterns and lifestyle modifications. These findings contribute to the advancement of Sustainable Development Goal (SDG) 3: Good Health and Well-Being, by supporting evidence-based strategies for reducing non-communicable diseases and promoting preventive healthcare measures. Future research is recommended to expand the model by incorporating additional influential factors such as physical activity, genetic predisposition, stress, and other lifestyle variables to enhance predictive accuracy and policy relevance.

Keywords: Coronary Heart Disease, Hypertension, Penalized Spline, Semiparametric Logistic Regression



Development of Recombinant Human LOX-1 Protein Vaccine Based on Chitosan Nanoparticles by the Ionic Gelation Method

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Abstract. CVD risk factors such as dyslipidemia cause high levels of ox-LDL, leading to overexpression of LOX-1. LOX-1 is a scavenger receptor that absorbs ox-LDL in endothelial cells. A new approach to improve treatment adherence is needed, namely the development of an atherosclerosis vaccine. The vaccine offers long-term efficacy with periodic boosters, improving patient adherence. In this study, the LOX-1 recombinant protein vaccine was encapsulated in nanoparticle-based chitosan. The production of chitosan-recombinant human LOX-1 protein-based nanoparticle vaccines using the ionic gelation method. The formation of the nanoparticle (NP) vaccine was tested using HPLC to determine loading efficiency and encapsulation efficiency, TEM to determine NP morphology, and PSA to determine NP size distribution and PDI. The result of HPLC showed that EE is 58,5% (moderate EE) and LC is 3% (ideal in protein formulation). Based on the PSA results, nano-LOX-1 shows an average size of 118,6 nm, with a PDI of 0,218, indicating a relatively narrow particle distribution. Particles with a diameter >150 nm were rarely found, indicating a low risk of agglomeration. The TEM image of the nano-LOX-1 shows spherical nanoparticles with an average size of 77.4 nm. Conclusion: chitosan nanoparticles can be used as an LOX-1 vaccine delivery system



Comparison of Autoregressive Integrated Moving Average (ARIMA) and Multilayer Perceptron (MLP) Model in Predicting S.M. Entertainment Stok Prices

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Abstract. Accurate stock prices predictions are key to investment decision-making, especially for volatile stocks such as S.M. Entertainment, which is influenced by the dynamics of the global entertainment industry. This study compares the performance of the Autoregressive Integrated Moving Average (ARIMA) and Multilayer Perceptron (MLP) method to predict the weekly price of S.M. Entertainment's stock. The best models obtained from this study are ARIMA (0,2,1) without constant and MLP with one hidden layer containing 1000 neurons. The evaluation results using Mean Absolute Percentage Error (MAPE) show the superiority of the MLP model with a value of 5.39% compared to ARIMA which reached 9.69%, indicating the MLP's better ability to capture non-linear patterns in S.M. Entertainment stock data. These findings recommend MLP as a more effective tool for prediction, providing practical contributions to investors in developing daily trading strategies, as well as academic contributions to the development of machine learning-based financial prediction models for entertainment sector stocks. More broadly, this research supports the achievement of the Sustainable Development Goals (SDGs), particularly SDG 8 (Decent Work, and Economic Growth) by increasing capital market efficiency, and SDG 9 (Industry, Innovation, and Infrastructure) through the development of innovative artificial intelligence-based prediction models



Synthesis of ZnO and SnO₂ Catalysts Using Roselle Flower Extract for Biodiesel Production from Waste Cooking Oil

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Abstract. The development of biodiesel from waste cooking oil using green-synthesized heterogeneous catalysts offers a sustainable alternative to fossil fuels. In this study, ZnO and SnO₂ catalysts were synthesized using roselle flower (*Hibiscus sabdariffa* L.) extract and applied to transesterification. Characterization revealed that SnO₂ exhibited a surface area of 51.52 m²/g and a pore volume of 0.080 cm³/g, nearly 12 times higher than ZnO (4.11 m²/g; 0.009 cm³/g), resulting in superior catalytic activity. FTIR analysis of biodiesel catalyzed by ZnO showed ester-specific peaks at 1115 cm⁻¹ (C–O) and 1022 cm⁻¹ (C–O–C), while biodiesel from SnO₂ displayed a strong ester carbonyl band at 1744 cm⁻¹, confirming FAME formation. GC–MS results indicated that ZnO-catalyzed biodiesel consisted mainly of methyl oleate (60.23%), methyl palmitate (34.83%), methyl stearate (2.27%), and methyl myristate (0.34%), with a total FAME content of 97.34%. In contrast, SnO₂-catalyzed biodiesel contained methyl oleate (55.85%), methyl palmitate (37.12%), methyl stearate (4.50%), and methyl myristate (0.64%), yielding nearly 100% FAME. The dominance of methyl oleate and palmitate confirmed the production of high-quality biodiesel with balanced oxidative stability and combustion properties. Therefore, roselle-extract-based SnO₂ demonstrated greater potential than ZnO as an eco-friendly catalyst for biodiesel production from waste cooking oil.

Keywords: Biodiesel, Waste cooking oil, ZnO, SnO₂, Roselle extract



Analysis of Adverse Drug Reactions to First-Line Antiretroviral Therapy in Melanesian HIV/AIDS Patients: Type, Causality, Severity, and Management as a Foundation for Big Data Pharmacovigilance

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Abstract. Adverse drug reactions (ADRs) remain a major challenge in people living with HIV (PLHIV), often affecting adherence and long-term treatment outcomes. However, limited evidence exists regarding ADR patterns among the Melanesian population, who are underrepresented in global HIV research. This study aimed to describe the type, causality, severity, and management of ADRs among Melanesian PLHIV receiving first-line antiretroviral therapy (ART), and to explore their contribution as a foundation for big data pharmacovigilance. An observational descriptive study was conducted among adult Melanesian PLHIV attending the Voluntary Counseling and Testing (VCT) service at Central Papua Regional Hospital in 2023. Eligible participants were receiving first-line ART with good adherence (Medication Possession Ratio >95%). Sociodemographic, clinical, and ART regimen data were collected. ADRs were identified through baseline and weekly follow-up interviews over one month, verified using medical records, and assessed for causality (Naranjo algorithm), severity (Hartwig & Siegel scale), and management approaches. A total of 142 patients were included. ADRs were reported in, with gastrointestinal and central nervous system effects being most common. Most ADRs were categorized as probable by the Naranjo scale and moderate in severity by Hartwig & Siegel. Most ADRs were managed through symptomatic treatment or regimen adjustment without discontinuation of ART. Integration of structured ADR data into a digital framework highlights the potential for developing big data pharmacovigilance models to detect patterns, predict risks, and inform clinical decision-making in underrepresented populations such as Melanesians. ADRs among Melanesian PLHIV were frequent but generally manageable. Causality, severity, type, and management assessments provide robust datasets that can be scaled into big data pharmacovigilance systems. This study contributes novel evidence from an under-researched population and underscores the clinical and policy impact of incorporating ADR monitoring into digital pharmacovigilance frameworks

Keywords: Adverse drug reactions, Antiretroviral therapy, Melanesian, Pharmacovigilance, Big data



Comparative Forecasting of the Rupiah-US Dollar Exchange Rate using Fourier Series and Support Vector Regression: Foreign Exchange Risk Implications

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Abstract. The exchange rate of the Indonesian Rupiah against the United States Dollar is a key determinant of economic stability and financial decision-making, where fluctuations create risks for businesses with foreign currency exposure. This study compares two forecasting methods Fourier Series and Support Vector Regression (SVR) and examines their implications for risk management using Value at Risk (VaR) and stress testing. Monthly USD/IDR data from May 2015 to May 2025 are analyzed, with forecasting accuracy evaluated using Mean Absolute Percentage Error (MAPE) and Root Mean Square Error (RMSE). The results show that the Fourier Series model provides more accurate predictions than SVR, indicated by lower MAPE and RMSE values, suggesting that cyclical patterns in exchange rate data are better captured by the Fourier approach. Risk assessment further reveals that an exposure of USD 1 million per month entails potential losses of approximately IDR 36.5 million under the 95% VaR measure, with stress testing indicating a significant increase in losses under extreme conditions. These findings underscore the importance of adopting forecasting models that not only deliver statistical accuracy but also provide reliable estimates of financial risk, thereby supporting more effective hedging strategies and informed decision-making for businesses and policymakers in the face of exchange rate volatility

Keywords: Exchange Rate Forecasting, Fourier Series, Support Vector Regression, Value and Risk, Foreign Exchange Risk



Optical and Magnetic Properties of the Green Synthesized CoFe₂O₄/Ag Nanoferrites

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Abstract. Magneto-plasmonic nanostructures offer unique opportunities for advanced optical sensing, where magnetic tunability and plasmonic field enhancement can be synergistically exploited. Pure CoFe₂O₄ nanoferrites, despite their excellent magnetic anisotropy and chemical stability, exhibit poor plasmonic performance. In this research, we demonstrate the green synthesis of CoFe₂O₄/Ag core-shell nanoparticles as multifunctional platforms for Surface Plasmon Resonance (SPR) sensor applications. Neem leaf extract was employed as a sustainable reducing agent, enabling an eco-friendly fabrication route. CoFe₂O₄ cores were obtained via coprecipitation at 70 °C and subsequently encapsulated with Ag shells at 60 °C, imparting both localized surface plasmon resonance (LSPR) and enhanced surface functionality. Optical characterization revealed a pronounced Ag-driven plasmonic absorption near 430 nm and strong photoluminescence emissions at ~350 nm (UV) and ~700 nm (red), supporting dual-wavelength optical response. FTIR confirmed characteristic Co–O and Fe–O vibrations at wavenumber of 590.24 cm⁻¹ and 432.07 cm⁻¹, respectively. The VSM measurements indicated soft magnetic behavior at room temperature, desirable for magnetic field modulation. The combination of high plasmonic activity, biocompatible Ag surface, and tunable magnetism underscores the potential of CoFe₂O₄/Ag nanostructures as next-generation materials for ultrasensitive SPR-based biosensing

Keywords: CoFe₂O₄/Ag, green synthesis, magnetic, optical



Prediction of Hypertension Risk Based on Lifestyle and Biological Factors Using Machine Learning Approach and Feature Selection

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Abstract. Hypertension is a major health problem worldwide, affecting 1.28 billion people. Indonesia ranks first among Southeast Asian countries in terms of hypertension prevalence. Prevention and appropriate treatment efforts must be made. These efforts support the Sustainable Development Goals (SDGs), specifically point 3. One of the early detection efforts that can be undertaken is the construction of a machine learning-based method for predicting the risk of hypertension. This study compares four machine learning methods, namely K-Nearest Neighbor (KNN), Random Forest (RF), Extra Tree (ET), and Naïve Bayes (NB), to predict the risk of hypertension based on lifestyle and biological factors. This study also employs the information gain method to identify the features most relevant to the risk of hypertension. The data used in this study were collected directly from respondents at Airlangga University Hospital, focusing on the local Indonesian population. The results of this study indicate that the most significant factor contributing to the risk of hypertension is salt intake. Additionally, KNN is the most effective method for predicting hypertension risk compared to RF, ET, and NB, with an accuracy of 92.31%, sensitivity of 100%, specificity of 85.71%, and an AUC value of 92.86%.



Quantitative Retail Sales Optimization Using Hierarchical Analysis, Association Mining, and Supervised Classification

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Abstract. Every retail store, including Indomaret, requires effective promotional strategies to increase sales and customer loyalty. One approach that can be implemented is utilizing historical customer purchase data analysis. This research aims to analyze and design promotional strategies based on the Analytic Hierarchy Process (AHP), Association Rule Mining - Market Basket Analysis (AR-MBA), Clustering, and Classification methods. The Analytic Hierarchy Process method is used to determine promotional method priorities. Association Rule Mining - Market Basket Analysis is used to discover interconnection patterns between products. Clustering is performed to categorize products into three main categories: popular products, potentially targeted products, and less potential products. Meanwhile, Classification is used to predict customer tendencies in responding to promotions. The research results show that direct discounts are the most prioritized promotional method based on the Analytic Hierarchy Process, followed by buy-one-get-one-free promotions. Market Basket Analysis generated 24 valid association rules with strong interconnection patterns between products. The recommended promotional strategies include direct discounts and bundling promotions for popular products, as well as buy-one-get-one-free promotions and reward points for less potential products. This research demonstrates that promotional strategies based on historical data, by combining various analytical methods, can provide effective guidance for increasing sales and customer loyalty

Keywords: AHP, AR-MBA, Clustering, Classification, Strategic Marketing, Product Promotion



Comparative Study of Conventional and Spatial Panel Models in Analyzing the Information and Communication Technology Development Index

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Abstract. Digital inequality in Indonesia remains a major challenge in achieving equitable development of information and communication technology (ICT). Support line SDG 9 and 10, this study aims to analyze the factors influencing the ICT Development Index (ICT-DI) across provinces in Indonesia by comparing conventional panel data models with spatial panel approaches. The data used were from Statistics Indonesia (BPS) for 2020–2023, with ICT-DI as the dependent variable and several demographic, infrastructure, and technology usage indicators as independent variables. Descriptive analysis and thematic mapping were conducted, followed by estimation using the Panel Model, as well as spatial models including Spatial Autoregressive Fixed Effect (SAR-FE) and Spatial Error Model Fixed Effect (SEM-FE). The results indicate significant spatial dependence across provinces, confirming the relevance of spatial analysis. The SAR-FE model was identified as the best model, explaining 98.47% of the variation in ICT-DI with the lowest MAPE value (1.1023). Among the variables tested, population density was found to have significant positive effect on ICT-DI, suggesting that densely populated regions tend to have better ICT infrastructure and higher digital capacity. Policy implications highlight the importance of considering interregional spillover effects in formulating inclusive and sustainable ICT development to reduce regional disparities in Indonesia

Keywords: ICT Development Index, Regional Disparity, Spatial Panel, Digital Inequality



Clustering Analysis of DKI Jakarta Criminal Cases in 2024 Using K-Prototype on Mixed Data

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Abstract. Criminality remains a major social issue in metropolitan areas, particularly in Jakarta, where population density and socio-economic inequality increase crime potential. This study seeks to identify spatial and demographic patterns of criminal cases in DKI Jakarta during 2024 using the K-Prototypes clustering algorithm, which is appropriate for mixed numerical and categorical data. The goal is to form meaningful clusters that can guide effective crime prevention strategies. The research used secondary data from the Open Data Jakarta portal, including administrative region, complaint location, type of crime, time of occurrence, offender's age, and number of victims. Data preprocessing involved converting numerical variables into categorical form, standardizing values with Z-score, and clustering with K-Prototypes. The Elbow method determined the optimal number of clusters, while profiling helped interpret cluster characteristics. Analysis was conducted in Python. Results revealed three optimal clusters. Cluster 1: East Jakarta, brawls at night, older offenders. Cluster 2: West Jakarta, theft during daytime, more victims. Cluster 3: South Jakarta, brawls at night, younger offenders. Spatial mapping showed central areas had more diverse and intense cases, while peripheral areas were more homogeneous. In conclusion, crime in Jakarta is heterogeneous, shaped by spatial, temporal, and demographic factors, offering useful insights for policymakers and law enforcement



Data-Driven Mathematical Optimization for MSMEs: Leveraging Multi Method Analytical Framework in Batik Marketing

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Abstract. Micro, Small, and Medium Enterprises (MSMEs) are the backbone of Indonesia's economy, but in facing increasingly intense market competition, especially in the batik industry, many MSMEs struggle to design effective and efficient marketing strategies. Data-driven marketing, particularly with a mathematical and optimization approach, is essential to help MSMEs overcome these challenges. Batik, as one of Indonesia's cultural heritages, requires marketing strategies that not only attract consumers but also maintain competitiveness in an increasingly digital market. This study aims to optimize the discount strategy for products at UMKM Wahyu Mulyo by analyzing sales data using data-driven and mathematical approaches, utilizing the Analytical Hierarchy Process (AHP), Clustering, Association Rule-Market Basket Analysis (AR-MBA), and Classification methods. Using 150 Shopee transaction data, this research generates more accurate decisions regarding which products to produce, customer segmentation, frequently purchased product combinations, and the eligibility for discounts. The AHP results show that "Rok" (skirt) is the highest priority product for production. Clustering divides customers into five segments, with Cluster 5 being the most promising for discounts. AR-MBA identifies product combinations such as "Rok" (Skirt) and "Kemeja" (shirt) often bought together, which can be utilized for bundling promotions. Meanwhile, classification with an accuracy of 98.67% helps determine which customers are eligible for discounts. This study highlights the importance of applying data-driven analytical techniques in designing more precise and sustainable marketing strategies for MSMEs in the batik industry amid the dynamic market competition

Keywords: Data mining, mathematical optimization, decision analysis, MSMEs, batik marketing, multi method, optimization



Application of Proportional Hazard and Additive Models in the Survival Analysis of Breast Cancer Patients

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Abstract. Breast cancer remains the leading cause of cancer-related mortality among women worldwide, and this study was conducted to model survival time and identify influencing factors in patients with the disease. Survival analysis was performed on secondary data from 1458 breast cancer patients with 10 covariates, applying three approaches, the Cox proportional hazards regression model, the Lin–Ying additive hazard model, and the Aalen additive hazard model. The proportional hazard assumption test indicated that the Cox regression model did not fully satisfy the assumption, suggesting limitations in its applicability for the dataset. In the Cox and Lin–Ying models, hormonal therapy, radiotherapy, the Nottingham Prognostic Index (NPI), and tumor size were identified as significant predictors of survival, whereas in the Aalen model, significant factors also included age and chemotherapy in addition to those four covariates. These findings highlight that while the Cox model provides efficient estimation and interpretable hazard ratios, the Lin–Ying and Aalen models offer more robust alternatives when the proportional hazard assumption is violated. Overall, risk control efforts in breast cancer patients should focus on managing NPI scores and tumor size as well as ensuring appropriate therapies, particularly hormonal therapy and radiotherapy, which have been demonstrated to provide protective effects



Sentiment Analysis of Balikpapan City Trans (BACITRA) using Lexicon Based and K-Nearest Neighbor (KNN)

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Abstract. The growth of population and motorized vehicles in Balikpapan City has created transportation problems such as congestion and traffic accidents. To address these issues, the government launched Balikpapan City Trans (BACITRA), a transportation service based on Integrated Bus Rapid Transit (BRT) with a Buy The Service scheme. However, its implementation faces challenges, such as rejection from city transportation drivers and public criticism regarding limited services. Therefore, analyzing public sentiment towards BACITRA through social media is essential for further study. This study aims to analyze public sentiment using a text mining approach. The dependent variable used is sentiment class (positive, neutral, negative), and the independent variable is review words. Data were collected from Instagram, X (Twitter), and TikTok using keywords related to BACITRA, then processed through preprocessing and TF-IDF weighting stages. Sentiment labeling was carried out using the Lexicon-Based method and classified using the K-Nearest Neighbor (KNN) algorithm. The evaluation results show that the two-sentiment classification (positive and negative) performed better than the three-sentiment classification, with an accuracy of 92% on the test data and an F1-score of 0.93. Meanwhile, the three-sentiment classification only achieved an accuracy of 67% and an F1-score of 0.64. This indicates that the KNN model is more optimal in distinguishing the two main sentiments, making it more appropriate for identifying the general public perception of BACITRA



Survival Time Modeling of HIV/AIDS Patients Using The Extended Cox Regression Approach

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Abstract. Survival analysis is a method of data analysis about the time until the occurrence of a certain event. One of the survival analyses with a semiparametric approach that is often used is the cox proportional hazard regression model. The extended cox model is a model that involves variables depending on the time used to handle non-proportional hazard cases. This study aims to model the survival time of HIV/AIDS patients with an extended cox regression approach. The data used is secondary data obtained from a clinical study in the United States accessed through the kaggle.com website. The data of this study amounted to 2,139. The results showed that the best model was the extended cox regression model with a function $g(t)=t$ four significant variables, namely the Treatment (2) (Treatment with didanosine), Treatment (3) (Treatment with zidovudine + didanosine), Treatment (4) (Treatment with zidovudine + zalcitabine), and Treatment variables with the interaction of time t . Treatment with Treatment (1) (treatment with zidovudine), has the lowest risk of death than other treatments. When sorted from the treatment with the lowest risk of death, the order is Treatment (1), Treatment (2), Treatment (3), and Treatment (4). This research is expected to be an input and reference for researchers in related fields to be able to increase the chances of survival of HIV/AIDS patients based on significant factors.

Keywords: Survival Analysis, Extended Cox, HIV/AIDS, Treatment Types of Drugs, Antiretroviral.



Exploring the Potential of Kolmogorov-Arnold Networks to Approximate the Universal Exchange-Correlation Functional in Density Functional Theory

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Abstract. This work introduces Kolmogorov-Arnold Networks (KANs) as a novel approach for approximating the exchange-correlation (XC) functional in Density Functional Theory (DFT), specifically targeting accurate modeling of non-covalent interactions, a persistent challenge in computational chemistry. Our methodology employs KANs to directly model the XC functional by processing standard meta-generalized gradient approximation features on the DFT integration grid, implementing a two-grid system that enables efficient non-local representation learning while preserving the $O(N^3)$ computational complexity of semi-local DFT. Our KAN-based functional achieves chemical accuracy with a mean absolute error of 0.89 kcal/mol on the W4-17 atomization energy benchmark and a weighted total mean absolute deviation of 2.60 kcal/mol on the GMTKN55 benchmark, representing 1.85× improvement over M06-2X

Keywords: Density Functional Theory, Exchange-Correlation Functional, Kolmogorov-Arnold Networks, Non-covalent interactions, Quantum Chemistry, Machine Learning



Modelling of Ocean Hydrodynamics in Sumbawa Waters, West Nusa Tenggara

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Abstract. The coastal waters of Sumbawa, West Nusa Tenggara, are a semi-open, hydrodynamically complex area, influenced by waves, currents, and tides. This study aims to simulate and analyze the hydrodynamic conditions in the region using Delft3D software. Primary data such as bathymetry, tides, and currents were obtained through field measurements, while secondary data came from BATNAS and ECMWF. Waves were simulated using a hindcasting method based on wind data for the past 10 years from five dominant directions (west, northwest, north, northeast, and east). Validation of the tidal and current data was carried out using the RMSE method with very low error values (tidal RMSE: 0.1048; current RMSE components U and V: 0.0298 and 0.0232), indicating a high level of accuracy. The model results show that waves from the northwest direction have the largest significant height (1.2 m) and tend to decrease closer to the coast due to refraction phenomena. Currents in the study area are generally weak, with directions varying according to the tidal cycle. This study provides important insights into the hydrodynamics of Sumbawa waters and can be used as a basis for coastal area management planning and maritime safety

Keywords: Sumbawa Waters, Hydrodynamic, DELFT3D, Current, Wave



DNA Extraction Approaches in Soft and Hard Capsule Shells for Porcine (*Sus scrofa*) Detection Using Real-Time PCR targeted 12S rRNA

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Abstract. Detection of porcine-derived gelatin in pharmaceutical capsules is an important step to ensure product safety and halal compliance. This study aims to evaluate the effectiveness of DNA extraction methods in different capsule types. Furthermore, the prescence of porcine-derived DNA was demonstrated in capsule shells by targeting the 12S rRNA gene through Real-Time Polymerase Chain Reaaction. Capsules samples were collected by stratified random sampling throughout its halal labelling and market authorization, including one capsule labeled as halal. DNA extraction was carried out using two approaches: silica column extraction for soft capsules and phenol-chloroform isoamyl (PCI) based solvent extraction (25:24:1 v/v) for hard capsules. The highest DNA concentration was obtained from the PCI method (147,34 ng/ μ L), although the purity was relatively low as indicated by the 260/230 ratio (0,05), implying the evidence of inhibitory compouds potentially affecting PCR efficiency. Real-Time PCR amplification was performed using Evagreen dye reagent. The test resulting that two positive controls showed strong amplification with a quantification cycle (Cq) value of 13,34 and 13,37, while exhibit spesific melting temperature (Tm) of 80 °C, confirming the successful detection of porcine DNA. In contrast, capsule samples presented detectable fluorescence signals with measurable Cq values. However, melt curve analysis indicated the absence of a defined Tm, suggesting that the amplified product were non spesific in the capsule samples. One capsule labeled as halal was confirmed to contain no detectable porcine DNA. This results indicate that the integration of Real-Time PCR with melt curve analysis allows clear differentiation between spesific porcine-derived amplicons and non-spesific products. This study has proved reliable in the framework for the authentication of pharmaceutical products in gelatin capsule shells



Improved Risk Modeling for Concurrent Diabetes and Hypertension: a Biresponse Nonparametric Logistic Regression Approach

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Abstract. One of the key strategic priorities in Indonesia's health development, as outlined in the Sustainable Development Goals (SDGs) agenda, is to reduce premature mortality from Non-Communicable Diseases (NCDs) by one-third. Diabetes and hypertension are two closely related NCDs that often coexist. This study aims to develop a risk model for the simultaneous occurrence of diabetes and hypertension using a biresponse approach. Data were collected from 211 patients at the Internal Medicine Polyclinic of Airlangga University Hospital Surabaya. A Chi-square dependency test revealed a significant association between the occurrence of diabetes and hypertension. Additionally, the relationship between each predictor variable and the observed logit of diabetes and hypertension demonstrated a non-linear pattern, suggesting that the impact of predictor variables on the risk of both diseases is not linear. A comparison of the biresponse logistic regression model with both parametric and nonparametric approaches indicated that the Biresponse Nonparametric Logistic Regression model outperformed the parametric approach in terms of performance and stability



Hypertension risk modeling with Multivariate Adaptive Regression Splines (MARS) for ordinal scale data

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Abstract. Hypertension is a major public health issue and one of the most prevalent non-communicable diseases in Indonesia. It is associated with serious complications and significantly contributes to morbidity and mortality. This study aims to develop a model for hypertension using the Multivariate Adaptive Regression Splines (MARS) method, which is particularly effective for handling nonlinear relationships and ordinal response variables. A quantitative approach with secondary data analysis was used, where hypertension status was the response variable, and predictor variables included age, body mass index (BMI), sex, family history of hypertension, and fat consumption. The model selection was based on minimizing the Generalized Cross-Validation (GCV) value to ensure optimal fit. The best MARS model for predicting hypertension status was achieved with parameters $BF = 10$, $MI = 2$, and $MO = 1$, yielding a GCV value of 2.196575 and an Akaike Information Criterion (AIC) of 265.6123. Performance evaluation showed that the model achieved 58% accuracy, 44.67% sensitivity, 75.2% specificity, and an Area Under the Curve (AUC) of 0.68. These results indicate that the ordinal MARS model provides moderate predictive performance and can serve as a foundation for developing more targeted strategies in hypertension prevention and control.



Modelling of Coronary Heart Disease Risk Using Semiparametric Binary Logistic Regression Based on Least Square Spline

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Abstract. Coronary heart disease (CHD) is a non-communicable disease that is a leading cause of mortality worldwide. According to the World Health Organization, cardiovascular diseases, including the CHD, resulted in more than 17.9 million deaths in 2019, constituting 32% of all global deaths. In this study, we employ a semiparametric binary logistic regression (RBLR) to model the CHD risk. This proposed model can accommodate functional relationships of linear (as parametric component) and non-linear (as nonparametric component). The predictor variables consist of parametric components namely sex, chest pain, hypertension status, HbA1c levels and nonparametric component namely Cystatin-C levels. The estimated model produced metrics of accuracy, precision, sensitivity and specificity with their values more than and equal to 90%, and the AUC value of 90.59% which is categorized as outstanding classification. This study aligns with the objectives of the third Sustainable Development Goal (SDGs), which aims to promote good health and well-being



Synthesis of Mg/Al-NO₃ Hydrotalcite Immobilized by Citric Acid for [AuCl₄]⁻ Adsorption

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Abstract. Synthesis of Mg/Al-NO₃ hydrotalcite immobilized by citric acid (Mg/Al-NO₃ HT-Cit) has been conducted for [AuCl₄]⁻ adsorption. The Mg/Al-NO₃ HT-Cit was prepared by co-precipitation method. Optimum condition for the synthesis was studied by determining the optimum acidity and concentration of precursors. Application of adsorbent for [AuCl₄]⁻ adsorption was studied by determining their kinetics model. The results showed that the optimum acidity for Mg/Al-NO₃ HT-Cit preparation was pH 7 with adsorption capacity of citric acid was 121.95 mg g⁻¹. The XRD diffractogram showed that synthesis of Mg/Al-NO₃ HT-Cit was successfully immobilized onto the surface of hydrotalcite with basal spacing d(003) was 7.99 Å. Adsorption of [AuCl₄]⁻ was optimum at pH 3 and fitted well to pseudo second order



Formulation of Dissolving Microneedle with Rapet Wood Extract (*parameria laevigata*) as an Antioxidant and Anti- Acne Agent

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Abstract. Acne (*Acne vulgaris*) is a common dermatological condition in adolescents and young adults, associated with excessive sebum production, follicular hyperkeratinization, bacterial colonization, and oxidative stress. Conventional therapies, including antibiotics, carry the risk of developing resistance, necessitating safer alternatives from natural sources. Kayu Rapet (*Parameria laevigata*), a climbing plant native to Southeast Asia, is traditionally used for its astringent and anti-inflammatory properties and contains flavonoids, tannins, alkaloids, and saponins with potential antioxidant and antibacterial properties. This study aimed to evaluate the effectiveness of *P. laevigata* extract loaded into a dissolving microneedle patch for topical acne therapy. The crude drug powder was extracted using 95% ethanol by sonication, followed by phytochemical screening and measurement of total flavonoids. Antioxidant activity was assessed using DPPH, FRAP, and ABTS, while antibacterial activity was tested against *Staphylococcus aureus* and *Propionibacterium acnes*. Microneedle patches were formulated from PVA and PVP in eight varying ratios, then characterized for morphology, penetration, mechanical strength, and functional interactions using FTIR. The results showed an extract yield of 4.17% containing saponins, tannins, flavonoids, and alkaloids. Antioxidant activity increased with concentration, while antibacterial activity suppressed the growth of *P. acnes* and *S. aureus*. The microneedles were 360–500 μm long, had adequate penetration through parafilm, and had high mechanical strength with minimal needle breakage. FTIR analysis showed physical interactions between components without covalent bond formation, supporting matrix stability. The integration of Kayu Rapet extract in dissolving microneedles offers an effective, minimally invasive topical approach, combining antioxidant and antibacterial action with efficient transdermal delivery, opening up opportunities for the development of local natural ingredient-based acne therapies

Keywords: Pimple; *Parameria laevigata*; microneedle; antioxidant; antibacterial; delivery



Corncob-Based Adsorbent: an Eco-Friendly Approach to Reduce Impurities in Recycled Cooking Oil

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Abstract. Used cooking oil is one of the wastes generated from cooking activities which, if directly discharged into water bodies, can be harmful due to its adverse impact on aquatic ecosystems. This study aims to synthesize an adsorbent from corncob to reduce contaminants in used cooking oil. The research employed an experimental method. Corncobs were dried, ground, and activated using NaCl. After activation, the corncob powder was oven-dried and applied to the used cooking oil. The measurement results of peroxide value and free fatty acid levels showed a significant decrease of up to 50%, which was higher compared to the reduction achieved using conventional activated carbon (37%). These findings indicate that the synthesized adsorbent is effective in reducing contaminants in used cooking oil

Keywords: corncob-based adsorbent, recycled cooking oil



Cost Effectiveness Analysis Cefazolin, Ceftizoxim, and Ceftriaxon Effect of Prophylactic Antibiotics on Surgical Site Infections in Caesarean Section Patients in Bhakti Medicare Hospital

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Abstract. Prophylactic antibiotics are medications used to prevent and treat surgical site infections (SSI). Surgical site infections account for 1,27% of infections, with the highest incidence occurring in obstetrics and gynecology. The use of prophylactic antibiotics is a primary mitigation strategy that tends to be more cost-effective, but can vary in effectiveness and cost depending on various factors. The purpose of this study was to determine the effect of the appropriateness of prophylactic antibiotic use on the incidence of surgical wound infections and to determine the differences in effectiveness, safety, and costs in patients with cesarean section. This study was conducted as an observational analytic with a case-control study design. The research data were taken from the medical records of cesarean section patients in August - October 2024 and then grouped into SSI and non-SSI groups. The results of the study in 6 SSI groups and 94 non-SSI groups showed no relationship between the appropriateness of prophylactic antibiotics and the incidence of surgical wounds ($p>0.05$). The total costs incurred by SSI patients during hospitalization were Rp. 10,629,345,- with an average expenditure of Rp. 8,168,277,-. The average total cost of treatment for patients receiving prophylactic antibiotics ceftizoxime and ceftriaxone was greater than cefazolin. The effectiveness value of cefazolin was higher and the LOS was shorter with an average total cost of treatment lower than ceftizoxime and ceftriaxone

Keywords: Prophylactic antibiotics, surgical site infections, sectio caesarea



Characterization of Turmeric–Gotu Kola Nanophytosome for Arterial Stiffness in Hypertension

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Abstract. Hypertension affects over 1.28 billion adults worldwide and is strongly linked to arterial stiffness, a major predictor of cardiovascular risk. Conventional drugs reduce blood pressure but have limited endothelial benefits. Curcumin (turmeric) and asiaticoside (gotu kola) act synergistically through ACE inhibition, eNOS modulation, and antioxidant/anti-inflammatory pathways, but poor bioavailability hampers their use. The objective of this research was to formulate and characterize a nanophytosome containing turmeric and gotu kola extracts. Nanophytosomes were prepared with Phospholipon + Plantacare (PP, 30 min), Soya lecithin + Plantacare (SP, 30 and 60 min), and Soya lecithin + Cremophor (SC, 60 min). Characterization included particle size, polydispersity index (PDI), and zeta potential. Preclinical studies are ongoing in L-NAME-induced hypertensive Wistar rats, measuring blood pressure and pulse wave velocity (PWV). The SP 60 min system yielded the most favorable profile (particle size 38.85 ± 9.25 nm, PDI 0.43 ± 0.11 , zeta potential -29.23 ± 11.12 mV). Other systems showed larger size variability or less negative zeta values. The turmeric–gotu kola nanophytosome showed promise as an adjuvant antihypertensive therapy targeting arterial stiffness. The SP 60 min formulation was the most promising, though optimization is needed to improve uniformity.

Keywords: nanophytosome, curcumin, asiaticoside, arterial stiffness



Photocatalytic Degradation of Methylene Blue Using Fe₃O₄/TiO₂ Under The Influence of TiO₂ Type and Irradiance Intensity

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Abstract. This study explores the photocatalytic degradation of methylene blue (MB) using Fe₃O₄/TiO₂ nanocomposites synthesized from commercial TiO₂ P25 and locally sourced TiO₂. Magnetite (Fe₃O₄) was synthesized from natural iron sand via a co-precipitation method and combined with TiO₂ at a 1:1 weight ratio. Prior to composite formation, the local TiO₂ underwent calcination at 450 °C for 1 hour to improve its crystallinity. Characterization using XRD and VSM confirmed the presence of anatase TiO₂ and superparamagnetic behavior in both composites. Photocatalytic performance was evaluated under UV-A irradiation using two different reactor configurations with varying lamp intensities. The Fe₃O₄/TiO₂ P25 catalyst achieved 39.73% MB degradation within 90 minutes, outperforming the Fe₃O₄/TiO₂ Local catalyst, which reached 30.00% under higher light intensity. The degradation followed pseudo-first-order kinetics with rate constants of 0.0059 min⁻¹ and 0.0038 min⁻¹, respectively. Despite its lower efficiency, the Fe₃O₄/TiO₂ Local composite demonstrated promising activity and potential for magnetic separation, making it a viable low-cost alternative for wastewater treatment. The findings highlight the importance of TiO₂ quality over irradiance intensity and suggest that further improvements in local TiO₂ structure could enhance its photocatalytic efficiency

Keywords: photocatalytic, Fe₃O₄/TiO₂ nanocomposites, co-precipitation method, degradation of methylene blue



Development and Characterization of Nanoliposomes Containing Turmeric (*Curcuma longa* L.) and Gotu Kola (*Centella asiatica* L.) Extracts for Enhanced Stability and Bioavailability

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Abstract. Herbal extracts such as turmeric (*Curcuma longa* L.) and gotu kola (*Centella asiatica* L.) are widely known for their therapeutic potential, particularly as antioxidant and antidiabetic agents. However, their practical application is limited due to poor solubility, low stability, and limited bioavailability. This study aimed to develop and characterize nanoliposomes encapsulating combined turmeric and gotu kola extracts to improve their physicochemical stability and potential bioavailability. Nanoliposomes were prepared using thin-film hydration followed by sonication. The resulting formulations were evaluated for particle size, polydispersity index (PDI), zeta potential, entrapment efficiency, and morphological characteristics using transmission electron microscopy (TEM). Preliminary stability testing under accelerated storage conditions was also performed. The optimized nanoliposome formulation demonstrated particle sizes within the nanometer range (<200 nm), a low PDI (<0.3), negative zeta potential, and high entrapment efficiency (>70%). These findings suggest that nanoliposomes could serve as a promising delivery system for turmeric and gotu kola extracts, potentially enhancing their therapeutic effectiveness. Further in vitro and in vivo studies are recommended to assess pharmacological activities

Keywords: Nanoliposomes, *Curcuma longa*, *Centella asiatica*, herbal extracts, bioavailability, stability



Development of Effervescent Antidiabetic Granules from a Combination of Binahong Extract and Life Graft: In Vitro Activity and Toxicity Test

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Abstract. Diabetes mellitus is a global health problem. Binahong and Sambung Nyawa are medicinal plants with potential as antidiabetics. The development of modern herbal preparations such as effervescent granules can improve patient compliance. This study aimed to develop effervescent granules from a combination of Binahong (*Anredera cordifolia*) and Sambung Nyawa (*Gynura procumbens*) extracts as a potential antidiabetic preparation. The antidiabetic activity was tested through in vitro inhibition of α -amylase and α -glucosidase enzymes, with acute oral toxicity tested in Wistar rats following OECD guidelines. The best extract combination was formulated into granules and evaluated for its physical properties. In vitro tests showed that the extract combination significantly inhibited α -amylase ($IC_{50} 21.90 \pm 2.93 \mu g/mL$) and α -glucosidase ($IC_{50} 26.15 \mu g/mL$), where the α -glucosidase inhibitory activity exceeded that of acarbose ($IC_{50} 37.78 \mu g/mL$). The acute toxicity test proved its safety with an $LD_{50} > 2000 \text{ mg/kg BW}$ (category 5, low toxicity). The effervescent granule formulas F2 and F3 met all physical evaluation parameters, including good flow rate, dispersion time of <5 minutes, and acceptable pH. It is concluded that the combination of Binahong and Sambung Nyawa extracts has potent and safe antidiabetic activity and was successfully formulated into effervescent granule preparations (F2, F3) with characteristics that meet the requirements, thus having potential as a complementary therapy for diabetes

Keywords: *Anredera cordifolia*, *Gynura procumbens*, α -glucosidase inhibitor, α -amylase inhibitor, effervescent granules, acute toxicity



Formulation, Evaluation, And Activity Test of Nanostructured Lipid Carrier (NLC) Curcumin Gel as an Anti-Acne Agent

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Abstract. Introduction: Curcumin possesses anti-inflammatory, antimicrobial, and antioxidant activities but suffers from low bioavailability. This study aimed to formulate and evaluate a Nanostructured Lipid Carrier (NLC) gel containing curcumin as an anti-acne agent to improve its stability and therapeutic efficacy. Method: Curcumin NLCs were prepared using hot homogenization followed by probe sonication. The lipid phase consisted of Compritol® (solid lipid) and Myritol® (liquid lipid), stabilized with Plantacare® and Tegocare® as surfactants. Particle size, polydispersity index, zeta potential, adsorption effectiveness, and morphological measurements were then used to describe NLC. Results: The characterization results showed that NLC Curcumin has a particle size of <200 nm for 2 measurements over 30 days, a polydispersity index value of 0.5, a zeta potential of <-20mV, and an efficiency entrapment value of >80% for all formulas. Spherical shape emerged from the morphology data. Conclusion: The findings demonstrate that Curcumin's nanostructured lipid carriers provide favorable characterization outcomes

Keywords: Curcumin, Nanostructured Lipid Carrier (NLC), Gel, Anti-Acne



Antimicrobial Activity of Ethanol Extract of Sungkai Leaves (*peronema canescens jack*) Against Bacteria *Streptococcus mutans*

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Abstract. Infectious diseases can be transmitted between individuals or from animals to humans. Infections can be caused by various microorganisms, including bacteria, viruses, parasites, and fungi, which trigger responses from the immune system. This study aims to determine the antimicrobial activity of ethanol extract of sungkai leaves (*Peronema canescens Jack*) against *Streptococcus mutans*, *Staphylococcus aureus* and *Candida albicans* by paper disc method. Knowing the value of Minimum Inhibitory Concentration (KHM) and Minimum Kill Concentration (KBM)/Minimum Fungicidal Concentration (KFM) microdilution method and Scanning Electron Microscope (SEM) testing to determine microbial cell damage due to exposure to test extracts. The results of the study using the paper disc method showed that sungkai leaf extract has activity against *Streptococcus mutans*, *Staphylococcus aureus* and *Candida albicans*. The KHM value of the ethanol extract of sungkai leaves (*Peronema canescens Jack*) at a concentration of 256 µg/mL with a KBM value of 512 µg/mL, against *Streptococcus mutans* bacteria, while the KHM and KBM values on *Staphylococcus aureus* bacteria are 8,192 µg/mL and 32,768 µg/mL and for KHM and KFM values on *Candida albicans* fungi are 512 µg/mL. SEM test observations showed exposure to ethanol extract of sungkai leaves (*Peronema canescens Jack*) against *Streptococcus mutans* morphological changes appear deformed cells, with irregular surfaces, and indications of lysis. The conclusion of this study is that the ethanol extract of sungkai leaves (*Peronema canescens Jack*) exhibits good antimicrobial activity and therefore can be further developed as an antibacterial and antifungal agent

Keywords: *Peronema canescens*, Antimicrobial, *Streptococcus mutans*, *Staphylococcus aureus*, *Candida albicans*



Structure-Based Docking Analysis of Rhenium-Hesperidin Complexes for Breast Cancer Radiopharmaceutical Applications

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Abstract. Breast cancer continues to represent a major global health challenge, and novel radiopharmaceutical scaffolds are urgently needed to improve diagnosis and therapeutic monitoring. Rhenium, a transition metal with favorable coordination chemistry and radiophysical properties, has been increasingly investigated as an alternative to technetium in radiopharmaceutical design. In this context, hesperidin, a natural flavonoid abundant in citrus species, was evaluated as a chelating backbone to form a Rhenium–Hesperidin complex targeting breast-cancer-associated proteins. A structure-based docking study was conducted against five transferase proteins implicated in breast cancer progression (PDB IDs: 1A52, 3PP0, 4EJN, 4I23, 7R9V). Docking simulations were carried out to predict binding energies and explore possible interactions of the Rhenium–Hesperidin complex with these molecular targets. The complex demonstrated distinct binding tendencies, with calculated docking scores of –2.44 (1A52), –1.65 (3PP0), –7.49 (4EJN), –5.62 (4I23), and –3.97 (7R9V) kcal/mol. The most pronounced affinity was observed for 4EJN, followed by 4I23, suggesting that Rhenium–Hesperidin shows selectivity within this protein set. The docking profile reflects a potential for moderate-to-strong interactions, particularly with enzymes relevant to cancer signaling pathways. These findings highlight Rhenium–Hesperidin as a promising candidate for further exploration as a breast cancer radiopharmaceutical. Additional studies, including experimental radiolabeling, biological stability testing, and advanced molecular simulations, are recommended to validate its performance and guide translational development



Phytochemical Screening and Metabolite Profiling *Sechium edule*, *Syzygium polyanthum*, *Cucumis sativus*

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Abstract. Chayote (*Sechium edule*), Bay leaves (*Syzygium polyanthum*), and Cucumber (*Cucumis sativus*) have been reported to contain phenols, flavonoids, tannins, and volatile compounds such as cucurbitacin in cucumbers. This analysis aims to provide insight into the content of compound groups and compounds in chayote, bay leaves, and cucumber plants. The results showed that positive pumpkins contained alkaloids; triterpenoids; flavonoids; saponins; and tannins, for positive bay leaves contained alkaloids; steroids; flavonoids; quinones; saponins; and tannins, while cucumbers contained triterpenoids; flavonoids; saponins; and tannins. Overall functional group analysis Strong bonds at 3300 cm^{-1} , $1650\text{-}1400\text{ cm}^{-1}$, and $1200\text{-}1000\text{ cm}^{-1}$. These results indicate the presence of hydroxyl groups, lipids, alkanes, carboxylic acids, ethers, and amino acids. LC-HRMS analysis of the combined ethanol extracts yielded 100 identified peaks representing 74 compounds. The highest peak was observed at RT 15.522 min, corresponding to 3,4-Dihydroxy-12,13- epoxytrichothec-9-en-15-yl acetate. Other significant peaks appeared at around RT 1.048 min and 20.955 min, identified as Choline. These analytical insights provide detailed chemical fingerprints crucial for comprehensive phytopharmaceutical exploration so that potential bioactive compounds can be proposed for further activity testing

Keywords: Phytochemical Screening and Metabolite Profiling, *Sechium edule*, *Syzygium polyanthum*, *Cucumis sativus*



Fungal Exploration and Viability Testing of Oil Palm Pollen in the Belitung Islands Region, Indonesia

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Abstract. The fungal exploration aimed to identify the types of fungi growing around the plants, both beneficial and harmful. Isolation was carried out using two methods: the direct method and the dilution method. The growth medium used was Potato Dextrose Agar (PDA), and identification was conducted through microscopic examination. The isolation results revealed several fungal species with distinct morphological characteristics, namely *Curvularia* sp., *Marasmius palmivorus*, and *Trichoderma* sp. The pollen viability test was performed using a microscopic method after mixing with water. The test showed that 99% of the pollen was still viable, indicated by full cytoplasm and clearly visible nuclei, while non-viable pollen appeared empty or had damaged cytoplasm. The high viability rate indicates that the pollen quality is excellent for supporting the pollination process in oil palm. Overall, this exploration successfully identified several fungal species that may be beneficial to oil palm. Additionally, the high pollen viability supports the effectiveness of artificial pollination (hand pollination)

Keywords: fungal exploration, isolation methods, pollen viability, oil palm



Perspectives, Attitudes, and Practices of Health Workers about Cosmetovigilance in the Samarinda City Area

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Abstract. Adverse reactions due to cosmetics must be reported to avoid the increasing incidence among the community. Cosmetovigilance is a term used for activities related to the collection, evaluation, and monitoring of spontaneous reports regarding undesirable events observed during or after the normal or reasonable use of cosmetic products. Although this is important, many adverse reactions due to the use of cosmetics are not reported by health professionals. This study conducted a survey on the perspectives, attitudes, and practices of health workers, especially doctors and pharmaceutical personnel, about cosmetovigilance in the Samarinda city area. The assessment of these three variables used a questionnaire that had been tested for validity and reliability. The results of this survey showed that there were 91 respondents consisting of 19 general practitioners, 21 dermatovenereologists, 24 pharmacists, and 27 pharmaceutical technicians who worked in facilities such as hospitals, clinics, and pharmacies. From the distributed questionnaires, it was shown that most health professionals indicated that they had heard the term cosmetovigilance for the first time while being students, and those who heard the term cosmetovigilance mostly during training programs or education. Also, all health professionals knew that adverse reactions related to cosmetics, drugs, and vaccines must be reported. And the majority of health workers had attended training related to cosmetovigilance. Respondents also knew how to report cosmetic side effects, and health workers knew reporting using websites, but some did not know reporting using websites. Health workers strongly agreed on the existence of education or the provision of information related to the effects of cosmetic use to the public because it broadens the information for choosing cosmetics and their use so that undesirable effects do not occur, and provides information to the public that cosmetic side effects can be reported through health workers and the provided website. The purpose of reporting cosmetic side effects in this study showed the most was to identify new or newly emerging side effects. The results of this survey can be concluded that the role of health workers is very important in providing education regarding the safety of cosmetic product use and the system for reporting side effects. The high use of cosmetics combined with the lack of education and supervision can increase the risk of serious side effects. Therefore, cosmetovigilance is very important as a preventive effort and early detection of adverse effects of cosmetics

Keywords: cosmetovigilance, health workers, cosmetic side effects



Nanohydrogel Preparation from Kelakai Leaf Extract (*Stenochlaena palustris* (Burm.f) Bedd.) as Antibacterial

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Abstract. Antibiotic resistance has been recognized as a major public health threat by the World Health Organization (WHO). One cause of antibiotic resistance is biofilms, groups of structured microorganisms that produce extracellular polymeric substances (EPS). One plant with potential for development as an antibacterial and antibiofilm agent is Kelakai (*Stenochlaena palustris* (Burm.f.) Bedd.). Several studies have found that Kelakai extract has little or no antibacterial activity. Most plant extracts are insoluble or poorly soluble, resulting in lower bioavailability. This study aimed to determine the characteristics of Kelakai leaf extract nanohydrogel preparations and evaluate the antibacterial activities of these Kelakai leaf extract nanohydrogel preparations. Kelakai leaves were extracted using 96% ethanol and a sonication method. The compounds were identified using Thin-Layer Chromatography (TLC). A nanohydrogel was then prepared by mixing a gel base with silver nanoparticles from the Kelakai extract at different concentrations. Tests were done to measure antibacterial activity. Statistical analysis used paired t-tests and one-way ANOVA. Kelakai leaf extract contains alkaloids, flavonoids, phenols, tannins, steroids, terpenoids, and saponins. The Kelakai leaf extract nanohydrogel met all topical formulation evaluation criteria before and after the accelerated stability test. The Kelakai leaf extract nanohydrogel enhanced antibacterial and antibiofilm activity compared to Kelakai leaf extract alone, with significant differences between the test samples ($p < 0.05$)

Keywords: Antibiotic resistance, Kelakai, Nanohydrogel, Antibacterial



Coumarin Compounds with Potential as Sunscreens Through TD-DFT (Time Dependent Density Functional Theory) Analysis

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Abstract. A computational chemistry study using the TD-DFT method has been conducted on coumarin, a compound known to be the major component of cinnamon. The study involved creating a geometry-optimized model of the coumarin molecule using Density Functional Theory (DFT), followed by spectral analysis using TD-DFT. The results indicate that coumarin can be used as a natural UV-A shield

Keywords: Coumarin, DFT, and TD-DFT



Green Nanomedicine Approach for Antidiabetic: a Review Articles

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Abstract. Diabetes mellitus is a chronic disease with serious complications in the form of diabetic foot ulcers that are difficult to heal and pose a high risk of morbidity and amputation. Conventional therapy is still limited due to microbial resistance, high costs, and side effects, so a more effective alternative is needed. Plant extracts with antioxidant, anti-inflammatory, and antimicrobial activities have great potential, but their bioavailability and stability are low. Nanoparticle technology can overcome these limitations by increasing bioactive compounds' stability, penetration, and effectiveness. This review aims to critically assess the effectiveness of plant extracts in nanoparticle formulations as a treatment for diabetic wounds. The research method involved a comprehensive literature review of articles in leading academic databases, including Google Scholar and PubMed. The search process yielded six articles that were considered to meet the criteria for inclusion. These articles demonstrated the effectiveness of plant extracts in the in vivo treatment of diabetic wounds



Remediation of Contaminated Soil with Crude Oil Using Solvent Extraction Method

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Abstract. An innovation for removing crude oil from contaminated soil was studied. A mixture of hexane, acetone, and water was used to investigate the ability of solvent extraction techniques to clean soil under various extraction conditions. The study was conducted with initial processing stages using batch and ultrasonic methods, followed by GC-MS and FTIR analysis. The results showed that the soil was contaminated with saturated hydrocarbons, aromatic naphthene's, polar aromatics, and asphaltenes. The effect of solvent ratio and extraction time was studied, and the results showed that the best solvent ratio and extraction time were 1:6 (w/v) and 60 minutes, with a solvent efficiency of 70% and successfully extracting contaminants (saturated fractions of 97.25% and aromatics of 2.75%). Repeated extraction was better than a single extraction where the solvent efficiency was 63.8% and the contaminants were paraffin compounds of 71.96% and naphtha of 28.04%.

Keywords: remediation, soil, crude oil, solvent, extraction



Knowledge and Attitudes on Information of Beyond Use Date (BUD) Medicines in Pharmacies in The Poso Regency: Study in Pharmacists and Patients

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Abstract. Information about BUD often missed. However, understanding of BUD is significant in the context of drug safety. This study aims to analyze the relationship between the level of knowledge and attitudes of pharmacists with patients towards Beyond Use Date (BUD) information in pharmacies in the Poso Regency. This study used a quantitative approach using a cross-sectional survey method. The study was conducted in 28 pharmacies in Poso Regency, Central Sulawesi, during the period of March–May 2024. The inclusion criteria of patients were who purchased compounded drugs, ointments, syrups, or eye drops. While, the pharmacists who have practiced for 5 hours/day and dispense the medication to the patients were included in this study. The data collection used a validated questionnaire which divided into two parts: a knowledge and an attitude section. Knowledge was measured using a Guttman scale (true/false), while attitudes were measured using a 5-point Likert scale. The data were analyzed univariately to describe the frequency distribution of characteristics, knowledge, and attitudes, and bivariately to test the relationship between knowledge and attitude of pharmacist with knowledge and attitude of patients using the Spearman Rank test with a significance level of 0.05. The results showed that the most of pharmacists and patients had a good level of knowledge about. However, this was not fully reflected in positive attitudes. Statistical tests showed no significant relationship between pharmacist and patient's knowledge ($p=0.935$), also not significant between pharmacist and patient attitudes ($p=0.51$). These findings emphasize the importance of continuous educational interventions to improve the implementation of BUD information in pharmaceutical practice

Keywords: Beyond Use Date, knowledge, attitude, pharmacies



The Implementation of Corporate Social Responsibility Based on Renewable Energy Through the Development of a Hybrid Power Plant in Bondan Hamlet

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Abstract. Energy is a fundamental need that determines the quality of life, particularly in rural and underdeveloped areas that still face limited access to electricity and clean water. Bondan Hamlet in Cilacap Regency is one of the villages that has experienced energy isolation for more than two decades. To address this issue, PT Kilang Pertamina Internasional RU IV Cilacap, through its Corporate Social Responsibility (CSR) program, developed a Hybrid Power Plant (PLTH) based on renewable energy by combining solar and wind sources. This study aims to analyze the planning, implementation, and outcomes of CSR programs based on renewable energy in Bondan Hamlet and their impacts on both the community and the company. The research applied a qualitative approach with a case study design. Data were collected through observations, in-depth interviews, documentation, and literature review, then analyzed using the interactive model of Miles and Huberman with source triangulation techniques. The findings reveal that the implementation of renewable energy-based CSR in Bondan Hamlet has produced multi-dimensional impacts. For the community, the program increased access to electricity and clean water, stimulated economic growth with a 335% income increase within five years, and strengthened local institutions through cooperatives and micro-enterprise groups. For the company, the program generated a value creation of IDR 1.15 billion, cost savings of IDR 151 million, and enhanced its reputation with a Proper Emas award. Additionally, the program successfully reduced carbon emissions by 126.4 tons of CO₂eq per year, produced governance standards (STK), registered intellectual property, opened opportunities for replication in other regions, and created commercial potential worth up to IDR 7.8 billion. In conclusion, CSR based on renewable energy is not only a technical solution to energy scarcity but also a catalyst for socio-economic transformation in underdeveloped villages. The Bondan model can be replicated in Indonesia's frontier, outermost, and underdeveloped regions (3T) as a sustainable development strategy aligned with the Sustainable Development Goals (SDGs)

Keywords: Corporate Social Responsibility, Renewable Energy, Energy Independent Village



Exploration of Endophytic Fungus *Meyerozyma guilliermondii* and Its Bioactive Potential Isolated from *Ficus carica*

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Abstract. Endophytic fungi are microorganisms that live within plant tissues and are known producers of secondary metabolites with antimicrobial and anticancer properties. In this study, endophytic fungi were isolated from *Ficus carica* to evaluate their potential activity against bacteria, fungi, and cancer cells. The fungi were collected from the root, stem, leaf, and fruit tissues of *Ficus carica*. Mycelial extracts from each fungal isolate were tested for antimicrobial activity against several pathogens, and for cytotoxicity against mammalian fibroblast cells using the MTT assay. Fungal DNA was extracted, and the ITS region was sequenced for species identification. One endophytic fungal species isolated from the root exhibited strong antibacterial and antifungal potential in preliminary screening. The mycelial extract of this fungus inhibited the growth of *Staphylococcus aureus* by 62.29% at a minimum inhibitory concentration (MIC) of 31.25 µg/mL, and *Candida albicans* by 57.26% at an MIC of 125 µg/mL. Phytochemical analysis revealed the presence of terpenoids and alkaloids in the mycelial extract. Based on ITS sequence analysis, the fungus was identified as *Meyerozyma guilliermondii*. The results indicate that *Meyerozyma guilliermondii*, an endophytic fungus isolated from *Ficus carica*, possesses antibacterial and antifungal properties without significant cytotoxic effects on normal mammalian fibroblast cells

Keywords: *Ficus carica*, *Meyerozyma guilliermondii*, antibacterial, antifungal



Antimicrobial Efficacy and Time-Kill Study of *Curcuma aeruginosa* Roxb. Against Respiratory Tract Pathogens

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Abstract. In this study, the extract of chloroform, ethyl acetate, and methanol from *Curcuma aeruginosa* Roxb. were tested for their antimicrobial activity using the microdilution method. A time-kill assay was conducted to assess the rate at which each extract acted against the tested microbes. Additionally, the effect of the extracts on microbial virulence factors, particularly protease enzyme activity, was investigated. Among the extracts, the chloroform extract exhibited the highest antimicrobial efficacy, with minimum inhibitory concentrations (MICs) ranging from 1.56 mg/mL to 25 mg/mL against *Streptococcus pyogenes*, *Staphylococcus aureus*, methicillin-resistant *Staphylococcus aureus* (MRSA), and *Candida albicans*. The time-kill study revealed that the chloroform extract had bactericidal and fungistatic properties. At concentrations of MIC and 2×MIC, the extract was able to eliminate the tested pathogens within 8–12 hours. Furthermore, at ½×MIC concentration, the chloroform extract inhibited the protease activity of all tested microbes except *Streptococcus pyogenes*. These findings suggest that *Curcuma aeruginosa* Roxb. extract possesses both antibacterial and antivirulence effects against Gram-positive bacteria and fungi

Keywords: *Curcuma aeruginosa*, antimicrobial, antivirulence, time kill assay



Bioactivity Assessment: Antibacterial and Anticancer Activity of Ethanol Extract and Fractions (n-Hexane, Ethyl Acetate, Methanol) from *Houttuynia cordata* Leaves and Rhizomes.

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Abstract. *Houttuynia cordata* is a medicinal plant known for its diverse pharmacological properties, including potential antibacterial and anticancer activities. However, comprehensive studies comparing extracts and fractions of different plant parts are limited. The antibacterial activity of *Houttuynia cordata* rhizome and leaf extracts and fractions was evaluated using the disk diffusion method against *Staphylococcus aureus* and *Escherichia coli*. Anticancer activity was assessed by MTT assay against A549, HeLa, and MG-63 cancer cell lines, with normal HDFa cells as controls. Metabolite profiling was performed using UHPLC-HRMS. Ethanol extracts of rhizomes and leaves exhibited weak antibacterial activity against *S. aureus*. Among the fractions, the ethyl acetate fraction showed no significant activity, while the hexane fraction displayed weak inhibition. The methanol fraction demonstrated the strongest antibacterial activity, particularly the leaf fraction, which showed strong inhibition against *E. coli* at 10% (13.567 ± 2.902 mm) and 5% (10.633 ± 1.365 mm), and moderate inhibition at 2%. The methanol rhizome fraction exhibited moderate activity against *S. aureus*. In cytotoxicity assays, neither rhizome nor leaf extracts showed significant activity. The ethyl acetate rhizome fraction displayed moderate cytotoxicity against HeLa cells ($IC_{50} = 97.67 \pm 0.31$ μ g/mL), but weak activity against A549 and MG-63. Hexane fractions were largely inactive, except for weak inhibition of HeLa cells by the leaf fraction. The methanol rhizome fraction showed weak activity against HeLa cells, while the methanol leaf fraction was inactive against all cancer cell lines. UHPLC-HRMS analysis identified metabolites associated with antibacterial activity (p-cymene, (-)- β -caryophyllene oxide, 5-hydroxymethyl-2-furaldehyde, geranyl acetate, quercetin, quercitrin, and phytol) and anticancer potential (citral, piperolactam A, laurylaldehyde, and 2-undecanone). The methanol fraction of *Houttuynia cordata*, particularly from leaves, exhibited notable antibacterial activity against *E. coli*, whereas the ethyl acetate rhizome fraction showed moderate anticancer potential against HeLa cells. These findings highlight *Houttuynia cordata* as a promising source of bioactive compounds for further development of antibacterial and anticancer agents

Keywords: *Houttuynia cordata*, A549 cell, MG-63 cell, HeLa cell, MTT assay, disc diffusion, UHPLC-HRMS



Hypertension risk modeling with Multivariate Adaptive Regression Splines (MARS) for ordinal scale data

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Abstract. Hypertension is a major public health issue and one of the most prevalent non-communicable diseases in Indonesia. It is associated with serious complications and significantly contributes to morbidity and mortality. This study aims to develop a model for hypertension using the Multivariate Adaptive Regression Splines (MARS) method, which is particularly effective for handling nonlinear relationships and ordinal response variables. A quantitative approach with secondary data analysis was used, where hypertension status was the response variable, and predictor variables included age, body mass index (BMI), sex, family history of hypertension, and fat consumption. The model selection was based on minimizing the Generalized Cross-Validation (GCV) value to ensure optimal fit. The best MARS model for predicting hypertension status was achieved with parameters BF = 10, MI = 2, and MO = 1, yielding a GCV value of 2.196575 and an Akaike Information Criterion (AIC) of 265.6123. Performance evaluation showed that the model achieved 58% accuracy, 44.67% sensitivity, 75.2% specificity, and an Area Under the Curve (AUC) of 0.68. These results indicate that the ordinal MARS model provides moderate predictive performance and can serve as a foundation for developing more targeted strategies in hypertension prevention and control



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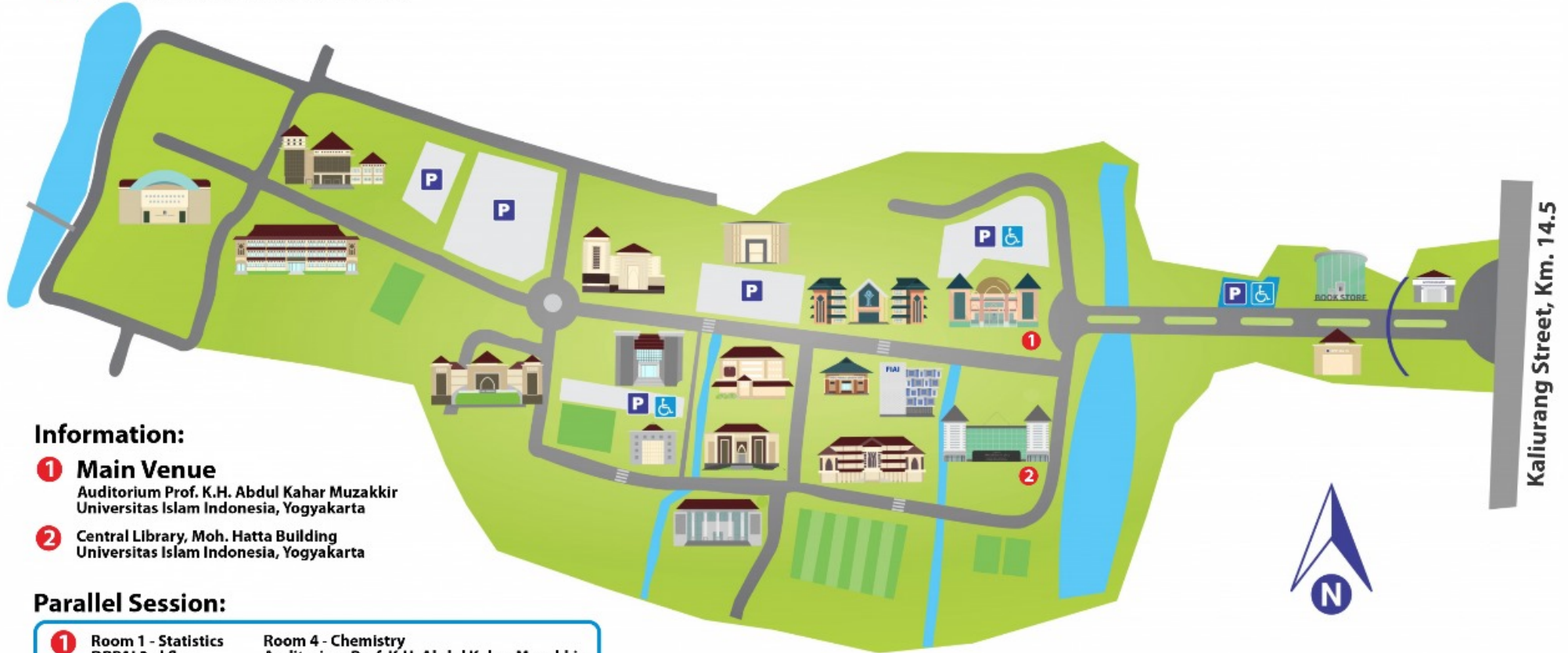
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