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NRLS | INTERNATIONAL CONFERENCE ON NATURAL RECOURCES AND LIFE SCIENCES

BOOK OF ABSTRACT

NATURAL RESOURCES AND LIFE SCIENCES 2022

Biotechnology-Pharmacy-Driven Research and Product Development

FACULTY OF BIOTECHNOLOGY
FACULTY OF PHARMACY

UNIVERSITY OF SURABAYA
AUGUST 24TH-25TH, 2022

NATURAL RESOURCES AND LIFE SCIENCES 2022

Biotechnology-Pharmacy-Driven Research and Product Development

Organized by:

FACULTY OF BIOTECHNOLOGY

FACULTY OF PHARMACY

UNIVERSITY OF SURABAYA

Virtual Conference

SURABAYA
AUGUST 24TH-25TH, 2022

Contents

Chief Organizer's Welcoming Remarks

Distinguished Guests and Participants,
Ladies and Gentlemen,

I would like to start by wishing you all my personal best–for your health and success in these difficult times during pandemic. We know that, despite the extraordinary uncertainty, we can *chart a path forward*.

Welcome to NRLS 2022 Conference!

We are privileged to have you join us: students, researchers, scholars, practitioners, and industry professionals from around the world.

As we know molecular biology, has given a great impact in life science investigation. The advances in molecular biology over the last several decades have boosted research and product development in many disciplines of life science, including *Biotechnology* and *Pharmacy*. These advances comprise: (1) the progression of more sophisticated techniques in molecular biology with a broad, interdisciplinary applications; (2) the expanding flow of information of technical novelties and scientific discoveries across scientific community; and (3) the development of more sophisticated software and continuously updated databases. This has changed the rationale and approach of experimentations, giving rise to revolutionizing discoveries in many fields of science. It has become evident that the deregulation of molecular processes in body is associated with, and in certain circumstances is the direct cause of, a wide range of pathological conditions. It is necessary to mention the biomedical relevance of molecular biology-related investigations for drug discovery and the development of a more personalized medicine.

Following the successful program of **3rd NRLS 2020**, we are holding the two-day biannually conference along with a one-day optional workshop in **4th NRLS 2022**, as a scientific forum for biotechnology and pharmacy researchers and product developers to discuss the recent advances in the fields and their application.

We expect this conference to provide insight on how biotechnology and pharmacy-driven research and development will carry out and give impact on society.

As one of the reputable private universities in Indonesia, University of Surabaya is especially charged to develop native natural resources through global interconnections.

I invite our potential partners to collaborate in research and development that can contribute to human prosperity, health, security, and community welfare. We will be glad to provide any further information you might need.

Finally, I wish all of you great success in this conference and in your work and collaborations ahead.

Thank you all.

Tjie Kok, Ph.D

Chief Organizer

Rector's Opening Remarks

Distinguished Keynote Speakers, Dean of Faculty of Biotechnology Universitas Surabaya, Dean of Faculty of Pharmacy Universitas Surabaya, Universitas Surabaya (UBAYA) Colleagues, and Participants.

I am very honored to deliver the opening remarks of the 4th International Conference on Natural Resources and Life Sciences (4th NRLS) "Biotechnology- and Pharmacy- Driven Research and Product Development" organized by Faculty of Biotechnology in collaboration with Faculty of Pharmacy. I also wish to take this opportunity to express my sincere thank you to all the members of the 4th NRLS committee who have been such gracious personnel, serving this a wholehearted event and inviting all of us to join the event conducted hybrid.

When I was first asked to open this molecular biology event, I was fascinated because even though I am neither a biologist, nor a scientist, nor a pharmacist, I once read that molecular biology has immensely contributed to how we deal with the Covid-19 pandemic. So, before I continue, we should appreciate the development of molecular biology.

To my understanding, Polymerase Chain Reaction (known as PCR) is one of the molecular biology applications that has been very popular in the past 2.5 years during the pandemic. PCR, that is very popular and generally used as a standard method for various molecular biology studies, has now been applied in dealing with Covid-19. In fact, a swab test that applies the PCR technique is used to detect Covid-19-infected patients.

You can imagine what would happen to us if there was no swab test using the PCR technique during the pandemic. Well, we all know that the pandemic has been unbelievably bad, but it could be even much worse without a swab test. We will not know whether our friends or even family are infected the Covid-19 and by not knowing so, the case can even be worse than now. Considering this, I believe molecular biology is still growing and can contribute enormously to society.

This fact challenges UBAYA to prove its existence in the development of molecular biology. I know this is challenging, but I am so grateful that Faculty of Biotechnology and Faculty of Pharmacy have worked hand in hand, supported by the existence of various molecular biology equipment at the faculties, including virus infection detection kit in shrimp, prototype kit for detecting halal ingredients, and molecular marker for diabetes. I believe that the two faculties can make the most of the equipment because they can help us in doing initial screening at the molecular level to ensure the treatment can be done immediately and on target. The equipment can also help prevent

spreading viral diseases and diabetes and prevent eating non-halal foods for Muslims.

Seeing the respectable number of papers that will be presented, I believe that by the conclusion of this event, we will be one step ahead in taking part in the development of molecular biology. Let me conclude my remarks by wishing all of you every success at this conference. May all our fruitful works come to excellent results. I now declare that the 4th International Conference on Natural Resources and Life Sciences, "Biotechnology- and Pharmacy-Driven Research and Product Development" is officially opened.

Dr. Ir. Benny Lianto, MMBAT.

Rector

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PROGRAM SCHEDULE

DAY I Wednesday, August 24th, 2022 (GMT+7)

Plenary Session		
10.00-10.30	Registration	
10.30-10.45	Opening video	
	Opening	MC
10.45-11.00	Welcome speech I	Rector
	Welcome speech II	Chief Organizer
Keynotes Session I		
11.00-11.30	Advances on the development of novel adjuvants for modern vaccines	Keynote Speaker: Prof. Garnpimol C Ritthidej
11.30-12.00	Revealing the Potency of Indonesian Medicinal Plants as Anti-inflammatory Agents	Keynote Speaker: apt. Tjie Kok, M.Si., Ph.D.
12.00-12.30	Discussion	Moderator: apt. Ridho Islamie S.Farm., M.Si.
12.30-13.20	Break & Sponsor presentation	
Keynotes Session II		
13.30-14.00	Routine cellular diagnostics; a platelet perspective	Keynote Speaker: Dr. Chris Jones
14.00-14.30	A molecular flexible oligosaccharide and combinations low molecular weight sugars and polysaccharides for the stabilization of proteins during drying and subsequent storage	Keynote Speaker: Dr. Wouter L.J.Hinrichs
14.30-15.00	Discussion	Moderator: Dr. apt. Christina Avanti M.Si.
Parallel Session I		
15.10-16.10	Parallel session I	
	Pharmaceutical Technology I (PTE-01 - PTE-07)	Moderator: Tegar Achsendo Yuniarta, S.Farm., M.Si.
	Plant Biotechnology I (PB-01 - PB-05)	Moderator: Wina Dian Savitri S.Si., M.Agr.
	Food Biotechnology (FB-01 - FB-05)	Moderator: Johan Sukweenadhi, Ph.D.
16.10-16.20	Door prize session & Closing of Day I	MC

DAY II Thursday, August 25th, 2022 (GMT+7)

Plenary Session		
08.30-09.05	Registration	
09.05-09.10	Opening	MC
Keynotes Session I		
09.10-09.40	Drug discovery and Development Post Pandemic	Keynote Speaker: Raymond R. Tjandrawinata, Ph.D, MS, MBA.
09.40-09.55	Discussion	Moderator: Dr. apt. Oeke Yunita, S.Si., M.Si.
Parallel Session II		
10.00-11.00	Parallel session II	
	Plant Biotechnology II (PB-06 - PB-10)	Moderator: Wina Dian Savitri S.Si., M.Agr.
	Pharmaceutical Technology II (PTE-08 - PTE-12)	Moderator: apt. Aditya Trias Pradana, S.Farm., M.Farm.
Keynotes Session II		
11.00-11.30	Finding the needle in the haystack: applying droplet microfluidic cultivations in the search for new antibiotics	Keynote Speaker: Prof. Dr. Miriam Agler-Rosenbaum
11.30-12.00	Microbial fuel cells and other bioelectrochemical systems for sustainable recovery of energy, resources and synthesis of biosurfactants	Keynote Speaker: Grzegorz Pasternak, Ph.D.
12.00-12.30	Discussion	Moderator: Dr.rer.nat. Theresia Desy Askitosari, S.Si., M.Biotech.
12.35-13.25	Break & Sponsor presentation	
Parallel Session III		
13.30-14.35	Parallel session III	
	Pharmacology and Toxicology (PT-01- PT-06 & CP-01)	Moderator: Dr. Finna Setiawan S.Farm., M.Si.
	Healthcare Biotechnology (HB-01 - HB-06)	Moderator: Dr. Dra. Mariana Wahjudi, M.Si.
14.40-14.50	Announcement of Best Presenter	MC
14.50-15.00	Photo session & closing	MC

ORAL PRESENTATION SESSION

DAY I Wednesday, August 24th, 2022 (GMT+7)

- **PHARMACEUTICAL TECHNOLOGY - I**

CODE	TITLE	PRESENTER	MODERATOR
PTE-01	Formulation of Chewable Gummy Tablet of *Moringa oleifera* L. Leaf Extract Using Combination Kappa Carrageenan and Iota Carrageenan	Karina Citra Rani	Tegar Achsendo Yuniarta
PTE-02	Optimization of Thin Layer Chromatography (TLC) System of Roselle (*Hibiscus sabdariffa* L.)	Bhujangga Agung Ayu Sri Kartika Dewi	
PTE-03	Analysis of some Zingiberaceae Rhizomes by TLC and Chemometric Fingerprint Profile	Qurrotul Aini	
PTE-04	Optimization of Extraction of Roselle Flower (*Hibiscus sabdariffa* Linn.) as a Foods and Drugs Colors	Kartika Nurul Yulianda Setyawan	
PTE-05	Isolation of Flavonoid Compounds from Leaves of Iler (*Plectranthus scutellarioides* (L.) R.Br.) with Antioxidant Activity Guidelines	Thysa Viranti	
PTE-07	Stability and antioxidant test of ethanol extract liposome of moringa leaves (*Moringa oleifera*)	Robert Tungadi	

- **PLANT BIOTECHNOLOGY - I**

CODE	TITLE	PRESENTER	MODERATOR
PB-01	Genetic variation analysis of Gandaria (*Bouea macrophylla* Griffith) using SRAP (Sequence-related amplified polymorphism) markers	Soni Muhsinin	Wina Dian Savitri
PB-02	Potency of *Carica papaya* L. var. Callina Seeds as Antibacterial in Spray Hand Sanitizer	Felya Evelina	
PB-03	Activities of Seagrass Extract *Enhalus* sp. and *Thalassia* sp. as Acne-causing Antibacterial	Yuanita Christpratistha Helsa Widyaswara	
PB-04	Development of Herbal Medicine Center through Conservation of Family Medicinal Plants (TOGA) in Ngelosari, Srimulo, Piyungan Bantul	Chatrien Mutia Andesyana	
PB-05	Analysis of Curcumin Levels In Some Rhizome of Zingiberaceae Using TLC-Densitometric Method	Virda Martha Ariyani	

- **FOOD BIOTECHNOLOGY**

CODE	TITLE	PRESENTER	MODERATOR
FB-01	*In Silico* Evaluation of Soybean Protein as Bioactive Peptide Anti-Thrombotic by Molecular Docking Study	Fadilla Sherlyna	Johan Sukweenadhi
FB-02	Formulation of Coconut Haustorium Supplement and Its Efficacy for Health Promotion	Yanti Yanti	
FB-03	Differences of Characteristics and Bacterial Community on White Glutinous Tapai with Several Types of Packaging during Fermentation	Noviana Cenniati	
FB-04	Analysis of Pork DNA in Processed Meat by Polymerase Chain Reaction	Meilinda Mustika	
FB-05	Profiling of Pepper (*Piper nigrum*) from Three Different Origins based on Piperin Content with FTIR Method	Wiranti Sri Rahayu	

DAY II Thursday, August 25th, 2022 (GMT+7)

- **PLANT BIOTECHNOLOGY - II**

CODE	TITLE	PRESENTER	MODERATOR
PB-06	The effect of 6-benzylaminopurine (BAP) and paclobutrazol (PBZ) with variations of light intensity for in vitro flowering cherry tomatoes (*Solanum lycopersicum* var. Tropical Ruby and Golden Sweet)	Siska Citra Dewi	Wina Dian Savitri
PB-07	Prediction of *Solanum lycopersicum* L. flowering in vitro using information system-based linear regression	Laurensius Dewa Senapati	
PB-08	Developing rice lines resistant to brown-planthopper (*Nilaparvata lugens* stal) with intermediate amylose content by performing bioassay and molecular markers application	Nono Carsono	
PB-09	Patchouli Alcohol Optimization from *Pogostemon cablin* Benth. cv. Sidikalang Leaves Using Response Surface Methodology	Moch. Firmansyah	
PB-10	The identification of Gibberellin A1 compound in *Arabidopsis thaliana* as the AKT1-Human inhibitor in Colorectal cancer	Michael Anthony Thongiratama	

- **PHARMACEUTICAL TECHNOLOGY - II**

CODE	TITLE	PRESENTER	MODERATOR
PTE-08	Moringa Leaf Extract Nanoparticles Formulation Using Chitosan and Sodium Tripolyphosphate in Periodontal *In situ* Gel Preparation	Gede Arya Rizky Artana	Aditya Trias Pradana
PTE-09	Nanoparticles Loaded *In situ* Gel Preparation for Periodontal Delivery of *Moringa oleifera Leaf* Extracts	Ni Kadek Ayu Sri Darma Putri	
PTE-10	Formulation of Nanoparticles *Moringa oleifera* Leaf Extract using Chitosan and Alginate Sodium in Periodontal In-situ Gel Preparation	I Putu Gede Hendra Wiarta	
PTE-11	Characterization and Formulation of Nanoparticles Extract of Bundung Plant (*Actinoscirpus grossus*) with Variations in Concentration of Chitosan and Na-TPP Bases Using the Ionic Gelation Method	Yuditha Mutia Windy	
PTE-12	Characterization of Nanocapsules of Serunai Leaf Extract (*Chromolaena odorata* L.) with Chitosan-Alginate Variations Using The Emulsion-Diffusion Method	Roosma Hatmayana	

- **PHARMACOLOGY & TOXICOLOGY**

CODE	TITLE	PRESENTER	MODERATOR
PT-01	Honey-Garlic Fermentation Prevents Oxidative Stress In Hyperlipidemic Rats	Devyana Dyah Wulandari	Finna Setiawan
PT-02	Anti-inflammatory and Mucolytic Activity Test of Ethanol Extract Fennel Leaf (*Foeniculum vulgare* Mill.)	Syifatul Lutviani	
PT-03	LFER and 3D-QSAR Analysis of Febrifugine Derivatives against Plasmodium falciparum FCR-3 Strain	Tegar Achsendo Yuniarta	
PT-04	Antiseptic Effectiveness of Wet Tissue Preparation from Ethanol Extract of Secang Wood (*Caesalpinia sappan* L.)	Dian Natasya Raharjo	
PT-05	A Photosensitization Treatment for Antimicrobial Photodynamic Therapy Mediated by Dyes	Asmiyenti Djaliasrin Djalil	
PT-06	Wound Healing in vivo Activity of Standardized Extract Combination from *Centella asiatica* and *Curcuma domestica* Blended with Honey	Paula Mariana Kustiawan	

- **CLINICAL & COMMUNITY PHARMACY**

CODE	TITLE	PRESENTER	MODERATOR
CP-01	Systematic Literature Review: Side Effect of *Moringa oleifera* Lam.	Nikmatul Ikhrom Eka Jayani	Finna Setiawan

- **HEALTHCARE BIOTECHNOLOGY**

CODE	TITLE	PRESENTER	MODERATOR
HB-01	Novel Collagen-Chitosan-Nigella sativa Composite Dressing stimulates epithelialization and angiogenesis in skin wounds	Ary Andini	Mariana Wahjudi
HB-02	The Effect Of Bajakah Tampala Stem (*Spatholobus littoralis* Hassk) Extract on Clotting Time In Vitro	Noza Narawangsa M	
HB-03	Analysis of Consumer Knowledge and Needs For Herbal Information	Oeke Yunita	
HB-04	Bst Polymerase Enhancement: A Bioinformatic approach to improve Bst polymerase characteristics	Jonathan	
HB-05	Coconut Haustorium Extract As A Cosmeceutical Ingredient for Face Serum Formulation	Yanti	
HB-06	Antibacterial Activity and Molecular Identification from Nudibranch-Associated Bacteria Isolate	Chika Edenia	

INVITED SPEAKERS

Advances on the development of novel adjuvants for modern vaccines

Garnpimol C. Ritthidej

Faculty of Pharmaceutical Sciences, Chulalongkorn University, Thailand

Abstract

Vaccines have protected and saved billions of lives since Louis Pasteur's time. The conventional platforms of live attenuated, and inactivated types mostly do not need adjuvants due to large size and several mechanisms of action of whole bacteria/virus. For modern vaccines, the technology on subunit, viral vector, DNA and mRNA are for more specific activity and mass production in rapid time. However, these modern vaccines generally require adjuvant to create stronger immune response. The first and well-known used adjuvants in several decades, aluminium salts, seem not to meet the requirement for modern vaccines. Novel adjuvants have been gradually and cautiously developed. Influenza vaccines are typically contained one of these adjuvants such as Verosomes, a type of artificial virus which consists of a liposome, MF59, squalene-based emulsion type and AS03, a squalene emulsion including the immunopotentiating a-tochoperol. AS04, aluminum hydroxide incorporating immunostimulatory monophosporyl lipid A (MPL-A)6 is used in human papilloma vaccine. AS01E, a liposomal adjuvant containing MPL-A and immunostimulatory saponin QS-21 is contained in malaria vaccine. Thermos-reversible oil/water, Montanide ISA51 is also used therapeutic and prophylactic vaccines. Recently various lipid particles are used in pandemic covid-19 vaccines. Details on each novel adjuvant will be discussed.

Revealing the Potency of Indonesian Medicinal Plants as Anti-inflammatory Agents

Tjie Kok

Faculty of Biotechnology, University of Surabaya

Abstract

In the past decades, there has been increasing evidence showing association between inflammation and many chronic diseases including rheumatoid arthritis, inflammatory bowel disease, diabetes, cardiovascular disease, chronic obstructive lung disease, cancer, and asthma. Studies show that herbal medicine use was found to be higher among patients who had been diagnosed with chronic diseases. Indonesia has numerous plant species that have the potential to be developed for treatment of chronic diseases, however it is still a challenge due to lack of scientific evidence underlying their efficacy and safety. Therefore, there is still a lot of opportunities that can be explored by researchers to provide rationales for the use of the plant species for prevention and/or to treatment of chronic diseases. This study aims to reveal the potency of Indonesian herbals as anti-inflammatory agents. In this study, we have identified several Indonesian herbals whose extracts showing activity to inhibit macrophage migration inhibitory factor (MIF), a key pro-inflammatory protein in immune response, and activity to lower the expression of pro-inflammatory cytokines, such as TNF-α, IL-1β, IL-8, and IFN-γ, produced by macrophage. Hence, the corresponding herbals have potential to be developed further for prevention and/or treatment of inflammatory diseases.

Routine cellular diagnostics; a platelet perspective.

Chris Jones

School of Biological Sciences-Institute of Cardiovascular and Metabolic Research-University of Reading, England

Abstract

The idea of conducting tests for an infectious disease on the kitchen table would have seemed unimaginable only three years ago; now, it is a routine part of life in many countries. Similarly, measuring health markers such as heart rate or blood pressure used to involve a trip to your GP's surgery; now, they can be measured by your watch. Routine testing of cellular function may be the next step, supplying data on cellular changes that occur before the presentation of symptoms or rapidly assessing the efficacy of therapies. Platelets are small blood cells that play a vital role in chronic and acute cardiovascular disease but also have roles in immunity, inflammation, cancer metastasis, Alzheimer's disease and infections, such as dengue, HIV-1, malaria, and COVID-19. In addition, these small blood cells are easily obtained from subjects or patients, making them valuable biomarkers for changes in blood vessels associated with disease, ageing or therapy. We have developed a range of novel platelet function tests that offer new insights into the functioning of these cells and are suitable for use either in the lab and at point-of care. We thereby aim to expand the utility and practicality of platelet function testing.

A molecular flexible oligosaccharide and combinations low molecular weight sugars and polysaccharides for the stabilization of proteins during drying and subsequent storage.

Wouter Hinrichs

Groningen Research Institute of Pharmacy, University of Groningen, Netherlands

Abstract

Although oligo- and polysaccharides exhibit excellent physico-chemical characteristics, usually low molecular weight sugars are used to stabilize proteins during drying and subsequent storage. The reason is that most oligo- and polysaccharides behave as rigid rods and can therefore not form a tight and thereby a stabilizing coating around irregular shaped protein. However, in this study we have shown that the oligosaccharide inulin can be used as an excellent protein stabilizer, which can be ascribed to its exceptional high molecular flexibility. Furthermore, we have shown that a mixture of low molecular weight sugars and polysaccharides can also be used as protein stabilizers, particularly when exposed to a high relative humidity after drying. We hypothesized that such combinations benefit from the ability of low molecular weight sugars to form a tight coating around irregular shaped proteins and the excellent physico-chemical characteristics of the polysaccharides.

The Biopharmaceutical Story and its Implication for Drug Disovery and Development Post Pandemic

Raymond R. Tjandrawinata

Dexa Laboratories of Biomolecular Sciences (DLBS), Jakarta, Indonesia

Abstract

Dimasa pandemi COVID ini, kita mengalami perubahan dibidang penemuan obat baru. Presentasi ini mendiskusikan penemuan obat baru yang berasal dari genomik dan sequencing genom manusia. Banyak obat-obatan sudah ditemukan berdasarkan target yang sudah divalidasi. Penggunaan teknik-teknik bioteknologi dalam penemuan obat baru memungkinkan untuk kita mendapatkan berbagai obat berbasis biologi, seperti antibody monoklonal, RNA-based therapy sampai ke CRISPR dimasa mendatang. Penggunaan AI dalam penemuan obat baru sampai ke penggunaan robotik pada daerah manufacturing akan didiskusikan sesuai dengan kemajuan jaman Industri 4.0 ini.

Finding the needle in the haystack: applying droplet microfluidic cultivations in the search for new antibiotics

Miriam Agler-Rosenbaum

Friedrich-Schiller University, Jena, Germany

Abstract

Droplet microfluidics offer a unique opportunity to effectively and functionally explore complex microbial communities, even down to the single cell level. It allows ultra-high throughput screening with deeper sample analysis. With an urgent need to combat the occurrence of antibiotic resistant pathogens, it is essential to screen for novel bioactive molecules. We recently showed the remarkable potential of droplet microfluidic cultivations to access a much broader range of the microbial community in various habitats compared to classical strain isolation methods. In brief, we encapsulate and grow single cell inocula from different environmental sources in 200 pL size droplets. With optical fibers integrated into the microfluidic platform, multiple fluorescence-colors are simultaneously detected. Thus, we can multiplex the screening of different inhibition activities by adding multiple fluorescing microbial reporter strains to our pre-grown droplets. The applicability of our platform was first demonstrated by screening for gram-positive and gram-negative inhibiting natural products produced by known Streptomyces and verified by its application to unknown environmental samples. We isolated several strains with antimicrobial activity. The results clearly showed the immense potential of this promising tool for exploring diverse microbial communities.

Microbial fuel cells and other bioelectrochemical systems for sustainable recovery of energy, resources and synthesis of biosurfactants

Grzegorz Pasternak

Wroclaw University of Science and Technology, Poland

Abstract

Microbial fuel cells (MFC) belong to a wider group of bioelectrochemical systems (BES). MFCs are devices, in which the electroactive microorganisms are oxidizing organic matter and transfer the electrons to the electrode, while protons travel to the cathode. Through the electron transfer mechanisms, MFCs, together with other types of BES such as microbial desalination cells or microbial electrosynthesis cells, are capable of producing electricity but also to separate or precipitate ionic species. By applying various types of microorganisms which grow either on the surface of the BES electrodes or in electrolyte (medium), it is possible to synthesize various useful chemicals. These processes are called microbial electrosynthesis or electrofermentation. Our current research focuses on establishing various microbial consortia dedicated to resource recovery and biodegradation. In biodegradation process, the organic pollutants of hydrophobic nature are degraded in MFCs, which provide the non-limited electron acceptor to improve biodegradation rate. In this process, we utilize in-situ production of biosurfactants to improve the bioavailability or recalcitrant chemicals. Such an approach is an example of applying BESs in sustainable processes to match the objectives of circular economy.

ORAL PRESENTER

FOOD BIOTECHNOLOGY

FB-01

In Silico Evaluation of Soybean Protein as Bioactive Peptide Anti-Thrombotic by Molecular Docking Study

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ABSTRACT

Cardiovascular Diseases (CVDs) cases are increasing significantly in Indonesia and the world. In 2018, the Indonesian Ministry of Health stated 33.3% of Indonesia population has experienced CVD caused by stroke. Meanwhile, 87% of the world population in 2021 has experienced CVD caused by stroke as stated by the WHO. Stroke is a disease caused by red blood cells undergo thrombolysis by the α-thrombin (IIa) receptor which interacted with coagulation factors around the heart blood vessel. Chemical or synthesis drugs to treat thrombolytic such as heparin is already available, but they could be harmful if they are used inappropriately. The focus on this research is to analyze the activity and interaction of anti-thrombotic bioactive peptides as thrombotic prevention agents and their functions on the food-derived bioactive peptide from soybean protein. There are 3 peptides found and the 7s globulin has the highest activity with 0.0098 A based on BIOPEP. The peptide will be visualize using molecular docking analysis with PyMol, PyRx, and Discover studio for screening the best peptide. ToxinPred and AlgPred showed there are no potentially harmful peptides but protein variant of β-conglycinin subunit is potential of being an allergen known to the immune system IgE for several people that hypersensitive to this protein. To summarize, PG peptide has the highest binding affinity with the total energy of -5.4 kcal/mol but still lower than the control analysis.

Keywords: *Anti-thrombotic peptide, Food derived bioactive peptide, Molecular Docking*

FB-02

Formulation of Coconut Haustorium Supplement and Its Efficacy for Health Promotion

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ABSTRACT

The coconut (*Cocos nucifera* L.) haustorium is a spongy tissue that is rich in nutritious contents but often thrown away because their benefits are unknown to many people. Food supplements can be used for health promotion, but pharmaceutical products are currently limited due to their low bioavailability, therefore microemulsions are applied because they increase bioavailability and solubility. This study aimed to extract unsaturated fatty acids (UFAs) from coconut haustorium, to formulate supplements in the form of microemulsions containing UFA, and to test the efficacy of the extract and microemulsions for health promotion. This research consisted of 9 steps, including sample preparation, extraction, microemulsion formulation, characterization, efficacy tests, and organoleptic test. Coconut haustorium preparation and extraction produced a yield of 14.60% and 72.04%, respectively. Gas chromatography results showed that all samples contained linoleic acid and oleic acid. Microemulsion products showed no phase separation and were stable for 56 days of storage. Antioxidant activity results showed that microemulsion F0 had antioxidant activity of 86.59%, while -amylase inhibitory activity results showed that all samples did not have any inhibitory activity. Thus, these data indicate that microemulsion food supplement containing coconut haustorium with antioxidant activity could be applied for health promotion.

Keywords: *Antioxidant activity, Coconut haustorium, Food supplement, Microemulsion, Unsaturated fatty acids*

FB-03

Difference of Characteristics and Bacterial Community on White Glutinous with Several Types of Packaging during Fermentation

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ABSTRACT

White Glutinous Rice Tapai (WGRT) is a traditional Indonesian fermented food. There are several types of packaging that can be used for white glutinous rice tapai (WGRT). However, the information about the effect of different types of packaging on characteristics and bacterial community has not been discovered yet. Therefore, this study aims to evaluate the effect of packaging on the quality of WGRT. WGRT was fermented using a plastic box (WGRT-PB), banana leaves (WGRT-BL), and rose apple leaves (WGRT-RAL). The bacterial community was analyzed using Next Generation Sequencing. The results showed that the type of packaging did not significantly affect pH, total acid, and alcohol content, but had a significant effect on reducing sugar content. The highest reducing sugar levels were found in WGRT-PB. The organoleptic profile showed that the WGRT-PB tended to be the most preferred by the panelists, which was significantly different from the WGRT-RAL. The results of the bacterial community analysis between WGRT-PB and WGRT-RAL showed a difference. The difference in the bacterial community was presumably due to the different types of packaging used during fermentation. Thus, the different types of packaging used during fermentation affect the quality of the tapai.

Keywords: *Bacteria, Food fermentation, NGS, White glutinous rice tapai*

FB-04

Analysis of Pork DNA in Processed Meat by Polymerase Chain Reaction

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ABSTRACT

Meatballs and kebabs are processed meat in great demand by the public, made from beef, chicken, or lamb. PCR is an enzymatic method for amplifying DNA in vitro. This study aims to determine whether pork DNA in meatballs and kebabs is analyzed using the PCR method. Sampling was conducted at three meatball outlets and three kebab outlets selected by simple random sampling. The research phase includes the isolation and purification of DNA samples and positive control (pork) using cytochrome b primer and amplification using electrophoresis. The results showed that from the three samples of meatballs, all were positive for pork DNA and from the three samples of kebabs, there was one positive sample containing pork DNA marked with the same band as the positive control (pork) at 132 bp. Therefore, it can be concluded from the six samples of processed meat examined that four samples were positive for pork DNA.

Keywords*: DNA, Electrophoresis, Kebabs, Meatballs, Pork*

FB-05

Profiling of Pepper (*Piper nigrum*) from Three Different Origins Based on Piperine Content with FTIR Method

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ABSTRACT

Pepper is widely used as a spice and herbal or traditional medicine purposes. Pepper from different origins will have different metabolite compositions because metabolites are affected by soil nutrition, climate, temperature, and humidity. Piperine is the most important alkaloid present in black pepper and is a marker in pepper quality control. The purpose of this study was to determine the profile of pepper from different origins using FTIR and HPLC methods based on piperine content. The results showed that the PCA analysis of the FTIR spectrum could separate the three peppers in different quadrants and this result was also proven by the piperine content data on the HPLC method. The cheap, simple and fast FTIR method can be used to determine pepper from different locations.

***Keywords**: FTIR, pepper, piperine*

HEALTHCARE BIOTECHNOLOGY

HB-01

Novel Collagen-Chitosan-Nigella Sativa Composite Dressing Stimulates Epithelialization and Angiogenesis in Skin Wounds

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ABSTRACT

Black cumin (*Nigella sativa*) has excellent properties in the wound healing process and maintains the skin moist. Modification of Collagen-chitosan-N sativa composite dressing is expected to accelerate the wound healing process on the skin. The aim of this study was to analyze the effectiveness of a collagen-chitosan-*Nigella sativa* dressing to promote epithelialization and angiogenesis in wounds. A total of 40 male rats were induced by incisional wounds which were then divided into a control group (N) which was treated with aquadest, collagen-chitosan wound dressing 1:1 w/w (P), collagen-chitosan-*Nigella sativa* wound dressing with 2:2: 1 w/w (IL), collagen-chitosan-*Nigella sativa* wound dressing with 1:1:1 w/w (IM), collagen-chitosan-*Nigella sativa* wound dressing with 1:1: 2 w/w (IH). Incision skin samples were taken on days 3 and 14 for histopathological tests to see the process of epithelialization and angiogenesis. The results showed that the epithelialization score increased on days 3 to 14 in all groups, but the best was in the IM group with a significant increase (p-value = 0.000) on days 3 and 4. While the angiogenesis score in each group increased from days 3 and 14, but the best on day 3 was the IL group and day 14 was the P group.

Keywords: *Angiogenesis, Black Cumin, Epithelialization, Wound Dressing*

HB-02

The Effect Of Bajakah Tampala Stem (*Spatholobus littoralis* Hassk.) Extract on Clotting Time In Vitro

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ABSTRACT

Wounds that are not treated immediately can lead to infection. The risk of infection can be reduced by stopping the bleeding as soon as possible. The way to stop is by giving hemostatic agents. This hemostatic agent can come from plants, namely Bajakah Tampala (*Spatholobus littoralis* Hassk.) which contains flavonoids, saponins, and tannins. This study aims to examine the effect of bajakah tampala stem extract on clotting time. This study used true experimental laboratories on 18 men aged 19-25 years, which were divided into 8 groups. This research uses the glass object method. Clotting time data will be analyzed using a one-way ANOVA test. The results of one-way ANOVA is 0.000 (<0.05) which indicated that there was an effect between the administration of Bajakah tampala stem extract on blood clotting. The increase in the concentration of Bajakah tampala stem extract is not directly proportional to the clotting time.

Keywords: *clotting time, Spatholobus littoralis* Hassk., *wound*

HB-03

Analysis of Consumer Knowledge and Needs For Herbal Information

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ABSTRACT

The growing public interest in herbal medicine has been met with insufficient information and communication systems. This presents the industry with a new challenge in terms of providing and developing an information system that will allow the public to interact with the industry both before and after the product purchase transaction. The purpose of this study is to analyze consumer knowledge and needs for herbal information using a cross-sectional survey and a self-administered questionnaire as the data collection medium. The findings revealed that the consumer knowledge profile can be seen from the information sources obtained by 55 consumers, particularly Sales Promotion (30.48 percent). Consumers obtained the most information about content (20.41 percent), usability (15.51 percent), instructions for use (13.06 percent), dosage (11.43 percent), and side effects (10.20 percent). Furthermore, 85.45 percent of consumers require special consulting services in the form of online consulting via chat (60.00 percent).

Keywords: *Customer, Herbal Information, Knowledge, Needs*

HB-04

Bst Polymerase Enhancement: A Bioinformatic approach to improve Bst polymerase characteristics

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ABSTRACT

DNA polymerase is a remarkably incredible invention in the biotechnology field. Since its discovery, molecular genetic-based research has been growing rapidly. Various methods for molecular-based diagnosis have been developed since. One of which is Loop-Mediated Isothermal Amplification, this method offers simplicity, sensitivity, and faster results compared to conventional PCR. However, the availability of the materials supporting LAMP reaction is still challenging. LAMP materials are often hard to access in a developing country, and the need to import from other countries makes the price significantly higher. Here we offer a Bst polymerase design that has a chance to be produced with the same or even higher quality than the commercial one. Sto7d fusion to the C-terminus of Bst polymerase (Br512g3.1) shows higher stability and solubility based on bioinformatics analysis. Sto7d fusion to the C-terminus improves processivity when used in Gss (Bst like polymerase). Lastly, Sto7d fusion to Br512g3.1 offers higher stability and processivity that can be used to overcome the cost problem of Bst polymerase.

Keywords: *Bst polymerase, DNA polymerase, LAMP, Sto7d*

HB-05

Coconut Haustorium Extract As A Cosmeceutical Ingredient for Face Serum Formulation

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ABSTRACT

Skincare products are among the items that the general population uses on a daily basis. People's desire for a bright skin tone has led them to seek out skincare solutions that help maintain or brighten the skin. The coconut (*Cocos nucifera L.*) haustorium has high nutritional value and functional efficacy for health and beauty promotion. Here, the purpose of this research was to determine formulations, characterizations, and functional efficacies of face serum products containing coconut haustorium extract. The stages of this research included preparation, extraction, identification, formulation, characterization (pH, water content, viscosity, and humidity tests), and functional efficacy (SPF, antioxidant effect, and inhibition of tyrosinase activity). Whole coconut haustorium fruit passed through the drying stage and yielded 26.11±4.04% of haustorium powder. Next, powder was extracted and yielded 9.57±1.46% of haustorium oil. Coconut haustorium extract was applied for face serum production in the form of ethosomes and transfersomes, because of their ability to penetrate deeper into the skin. In this research, extracts were prepared at various concentrations (0.1, 1, 5, 10, and 100% oil extract), while face serum were made in 2 forms (ethosomes and transfersomes) with 3 distinct formulas (negative control, positive 0.1, and 1%). The pH value of face serum was 7,viscosity and moisture content ranged from 35 to 175 mPa.s, and 73.33-86.22, sequentially. After 28 days of use, serums showed an increase in moisture on the panellists' skin. Cosmeceutical efficacy of extracts and serums were ranging from 17.04-70.40% (antioxidant activity), 3.67-38.00 (SPF value), and 9.03-45.92 (tyrosinase inhibitory activity). These data suggest that coconut haustorium extract had cosmeceutical ingredients and its face serum products could be applied as daily skincare to prevent melanin synthesis by inhibiting tyrosinase activity.

Keywords: *Coconut haustorium, Face serum, Skincare, SPF, UV protection*

HB-06

Antibacterial Activity and Molecular Identification from Nudibranch-Associated Bacteria Isolate

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ABSTRACT

Pathogenic bacteria can cause severe diseases in humans. These are worsened with the discovery of bacterial strains that are resistant to antibiotics, called Multi-Drug Resistant (MDR) bacteria. Exploration of antimicrobial compounds from microorganisms associated with marine invertebrates (nudibranch) may provide a solution to this problem. This study evaluated antibacterial activity and performed molecular identification in nudibranch-associated bacteria. Antibacterial screening were conducted on bacteria isolates from six nudibranchs (*Halgerda willeyi, Polycera abei, Discodoris boholiensis, Carminodoris grandiflora, Atagema spongiosa,* and *Tambja* sp.). A total of 79 isolates were successfully isolated from the nudibranchs. Five isolates (6,33%) were able to inhibit some MDR bacteria, two isolates inhibited *Bacillus subtilis* and three isolates inhibited *Pseudomonas aeruginosa*. One of the isolates was revealed as bactericidal against *B. subtilis* and another one showed a perfect clear round zone of inhibition during the screening test against *B.subtilis.* Molecular identification using partial sequences of 16S rRNA gene showed that these two potential isolates were *Bacillus sp*. strain X1-L (83,52%) and *Pseudomonas stutzeri* strain AL-C5 (79,89%).

Keywords: *Antibacterial, Bacillus sp., Nudibranch, Pseudomonas stutzeri*

PLANT BIOTECHNOLOGY

PB-01

Genetic variation analysis of Gandaria (*Bouea macrophylla* Griffith) using SRAP (Sequence-related amplified polymorphism) markers

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ABSTRACT

Gandaria is a tropical plant that spreads in Indonesia. This West Java identity flora has many benefits, but the information available about this plant is still limited, one of which is information about genetic variations. This research is intended to provide genetic information of gandaria. It is hoped that this research can help in the preservation of gandaria and its breeding efforts. The genetic variation of gandaria was analyzed using Sequence-Related Amplified Polymorphism (SRAP) primers, with Polymerase Chain Reaction (PCR). A total of 5 gandaria accessions from 5 different locations were amplified with 3 combinations of SRAP primers. The amplification results were translated into binary data through scoring, then analyzed using NTsys 2.1 software. The dendrogram was made using the Unweighted Pair Group Method Using Arithmetic Method (UPGMA). The results show that the genetic variation of gandaria is in a low category, which is in the range of 0-0.10. The closest relatives are found in the accessions of Serang City and Nganjuk City. The furthest kinship is found in the accessions of Sukabumi and Serang. SRAP primer was effectively used for analysis of genetic variation of gandaria with a polymorphism percent value of 88.66 %.

Keywords: *Gandaria, Genetic Variation, PCR, SRAP, UPGMA*

PB-02

Potency of *Carica papaya* L. cult. Callina Seeds as Antibacterial in Spray Hand Sanitizer

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ABSTRACT

Spray hand sanitizers are used to prevent disease transmission by pathogenic bacterias, such as *Bacillus subtilis*, *Staphylococcus aureus*, *Salmonella typhi*, and *Escherichia coli* that commonly can be found on hands. Most commercial spray hand sanitizers are alcohol-based, whereas alcohols can cause skin irritation. Plant extracts can be used to substitute the presence of alcohol in hand sanitizers. In this study, the goal was to determine antibacterial activity of papaya seeds (*C. papaya* L. cult. Callina) as an active ingredient in spray hand sanitizers against *B. subtilis*, *S. aureus*, *S. typhi*, and *E. coli* using disc diffusion method. Papaya seeds were extracted by maceration and the phytochemicals were determined by qualitative analysis. Alkaloid, flavonoid, saponin, and terpenoid were found in this study. Antibacterial activities were tested in various concentrations of the papaya seeds: 70%, 80%, 90%, 95%, and 100%. The antibacterial activity tests showed that the highest inhibition zone against those bacterias is found in concentration 90% to 100% of papaya seeds. According to those results, the spray hand sanitizer from *C. papaya* L. cult. Callina was formulated and tested for its antibacterial activity which showed that the product can inhibit the growth of *B. subtilis*, *S. aureus*, *S. typhi*, and *E. coli*. In addition, the product was also tested for organoleptic, homogeneity, pH, and respondent preference for product evaluation. The product has 7.73 pH level which is in accordance with SNI 2588-2027.

Keywords: *Antibacterial, C. papaya* L. cult. Callina, *Spray hand sanitizer*

PB-03

Activities of Seagrass Extract *Enhalus* sp. and *Thalassia* sp. as Acne-causing Antibacterial

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ABSTRACT

Seagrass is an aquatic plant that can be found in coastal areas with a depth of 3-5 meters. Seagrass has antibacterial potential due to the presence of phenol, flavonoids, and alkaloids hence it can be utilized as blue cosmetics to inhibit the growth of acne-causing bacteria. This study aims to determine the inhibitory activity of *Enhalus* sp. and *Thalassia* sp. extracts against acne-causing bacteria *Propionibacterium acnes* and *Staphylococcus aureus*. Seagrass samples were taken from Sabang Beach in December. Extraction was done by maceration with 96% ethanol. Antibacterial potential was identified by inhibition test with concentration varied from 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, and 100% and Minimum Inhibitory Concentration (MIC). The result showed that 80% *Enhalus* sp. and 20% *Thalassia* sp. are the most effective antibacterial concentration to *P. acnes*, whereas 80% and 30% *Enhalus* sp. and 20% *Thalassia* sp. are the most effective to *S. aureus*. The results of phytochemical identification using LC-MS indicated the presence of potential compounds that could cause inhibition of the test bacteria.

Keywords: *Enhalus sp., Thalassia sp., Propionibacterium acnes, Staphylococcus aureus, Inhibition Test*

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PB-04

Development of Herbal Medicine Center through Conservation of Family Medicinal Plants (TOGA) in Ngelosari, Srimulo, Piyungan Bantul

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ABSTRACT

Medicinal plants make an interesting diversity and natural wealth, and until now the condition of these plants still grows wild in forest and rural areas. This study aims to describe the development of TOGA park so that it can become a center for herbal medicine for the community and describe the results of the TOGA park. SWOT analysis can improve the community's economy accompanied by increasing public health. This research was conducted in Ngelosari Hamlet, Srimulyo Village, Piyungan District, Bantul Regency, DIY. The data collection method used questionnaire interviews and direct observation, then the data analysis technique used SWOT analysis. The results showed that the development of the Toga park in improving the economy and public health was carried out by providing counseling, introducing existing local potentials to the community, providing training to the community and forming small business groups. The results of the SWOT analysis explain that the people of Ngelosari Hamlet have high strengths and opportunities in developing a Toga park to improve the economy and public health by minimizing their weaknesses and being ready to face threats.

Keywords: *Conservation, Development, Economics, Health, Toga Park*

PB-05

Analysis of Curcumin Levels in Some Rhizome of *Zingiberaceae* Using TLC-Densitometric Method

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ABSTRACT

Medicinal plants that are widely used, namely from the *Zingiberaceae* family, have many types, most of which are easy to breed. Among them are *Curcuma longa* L., *Curcuma zanthorrhiza* Roxb., *Curcuma mango* Val., *Curcuma heyneana* Val & Zijp., *Zingiber purpureum* Roxb., *Zingiber aromaticum* Val., *Curcuma zedoaria* (Christm.) Rosc., and *Curcuma aeruginosa* Roxb., where the benefits depend on curcumin levels, Therefore, a valid method is needed to determine curcumin levels by TLC Densitometry. Validation of the method for curcumin analysis was carried out with silica gel 60 F254, the mobile phase was chloroform: methanol (40:1) and then measured with a densitometer to obtain a maximum wavelength of 422 nm. The results of the analysis of the validation parameters obtained linearity with a value of r = 0.983911; LOQ and LOD values were 199.3451913 ng/spot and 604.0763374 ng/spot, respectively; Intraday precision is 2.94% - 5.03% and interday precision is 6.71% and obtained % recovery accuracy is 78.91% and 102.42%. The results of determining the levels of curcumin from each rhizome are *Curcuma longa* L 0.006022 mg/g; *Curcuma zanthorrhiza* Roxb. 0.001255 mg/g; *Zingiber purpureum* Roxb. 0.001191 mg/g; *Curcuma heyneana* Val & Zijp. 0.000478 mg/g; *Zingiber aromaticum* Val. 0.000213 mg/g; *Curcuma mango* Val. 0.000048 mg/g; and the levels of *Curcuma zedoaria* (Christm.) Rosc., and *Curcuma aeruginosa* Roxb. cannot be calculated.

Keywords: *Curcumin, Zingiberaceae, TLC Densitometry*

PB-06

The effect of *6-benzylaminopurine* (BAP) and *paclobutrazol* (PBZ) with variations of light intensity for *in vitro* flowering cherry tomatoes (*Solanum lycopersicum* var. Tropical Ruby and Golden Sweet)

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ABSTRACT

Breeding of *Solanum lycopersicum* L. has been carried out to obtain superior seeds, including one of its varieties, cherry tomato. Tomato regeneration is more often done conventionally, but due to the challenges of time and land required to obtain a stable genotype, researchers are regenerating using plant tissue culture methods. The in vitro method was further developed into an in vitro flowering method so that flowers and fruit can grow in bottles with expectation that the vegetative phase of the plant will be shorter. However, in vitro flowering method information is still limited, especially for cherry tomatoes. Therefore, this research was conducted using seven types of media combined with 3 light intensities, followed by flowering treatment using a feeding technique by adding liquid medium MS+PBZ 1 ppm. The results obtained are still varied and it is not possible to conclude the effect of BAP concentration, the effect of PBZ, and the effect of light intensity on flowering in vitro on cherry tomatoes of Ruby and Golden Sweet varieties. However, there was a positive response from the Golden Sweet variety where at a light intensity of 2.600 lux there were 5 explants that emerge buds. The percentage of flower buds that appeared for each treatment combination was 25%, meaning there was one explant that had buds from four replications performed on each treatment. Flower buds appeared on explants grown on MS + BAP 0,5 ppm + PBZ 0,75 ppm + feeding treatment at 142 DAP, MS + BAP 0.5 ppm + feeding treatment at 157 DAP, MS + BAP 2 ppm + PBZ 0,75 ppm without feeding treatment at 160 DAP, MS + BAP 2 ppm + PBZ 0,75 ppm + feeding treatment at 166 DAP, and MS0 (Control) without feeding treatment at 169 DAP.

Keywords: *BAP, Cherry tomato, Feeding treatment, In vitro flowering, Light intensity, PBZ*

PB-07

Prediction of *Solanum lycopersicum* L. flowering *in vitro* using information system-based linear regression

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ABSTRACT:

Solanum lycopersicum L. can be used as a model plant for the benefit of plant biotechnology. However, *in vitro* plant regeneration in general still takes a relatively long time, is limited by genetic factors, and limited references. Therefore, the *in vitro* flowering method was developed to shorten the vegetative phase. This research was conducted by testing two kinds of flower induction media (MS + BAP 1 ppm, MS + BAP 1 ppm + PBZ 1 ppm, MS0 as control), three variations of light intensity (20W; 24W; 29W), and the use of rotor and non-rotor machines. The research data is used for prediction of tomato flowering based on information system (SI). The result shows that on the control medium, 29W light using a rotor machine produces a better average number of leaves of 10,33. As for linear regression analysis, it was predicted that using medium MS + BAP 1 ppm with light intensity 29W, and using rotor machine was the best composition to produce the flower. However, flowering occurred better without the use of machines where at 151 DAP there were 6 clusters that appeared with an average number of the best cluster of 0,5, namely on control media, 20W light and the best flowering percentage of 40% (out of 10 replications) on 24W light, control medium.

Keywords: *Flowering prediction, Information system method, In vitro flowering, Rotor machine, Tomato*

PB-08

Developing Rice Lines Resistant To Brown-Planthopper (*Nilaparvata lugens* Stal) with Intermediate Amylose Content by Performing Bioassay and Molecular Markers Application

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ABSTRACT

Rice lines that resistant to brown planthopper (BPH) with intermediate amylose content are two major goals for rice breeding. To obtain the promising rice genotypes with both traits, phenotypic and genetic assessment are desired. The study aimed to obtain rice lines with both traits by phenotypic and genotypic selection. Testing for resistance to BPH biotype 3 for F3 progenies derived from two hybridizations i.e. IR64 x PTB33 and Sintanur x PTB33 was conducted by using SSST (Standard Seedbox Screening Test) followed by molecular confirmation using Simple Sequence Repeat (SSR) markers. The Study revealed that thirty-four plants were categorized as resistant from both crosses. Two lines derived from Pandanwangi x PTB33 (PP) and 16 lines from Sintanur x PTB33 (SP) were in the same cluster with their parents (PTB33 and Sintanur) based on molecular markers for both traits. Thirty-six genotypes were categorized as resistant, 65 moderately resistant, 53 moderately susceptible, 593 susceptible and 793 highly susceptible. Meanwhile, twenty lines were derived from IR64 x PTB33 (IP) and 17 lines from Sintanur x PTB33 (SP) in the same cluster with their parents, PTB33, IR64 and Sintanur based on molecular markers for resistance to BPH and amylose content. Bioassay testing for BPH resistant lines followed by SSR molecular marker confirmation for both BPH resistance and amylose content is very useful in selecting the desired rice lines.

Keywords: *Brown Planthopper Resistance, Molecular markers, Rice, Simple Sequence Repeats*

PB-09

Patchouli Alcohol Optimization from *Pogostemon cablin* Benth. cv. Sidikalang Leaves Using Response Surface Methodology

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ABSTRACT

The demand for essential oils in the industrial sector continues to increase, this is proportional to the number of people using them. *Pogostemon cablin* popularly known as nilam in Indonesia produces patchouli oil with patchouli alcohol as the major compound. Patchouli oil has been used for a long time as perfume ingredients, cosmetics, aromatherapy, insecticides, and pharmaceutical products. Currently, the production process of patchouli oil in Indonesia is not optimal. In order to increase the results of patchouli alcohol, microwave assisted extraction (MAE) using ethanol 96% as solvent was performed for extraction and analyzed using gas chromatography (GC). Response surface methodology (RSM) statistics was used to calculate concentration of patchouli alcohol with parameters microwave power (180-600 W) and extraction time (25-60 seconds). The experiment results showed the optimum conditions for extraction were 60 seconds at 600 W with patchouli alcohol (0.23%) and these result similar to patchouli alcohol (0.25%) predicted by RSM for 60 s at 600 W.

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Keywords*: Gas chromatography, Microwave assisted extraction, Patchouli alcohol, Response surface method*

PB-10

The identification of Gibberellin A1 compound in *Arabidopsis thaliana* as the AKT1-Human inhibitor in Colorectal cancer

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ABSTRACT

Colorectal cancer has reached the fourth position as the one of the deadliest cancers in Indonesia. Common drug that been used in treating colorectal cancer with chemotherapy is Fluorouracil by inhibiting the thymidylate synthase enzyme that will lowering the amount of thymine and caused thymine deficiency, so it can inhibit the synthesis of DNA and RNA.AKT-1 is a human gene that is able to regulate proliferation, survival, and motility of a cell. Genetic alterations in AKT have been identified in various tumor types. The docking score indicated that the ligand used is as good as the control in binding to the active site of RAC-alpha serine/threonine-protein kinase (AKT1). This is because of the higher affinity value of Gibberellin A1 than the control which indicates that Gibberellin A1 is able to bind to the active site of human AKT 1 by computational method. Many secondary metabolites are owned by Arabidopsis plants such as Gibberellin A1 that are known to fight cancer because of their antineoplastic agent. Antineoplastic is an agent that used to prevent, inhibit, or stopping the development of neoplasms or tumors. Gibberellin A1 (GA1) in Arabidopsis thaliana is foreseeable to be used as AKT1-Human inhibitors in colorectal cancer. It's because Gibberellin A1 has an antineoplastic (anti-cancer) agent and it has greater affinity value than fluorouracil, which indicates that the bond between Gibberellin A1 and human AKT 1 is stronger compared with fluorouracil.

***Keywords**: AKT-1 human inhibitor, Arabidopsis, Colorectal cancer, Docking, Gibberellin A1*

CLINICAL & COMMUNITY PHARMACY

CP-01

Systematic Literature Review: Side Effect of *Moringa oleifera* Lam.

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ABSTRACT

Moringa oleifera Lam. (Drumstick tree) is one of the herbal plants that are commonly found in subtropical and tropical areas such as Indonesia. Moringa plants have been widely used because they have many pharmacological effects. In addition, due to the high consumption of Moringa, there is still need to be monitored regarding the safety of Moringa. This study aimed to Identify and analyze the side effects of using Moringa based on the results of a systematic literature review. A systematic literature review using articles with a case report study design. The search databases used are PubMed, Google Scholar, and Science Direct. Journal quality is assessed by JBI Critical Appraisal. There were 10 articles that met the criteria and were of good quality. Based on the results of the synthesis, the side effects that occur in the use of Moringa are in the respiratory tract, dermal, and rhabdomyolysis. The incidence of side effects in the use of Moringa is associated with chemical compounds contained in Moringa which can trigger hypersensitivity reactions and structural similarities to other synthetic drug compounds so that they can cause the same side effect reactions. The use of Moringa in both leaves and seeds can cause side effects, the manifestations of which are respiratory, dermal, and rhabdomyolysis disorders.

Keywords: *Moringa oleifera Lam., Side Effects, Asthma, Atopic Dermatitis, Rhabdomyolysis*

PHARMACEUTICAL TECHNOLOGY

PTE-01

Formulation of Chewable Gummy Tablet of *Moringa Oleifera* L. Leaf Extract Using Combination Kappa Carrageenan and Iota Carrageenan

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ABSTRACT

Moringa leaves were the most commonly used part of the Moringa plant because they were rich in nutrients. Moringa leaves extract was developed into a chewable gummy tablet to improve its acceptability. The main component of the chewable gummy tablet was a gelling agent. This study aims to determine the effect of gelling agent ratio (kappa-carrageenan and iota-carrageenan) on the physical characteristics of the chewable gummy tablet. Furthermore, this study was also conducted to determine the optimum formula for a chewable gummy tablet and analyze the physical stability of the prepared formula during storage. In this study, the concentration of gelling agents was 2%. The formulas were developed in this study using the various ratios of kappa-carrageenan and iota-carrageenan 1:0 (control formula), 1:1 (formula 1), 2:1 (formula 2), and 3:1 (formula 3). The results showed that the ratio of kappa-carrageenan and iota-carrageenan determined the texture, disintegration time, swelling ratio, and syneresis. The most optimum formula was Formula 1 (1:1). The characteristics of this formula were a yellow colour, melon odor, sweet taste, square shape, chewy texture, the average weight was 2.86 g ± 0.02, the disintegration time was 7.47 min ± 0.02, the swelling ratio was 1.21% ± 0.20, and the syneresis percentage was 0.93 ± 0.11 %. The result of physical stability evaluation during 14 days of storage also revealed that formula 1 was the most stable.

Keywords: *Chewable Gummy Tablets, Moringa oleifera, Kappa Carrageenan, Iota Carrageenan*

PTE-02

OPTIMIZATION OF THIN LAYER CHROMATOGRAPHY (TLC) SYSTEM OF ROSELLE (*Hibiscus sabdariffa* L.)

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ABSTRACT

Roselle (*Hibiscus sabdariffa* L.) is one of simplisia in a monograph Indonesian Herbal Pharmacopoeia 2nd edition which can be used as raw materials for traditional medicine. This research aims to determine the system KLT that can provide round and non-tailing spot separation results such as the Indonesian Herbal Pharmacopoeia 2nd edition and to find out if the TLC system developed meets the precision and stability validation parameters. The analytical method used is Thin Layer Chromatography using two TLC systems. The mobile phase I used silica GF254 as a stationary phase, the spotting volume 20 µl and cyanidin 0,01 % 4 µl. The mobile phase II used silica GF254 as stationary phase, the spotting volume in the sample 20 µl, chlorogenic acid 0,1 % two µl, and caffeic acid 0,005 % two µl and detection used NP/PEG. Validation method using stability and precision parameters. Stability test during chromatography, the stability of the analyte on the plate and in solution, and the stability of the chromatographic results. The value of % KV precision intraday and interday respectively on cyanidin I 1,24-6,00;17,25, cyanidin II 1,81-12,65;10,63, chlorogenic acid 6,48-15,88;22, 45, caffeic acid 2,97-16,19;5,26. The conclusion of this research shows that the TLC system which gives round and non-tailing spot separation results from FHI Edition II using 2 TLC systems.

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Keywords: *Roselle (Hibiscus sabdariffa L.), Thin Layer Chromatography, TLC system, Farmakope Herbal Indonesia 2nd edition*

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PTE-03

Analysis of Some *Zingiberaceae* Rhizomes by TLC and Chemometric Fingerprint Profile

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ABSTRACT

One of the commonly used medicinal plants is from the *Zingiberaceae* family. It has similar organoleptic characteristics. The purpose of this study was to create a TLC profile of *Zingiberaceae* rhizomes and to find out to what extent TLC and chemometrics could differentiate these rhizomes. TLC was carried out with silica gel 60 F_{254} as the stationary phase, toluene moving phase: ethyl acetate (93:7) and 6 µl spotting volume. The method validation carried out includes stability and precision parameters. Chemometric method use *Principal Component Analysis* (PCA) and *Cluster Analysis* (CA). Using PCA and CA methods analysis can classify 8 *Zingiberaceae* rhizomes into 3 clusters, where turmeric and curcuma are cluster 1; temu mangga, temu giring, temu putih, and temu ireng are cluster 2; as well as bangle and lempuyang wangi are cluster 3. It can be concluded that the TLC and chemometric fingerprint profiles have not been able to distinguish the 8 rhizomes of *Zingiberaceae*. However, it has been able to group it into 3 clusters.

Keywords: *Chemometrics, TLC Fingerprint, Zingiberaceae*

PTE-04

Optimization of Extraction of Roselle Flower (*Hibiscus sabdariff*a Linn.) as a Foods and Drugs Colors

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ABSTRACT

Dyes are one of the components of additives of food products such as food and medicine. Roselle flowers contain anthocyanins as a colour pigment that has antioxidant activity. Extraction optimization in this study includes extraction variables, the extraction method, solvent, duration of extraction and the solid to liquid ratio. The optimal extraction conditions were determined from the total anthocyanin levels set by the pH difference method, and the antioxidant activity of the extract was determined by the DPPH free radical suppression method. The results showed the highest anthocyanin levels by kinetic maceration method (3.79 mg / g) and have good antioxidant activity (IC50 561.97 ppm). The optimal ethanol concentration is 50 % ethanol with citric acid (4.33 mg / g) and the highest antioxidant activity with tartaric acid (IC50 218.32 ppm). The optimal extraction duration is 15 minutes total anthocyanin levels (3.92 mg / g) and antioxidant activity is highest at a time of 10 minutes (IC50 430.44 ppm). The optimal solid to liquid ratio based on total anthocyanin levels is a ratio of 1:15 g / mL (4.03 mg / g) and high antioxidant activity (IC50 243.6 ppm). It concluded that the optimal extraction conditions were kinetic maceration using a 50 % ethanol solvent acidified with 2 % citric acid, with an extraction duration of 15 minutes and a ratio solid to liquid of 1:15 mg / g.

***Keywords**: Anthocyanin, Antioxidant, Extraction optimization, Roselle*

PTE-05

Isolation of Flavonoid Compounds From Leaves of Iler (*Plectranthus scutellarioides* (L.) R.Br.) with Antioxidant Activity Guidelines

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ABSTRACT

Indonesia has natural resources, one of which is plants. Plants have benefits as a source of food, industrial raw materials and traditional medicine. The use of traditional medicinal plants is believed by the community does not cause side effects as well as synthetic drugs. In addition, medicinal plants also contain antioxidant compounds that can maintain a healthy body and ward off free radicals. One of the plants that may have antioxidant compounds is the slobber plant (*Plectranthus scutellarioides* (L.) R.Br.). Iler plants have a fairly high flavonoid content. Flavonoids have antioxidant activity that can prevent diseases caused by free radicals. The purpose of this study was the isolation of flavonoid compounds from iler leaves guided by antioxidant activity. Antioxidant activity test was carried out by DPPH free radical reduction method (2,2-diphenyl-1-picrylhydrazyl) by Spectrophotometry using a Microplate Reader. Extraction using various solvents with different polarity levels. The active fraction was isolated for its flavonoid content using column chromatography. The subfractions were analyzed by TLC-Densitometry, Spectrophotometer UV-Visible and antioxidant activity test. The antioxidant test used the DPPH method and the calculated IC_{50} values of the methanol-water extract, n-hexane fraction, ethyl acetate fraction and water fraction were 70.06 µg/mL, 450.11 µg/mL, 51.99 µg/ mL and 126.62 µg/mL. Very strong antioxidant activity is found in the ethyl acetate fraction. The subfraction resulting from separating compounds from the flavonoid group forgot flavones or flavonols (3-OH free) and had an IC_{50} value of 36.85 µg/mL.

Keywords: *Antioxidant, DPPH, Flavonoid, Isolation, Plectranthus scutellarioides*

PTE-07

Stability and Antioxidant Test of Ethanol Extract Liposome of Moringa Leaves (*Moringa oleifera*)

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ABSTRACT

Moringa leaf potentially has an antioxidant effect because it contains secondary metabolites, one of which is quercetin having poor solubility in water. Liposomes as carriers of drug compounds can increase the solubility of quercetin through an entrapment system in the lipid bilayer. This study aims to determine stability and antioxidant activity of ethanol extract liposomes of moringa leaves. This method used experimental research utilizing moringa leaf ethanol extract in different concentrations (0,125%, 0.25%, and 0.5%) which was formulated into liposome by extrusion method. Preparation of liposome utilized Lipoid S-75 and cholesterol (1 : 1) using ethanol injection method then was characterized and stability tested. Meanwhile, the antioxidant test of ethanol extract liposome of moringa leaves used the DPPH method. The characterization results showed that particle size of moringa leaf ethanol extract (0.125%, 0.25%, 0.5%) liposomes are 112, 145, and 175 nm and polydispersity index (PDI) of 0.34, 0.28, 0.12 respectively. Moreover, the entrapment efficiency (%EE) of all formulations showed 0.25% of moringa leaf ethanol extract liposome is the highest loaded into liposome (93%) compared to 0.125% (80%) and 0.5% (60%) then only the best result (0.25%) of size and %EE which continued for stability and antioxidant test. Six weeks of stability study described that size profile is stable at 25°C and 37°C. The result of antioxidant test was obtained IC_{50} by 124.41 ppm (only ethanol extract) and 61.78 ppm (loaded-liposome) which is included in the moderate and strong category respectively. It can be concluded that moringa leaf ethanol extract liposome has a strong antioxidant activity as a promising nanonutraceutical formulation.

Keywords: *Antioxidant, Ethanol extract, Liposome, Moringa leaf*

PTE-08

Moringa Leaf Extract Nanoparticles Formulation Using Chitosan and Sodium Tripolyphosphate in Periodontal In Situ Gel Preparation

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ABSTRACT

Quercetin (secondary metabolite in *Moringa oleifera*) which has potential in treating periodontitis, is known to have low solubility. Therefore, a nanoparticle system was chosen in this study to overcome these problems. The nanoparticles are formed through ionic interactions between polymer and cross-linker, which is highly dependent on their concentrations. The purpose of this study was to optimize the composition of polymer (chitosan) and cross-linker (sodium tripolyphosphate) in the Moringa oleifera ethanolic extract nanoparticle system and incorporate them into the in-situ gel system to increase its residence time. This research is an experimental laboratory study that produces *Moringa oleifera* extract nanoparticles through ionic gelation method using chitosan and sodium tripolyphosphate (Na-TPP). The composition of chitosan and Na-TPP was optimized based on their % transmittance, entrapment efficiency (% EE), and stability. The optimum nanoparticles were then evaluated for their particle size, PDI (polydispersity index), and zeta potential, then incorporated into an in-situ gel system using poloxamer 407 (thermosensitive polymer). The resulting in situ gel preparation was then evaluated for viscosity, pH, gelling temperature, and gelling time. The results showed that 0.6% chitosan and 0.15% Na-TPP were the optimum nanoparticles with opalescent characteristics, 87,7% transmittance, stable, and 81.56±0.24% of %EE. The nanoparticles were found to be around 632.1±9.35 nm size, with 0.414±0.08 PDI, and -17.7±0.1 mV zeta potential. This system was incorporated into an in-situ gel which resulted in a system with 6.7±0.6 dPa.s viscosity, 7.07±0.02 pH, 34.3±0.6 ^{O}C gelling temperature, and 2 seconds gelling time.

Keywords: *Chitosan, In situ gel, Moringa oleifera, Nanoparticles, Sodium tripolyphosphate*

PTE-09

Nanoparticles Loaded *In-situ* Gel Preparation for Periodontal Delivery of *Moringa oleifera* Leaf Extracts

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ABSTRACT

Solubility is a problem for quercetin (*Moringa oleifera* metabolites), despite its potential as antibacterial, anti-inflammatory, and antioxidant. Nanoparticles have been reported to be a solution to overcome that problem. However, nanoparticles are known to have short residence time at the application site. So, in this study *Moringa oleifera* extracts nanoparticles into *in-situ* gel preparations. This study was aimed to make in situ gel preparations of *Moringa oleifera* extract nanoparticles, which were preceded by optimization of polymer and cross-linker composition in the nanoparticle system. *Moringa oleifera* extract nanoparticles were prepared by ionic gelation method, using chitosan (polymer) and hyaluronic acid (cross-linker). The transmittance (%T), entrapment efficiency (%EE), and stability characteristics of nanoparticles were used to optimize the chitosan and hyaluronic acid composition. The optimum nanoparticles system was measured for its particle size, PDI (polydispersity index), and zeta potential. The system was then incorporated into poloxamer 407 (thermo-responsive polymer) to form an in-situ gel. The in-situ gel was evaluated for its viscosity, pH, gelling time, and gelling temperature. The results showed that F18 nanoparticles suspension (0.8% chitosan and 0.15% HA) were the optimum formula with opalescent characteristics, a good transmittance, stable, and high entrapment efficiency (84,85±0,21%). The system has a 502.5±2.76 nm size, with a 0.462±0.09 PDI, and -16.7±0.17 mV zeta potential. F18 was incorporated into an in-situ gel and produced a system with 633.3±57.7 cP viscosity and 7.11±0.03 pH. The system was able to form gel structure at 34.3±0.6°C in 2 seconds.

Keywords: *Chitosan, Hyaluronic Acid, In Situ Gel, Moringa oleifera, Nanoparticles*

PTE-10

Formulation of Nanoparticles *Moringa oleifera* Leaf Extract using Chitosan and Alginate Sodium in Periodontal *In-situ* Gel Preparation

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ABSTRACT

Moringa oleifera extract is known to contain a lot of quercetin which has antibacterial, anti-inflammatory, and antioxidant activities, thus it has the potential to be used in the periodontitis treatment. However, the low solubility of quercetin made the bioavailability of these compounds low, therefore in this study *Moringa oleifera* extract was delivered using a nanoparticle system in an *in-situ* gel preparation. In this study, chitosan and alginate sodium were used as components in nanoparticles preparation. This study aims to make in situ gel preparations that contain *Moringa oleifera* extract nanoparticles. *Moringa oleifera* extract nanoparticles were made using chitosan and alginate sodium as polymer and cross-linker, through the ionic gelation method. The composition of chitosan and alginate sodium was optimized based on their transmittance (%T), entrapment efficiency (%EE), and stability. The optimum formula was then tested for its particle size, PDI (polydispersity index), and zeta potential, then incorporated into the in-situ gel system using poloxamer 407. The in-situ gel preparation was evaluated for its viscosity, pH, gelling time, and gelling temperature. The results showed that the optimum nanoparticles were formed at a concentration of 0.8% chitosan and 0.2% alginate sodium with opalescent characteristics, 68,7% transmittance, stable, and 73,53±2,02% EE. The size, PDI, and zeta potential of the optimum nanoparticles were 413,9±1,46 nm; 0,384±0,06; and -19,1±0,20 mV respectively. Then this system was incorporated into an *in situ* gel system with a viscosity of 6,7±0,6 dPa.s, a pH of 7,22±0,005, a gelling temperature of 37±0 °C, and gelling time of 2 seconds.

Keywords: *Alginate Sodium, Chitosan, Moringa oleifera, Nanoparticles, Periodontal In Situ Gel*

PTE-11

Characterization and Formulation of Nanoparticles Extract of Bundung Plant *(Actinoscirpus grossus)* with Variations in Concentration of Chitosan and Na-TPP Bases Using the Ionic Gelation Method

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ABSTRACT

Bundung plant extract contains flavonoid secondary metabolite compounds that have the potential to kill *Staphylococcus aureus* bacteria. Its utilization uses nanoparticle technology because the ability to penetrate cell walls can be penetrated by the size of colloidal particles. The formation of nanoparticles using chitosan polymer and Na- TPP can produce preparations with good stability. This study aims to determine the characterization and formulation of nanoparticles and to determine the effect of the concentration of chitosan and Na-TPP on the characterization of nanoparticles of plant extracts. This research is experimental. Bundung plant extract formulated into nanoparticles with various concentrations of formula 1 (chitosan 0.1% and Na-TPP 0.2%), formula 2 (chitosan 0.15% and Na-TPP 0.15%) and formula 3 (chitosan 0.2% and Na-TPP 0.1%). Then organoleptic and characterization tests were carried out in the form of particle size tests, zeta potential and data were analyzed by ANOVA. All formulas showed nanoparticle size. The results of the nanoparticle characterization of the extract of the Bundung plant showed that F2 was the formula with the smallest particle size of 328.8 nm, but for the zeta potential value the stable formula was F3 because it had a zeta potential value close to +/-30mV, i.e. -10.4mV. The statistical results of One Way Anova show that the significance value is <0.05, which means that there is an effect of variations in the concentration of chitosan and Na-TPP. Variations in the concentration of chitosan and Na-TPP in each formula can affect the particle size and zeta potential value.

***Keywords**: Bundung Plant Extract, Chitosan, Ionic Gelation, Nanoparticles*

PTE-12

Characterization of Nanocapsules of Serunai Leaf Extract (*Chromolaena odorata* L.) with Chitosan- Alginate Variations Using The Emulsion-Diffusion Method

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ABSTRACT

Serunai (*Chromolaena odorata* L.) has been widely used in natural treatment as an antidiabetic. But the treatment using plant extracts has a disadvantage in solubility of the active substance and its bioavailability in the body. Nanocapsules can solve this problem by encapsulating the active substance of Serunai leaf extract as controlled drug delivery. To produce a good nanocapsules, it is necessary to carry out several characterization nanocapsules. Nanocapsules were prepared by emulsion-diffusion method using polymer chitosan-alginate variations. Chitosan- Alginate were widely used as natural polymers because of their biodegradable, biocompatible, and non toxic properties. Characterized by determining its particle size, zeta potential, encapsulation efficiency, and centrifugation. The results of particle size were Formula 1 (196.4nm), Formula 2 (264.2 nm), Formula 3 (207.4 nm). Nanocapsules have zeta potential of Formula 1 (-36.1 mV), Formula 2 (-40.1 mV), Formula 3 9-36.5 mV). Encapsulation efficiency was >99% and all formulas showed an emulsion type of m/a. It was found the best formula is Formula 2 with chitosan 3% and alginate 6%. This study demonstrated that Chitosan-Alginate variations have an effect on the characterization of nanocapsules.

Keywords: *Chitosan-alginate, Emulsion-diffusion method, Nanocapsules, Chromolaena odorata* L.

PHARMACOLOGY & TOXICOLOGY

PT-01

Honey-Garlic Fermentation Prevents Oxidative Stress In Hyperlipidemic Rats

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ABSTRACT

Hyperlipidemia and oxidative stress have been associated with the emergence of diseases such as cardiovascular disorders, degenerative diseases, and metabolic diseases with various complications. This increase in lipid peroxidation can be detected by measuring the levels of malondialdehyde (MDA), Superoxide dismutase (SOD), and Glutathione (GSH). This study aims to analyze the effect of fermented honey on oxidative stress parameters MDA, SOD and GSH. Wistar male rats were treated with high cholesterol with a high fat diet for 60 days. Rats that have shown high cholesterol with levels of 200 mg/dl in the test group will be treated with fermented honey at different doses, 2.5; 5; and 10 ml/kgBW/day in the test group, every day for 14 days orally. The standard drug group was treated with simvastatin at a dose of 10 mg/kg BW every day for 14 days orally. Serum was taken for analysis of levels of Malondialdehyde (MDA), Superoxide dismutase (SOD), Glutathione (GSH). The results showed that the administration of honey-garlic fermentation could significantly increase SOD and GSH levels but there was no significant change in MDA levels. The reduction of oxidative stress in rats treated with honey-garlic fermentation can be through modulation of antioxidant activity.

Keywords: *Fermented honey, Glutathione, Hyperlipidemia, Malondialdehyde, Superoxide dismutase*

PT-02

Anti-inflammatory and Mucolytic Activity Test of Ethanol Extract Fennel Leaf (*Foeniculum vulgare* Mill.)

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ABSTRACT

Chronic Obstructive Pulmonary Disease (COPD) is a progressive lung disease characterized by chronic bronchitis, airway thickening, and emphysema. There are several main mechanisms of COPD, namely chronic inflammatory processes in the airways, oxidative stress, and disturbances in the balance between proteolytic and antiproteolytic. Fennel is one of the plants that has been widely used in traditional medicine including as an anti-inflammatory, antioxidant, and reduces cough. This study was conducted to determine the potential of fennel leaf ethanol extract to be used in COPD therapy. The ethanol extract of fennel leaves was obtained by maceration which was carried out for 3x24 hours. The method used to determine anti-inflammatory activity in vitro is membrane stabilization by induction of a hypotonic solution. The mucolytic testing method was carried out in vitro using cow intestinal mucus. The ethanol extract of fennel leaves in various concentrations (25,75 µg/mL; 51,5 µg/mL; 103 µg/mL; 206 µg/mL; 412 µg/mL) showed membrane stabilization and mucolytic activity. The ethanol extract of fennel leaves at a concentration of 412 g/mL gave 53,5357% inhibition and can reduce the viscosity the most. The results of the statistical test showed the ethanolic extract of as leaves with a concentration of 25.75 µg/mL; 51.5 µg/mL; 103 µg/mL; 206 µg/mL; 412 µg/mL had % inhibition and decrease in viscosity significantly different ($p < 0.05$) with the control group. Based on data, the ethanol extract of Fennel leaves has hemolysis inhibition and mucolytic activity, but it's not equivalent (not effective) to the comparison group.

Keywords: *COPD, Foeniculum vulgare, Fennel, Inflammation, Mucolytic*

PT-03

LFER and 3D-QSAR Analysis of Febrifugine Derivatives against *Plasmodium falciparum* FCR-3 Strain

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ABSTRACT

Malaria is a serious disease caused by *Plasmodium* through the bite of the female *Anopheles* mosquito. Due to resistance to artemisin which is a first line antimalarial, new compounds are needed. This study aims to obtain a QSAR model from febrifugine derivatives against *Plasmodium falciparum* FCR-3 strain. 3D-QSAR modelling using Cloud-3D QSAR, and LFER (Linear Free Energy Relationship) Hansch QSAR equation using DTC QSAR have been carried out in this study. The results showed that the best 3D-QSAR model indicating the addition of steric substituents on carbons 6, 7, 8, 4", and 5", and electronic substituents on carbons 7 and 8 may increase activity. Furthermore, the best LFER Hansch QSAR equation is shown by pEC50 = 0,069(±0,0009) (logP)^2 +3,5234(±0,0461) (n = 40; R^2 = 0,9938; Q^2LOO = 0,9926; R^2–Q^2LOO = 0,0012; $\overline{Rm}^2$ = 0,9895; ΔRm^2 = 0,0037; Q^2F1 = 0,9956; Q^2F2 = 0,9955; CCC = 0,9978). Based on the LFER Hansch QSAR equation, the physicochemical parameter which must be considered to increase the activity is lipophilic parameters. In addition, febrifugine and its derivatives are predicted to possess a good ADMET profile. The results of this QSAR model can be used to develop further antimalarials.

Keywords: *Antimalaria, FCR-3 strain, febrifugine, QSAR*

PT-04

Antiseptic Effectiveness of Wet Tissue Preparation from Ethanol Extract of Secang Wood (*Caesalpinia sappan* L.)

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ABSTRACT

Hands contaminated with microorganisms can be the cause of infectious diseases in humans. Therefore, hand hygiene is very important to minimize the risk of infectious diseases. One of the efforts to maintain hand hygiene is to clean hands using antiseptic products. In this study, a wet tissue antiseptic preparation was formulated using the active ingredient of 4% Sappan wood (*Caesalpinia sappan* L.). The objective was to determine the effectiveness of antiseptic preparations of Sappan wood wet tissue using the percent reduction test method on research subject hands. The test was carried out on the test sample, namely wet tissue with 4% sappan wood content, a comparison test, namely wet tissue with 0.3% triclosan, and a negative control test. There were 9 research subjects involved in this study and each received pre and post treatment with the swab method using test samples, comparisons, and negative controls. The results of the statistical analysis of the percentage reduction of the test sample with the comparison using the Paired T test method with = 0.05, obtained p value = 0.832 which means that there is no significant difference in the percentage reduction between the test sample and the comparison preparation. Antiseptic preparations of wet tissue containing 4% ethanol extract of Secang wood have the same antiseptic effect as antiseptic preparations with 0.3% triclosan as the active ingredient. The preparation of Sappan wood wet tissue has the potential to be developed as the natural antiseptic product that is safe and effective.

Keywords: *Antiseptic, Caesalpinia sappan L., Percentage reduction, Secang wood, Wet tissue*

PT-05

A Photosensitization Treatment for Antimicrobial Photodynamic Therapy Mediated by Dyes

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ABSTRACT

Skin disease is a health condition that causes abnormal symptoms such as itching, pain, and discomfort that impact psychology and decrease quality of life. Treatment of skin diseases due to bacterial infections is usually treated with antibiotics, but long-term use can lead to bacterial resistance. Photodynamic Therapy (PDT) can be a promising option because it can quickly be treated with minimal side effects. This therapy requires a combination of drugs (photosensitizers), light, and oxygen. This study aimed to see the potency of dyes as candidates for PDT antimicrobial drugs. The photosensitizer used in this study was erythrosine B, para red, curcumin, beta-carotene, and riboflavin. PDT activity test was carried out by irradiating bacterial cells (*Staphylococcus aureus, Propionibacterium acnes*) in various kinds of light (640 nm red light, 423 nm blue light, and 532 nm green light).

Observations were made on several variations of irradiation time (10, 30, and 60 minutes), and variations in concentration (0.005; 0.010; and 0.015%). A cytotoxic test was carried out without LED light irradiation. All dyes have PDT activity. However, without irradiation, the pigment cannot inactivate bacteria. Erythrosin B has the potential to be further developed. Green light is the most optimal in reducing the number of bacterial cells. At a concentration of 0.015%, there was a decrease in % viability of 17.28% in S. aureus and 37.59% in P. acne for 60 minutes of irradiation. Conclusion: Erythrosine B has the potential as a photosensitizer for PDT, which is toxic to *S. aureus* and *P. acne* bacterial cells and is not toxic without irradiation.

Keywords: *Dye, PDT, Photosensitizer, Skin disease*

PT-06

Wound Healing in vivo Activity of Standardized Extract Combination from *Centella asiatica* and *Curcuma domestica* Blended with Honey

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ABSTRACT

Blended preparation is a combination of natural ingredients. Inflammation can occur due to tissue damage caused by incisions. *Centella asiatica* (CA) and *Curcuma domestica* (CD) have high antioxidant activity and have been known to have anti-inflammatory activity. The flavonoid content of typical Kalimantan honey also has anti-inflammatory and antibacterial activity. The objective of this study is to evaluate the wound healing activity of blended bee kelulut, CA and CD preparations. The total flavonoid content of combination CA and CD were determined by using spectrophotometry method with quercetin as standard. The wound healing activity was evaluated in vivo using an incision wound in male rabbit. The rabbits were divided into four groups, the first group served as positive control treated with povidone iodine, two groups treated by the blended CA and CD with honey in formula 1 and 2 respectively, and the fourth group as negative control. All the groups were treated for 8 days. The wound healing activity was determined by measuring the length of the wound in each group and comparing it to the initial wound (day zero wound). The blended preparation of CA and CD with honey in both formula 1 and formula 2 showed that after 7 days of treatment, the wound healing effect of formula 2 is slightly higher compared to formula 1 and the positive control. The blended preparation formula 2 (62.93+4.03%) has been known to have more total flavonoid content compared to formula 1(47.23+3.01%), suggesting that the wound healing activity was affected by the flavonoid content of the formula.

Keywords: *Blended extract, Centella asiatica, Curcuma domestica, Honey, Wound healing*

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