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LEMBAGA PENELITIAN DAN
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SMONAGENES
Smart Molecule of Natural Genetics Resource

CERTIFICATE

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Ernawati Sinaga

has awarded as

THE BEST PRESENTER

with presentation title

**Hepatoprotective Effect of Rhodomyrtus tomentosa Fruit Juice
in Rats Fed With High Fat High Cholesterol Diet**

in **The 2nd International Seminar on Smart Molecule of Natural Resources (ISSMART) 2020**

Head of LPPM UB

Malang, August 25-26, 2020

Head of RC SMONAGENES UB

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ABSTRACT BOOK

The 2ⁿᵈ International Seminar on Smart Molecule of Natural Resources (ISSMART) 2020

August 25-26, 2020

Topic : Smart Molecule from Natural Resources for Global Pandemic Diseases

Sub-Topics:

- Molecular science
- Biomolecular engineering
- Nutrigenomics and nutrigenetics
- Neuroscience
- Biochemistry and molecular biology

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SMONA GENES
Smart Molecule of Natural Genetics Resource

SURANAREE UNIVERSITY OF TECHNOLOGY

R RITSUMEIKAN UNIVERSITY

UTM
UNIVERSITI TEKNOLOGI MALAYSIA

WELCOME MESSAGE
RECTOR OF UNIVERSITAS BRAWIJAYA

Assalamualaikum wr. wb.

On behalf of organizing committee of ISSMART 2020, I would like to extend my warmest welcome to all delegates of ISSMART 2020 (2nd International Seminar on Smart Molecules of Natural Resources). Welcome to Malang, one of the educational cities in Indonesia. There are about 40 universities in Malang, the largest university in Malang is Universitas Brawijaya. Universitas Brawijaya is also included in the top ten the best universities in Indonesia.

ISSMART is held annually, starting last year with ISSMART 2019. This conference is organized by Research Centre of Smart Molecules of Natural Genetic Resources (SMONAGENES). SMONAGENES is one of the Research Centre in Brawijaya University. SMONAGENES is also one of the leading Research Centre in Brawijaya university. Also, one of top five Research Centre in Brawijaya university.

ISSMART 2020 aimed to promote mutual exchange between scientists and experts, to discuss of new research results in the fields of theoretical and experimental of smart molecules from natural resources. The seminar facilitates of researchers and academic members or experts from universities, government research institutions, private sectors, and non-government organization to share their knowledge and experience through the discussion on plenary session, and parallel session of oral presentation.

I believe that ISSMART 2020 should bring advantages for all participants. They will learn many new aspects of research in the related topics, either from keynote speakers or general participants. In addition, collaborations between Universitas Brawijaya and other universities both from Indonesia and overseas can be initiated.

Due to the corona virus outbreak or COVID-19 pandemic, ISSMART 2020 is going to be held as a virtual conference. However, I believe that this online seminar will still attract interests and will not reduce the excitement of this year event

Finally, I would like to express my gratitude to keynote speakers, for their expertise and knowledge they will bring to the conference, and of course the inevitable discussion their talks will spur. Special thanks are also extended to the members of organizing committee for their hard work in bringing this conference together. And last but not least, I would like to thank all of the conference participants who will contribute to making this the most memorable ISSMART yet.

Please enjoy ISSMART 2020 and have a delightful seminar.

Wassalamulaikum wr. wb.

Sincerely yours

Rector of Universitas Brawijaya

WELCOME MESSAGE
ISSMART 2020 CHAIRMAN

On behalf of the Organizing Committee, I would like to welcome all of you, keynote speakers, distinguished guests, and participants, to the 2nd International Seminar on Smart Molecule of Natural Resources (ISSMART 2020). The ISSMART 2020 is an annual scientific meeting organized by Research Centre of SMONAGENES (Smart Molecules of Natural Genetic Resource), Brawijaya University, Indonesia. This meeting aimed to promote mutual exchange between researchers and also experts, to discuss innovative ideas in scientific research.

The ISSMART 2020 runs for 2 days, 25-26 August 2020, as a virtual conference. However, I believe that the excitement to participate in ISSMART 2020 will not be lessened.
This year theme is "Smart Molecules from Natural Resources for Global Pandemic Diseases", which covers a broad range of research field with various scopes of

- Biochemistry & Molecular Biology
- Molecular Sciences
- Biomedical Engineering
- Neurosciences
- Nutrigenomics & Nutrigenetics

This particular theme is intended to promote recent advances in the field of natural genetic resources, importantly to address important issue that is outbreak of the corona virus.

This international forum also provides a platform where national and international academia or researchers, policy makers, and other stakeholders to translate technology, exchange ideas, and help stimulate multidisciplinary international collaborations in a convergent-manner for shaping a worldwide sustainable development.

The selected papers of the conference will be published in Journal of Physics: IOP Conference Series. Last year, we have published selected papers from ISSMART 2019, in Journal of Physics: IOP Conference Series, vol 1374.

Around 70 people registered to this seminar. They consist of 45 presenting participants, about 30 non-presenting participants, and 5 keynote speakers.

I would also like to thank to our keynote speakers:

Prof James Ketudat Cairns, from SUT, Thailand

Prof Fahrul Zaman Huyop, from UTM, Malaysia

Dr. Saki Shirako, from Ritsumeikan University, Japan

Prof Dian Handayani, from UB, Indonesia

And Prof Fatchiyah, from UB, Indonesia

The ISSMART 2020 could not become a reality without the help and assistance of many parties. Thus, in this occasion I would like to sincerely thank the Rector of Universitas Brawijaya, Research Centre SMONAGENES, and all members of the Organizing Committee, who have provided meaningful help and assistance for the implementation of this conference. And last but not least, I would like to thank all of the conference participants who will contribute to making this the most memorable event of ISSMART 2020.

Last but not least, we have tried to do our best to prepare ISSMART 2020. Nevertheless, there is nothing completely perfect in the world, including this conference. Therefore, please accept our deep apologizes for any inconveniences found in this conference.

Please enjoy ISSMART 2020.

Malang, 25 August 2020

Chairman of the Organizing Committee

Anna Safitri, Ph.D

Table of Contents

SCIENTIFIC PROGRAM

2nd International Seminar Smart Molecule of Natural Resources (ISSMART) 2020

Link Zoom Meeting untuk plenary session
https://univ-brawijaya.zoom.us/j/95762092617?pwd=SkU4M1o3SndxWm54Qmp5eiswWnhlZz09
Meeting ID: 957 6209 2617; Passcode: 582855

Tuesday, 25th August 2020

07.50-08.00   : Registration
08.00-08.05   : Welcome speech from ISSMART 2020 Chair
08.05-08.15   : Opening speech from Rector Universitas Brawijaya
08.15-09.00   : Moderator : dr. Nia Kurnianingsih, M. Biomed.
Keynote speaker speech: Prof Fahrul Zaman Huyop, Universiti Teknologi Malaysia, Malaysia "Biotechnological Applications: Bioremediation Potential Of Bacteria Isolated From Lake Tuz, Konya, Turkey"
09.00-09.45   : Keynote speaker speech: Prof Dian Handayani, Universitas Brawijaya, Indonesia "Functional food beta glucan as a way to prevent metabolic syndrome"
09.45-10.00   : Break
10.00-11.00   : Oral presentation session 1
11.00-12.00   : Oral presentation session 2

Wednesday, 26th August 2020

07.50-08.00   : Registration
08.00-08.45   : Moderator : Anna Safitri, PhD
Keynote speaker speech: Prof Fatchiyah, Universitas Brawijaya, Indonesia "Combination of Nutrigenetics and Nutrigenomics Approach to Deliver Individual Dietary"
08.45-09.30   : Keynote speaker speech: Saki Shirako, Ph.D, Ritsumeikan University, Japan "Comprehensive analysis of crude drugs of Japanese Kampo medicines"
09.30-10.15   : Keynote speaker speech: Prof James Ketudat-Cairns, Suranaree University of Technology, Thailand "Carbohydrate-active enzymes from rice and related compounds: Discovery & Application"
10.15-10.30   : Break
10.30-11.40   : Oral presentation session 3
11.40-12.00   : Closing ceremony and awards

ORAL PRESENTATION SCHEDULE-DAY 1 (Tuesday, 25th August 2020)

Room A (Moderator : Cleonara Yanuar Dini, M.Sc)		
Link Meeting: https://meet.google.com/vbs-mpjh-ngj		
Times	**Presenter**	**Title**
10.00-10.10	Tomohiko Sasase, Ph.D	Hemodynamics in the obese type 2 diabetic model Spontaneously Diabetic Torii Leprfa (SDT fatty) rats
10.10-10.20	Hironobu Tadaki	The glucose sensing insulin secretion with hyperglycemic clamp technique in Sprague Dawley rats
10.20-10.30	Ginta Siahaan, DCN, M. Kes	Effectiveness of Snakehead Fish Nuggets and Colored Fruit Extracts to Blood Protein (Total Protein, Albumin, Hb)

10.30-10.40	**Discussion**	
10.40-10.50	Ernawati Sinaga	Hepatoprotective Effect of Rhodomyrtus tomentosa Fruit Juice in Rats Fed With High Fat High Cholesterol Diet
10.50-11.00	Maratu Soleha	Antioxidant activity of methanol extract Tetracera scanden Predicted active compound of ethanol extract with GCMS NIST Library.
11.00-11.10	Kumboyono, M.Kep.	Analysis of Factors of Profile Lipid in Early Adulthood with Inappropriate Food Comsumption Habit : Screening Approach Dyslipidemia Induce Atherogenesis Acceleration
11.10-11.20	**Discussion**	
11.20-11.30	Dr. Harini Nurcahya Mariandayani, MSi	Relationship of Insuline Like growth Factor-2 Gene in Crosses of Indonesian Local Chicken
11.30-11.40	Imam Cholissodin, S.Si., M.Kom	Smart Development Big Data App for Determining Modelling Medicinal Compounds Covid-19 Using Deep AI Core Engine System
11.40-11.50	Stephen Kevin Giovanni	Photoacoustic Signal Modelling and Measuring Toward Glucose Concentration on Liquid
11.50-12.00	**Discussion**	

Room B (Moderator : apt. Ema Pristi Yunita, S.Farm., M.Farm.Klin)		
Link Meeting: https://meet.google.com/hae-hadu-qpw		
Times	**Presenter**	**Title**
10.00-10.10	Prof. Dr. Ir. Chanif Mahdi, MS.	The Conventional TabletEffect of Goat Milk Yogurt Caseinon Wings and Thigh Meat of Cobb Broiler Strainthat Exposed Dioxin Residue
10.10-10.20	Dr Trini Suryowati	Bioactive Compound Impacting the Metabolism and Antibacterial Activity of Gadung Tuber (Dioscorea hispida Dennst)
10.20-10.30	Andi Alfira Ratna Faradisa Dewi	In Vitro and In Silico Analysis of Pomegranate (*Punica granatum* L.) Fruit Powder as Pancreatic Lipase and α-Amilase Inhibitor
10.30-10.40	**Discussion**	
10.40-10.50	Nelma, SSi., MKes	Utilization of Activated Carbon of the Peel of Cassaca (Manihot utilissima) in Decreasing Iron and Manganese Concentration in the Dug Well Water in Tanjung Sari Village, 10 Sub districts of Medan Selayang
10.50-11.00	Isa Nuryana, M. Biotech	Root Colonization and Diversity of Arbuscular Mycorrhizal Fungi Associated with Lesser Yam (Disocorea esculenta)
11.00-11.10	Paradhita Ayu Puspitaloka	Development of Microfluidic Paper-Based Analytical Devices (µPAD) Methods for Determining Hydroquinone in Facial Whitening Cream Using Phloroglucinol Reagents
11.10-11.20	**Discussion**	
11.20-11.30	Dra.Anna Roosdiana MAppSc.	Determination of Optimum Condition to Produce Stearoyl Glycerol Enzymatically
11.30-11.40	Prof Titin Andri Wihastuti	Cytoplasm and Nuclear Crude Protein Proportion Observed in Peripheral Blood Mono Nuclear Cells under Senescence-Inducing Stress Exposure
11.40-11.50	Ulum Nidhamuddin	Hypolipidemic Effect of Avocado Peel (Persea americana Mill.) Extract in Rats with Dyslipidemia

11.50-12.00	Discussion	

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Room C (Moderator: Sisca Fajriani, MP)

Link Meeting: https://meet.google.com/awg-onxb-haz

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Times	Presenter	Title
10.00-10.10	Prof. Dr. dr. Djanggan Sargowo, Sp. PD, Sp. JP(K) FIHA, FACC, FCAPC, FESC, FASCC	Developing Herbal Medicine, The Role of β-1,3/1,6-D-Glucan forms of Polysaccharide Peptide (PsP) from Misellia Ganoderma lucidum Extracts for Lowering Elevated Total Cholesterol Level in Patients with Heart Failure in Ischaemic Heart Disease
10.10-10.20	Prof. Dr. dr. Djanggan Sargowo, Sp. PD, Sp. JP(K) FIHA, FACC, FCAPC, FESC, FASCC	Developing Herbal Medicine, The Role of β-1,3/1,6-D-Glucan forms of Polysaccharide Peptide (PsP) from Misellia Ganoderma lucidum Extracts for Lowering Elevated HbA1c Level in Patients with Heart Failure in Ischaemic Heart Disease
10.20-10.30	Sigit Yudistira	The Effect of Kangkong Vegetables (Ipomea reptans Poir.) and Swimming on Depression Intensity in Adolescent Male
10.30-10.40	**Discussion**	
10.40-10.50	Rif'an Nur Surya	The Effect of Aloe vera Juice Before Meals on Triglyceride of T2DM Patients
10.50-11.00	Dr. dr. Fauzi Yusuf, SpPD-KGEH	Low butyric acid is associated with constipation in geriatrics
11.00-11.10	Dr.rer.nat. dr. Muhsin	Rapid test screening of Covid-19 before gastrointestinal procedures, experience in a limited resource hospital
11.10-11.20	**Discussion**	
11.20-11.30	Dr. Uun Yanuhar, S.Pi., M.Si	The Status of Grouper Tissue Infected by VNN (Viral Nervous Necrosis) with Chlorella vulgaris Extract Treatment as an Anti-Virus Candidate
11.30-11.40	Nur Sakinah Junirahma, S.Pi	Immune Response of VNN (Viral Nervous Necrosis) Infected Grouper with Chlorella vulgaris Extract Treatment as An Anti-Virus Candidate
11.40-11.50	Prof Ernawati Sinaga	Supplementation of Channa lucius Extract Enhanced Wound Healing by Improving Angiogenesis in Alloxan-Induced Diabetic Rats
11.50-12.00	**Discussion**	

ORAL PRESENTATION SCHEDULE-DAY 2 (Wednesday, 26th August 2020)

Room A (Moderator: Rista Nikmatu Rohmah, S.Si., M.Si.)

Link Meeting: https://meet.google.com/vbs-mpjh-ngj

Times	Presenter	Title
10.30-10.40	Ari Asnani, S.Si.,M.Sc.,Ph.D.	Screening Anti-MRSA Activities of Indigenous Microbes and Prediction of The Biosynthetic Gene Clusters
10.40-10.50	Dr.dr.Teuku Heriansyah, Sp.JP(K)-FIHA	Lp-PLA2 and VEGF levels correlation in a population in the risk of atherosclerosis based on the Framingham Risk Score (FRS)
10.50-11.00	Davy Reyhanditya	In-Silico Analysis of Methoxyl Pectin Compounds from Banana Peels as HMG-CoA Reductase Inhibitor Complexes
11.00-11.10	**Discussion**	
11.10-11.20	Kadita Octavia Pertiwi	In Silico Analysis of CSN1S2 Peptides against Insulin Receptor as Anti-diabetic
11.20-11.30	Anggita Rahmi Hafsari, M.Si	Molecular Identification of Phosphate Solubilizing Bacteria Isolate K2.BR.5 from Rhizosfer of Imperata cylindrica Form Karst Citatah West Bandung Regency
11.30-11.40	Prof. Djoko Santoso, dr., SpPD-KGH., Ph.D., FINASIM	Effect of Ethanolic Extract of Cayratia trifolia on Histologically Kidney Mouse Model
11.40-11.50	**Discussion**	

Room B (Moderator: Dewi Ratih Tirto Sari, S.Si., MSi)

Link Meeting: https://meet.google.com/hae-hadu-qpw

Times	Presenter	Title
10.30-10.40	Prof. Muchammad Yunus, DVM., M.Kes., Ph.D	The Endogenous Development of Eimeria tenella in Chickens Injected Subcutaneously with Oocysts Protein as Initially Study of Development of Cecal Coccidiosis Killed Vaccine
10.40-10.50	Adelia Adrianne Tapiory	In Silico Study of Caffeine Compound as Antidepressants
10.50-11.00	Dr. Sri Endarti Rahayu,MSi	Protective effect of red betel (Piper crocatum) as natural antioxidants against hepatotoxicity induced by monosodium glutamate (MSG) in rats
11.00-11.10	**Discussion**	
11.10-11.20	Boyfannie Ivan Putra	Smart Ammonia Analyzer for Detecting Nitrogen-Ammonium Content in Fertilizer
11.20-11.30	Dr. Tutik Setianingsih	Improvement Of Malang Tofu Quality Using Sweet Potato Natural Dyes By Adsorption Technology
11.30-11.40	Anna Safitri	Metabolomics Profiles of Curcuma longa L and Cosmos caudatus Extracts and Their In-Silico Anti-cancer Activity
11.40-11.50	**Discussion**	

Room C (Moderator: Lidwina Faraline Triprisila, S.Si., M.Si.)

Link Meeting: https://meet.google.com/awg-onxb-haz

Times	Presenter	Title

Time	Name	Title
10.30-10.40	apt. Ema Pristi Yunita, S.Farm., M.Farm.Klin.	Effect of β-glucan Extract from Oyster Mushroom (Pleurotus ostreatus) on Expression of Serum Malondialdehyde in Sprague dawley Rat Induced by HFHF Diet
10.40-10.50	Afifah Hasna Nirwan	Production of Curcumin Nanoemulsions in Virgin Coconut Oil (VCO)-Tween 80 System with Wet Ball Milling Method
10.50-11.00	Dr. Anang Lastriyanto	Innovation Of Propolis Extraction Machine Based On Vacuum Resistive Heating
11.00-11.10	**Discussion**	
11.10-11.20	Annisa Aurora Kartika	Propolis Extraction Using Vacuum Resistive Heating Method
11.20-11.30	Sulfitriani Nahrun	Desulphurisation in Coal Using NaOH and HCl and characteristics with XRD
11.30-11.40	Viona Faiqoh Hikmawati	Virtual Prediction of Phenolic and Glucosinolate Compounds with Keap1 Protein as Anti-aging by Stimulating Nrf2
11.40-11.50	**Discussion**	

BIOTECHNOLOGICAL APPLICATIONS: BIOREMEDIATION POTENTIAL OF BACTERIA ISOLATED FROM LAKE TUZ, KONYA, TURKEY

Fahrul Zaman Huyop, PhD[1]

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Lake Tuz is the second largest hypersaline lake in Turkey and also the biggest salty lakes in the world. Economically, salt production in Turkey relies on Lake Tuz, it occupies a wide area in the central part of Anatolia. The Lake Tuz basin lies about 1500km square, located between several cities like Konya, Aksaray, Cihanbeyli, Kulu and Sereflikochisar. The highly populated area with maybe more than 3 billion people tend to create environmental problems in the area. For example, used water discharged from the neighbour cities and town. Therefore, studies on pollutant degrader like bacteria may have an ecological impact on scientific value of this natural saline and hypersaline lakes and ponds. Biodegradation of halogenated organic compounds by indigenous populations of microorganisms are highlighted because carbon-halogen bonds are the most recalcitrant. The identification of these microorganisms which have capabilities to convert the toxic hydrocarbons into less harmful products is crucial for bioremediation purposes. The initial study was to profile the microbial diversity of Tuz Golu in Turkey by means of Metagenomic Profiling. There were three potential microbes were isolated in the past, for example *Pseudomonas halophila* HX, *Bacillus subtilis* strain H1 and *Bacillus thuringiensis* strain H2. Under optimal growth conditions *P. halophila* HX almost completely degraded (99.3%) of the 2,2-dichloropropionic acid (20 mM), a model contaminant. The dehalogenase gene and protein of *P. halophila* HX was further analysed and characterised. In this context, microorganisms in highly saline environment may prove to be a practical bioremediation of contaminated coastal areas. This work is a joint project between Ondokuz Mayis University,Turkey and University Teknologi Malaysia under research grant project awarded by TUBITAK-the Goverment of Turkey.

Keywords: dehalogenase, pollutant degradation, halogenated compound, haloacids, haloalkanoic acids, *Pseudomonas halophila* HX, DehHX, Tuz Golu

Functional food (beta-glucans) as a way to prevent metabolic syndrome

Dian Handayani[1,2]

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[2]Research Center for Smart Molecule of Natural Genetics Resources (SMONAGENES),
Universitas Brawijaya, Malang, Indonesia

Metabolic syndrome is the term for a group of risk factors that elevates the risk of heart disease and other health problems, including diabetes and stroke. Metabolic syndrome becomes common as a result of frequency upsurge in obesity among adults. It is possible to prevent or delay metabolic syndrome, mainly by lifestyle changes. A healthy lifestyle is a lifelong commitment, including healthy food choices.

Functional food is one of the choices for healthy food. Functional food is food containing bioactive substances that are beneficial for health. Functional food may act in either preventing or treating metabolic syndrome. One of the bioactive substances in functional food widely used today is beta-glucans. Beta-glucans could be found in cereals, fungi, microorganisms, lichens, yeast, and algae. Glucans are glucose polymers, which have interchain linkage, either α- or β- linked. Beta (β) glucans are a heterogeneous group of non-starch polysaccharides, consisting of D-glucose monomers linked by β-glycosidic bonds. The dissimilarity in the structures of the beta-glucan bond causes beta-glucans to have various benefits. The characteristics of beta-glucans are soluble fiber and fermentable; thus, they are possible to provide prebiotic effects but also immunomodulatory (1–3).

In microorganisms, lichens, yeast, and algae, beta-glucans are usually extracted initially. In the concept of providing functional food, food ingredients containing beta-glucans widely used today are oats and mushrooms. Preventive measures for metabolic syndrome through oats have been reported to provide benefits for the prevention of obesity and insulin resistance. The mechanism of oat beta-glucan prevents the increase in blood glucose through improved satiety markers by both hormone (CCK) and subjective response through visual analog scale (4)

In addition to oats, mushrooms are also extensively reported to provide positive effects in improving lipid profiles, improving cancer, and preventing obesity. A comparison made between the benefits of Shiitake mushrooms that contain beta-glucan as much as 22% (W/W) and oats that contain beta-glucan as much as 20% (W/W) against obesity prevention shows that the Shiitake enriched diet is more potent in preventing obesity. On the one hand, other anti-nutritional substances found in Shiitake mushrooms can develop a negative effect if consumed excessively, namely an increase in liver TG and fatty liver (5–7). On the other hand, the addition of choline chloride to the diet may help to prevent this effect. Therefore, this warrants further investigation.

By considering the range of benefits of beta-glucans from various food sources, research related to beta-glucans still has the opportunity to be explored, especially the efforts to prevent metabolic syndrome.

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COMBINATION OF NUTRIGENETICS AND NUTRIGENOMICS APPROACH TO DELIVER INDIVIDUAL DIETARY

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Personal Nutrition is considered as combination of nutrigenetics and nutrigenomics. Nutrigenetics is the influence of individual genetics makeup in response to dietary components, nutrient requirements and predisposition to disease. Nutritional genetics also determines why and/or how the effect of same nutrient composition giving differently responds. The nutritional genomics is study of diet-gene interaction to describe the balance dietary arrangement. Nutrigenetics disclosed how the nutrient affects to molecular mechanism including regulation of gene expression, proteomics and metabolomics. The purpose is to address for better understanding of nutrient-gene interactions and development of personalized nutrition strategies for optimal health and disease prevention. The age, gender, physical activity, physiological state and social status, and special conditions are multiple factor to determine the personal dietary needs. There are various nutrients have been important factor in the development of the metabolic syndrome (Mets) and degenerative diseases risk. Many metabolic disorders need special dietary therapy. People with metabolic disorders need on going counselling and monitoring by a team of physicians, nurses, genetic counsellors, social workers, and dieticians for improved health and longevity. These complex disorders are difficult to treat effectively, and are increasingly prevalent as sedentary lifestyles and calorie-rich, nutrient-poor diets cause an obesity crisis throughout the developed world. Pigmented rice is currently one of the healthiest choices for healthy life, according to personal needs. Bran and grains of rice-pigmented contain a higher amount of fiber dietary than white rice. The bran contains mainly insoluble fibers, such as hemicellulose, and virtually no soluble fiber. The pigmented rice grains have a lot of bioactive compounds such as leucoanthocyanidin, phenol, flavonoids, quinone, antraquinone and glucoside and also total anthocyanin that has a higher content of nutrition values and phytochemical compounds compare with others and has biological function as anti-oxidative activity, immunomodulatory, anti-obesity, and lipid-lowering, to deliver healthy nutrition related with personal dietary.

Keywords: *biological function, Mets disease, nutrigenetics, nutrigenomics, personal nutrition*

Comprehensive analysis of crude drugs of Japanese Kampo medicines

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Traditional Japanese medicine is established as Kampo medicines and is widely used in Japan up to date. Kampo medicines are commercially available as Kampo extract products in Japan. The recipes and quality of the Kampo formulae are strictly defined by The Japanese Pharmacopoeia. Each Kampo formula consists of several crude drugs. The crude drugs are mostly derived from medicinal plants (herbs). Each crude drug includes a major constituents and principal constituents. The major constituent is included at a high content and characteristic of a crude drug. The principal constituents show pharmacological activities. However, most principal constituents are still incompletely identified and characterized. Here, in this talk, I introduce our research on separation and identification of pharmacologically active constituents from Kampo medicines and their effectiveness.

First, medical plants used in the crude drugs of Kampo medicines are extracted with methanol. The resultant extract is fractionated into three fractions based on its hydrophobicity, including ethyl acetate (EtOAc)-soluble, n-butanol-soluble, and water-soluble fractions. To screen pharmacological effects of the extract and its fractions, cell-based assays using primary cultured rat hepatocytes are performed. We can estimate anti-inflammatory activity based on pro-inflammatory mediators, such as nitric oxide (NO) and pro-inflammatory cytokines, which are produced by the hepatocytes. The fraction showing NO suppressing activity is further purified by column chromatography to obtain pure chemical compounds. Chemical structure is determined by using NMR, gas chromatography (GC)-mass spectrometry (MS), liquid chromatography (LC)-MS/MS. Animal experiments can be performed to investigate its effectiveness. Until now, NO suppressing activity of several herbal constituents was observed: shisoflavanone A found in EtOAc-soluble fraction of Perilla leaves (Perilla frutescens f. viridis); glycyrrhizin in n-butanol-soluble fraction of Licorice (roots and stolons of Glycyrrhiza uralensis); and chlorogenic acid in water-soluble fraction of flowers and buds of Lonicera japonica. Many constituents of the EtOAc-soluble fraction have been identified and shown to exert high pharmacological activity. In contrast, few studies have focused on water-soluble fraction which includes hydrophilic constituents, such as sugars, peptides, and amino acids.

There are almost no reports focusing on the peptides in Kampo medicines. Although it was initially assumed that all the peptides in foods are degraded into amino acids during digestion and absorption processes, it has been reported that some peptides are resistant to protease digestion and directly absorbed into the blood circulation. Recently, the peptides in protease digests of food proteins and some fermented foods have been shown to have biological functions, rather than sources of amino acids. These peptides are called 'bioactive peptides.' We previously established a method to identify bioactive peptides in food protein hydrolysates and some fermented foods by using LC-MS/MS. Today, I also introduce our new project to find bioactive peptides in crude drugs of Kampo medicines by using these techniques.

Carbohydrate-active enzymes from rice and related compounds: Discovery & Application

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Plants contain a wide range of carbohydrates, from glycosides, mono and oligosaccharides to polysaccharides and glycoproteins. In order to build and deconstruct these molecules, they contain a wide range of enzymes. In our investigation of enzymes related to beta-glucosidases from rice, we found enzymes with activities including phytohormone, monolignol and oligosaccharide beta-glucosidases, beta-mannosidases, beta-galactosidases and transglucosidases. Investigation of the Os9BGlu31 transglucosidase showed that it and its more active mutants can synthesize and breakdown phenolic glucose conjugates, including phytohormone conjugates, phenolic acid glucose esters and glycosides, and fatty acid glucose esters, and knockdown of the gene can affect the levels of some of these compounds in the plant. We applied this enzyme to synthesis of abscisic acid glucose ester, which allowed us to identify beta-glucosidases that act on this and other phytohormones in the plant. Moreover, production of glucose esters of phenolic acids has allowed us to investigate the action of putative acyl glucose-dependent acyl transferases, as well. Application of the enzyme to antibiotics, allowed the production of chloramphenicol glucoside. Recently, the solved the structure of the Os9BGlu31 transglucosidase and this structure is allowing us to design new mutations in order to produce new products from cheap glucose donors. Thus, investigation of the basic function of enzymes in rice has allowed us to develop tools for further investigation and production of novel products.

In Silico Study of Caffeine Compound as Antidepressants

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INTRODUCTION. Depression is a serious psychological disorders that commonly suffered by young people and affecting more than 264 million people worldwide. Based on Ministry of Health data in 2018, prevalance of depression in Indonesia is 6,1%. Phosphodiesterase-4D (PDE4D) is the best target for studying neurodegenerative diseases. Inhibiton of PDE4D have been investigated to be responsible for antidepressant effects. It is specifically used as a potential therapeutic target for depression treatment. Methylxanthines group such as caffeine (1,3,7-trimethylxanthine) is known to be PDE inhibitors. The aim of this study is to observe the interaction between caffeine and PDE4D then compared to fluoxetine, an antidepressants that commonly used for treatment. **METHODS.** Data mining are done by accessing PubChem and RCSB PDB, then ligands prepared using PyRx and protein using Discovery Studio BIOVIA 2019. PDE4D were docked to caffeine and fluoxetine using HEX 8.0.0 and visualized using Discovery Studio BIOVIA 2019. **RESULTS AND DISCUSSION.** The results shows that PDE4D binding energy for caffeine was -206.8 kJ/mol and fluoxetine was -295.6 kJ/mol. PDE4D binds to caffeine with 5 hydrogen bonds and 5 hydrophobic bonds. For fluoxetine, there are 8 interacted residue consist of 3 halogen bonds, 4 hydrophobic bonds and a hydrogen bond. Three amino acid residues between PDE4D-caffeine and PDE4D-fluoxetine shows same interaction, there are Lys254, Arg257 and Arg261. **CONCLUSION.**This shows that caffeine as alternative natural resources compound can replace fluoxetine for depression treatment because of the same interacted residue. Caffeine is better to be consumed because it doesn't cause "addictions effects" like fluoxetine.
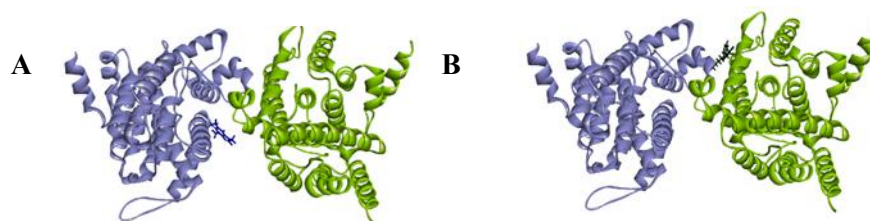
Figure 1. Docking interaction between Phosphodiesterase-4D (PDE4D) and ligands: A) Caffeine and B) Fluoxetine.

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Production of Curcumin Nanoemulsions in Virgin Coconut Oil (VCO)-Tween 80 System with Wet Ball Milling Method

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INTRODUCTION. Curcumin is one of the most popular medicines due to its various pharmacological properties. Nonetheless, curcumin has low bioavailability, insoluble in water, and aggregates easily. This can be overcomed by formulating curcumin into nanoemulsion. The aims of this study are, firstly, to determine the optimum milling time to produce curcumin nanoemulsion in the Virgin Coconut Oil (VCO)-Tween 80 system based on droplet size, polydispersity index, and nanoemulsion stability, and secondly, to determine the curcumin efficiency of encapsulation. **METHODS.** Curcumin nanoemulsion were prepared by wet ball milling method since it is more environmentally friendly, cost effective, easy to operate, and using no harmful organic solvents. Curcumin nanoemulsion was made by the combination of 1 mg curcumin powder, 200 µl VCO as oil phase, 60 µl Tween 80 as surfactant, and 5 ml aqua DM as dispersion medium. Parameters analysed include morphology shape, droplet size (nm), polydispersity index, nanoemulsion stability, and encapsulation efficiency. **RESULTS AND DISCUSSION.** The results show that curcumin nanoemulsion system milled for 24 hours produce smallest droplet size (160 nm), lowest polydispersity index (0.176), and stable during 30 days in the storage at room temperature (25 °C) and refrigerator temperature (4 °C). The maximum of curcumin that can be added in the nanoemulsion and produce a droplet sizes below 500 nm is 300 mg with an encapsulation efficiency of 78.13 % of the total curcumin in the nanoemulsion system. **CONCLUSION.** In summary, the current work has demonstrated the successful incorporation of curcumin into oil in water (O/W) nanoemulsion particles with small particle size, small index polydispersity, good physical stability, and fairly high encapsulation efficiency. Curcumin-loaded oil in water nanoparticles may be a promising drug delivery system to control drug release with improved bioavailability.
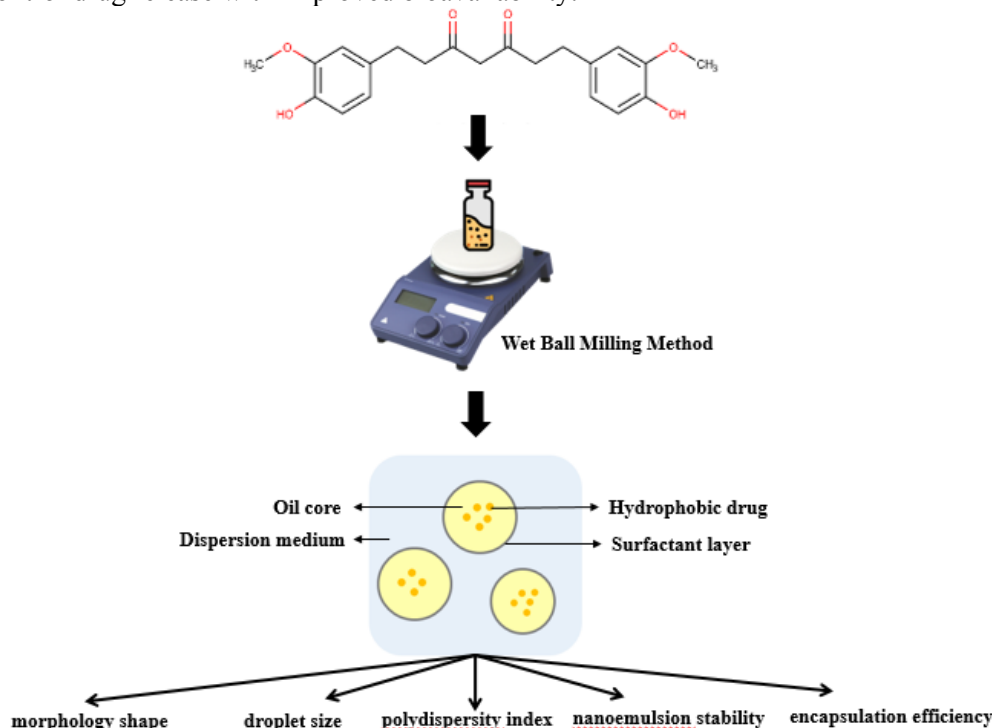
Innovation Of Propolis Extraction Machine Based On Vacuum Resistive Heating

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INTRODUCTION. In herbal medicine production, extraction technology is an important part of the process because it determines the quality. One of herbal medicine is propolis. The extraction of propolis is limited to conventional maceration method which the process is too long (72 hours)[1]. New technology called vacuum resistive heating is an extraction technology that utilizes electric current[2]. Resistive heating has variety of applications such as blanching, evaporation, fermentation, sterilization, and pasteurization[3]. In vacuum condition, it has been applied to dehydration, evaporation and distillation[4]. So that in this study the propolis will be extracted using vacuum resistive heating method. This study aims to design and evaluate the result of vacuum resistive heating extraction machine design. **METHOD**. This study used completely randomized design method with the method variations. The origin of propolis comes from Makassar, Batu and Bali. The extraction process was carried out 20 minutes in two stages. The first process was at a pressure of 16,6 KPa, 100V and 58°C using water solvent. While the second process was using 70% ethanol-water solvent at 16,6 KPa, 220V, and 37°C. The results were compared with propolis extracted by maceration method. **RESULTS AND DISCUSSION.** The results showed that the extraction machine ran well where the electric field affects the heat rate of the material. Energy consumption in the process was 0.4225 kWh/L. Then, the difference in propolis origin and the extraction method has a significant effect. The highest total phenol in vacuum resistive heating method was 45.72 mg GAE/g whereas the maceration method is only 24.2 mg GAE/g. The highest total flavonoids in vacuum resistive heating method were 15.19 mg QE g whereas the maceration method is only 3.15 mg QE/g. **CONCLUSION.** Vacuum resistive heating as extraction machine is a promising way for aseptically producing herbal medicine especially propolis. Propolis that was extracted by resistive vacuum heating had higher phenol and flavonoid content than maceration method. Food processing that involves electricity is often used as alternative to other thermal processing because electricity increase extraction yields and preserve bioactive compounds. By this advantageous, this model is feasible to be developed with various variants.

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In Vitro and In Silico Analysis of Pomegranate (Punica granatum L.) Fruit Powder as Pancreatic Lipase and α-Amilase Inhibitor

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INTRODUCTION. Excessive intake of fat and carbohydrates causes obesity, which leads to various diseases such as hypertension, heart disease, and diabetes mellitus. Moreover, obesity can be prevented with exercising, dietary intake, or inhibiting lipase and α-amylase enzyme activity by consuming orlistat and acarbose, respectively. Nevertheless, due to the side effects both of them, the exploration of bioactive compounds from herbal ingredients, especially fruit, is still an interesting challenge. Previous studies demonstrated that pomegranate ethanol extract which is rich in flavonoids, specific quercetin, has been shown activity as a pancreatic lipase inhibitor, but its activity in the form of the hot water extracted from dried powder is unknown yet. These study aims are to produce pomegranate powder, then to extracted with boiling water and to find out the phytochemical compounds, total phenolic compounds (TPC), total flavonoid compounds (TFC) and its inhibitory activity against pancreatic lipase by in vitro analyzed. Besides that, a compound that exists in pomegranate will also be in silico analyzed by docking technique, for its binding with the α-amylase enzyme compared to acarbose. **METHODS**. Qualitative phytochemical test and quantitave phytochemical test for total phenolic compounds (TPC) and total flavonoid compounds (TFC), bioassay such as in vitro inhibition tests were conducted by titrimetric method, using olive oil as substrate, pancreatic lipase as enzymes, and orlistat as a standard inhibitor; meanwhile, the in silico test was conducted by molecular docking techniques using human α-amylase as a receptor and acarbose and a compound in pomegranate (quercetin) as a ligand.. **RESULTS AND DISCUSSION.** The result has shown that hot water extracts of pomegranate fruits (1.5gr/150ml) contained flavonoids, polyphenols, and alkaloids qualitatively. Moreover, TPC and TFC contents were 0.01% and 0.75%, respectively; had inhibition activity of lipase pancreas 0.54 times compared to orlistat at the same mass (120 mg), and in the other hand, based on its molecular docking, quercetin, a compound that exist in the pomegranate could inhibit α-amilase competitively, even with slightly smaller affinity bindings than acarbose. **CONCLUSION.** Based on inhibition data activity, extracts of pomegranate have potency as alternative medicine of anti-obesity and quercetin as a inhibitor of α-amylase enzyme.
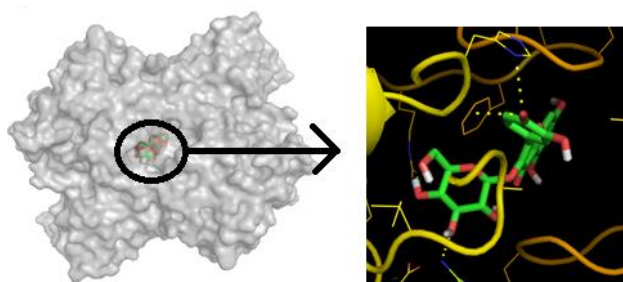
α-Amylase enzyme and quercetin as a ligand

Molecular Identification of Phosphate Solubilizing Bacteria Isolate K2.BR.5 from Rhizosfer of Imperata cylindrica Form Karst Citatah West Bandung Regency

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INTRODUCTION. The aim of this research was to observe the species of isolates (K2.BR.5) isolated from the rhizosphere of *Imperata cylindrica* plants in the karst area of Citatah Padalarang, Bandung Regency. **METHODS.** Research incl. DNA extraction, DNA amplification by PCR, qualitative DNA testing by electrophoresis and sequencing. **RESULTS AND DISCUSSION.** The results obtained sample concentration of 115.1 ng / μl with DNA purity of 0.82 at wavelength A260 / 280, then the results of the PCR DNA band were tested qualitatively by electrophoresis with a fragment length of 1500 bp, rRNA gene 16s results in the phylogenic tree of bacteria Isolate K2.BR. 5 has a similarity or relationship with the species *Aneurinibacillus migulanus* Isolate Am25 with a bootstrap value of 99%. Based on the genetic distance between Isolate K2.BR.5 and *Aneurinibacillus migulanus* Isolate Am25 has a distance value of 0.71%. Isolate K2.BR.5 is a Species Sp. with a fragment length of 1500 bp at 16s RNA.

Keywords: 16S rRNA sequence, distance, DNA extraction, karst, sequencing

Determination of Optimum Condition to Produce Stearoyl Glycerol Enzymatically

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INTRODUCTION. Stearoyl glycerol is the result of the esterification of glycerol with stearic acid enzymatically using immobilized lipase as catalyst. The lipase is immobilized with chitosan matrix with entrapment method. This study aims were to determine the optimum condition of esterification of glycerol with stearic acid based on reaction time and temperature, and reactant mol ratio. **METHODS.** The esterification reaction was done by varying reaction time (6, 12, 18,24,30) hours, reaction temperature (30, 35, 45, 50, 55) °C, and mol ratio of stearic acid : glycerol (1:1, 1:2, 1:4, 1:6, 1:8), the optimum conditions were achieved through conversion percentage. The produced ester were identified by FTIR spectrophotometer and characterized by the value of Hydrophilic-Lipophilic Balance (HLB). **RESULTS AND DISCUSSION**. The results showed that optimum conditions on reaction time 24 hours, reaction temperature 45 °C and mol ratio of stearic acid : glycerol (1:2) produced stearoyl glycerol with conversion percentage of 9.77% and HLB values of 5.01 that was included in the w/o emulsifier type. In addition, the FTIR spectra showed a strong absorption at wave numbers 1703.03 cm-1(C=O), 1043.02 cm-1 (C-O), and 3402.20 cm-1 (O-H) which indicated the characteristic absorption of stearoyl glycerol.

Metabolomics Profiles of *Curcuma longa* L and *Cosmos caudatus* Extracts and Their *In-Silico* Anti-cancer Activity

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INTRODUCTION. *Curcuma longa* L. is distributed throughout tropical and subtropical regions of the world, mostly cultivated in Asian countries**.** A natural yellow pigment derived from Curcuma longa L. is curcumin and is a mixture of curcuminoids**.** *Cosmos caudatus* is a rich source of bioactive compounds including proteins, minerals and vitamins, phenolics, flavonoids, and carbohydrates; and hence, increasing its nutritious significance**.** In this current study, *Curcuma longa* L was extracted using ethanol, in order to obtain curcumin, and *Cosmos caudatus* was extracted using n-hexane in order to obtain lutein. The mixture of *Curcuma longa* L and *Cosmos caudatus* extracts was designed into nanoparticles. The biological activity of curcumin and lutein were determined through *in silico* study. **METHODS.** Liquid chromatographic separation was conducted in the LSIH Laboratory, Universitas Brawijaya. Solvents used were, solvent A= 0.1% formic acid in water, solvent B=0.1 % formic acid in acetonitrile, with analytical flow rate of 40 μL/min. The 3D structures of *Curcuma longa* L and *Cosmos caudatus* extratcs were obtained from PubChem database: curcumin (CID 969516) and lutein (CID 448437). PyRx Virtual screening tool software was used to minimize their energy and convert the SDF format into PDB format. The human caspase-8 protein structure was obtained from the RCSB Protein Data Bank (PDB ID: 1QTN.A)**.** Human caspase-8 protein was docked to curcumin, lutein, and complex of curcumin-lutein. The HEX 8.0 software was used in this study to predict the interaction and energy binding of curcumin, lutein, and curcumin-lutein to caspase-8 protein. The docking results were visualized using Discovery studio visualizer v19.1.0.18287 program, 2018 version. **RESULTS AND DISCUSSION**. The predominant compounds contained in the *Curcuma longa* L extracts were tentatively identified as curcumin (RT=0.862 min), methyl palmitate (RT=10.710 min), dibutyl phthalate (RT=13.001 min), 1-stearoylglycerol (RT=16.534 min), stearamide (RT= 20.078 min), and choline (RT=26.335 min). The compounds contained in the *Cosmos caudatus* extracts were almost similar, which were triethanolamine (RT=1.010 min), lutein (RT=13.007 min), 1-stearoylglycerol (RT=16.586 min), stearamide (RT=20.066 min), and choline (RT=26.331 min). There were 5 interactions between curcumin and caspase-8 protein, consist of 2 hydrogen bonds, 2 hydrophobic interactions, and 1 unfavorable interaction**.** The binding energy between curcumin and caspase-8 was -291.8 cal/mol, with an LD_{50} value of 2000 mg/kg. There were more interactions between lutein and caspase-8. Those interactions consisted of 1 hydrogen bond, 6 hydrophobic interactions, and 4 unfavorable interactions. The binding energy between lutein and caspase-8 was -377.9 cal/mol, with LD_{50} value of 10 mg/kg. The interaction between the curcumin-lutein complex and caspase-8 formation of 11 interactions, 5 hydrophobic interactions and 6 interactions that are unfavorable. The binding energy between lutein-curcumin and caspase-8 was -425 cal/mol, with an LD_{50} value of 2000 mg/kg. The interaction of complex of curcumin-lutein with caspase-8 enzyme was the strongest, as indicated from the lowest binding energy. This suggest that the mixture of curcumin and lutein had the highest potential as anti-cancer agent. **CONCLUSION**. This study suggests that the use of LC-HRMS tentatively identified compounds contained in *Curcuma longa* L and *Cosmos caudatus* extracts. Curcumin, from *Curcuma longa* L extracts, and lutein from *Cosmos caudatus* extracts had the potential as anti-cancer agent, as well as mixture of curcumin and lutein. These have been shown by computational molecular docking of these compounds to caspase-8 protein, apical caspase which initiates programmed cell death. From the *in silico* studies, interactions of caspase-8 protein to curcumin, lutein, and complex of curcumin-lutein resulted in the binding energy of -291.8 cal/mol, -377.9 cal/mol, and -452 cal/mol.

Screening Anti-MRSA Activities of Indigenous Microbes and Prediction of The Biosynthetic Gene Clusters

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INTRODUCTION. Methicillin-Resistant Staphylococcus aureus (MRSA) is S. aureus, which shows resistance to the methicillin class of antibiotics. MRSA infection poses significant health problems because it causes severe disease in a vulnerable population and also because effective antibiotics are limited. Currently, actinomycetes are known as the main microbes producing antibiotics. AntiSMASH analysis of potential actinomycetes can predict the presence of Biosynthetic Gene Clusters (BGC), which encode all the enzymes needed to produce secondary metabolites. Thus, the study aimed to screen actinomycetes as potential anti-MRSA microbes and predict BGC from these actinomycetes. **METHODS**. This study used ten actinomycetes isolated from mangrove areas in Segara Anakan Cilacap and clinical MRSA 2983 from the Faculty of Medicine, UNSOED. DNA isolation used Quick-DNATM Fungal/Bacterial Miniprep Kit, 16S rRNA gene amplification used 27F and 1492R primers, and DNA amplicons were sequenced by the Sanger sequencing method. BCG prediction on the associated actinomycetes genes used the antiSMASH program. **RESULTS AND DISCUSSION.** The results showed that W-5A, P-6B, and W-5B isolates have anti-MRSA activities with inhibition indexes of 0.58; 0.53; and 0.47, respectively. The results of BGC analysis showed that W-5A (Streptomyces longisporoflavus) has one BGC with similarity to tetronacin. P-6B (Pseudarthrobacter siccitolerans) has one BGC with similarity to desferrioxamine E. W-5B (Streptomyces cellulosae) has eight BGCs with similarity to tiacumicin B, actinorhodin, ulleungmycin, albaflavenone, desferrioxamine B/E, stenothricin, auricin, and lugdunomycinauricin, and lugdunomycin. **CONCLUSION.** Based on these results the microbes isolated from Segara Anakan Cilacap are potential to be anti-MRSA producing microbes.

The Conventional Tablet Effect of Goat Milk Yogurt Casein on Wings and Thigh Meat of Cobb Broiler Strain that Exposed Dioxin Residue

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INTRODUCTION. Public consumption of chicken meat, especially broiler chickens continues to increase as time goes by. Chicken meat is more desirable by the public due to: easy to be digested, has an affordable price, and as a good source of animal protein. The current issue regarding food safety of animal origin is the presence of dangerous contaminants from dioxin compounds. Dioxin already known as dangerous chemical produced from household combustion and industrial waste. Food has a main role and pathway source in order to help dioxin entered the human body, mostly found in beef, chicken, fish, eggs, and milk. **METHODS.** This study used a completely randomized design (CRD) with 18 *Cobb broiler strain* chickens as experimental animals, which are divided into 3 groups namely: negative control group, positive control group, and therapy group. The experimental animals were given 3 conventional casein tablets of goat yogurt milk in every single goat/day (casein dose 750 mg of tablet weight) dissolved with Reverse Osmosis water (RO) and 2,3,7,8-TCDD dose of 50 ng/ml/1 kg of feed for 21 days. Samples of wing and thigh meat were analyzed for the residual dioxin levels using a 300nm wave length UV spectrophotometer. The residual content data is processed statistically with ANOVA test followed by *Least Significance Different* (LSD) test. **RESULTS AND DISCUSSION**. The results showed a decrease in the level of residual dioxin on wing and thighs meat of the therapy group obtained by comparison of average positive control residue level.

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In-Silico Analysis of Methoxyl Pectin Compounds from Banana Peels as HMG-CoA Reductase Inhibitor Complexes

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INTRODUCTION. Cardiovascular disease (CVD) is one of the most important health problems that emerge in the last decade. The major factor of the disease is by the high level of cholesterol in blood. Several ways can be used to reduce the amount of cholesterol in blood, as using HMGR treatment. This enzyme acts as catalyst in the initial step and limits the cholesterol biosynthesis. Pectin is a polysaccharide compound that used as an agent to reduce the total cholesterol in bloods. In this research, we aim to analyze the function of methoxyl pectin in inhibiting excessive cholesterols in blood by binding with the HMGR. **METHODS.** The method we used in this research, first step searching data mining from database and preparation of protein and ligands using discovery studio. Molecular docking analyzed via HEX software. The result of molecular docking is visualized using discovery studio to analyze the energy binding level, also the bonds that formed and the impact that comes from the bonds. **RESULTS AND DISUCUSSION.** The results show that HMGR binding energy for native ligand (HMGCoA) as control ligand was -450.2 kJ/mol, methoxyl pectin was -177.3 kJ/mol and atorvastatin, a group of drugs commonly used for CVD treatment was -386.6 kJ/mol. HMGR binds to HMGCoA with 7 hydrogen bonds and a hydrophobic bond. Methoxyl pectin binds to HMGR with residue Glu700 and His625. Atorvastatin binds to HMGR with residue Lys633 and Leu634. It is known that native ligands bind to HMGR when cholesterol goes down. Based on research, methoxyl pectin bond with HMGR is the same as the HMGCoA native ligand with HMGR, namely His635. **CONCLUSION.** This shows that methoxyl pectin is predicted to inhibit HMGR and resulting LDL cholesterol decrease. Methoxyl pectin is indicated to be an alternative drug for cardiovascular disease considering that atorvastatin has several side effects. Methoxyl pectin is derived from natural ingredients with minimum side effect. Keywords: atorvastatin, binding energy, cardiovascular disease, HMGR, methoxyl pectin.
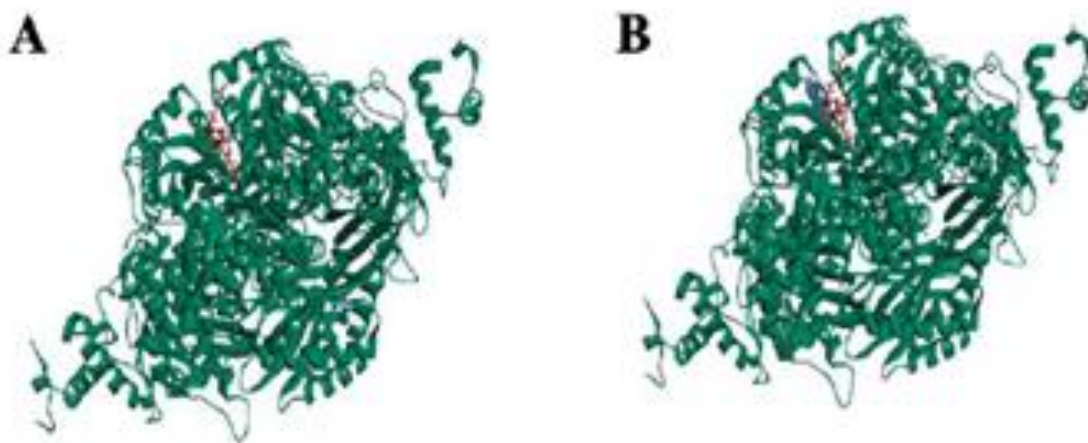
Figure 1. Docking results between HMGR-CoA Complex with A) Methoxyl Pectin B) Atorvastatin.

Developing Herbal Medicine, The Role of β-1,3/1,6-D-Glucan forms of Polysaccharide Peptide (PsP) from Misellia Ganoderma lucidum Extracts for Lowering Elevated Total Cholesterol Level in Patients with Heart Failure in Ischaemic Heart Disease

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INTRODUCTION. High levels of total cholesterol can worsen the condition of ischemic heart failure. Polysaccharide peptide (PsP) is a capsule of *Ganoderma lucidum* extract. This study aims to measure changes in total cholesterol levels in patients with ischemic heart failure before and after the administration of PSP and Placebo and to analyze differences in decreases in total cholesterol levels between PSP and Placebo group. **METHOD**S. This research is a true experiment with a prospective double-blind randomized control method through pre-post test design. The sample consisted of 26 patients, divided into 2 groups and given PSP or placebo capsules per oral interventions carried out every day for 90 days. Venipuncture blood was taken before and after the intervention to measure total cholesterol levels by spectrophotometry methods. Paired T Test was used to determine the average reduction in total cholesterol levels for each group. Independent T Test was used to determine the difference of reduction in total cholesterol average between the two groups. **RESULTS AND DISCUSSION.** The decrease of total cholesterol average level in PsP group was 24.3 mg/dl (p value 0.001) and an increase of Placebo group was 8.3 mg/dl (p value 0.099). Comparison of the average reduction in total cholesterol levels in PsP : Placebo group was 24.31: -8.31 mg/dl (p value 0.000). **CONCLUSION.** There was significant decrease total cholesterol levels in PsP group and neither was of the Placebo group. In addition, there was significant difference in the reduction of total cholesterol levels between PSP and Placebo group.

Keywords: *Ganoderma lucidum,* Ischemic Heart Failure, PsP, Total Cholesterol

Developing Herbal Medicine, The Role of β-1,3/1,6-D-Glucan forms of Polysaccharide Peptide (PsP) from Misellia Ganoderma lucidum Extracts for Lowering Elevated HbA1c Level in Patients with Heart Failure in Ischaemic Heart Disease

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INTRODUCTION. Increased HbA1c level is associated with a worse prognosis in ischemic heart failure. Polysaccharide Peptide (PsP) is a capsule from the extract of mycelia *Ganoderma lucidum*. The purpose of this study was to measure HbA1c level changes in ischemic heart failure patients before and after given of PsP or placebo and to analyze differences of HbA1c level reduction in PsP group and placebo group. **METHODS.** This study was a true experimental with double-blind prospective randomized control method through pre-test and post-test design. The sample consisted of 26 patients, divided into two groups and given PsP or placebo capsules orally everyday for 90 days. Before and after the intervention, the venipuncture blood was taken to measure the HbA1c level by spectrophotometric method. The Wilcoxon test was used to measure HbA1c average level changes for each group and the Mann Whitney U test was used to determine HbA1c level average reduction between two group with significance level of 0,05. **RESULT AND DISCUSSION.** The average HbA1c level in PsP group was decrease 0,7% from 8,08% to 7.38% (P value = 0.041) and in placebo group was increase 0,31% from 8,23% to 8,54 % (P value = 0.272). The comparison of the average decrease HbA1c levels in PsP: placebo group was 0.7%: -0.31% (P value = 0.039). **CONCLUSION.** There was significant decrease in HbA1c level in PsP group and there was no decrease in HbA1c level in placebo group. In addition, there was significant decrease diffeences of HbA1c between and placebo group.

Keywords: *Ganoderma lucidum*, HbA1c, Ischemic Heart Failure, PsP

Effect of Ethanolic Extract of *Cayratia trifolia* on Histologically Kidney Mouse Model

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INTRODUCTION. The study was carried out to observe the effect of ethanolic extract of *Cayratia trifolia* on histologically kidney mouse model. **METHODS.** A total of 12 adult male Balb/c mice were randomly divided into two groups, comprising six mice in each group. The first group of 6 mice served as the control group and received 25 ml/kg BW orally sodium carboxymethylcellulose during 6 days. The second group, 6 mice was administered 50 mg/kg BW of *C. trifolia* ethanolic extract in sodium carboxymethylcellulose orally during 6 days. The present study, we have performed histological kidney mice evaluation after 6 days of *C. trifolia* ethanolic extract administration. The histological kidney mice was quantified in term of tubular epithelium, glomerular and focal mononuclear infiltrate. **RESULTS AND DISCUSSION.** The effect of administration of *C. trifolia* ethanolic extract on histological kidney of mice appeared normal tubular morphology in cortical and medullary regions of kidney in administered *C. trifolia* ethanolic extract mice, there was no kidney change histologically showed normal architecture of the glomerulus and tubules, while in control mice group, kidney histologically first marked with mononuclear cell infiltration, glomerular congestion, tubular necrosis and hyaline casts. **CONCLUSION.** The study results demonstrated that relatively sufficient in histopathological changes in the corticomedullary junction of mice kidneys, including tubular epithelial damage, tubular dilatation and intratubular cast formation.

Keywords: Balb/c mice, *C. trifolia* ethanolic extract, kidney

Effect of β-glucan Extract from Oyster Mushroom (*Pleurotus ostreatus*) on Expression of Serum Malondialdehyde in *Sprague dawley* Rat Induced by HFHF Diet

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INTRODUCTION. The prevalence of obesity in the world increases yearly. This is considered as a serious health condition in the society because, the disease can cause clinical problems related to metabolic syndrome and also trigger lipid peroxidation. Therefore, this study aimed to determine the effect of β-glucan extract from oyster mushrooms on one of the lipid peroxidation markers, which is serum MDA levels in rats induced by the High-Fat-High-Fructose (HFHF) diet. **METHODS.** To evaluate it, the rats were divided into four groups, which are KN, KP, P1 and P2. The diets given to them were as follow, AIN-93M standard to KN, AIN-93M modified HFHF to KP, AIN-93M modified HFHF + 125 mg/kgBW β-glucan to P1, and AIN-93M modified HFHF + 375 mg/kgBW β-glucan to P2. The treatment was administered for 14 weeks. Fourier-transform infrared spectroscopy (FTIR) spectrophotometer was used for the detection test of β-glucans, while its content analysis in the mushroom was carried out by using Mega-Calc^{TM} from Megazyme. MDA levels were investigated through thiobarbituric acid reactive substances (TBARS) method. **RESULTS AND DISCUSSION.** The average Lee Index of the rats and MDA level can be seen in Table 1.

Table 1. Lee Index Values and Kruskal-Wallis Analysis Results of Serum MDA Levels

Group	Average Lee Index ± S.D	p	Average MDA Levels (ng/mL) ± S.D	p
KN	294.00 ± 6.40	0.687	507.833 ± 35.95[a]	< 0.001*
KP	292.78 ± 6.37		504.184 ± 29.17[a]	
P1	291.85 ± 9.60		540.397 ± 29.80[a,b]	
P2	286.88 ± 10.60		553.996 ± 86.78[c]	

Kruskal-Wallis Test. Mann-Whitney Post-hoc Test. Within a column, values with different superscript are significantly different, *p < 0.05*.
*It is statistically significant when the *p value < 0.05*.

The HFHF diet caused the rats to experience pre-obesity conditions resulting in lipid peroxidation due to free radical induction. It also brought about membrane function damage and various diseases. In addition, free radicals in the body can be determined through the measurement of serum MDA levels. From the FTIR spectrum results, it was proven that the extract contained β-glucans which has antioxidant effect. Therefore, provision of the extract is expected to be able to counteract the formation of free radicals. However, the β-glucans given was not able to reduce serum MDA levels. This might have resulted from the inadequate dose or duration of its administration. **CONCLUSION.** The results showed that the dose and duration may not be adequate enough to prevent the process of lipid peroxidation.

Hepatoprotective Effect of *Rhodomyrtus tomentosa* Fruit Juice in Rats Fed With High Fat High Cholesterol Diet

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INTRODUCTION. Hepatic diseases is an alarming public health problem due to its growing prevalence and potential as risk factor for other diseases. One of the main cause of hepatic diseases is daily lifestyle including high fat high cholesterol diet. Medical treatments for these diseases are often difficult to achieve and may have limited efficiency. Therefore, there has been considerable interest in developing nutraceuticals from natural products that may prevent or reduce the risk of developing liver diseases. Fruits of *Rhodomyrtus tomentosa*, an edible wild fruits that thrives in tropical areas including Indonesia, contains various phytochemicals such as flavonoids and terpenoids which are potential to be developed as hepatoprotective agent. In this study we conducted experiments to prove the effectiveness of *R. tomentosa* fruit juice as hepatoprotective agent in rats fed with high fat high cholesterol diet. **METHODS**. The experiments were carried out using male albino rats (*Rattus norvegicus*) which were fed with high fat high cholesterol diet (HFHCD) for 75 days and at the same time orally supplemented with *R. tomentosa* fruit juice in doses of 500,1000 and 2000 mg/kg bw daily for 75 days. Simvastatin is used as a positive control. At the end of the experiment, the liver function markers in serum, alanine aminotransferase (sALT) and aspartate aminotransferase (sAST) were determined as well as the examination of histopathological image of the liver. **RESULTS AND DISCUSSION.** Results of the experiments showed that HFHCD significantly induced hepatotoxicity showed by increase of sALT and sAST level. Supplementation of *R. tomentosa* fruit juice (RTFJ) significantly prevent the increase of sALT and sAST levels in rats fed with HFHCD (Figure 1). Histopathological examination showed that the administration of RTJF maintained the healthy histopathological image of liver tissue in rats fed with HFHCD, reduce inflammatory cells, swollen hepatocytes, and fatty liver as seen in untreated rats (Figure 2). **CONCLUSION.** *R. tomentosa* fruit juice possess significant hepatoprotective activity in rats fed with high fat high cholesterol diet, and therefore could be develop further as nutraceutical to prevent hepatic disorder due to high fat high cholesterol diet.

Keywords: hepatoprotective, high cholesterol diet, nutraceuticals, *Rhodomyrtus tomentosa*

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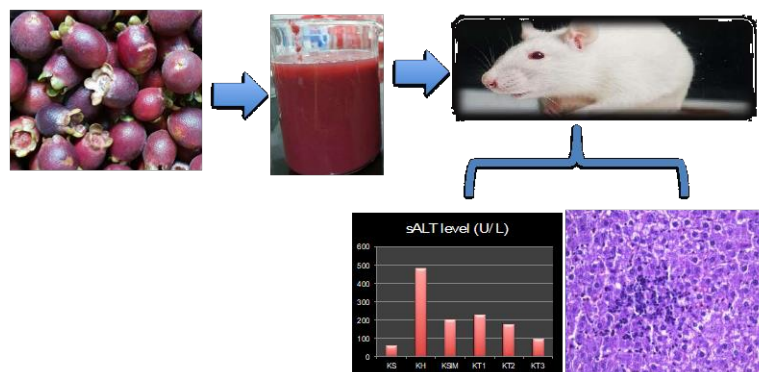
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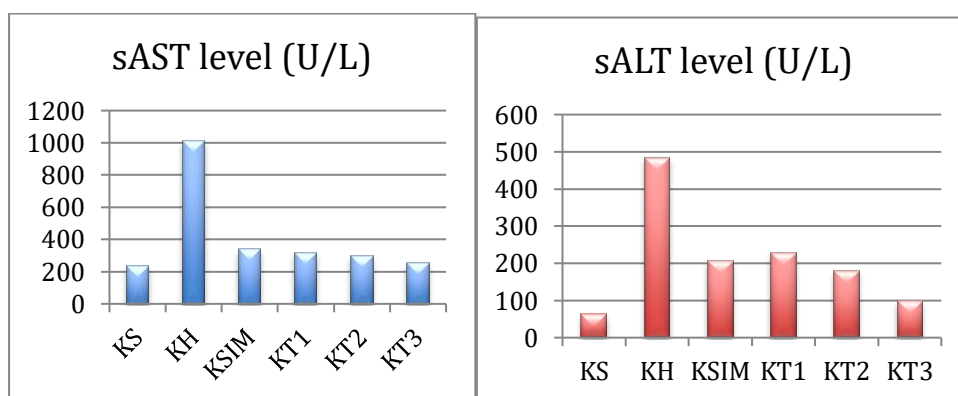
Figure 1. sALT (serum alanine aminotransferase) and sAST (serum aspartate aminotransferase) levels in rats fed with high fat high cholesterol diet.
(KS=healthy control group; KH=Rats fed with HFHCD without treatment; KSIM= Rats fed with HFHCD treated with simvastatin; KT1, KT2, KT3= Rats fed with HFHCD treated with RTFJ doses 500, 1000, and 2000 mg/bw respectively)
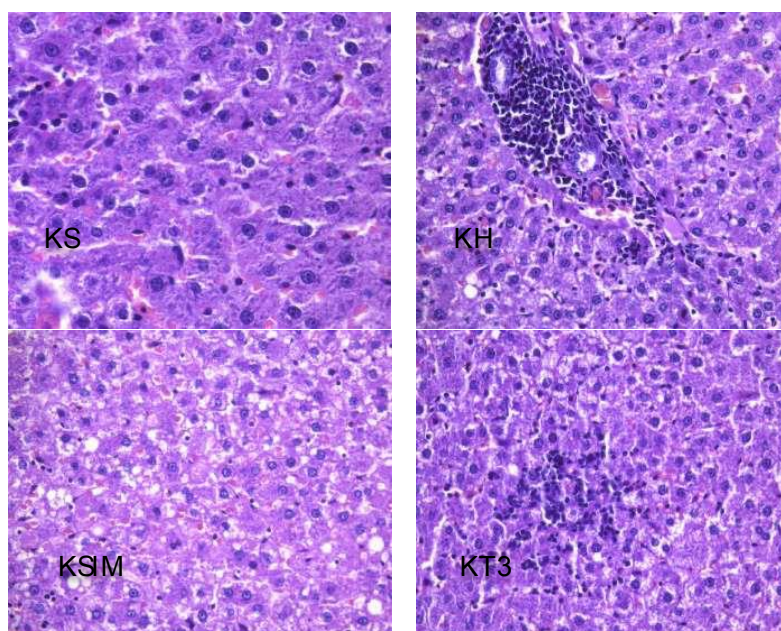
Figure 2. Histopathological images of liver rat's fed with high fat high cholesterol diet.
(KS=healthy control group; KH=Rats fed with HFHCD without treatment; KSIM= Rats fed with HFHCD treated with simvastatin; KT1, KT2, KT3= Rats fed with HFHCD treated with RTFJ doses 500, 1000, and 2000 mg/bw respectively)

Supplementation of *Channa lucius* Extract Enhanced Wound Healing by Improving Angiogenesis in Alloxan-Induced Diabetic Rats

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INTRODUCTION. Angiogenesis plays a critical role in wound healing, and impaired angiogenesis is an important factor in delayed healing in diabetic wound. *Channa lucius* is a species of snakehead fishes that is traditionally used in Indonesia as functional foods for women postpartum to promote wound healing. Several studies have shown that supplementation of *Channa lucius* extract (CLE) can accelerate diabetic wound healing, however the mechanism is not known yet. In this study we investigated the activity of CLE in improving impaired angiogenesis in diabetic rats while enhancing the wound healing. We also investigated whether the wound healing activity of CLE is related to its activity in normalizing the glucose level of the diabetic rats. **METHODS**. Full thickness of excision wounds were inflicted at the dorsal of diabetic male Sprague-Dawley rats previously injected with a single dose of 125 mg/kgbw alloxan. Rats with blood glucose level ≥200 mg/dL were considered diabetic and assigned for the experiment. Subsequently, the rats were orally treated with *Channa lucius* extract (CLE) in doses of 1.25, 2.5, and 5 g/kgbw once daily until the wound completely healed. Glibenclamid (5 mg/kgbw) was used as positive control. The wound healing progress was assessed by measuring the wound surface area every 3rd day after wound formation. At day 9, 18, and at the day of complete healing, the rats were euthanized using ketamine hydrochloride, the wound tissues were collected for examination of the capillary density and the serum were checked for glucose level. **RESULTS AND DISCUSSION.** Supplementation of CLE significantly accelerated the wound healing (Figure 1) and improved the angiogenesis (Figure 2). Supplementation of CLE 5 g/kgbw accelerated the complete healing of the diabetic wounds 156% faster compare to the untreated ones. However, the improvement in wound healing is not correlated with mild hypoglycemic activity of CLE (Figure 3). **CONCLUSION.** From the results we concluded that supplementation of *Channa lucius* extract enhanced diabetic wound healing by improving the angiogenesis in diabetic rats, however, it could not decrease the serum glucose of diabetic rats to normal level.

Keywords: Angiogenesis, *Channa lucius*, diabetic, hypoglycemic activity, wound healing

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Graphical Abstract

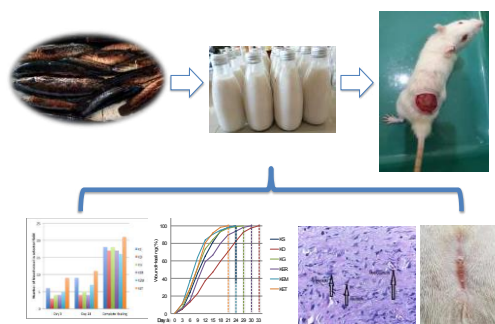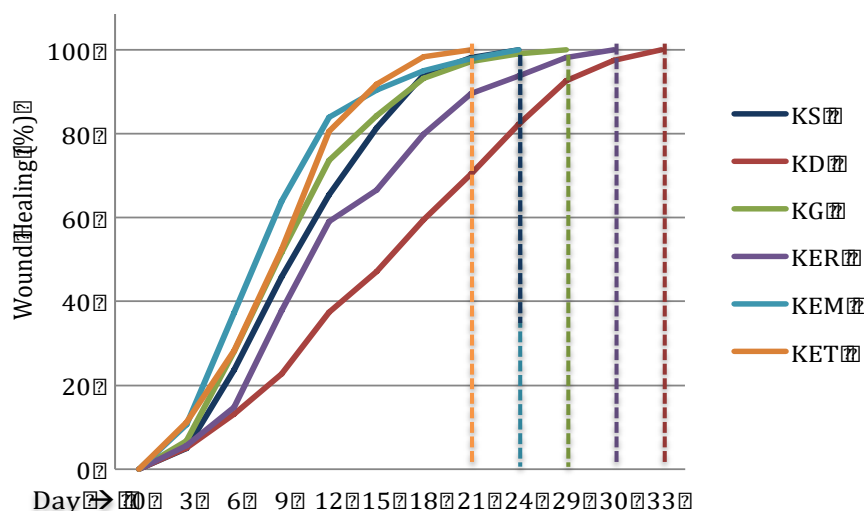**Figure 1. Effect of *Channa lucius* extract on wound healing in diabetic rats. The higher the dose of *Channa lucius* extract supplemented to the rats the faster the healing of the diabetic wounds.**
(KS=healthy control rats; KD=untreated diabetic rats; KG= diabetic rats treated with glybenclamid; KER, KEM, KET= diabetic rats treated with CLE doses 1.25, 2.5, and 5 g/kgbw respectively)
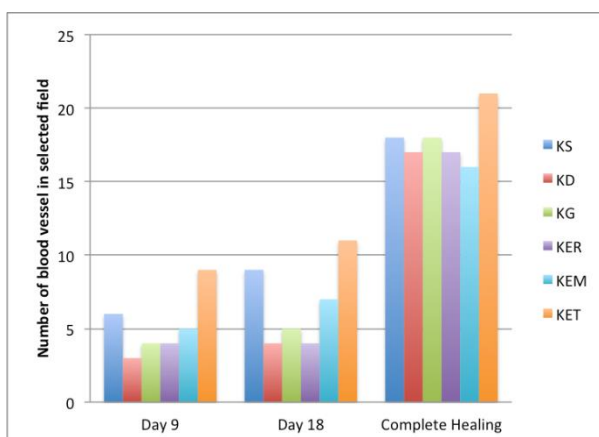
Figure 2. Supplementation of *Channa lucius* extract improved the angiogenesis in wound healing tissue of diabetic rats.
(KS=healthy control rats; KD=untreated diabetic rats; KG= diabetic rats treated with glybenclamid; KER, KEM, KET= diabetic rats treated with CLE doses 1.25, 2.5, and 5 g/kgbw respectively)
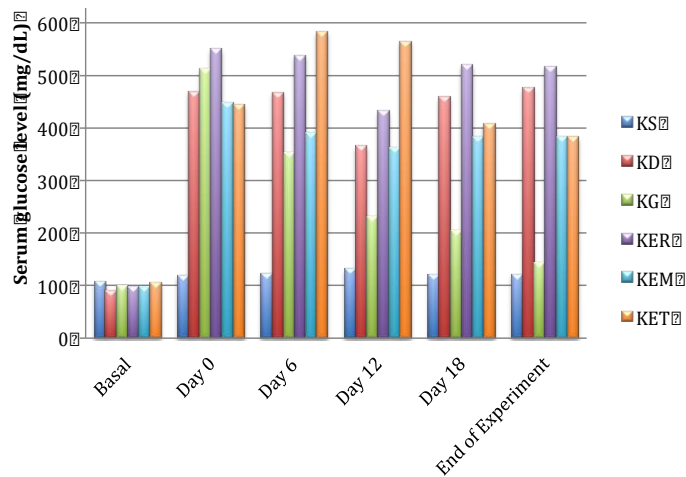
Figure 3. Supplementation of *Channa lucius* extract could not decrease serum glucose of diabetic rats to normal level.
(KS=healthy control rats; KD=untreated diabetic rats; KG= diabetic rats treated with glybenclamid; KER, KEM, KET= diabetic rats treated with CLE doses 1.25, 2.5, and 5 g/kgbw respectively)

Low Butyric Acid is Associated with Constipation in Geriatrics

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INTRODUCTION. Constipation is a disorder in bowel movement characterized by reduced frequency of defecation less than three times a week. About half of geriatrics worldwide experience constipation. Short chain fatty acids (SCFA) such as butyric and propionic acid are main products of microbial fermentation that affect bowel motility. It may play a role in pathogenesis of constipation. Research have showed therapeutic effect of butyric supplements to reduce bowel pain but less studies assessed role of butyric acid in constipation. **METHODS**. The study evaluated levels of fecal butyric acid in 30 participants above 60 years old both with and without constipation. **RESULTS AND DISCUSSION**. About 13 geriatrics (54.2%) in constipation and 11 people (45.8%) in non-constipation groups had normal fecal SCFA levels. Additionally, level of propionic acid was also not different between both groups. Interestingly, level of fecal butyric acid in constipation group were significantly lower than those in the non-constipation group. Since butyric acid is associated with anti-inflammatory effects, increasing contractility of colonic smooth muscle and regulating intestinal neurotransmission, reduced level of butyric acid may lead to decrease intestinal peristaltic thus increased incidence of constipation. **CONCLUSION**. The study showed that lower levels of fecal butyric acid is associated with increased incidence of constipation in geriatrics. Future experimental study should be conducted to address the exact mechanism of role of butyric acids in constipation.

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Effectiveness of Snakehead Fish Nuggets and Colored Fruit Extracts to Blood Protein (Total Protein, Albumin, Hb)

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INTRODUCTION. The high prevalence of HIV/AIDS and its development problems in the world and in Indonesia is like an iceberg phenomenon. HIV/AIDS case found in Dubai reached 1.8 million, which about 940.000 people died because AIDS. While in Indonesia the discovery of new cases in 2016 in Riau province was around 6.885 cases. Special Capital Region of Jakarta had 35.947 cases, Papua reached about 31.846 cases and North Sumatera was around 7.890 cases. The study aims were to see the effectiveness of giving snakehead fish nuggets and colored fruit extracts to blood protein (total protein, albumin and haemoglobin)in People Living with HIV (PLHIV). **METHODS.** This was a Quasy – Experimental study with One Group Pretest and Posttest Design. This design allowed researchers to measure the difference in total protein, albumin and Hb in PLHIV before and after snakehead fish nuggets and colored fruit extracts delivery intervention. This study was carried out for 22 days, while the sample selection used a total sampling technique. Location of this research conducted in the "Bahagia" social rehabilitation center in Medan. **RESULTS AND DISCUSSION.** The results of this study showed that there was an effect of snakehead fish nuggets and colored fruit extracts treatment to total protein (p= 0.036), albumin levels (p =0.000) and Hb levels (p = 0.001). **CONCLUSION.** The conclusion of this study is there is a change in blood protein (total protein, albumin and Hb) after being given the snakehead fish nuggets and colored fruit extracts treatment.

Keywords : Blood protein, colored fruit extracts, HIV, Snakehead fish nuggets

Relationship of Insuline Like growth Factor-2 Gene in Crosses of Indonesian Local Chicken

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INTRODUCTION. Local chickens varieties have potential to develop as commercial chicken. Crosses between local chickens can increase the productivity. The crossing of local chicken Sentul, Kedu and Kampung varieties produced Sentul Kampung-Kedu (SKKedu) and Kedu-Sentul Kampung (KeduSK) varieties. One of the genes that control growth is IGF-2 (Insulin-like Growth Factor-2). Therefore, it important to analyze the diversity of IGF-2 genes and the relationship between the diversity of IGF-2 genes in SKKedu and KeduSK chickens. **METHODS.** Samples used were 23 DNA of the KeduSK chickens and 17 DNA SKKedu chickens. Growth measurements consist of body weight, body weight gain, consumption and feed conversion ratio. DNA extracted from the blood samples were analysed by PCR-RFLP (Polymerase Chain Reaction-Restriction Fragment Length Polymorphism). The diversity of IGF-2 genes was analysed with X^2 test. Statistical analysis of the relationship between the diversity of IGF-2 genes and the growth parameters was carried out using t test. **RESULT AND DISCUSSION.** The frequency of T and C alles of IGF-2 gene in SKKedu chickens were 0.48 and 0.52 respectively, while those in KeduSK chickens were 0.50 and 0.50 respectively (Table 1). It means that SKKedu and KeduSK varieties were polymorphic. Results of Hardy-Weinberg balance analysis of IGF-2 gene indicated that the population of chicken samples were in equilibrium state ($P<X^2_{0.05}$) (Table 1). Body weight, body weight gain, consumption, and feed conversion ratio of SKKedu and KeduSK chicken based on differences in CC, TC, TT genotypes at the IGF2 locus were almost the same (Table 2). It means that there were no differences in the growth traits from differences in genotype at the IGF2 locus. There was no correlation between genotype at IGF2 locus with body weight, body weight gain, consumption and feed conversion ratio of SKKedu and KeduSK chicken (Table 3). **CONCLUSION.** IGF2 gene was polymorphic in SKKedu and KeduSK chicken samples and was in the Hardy-Weinberg equilibrium state. There was no relationship between IGF-2 genotype of SKKedu and KeduSK chicken with growth traits.

Keywords : Crossing, growth traits, IGF2 gene, SKKedu, KeduSK

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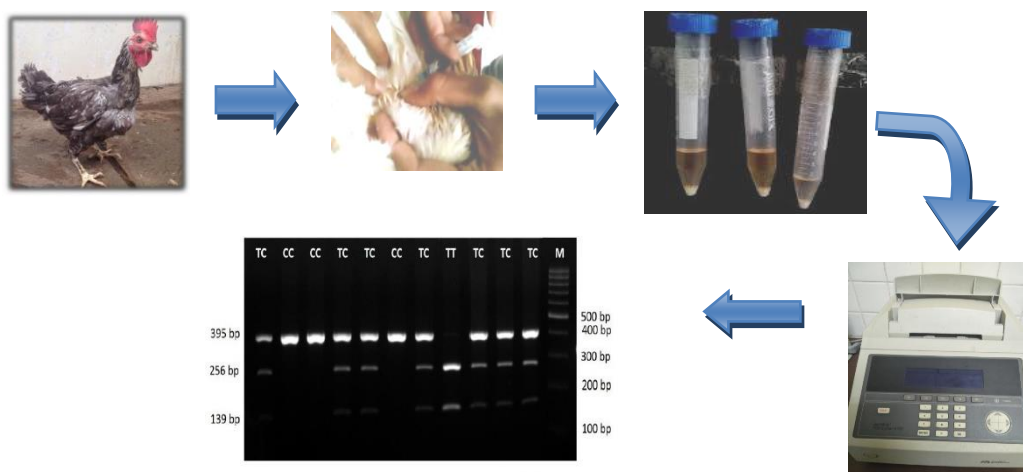
Gambar 1. Hasil Elektroforesis Pengujian DNA Menggunakan PCR-RFLP IGF2|NlaIII

Graphical Abstract

Table 1. Variation of Genotype

Chicken Varieties		Genotype Frequency			Allele Frequency		X^2
		CC (n)	TC (n)	TT (n)	T	C	
KeduSK	2	0.17 (4)	0.61 (14)	0.22 (5)	0.48	0.52	1.11(tn)
SKKedu	7	0.18 (3)	0.65 (11)	0.18 (3)	0.50	0.50	1.47(tn)

N: a number of individuals, tn: no significant value at α=0.05.

Table 2. Average body weight, body weight gain, consumption, 12 week age feed conversion ratio based on genotype on IGF2 allele in SKKedu and KeduSK chickens

Genotype*	SKKedu	KeduSK
	Body Weight (g)	
CC	1055.8±37.5	1153.7±36.5
TC	1059.7±30.4	1153.7±32.8
TT	1012.5±0.00	1147.4±34.6
	Weight Gain (g)	
CC	111.09±9.68	143.72±18.82
TC	112.11±7.83	143.71±16.43
TT	99.91±0.00	146.88±17.35
	Feed Consumption (g ekor^{-1} minggu^{-1})	
CC	531.19±16.59	568.95±9.27
TC	532.93±13.42	568.96±8.33
TT	512.04±0.00	567.35±8.79
	Feed Conversion	
CC	5.85±0.30	5.04±0.18
TC	5.77±0.21	5.04±0.16
TT	6.19±0.00	5.01±0.17

*)Results of t test with α = 0.05 were not significantly different in the variables of body weight, body weight gain, consumption, feed conversion

Table 3. Correlation between genotypes of IGF2 locus with body weight, body weight gain, consumption and feed conversion

Chicken	P Value	R*
Bobot Badan		
SKKedu	0.109	-0.402
KeduSK	0.762	-0.067
Pertambahan Bobot Badan		
SKKedu	0.109	-0.402
KeduSK	0.762	0.067
Konsumsi Pakan		
SKKedu	0.109	-0.402
KeduSK	0.762	-0.067
Konversi Pakan		
SKKedu	0.098	0.414
KeduSK	0.762	-0.067

R=Correlation value ; *)Not significant

Smart Development Big Data App for Determining Modelling Medicinal Compounds Covid-19 Using Deep AI Core Engine System

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Smart Big Data App Using Deep AI Core Engine System is a development framework based on lightweight serverless from our previous research with the name EdUBig as an open-source Hadoop distribution, which can run on Windows and Linux OS. The focus of this research is solving problems related to difficulty in building a prototyping model as an initiation of the complex Covid-19 drug compound involving Big Data ecosystems such as Hadoop and Spark. Most of the difficulties are found, so why it requires implementation in the Big Data ecosystem. The difficulty is like currently still very hard to measure the rate of mixture of a compound with many other compounds when combined, which can consider trade-offs in minimizing negative effects and optimizing their positive effects. In the other hand, the time used if it is done in computational non-Big Data becomes very long, because the number of its compounds can be said to be quite a lot of variants, and also enters into very complex computational conditions which are very difficult to model with conventional mathematical calculation techniques, so that it is needed fast computing process with distributed computing like the Big Data ecosystem. From these problems, the Big Data App framework was created using the Deep AI Core Engine System based on the Naive Bayes algorithm and Deep Learning in the Big Data ecosystem, so that end-users, especially developers, find it easier to build a Big Data application that is in it there is a very complex computational technique, one of which is in the form of a meta-heuristic technique to minimize negative effects and optimize the positive effects of the drug compounds by involving many data to overcome the difficulty of determining the modeling of the drug compound Covid-19. The new features from developed framework are integrated with the frontend using the Web App from the Django framework and the Native Mobile App, while for the backend it uses the Django framework, so that it can communicate with scripts both hadoop batch and streaming processing and also with spark streaming. So that the prototyping modeling project can be completed quickly, robustly and produce evaluation values with high performance measurements.

Keywords: big data, covid-19, deep ai core engine system modelling medicinal compounds, smart development
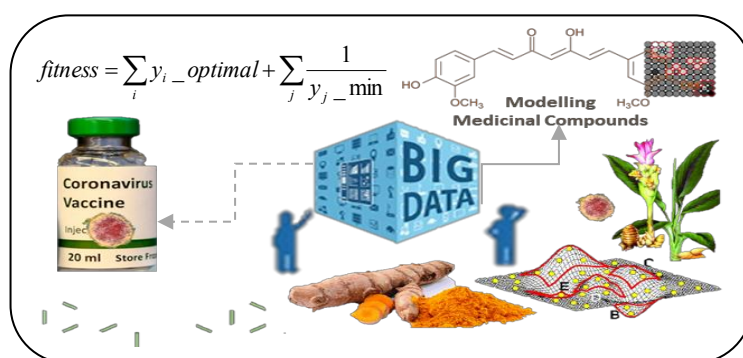
Determining Modelling Medicinal Compounds Covid-19

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In Silico Analysis of CSN1S2 Peptides against Insulin Receptor as Anti-diabetic

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INTRODUCTION. Type 2 Diabetes Mellitus (T2DM) is one of the most health problems in Indonesia, the prevalence has increased over the last 6 years. This disease is characterized by increased blood sugar levels in the body because β-pancreatic cells are unable to secrete insulin or there is an impaired function of insulin. The purpose of this study is to observe the interaction between CSN1S2 protein peptides and Insulin Receptor. **METHODS.** 3-D structure of Insulin Receptor is done by accessing RCSB PDB (ID: 4ZXB), protein was prepared using Discovery Studio BIOVIA 2019 and ligands were prepared using PyRx. Insulin receptor was docked to CSN1S2 protein peptides using HEX 8.0 software and visualized using Discovery Studio BIOVIA 2019. **RESULTS AND DISCUSSION.** The results of this study showed similar binding patterns, most of the chemistry bond were resulted between protein and ligands interaction are hydrogen bonds and electrostatic, the binding energy of CSN1S2 fragment 41-47 and fragment 214-221 to insulin receptor are -186.9 kJ/mol and -172.7 kJ/mol respectively. **CONCLUSION.** The CSN1S2 protein peptides have ability to be used as T2DM therapy because they can bind to spesific sites of the insulin receptor and may enhance signal transduction of cellular functions, especially tyrosine kinase activity.
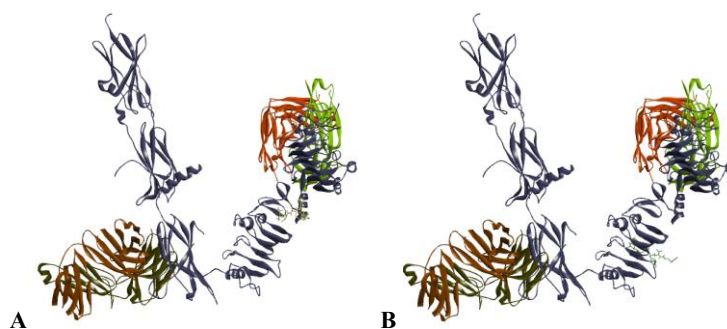
Figure 1. Docking result between Insulin Receptor complex with A) CSN1S2 fragment 41-47 B) CSN1S2 fragment 214-221.

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Analysis of Factors of Profile Lipid in Early Adulthood with Inappropriate Food Comsumption Habit : Screening Approach Dyslipidemia Induce Atherogenesis Acceleration

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INTRODUCTION. Dyslipidemia is a risk factor for cardiovascular disease through atherogenesis induction. The productive age of young adults today has different eating habits in relation to increasing culinary lifestyles and food hunter habits. In general, dyslipidemia rarely causes early phase symptoms. We suspect that there is an increase in the group with impaired lipid profiles related to dietary habits that do not pay attention to the essential needs of eating itself. **METHODS**. The collected serum was carried out using a venous puncture procedure on 45 early adult subjects (men n = 9; women n = 36) aged 19-27 years in Malang City. The lipids were analyzed for lipid profiles including TC, TG, HDL-c, and LDL-c. The questionnaire was used to identify dietary habits, sleeping habits, and physical activity. **RESULTS AND DISCUSSION.** The results of men respondents showed higher differences in the lipid profiles of TC (p = 0.000), TG (p = 0.001), and LDL (p = 0.000) than women while HDL-c levels (p = 0.010) in women had higher differences than men. Sleeping habits had a moderate correlation with TG levels (r = 0.448 **; p = 0.002) and HDL (r = 0.394 **; p = 0.007), while physical activity had no significant relationship with all lipid levels (p> 0.05). Consumption of noodles and beef showed a significant correlation with levels of TC, TG, and LDL (p <0.05). **CONCLUSION.** At least in this study, we found that men in early adult had a higher profile level compared to women. This is of course related to diet (noodles and beef that had high correlation with lipid profiles) and sleeping habits which have an impact on increasing lipid levels. For this reason, it is advisable to maintain a more productive lifestyle to reduce the risk of dyslipidemia.
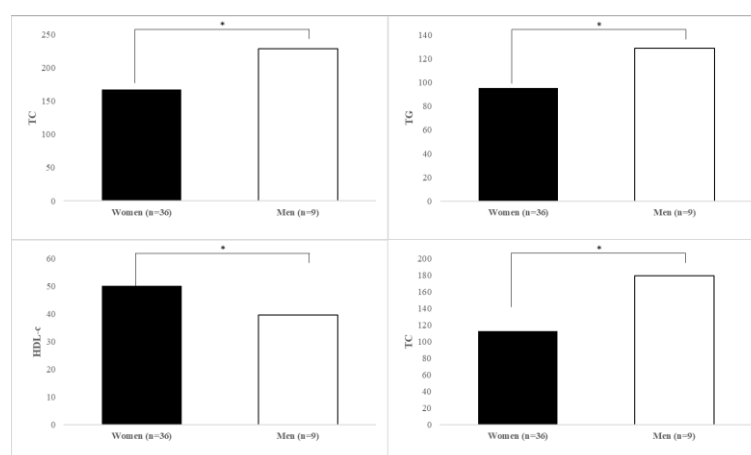
Figure 1. Assessment of the lipid profile of early adulthood for the serum levels of total cholesterol (TC), triglycerides (TG), high-density lipoprotein cholesterol (HDL-c), and low-density lipoprotein cholesterol (LDL-c) in women (n=36) and men (n=9) with Mann-Whitney U Test. Men respondents showed higher differences in the lipid profile such as TC (p=0.000*); TG (p=0.001*) and LDL-c (p=0.000*) while women have higher HDL-c levels than men (p=0.010*).

Antioxidant Activity Of Methanol Extract Tetracera Scanden Predicted Active Compound Of Ethanol Extract With GCMS NIST Library

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INTRODUCTION. Excessive exposure to free radicals can increase the risk of premature aging and several diseases, such as heart disease, cancer, and dementia. Therefore, the body needs antioxidants to fight the effects of exposure to these free radicals. One of the plants used as traditional medicine is *Tetracera scandens L.* which comes from the Dilleniaceae family. Various parts of the T. scandens L. plant have been used in traditional medicine such as lowering high blood pressure, treating gout and hepatitis. **METHODS**. This study tested the anti-oxidant effect of T scanden with the DPPH free radical reduction method. The active substance content in the extract was viewed by GCMS compared to the existing NIST library. **RESULTS AND DISCUSSION** The results showed that the methanol extract had very strong anti-oxidant activity, IC50 value of 47.82 µg/mL. The results of GCMS contained 14 kinds of compounds and the largest content was that the most compounds were Decanedioic acid, bis (2-ethylhexyl) ester which had 68% similarities with the data base collected as much as 21% of the total detected compounds with a retention time of 21,782 minutes. The second largest compound, 7-Amino-7H-S-triazolo [5,1-c] -S-triazole-3-thiol which has 40% similarity with an abundance of 14,098% peaks appeared at the retention time of 12,082. The third compound is Heptacosane which has 87 percent similarity with the data base that appeared at 15,269 minutes. Eleven other compounds had an abundance of below 10 percent. **CONCLUSION.** Tetracera scanden is potential as an antioxidant because it has very strong anti-oxidant activity.

Standard Curve

$$y = 1{,}1411x - 3{,}6533$$
$$R^2 = 0{,}9983$$

Series1
Linear (Series1)
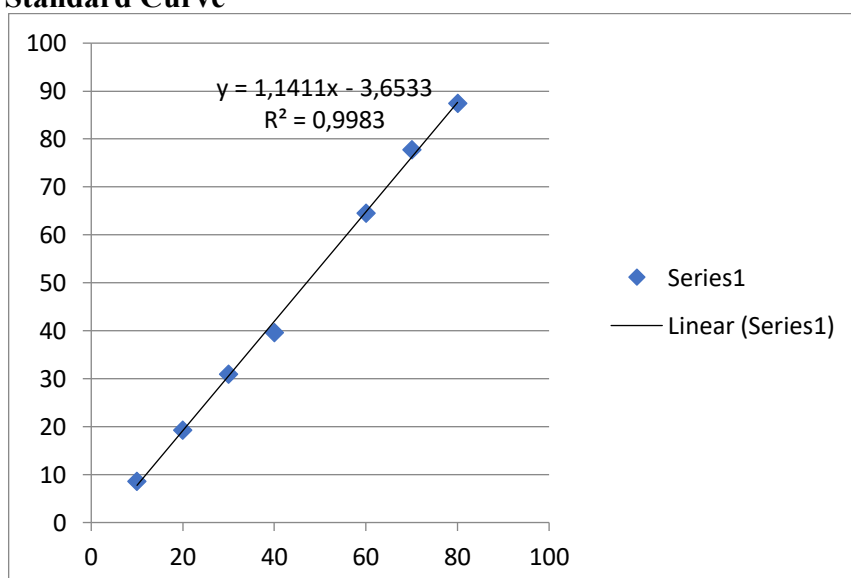
Graph Absorbance

Extract Concentration (µg/mL)	Absorbance		% inhibition 1	% inhibition 2	Ic_{50} 1	Ic_{50} 2	IC_{50} (Mean)
	1	**2**					
	Blanko 1	**Blanko 2**					
	0,909	0,902					

10	0,814	0,824	10,4510	8,6474			
20	0,736	0,728	19,0310	19,2904			
30	0,615	0,623	32,3432	30,9312	46,87 (µg/mL)	48,77 (µg/mL)	47,82 (µg/mL)
40	0,553	0,545	39,1639	39,5787			
60	0,328	0,320	63,9163	64,5232			
70	0,205	0,201	77,4477	77,7161			
80	0,114	0,113	87,4587	87,4722			

GCMS Curve Tetracera scanden

Tetracera scandens
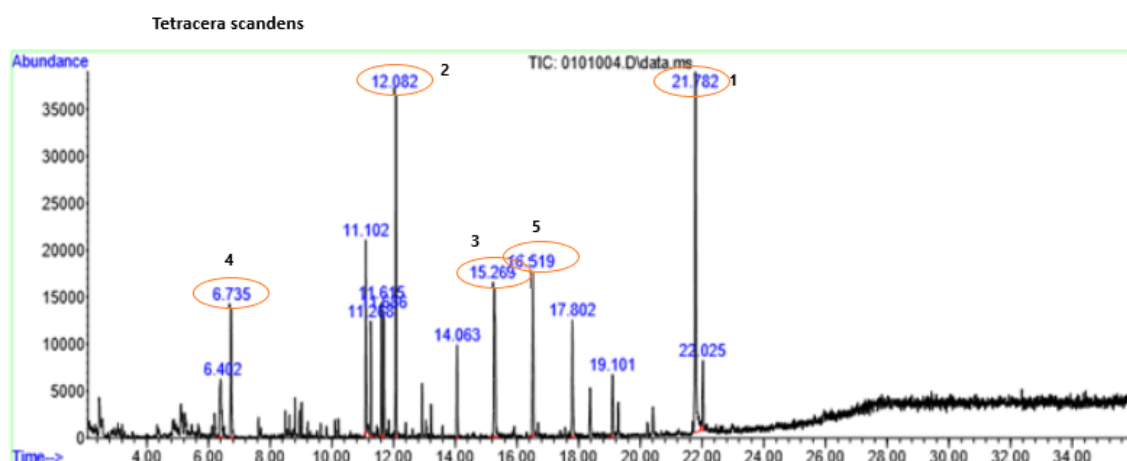
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26. Volume 5, Issue 3, March 2015, Pages 221-227

The Endogenous Development of *Eimeria tenella* in Chickens Injected Subcutaneously with Oocysts Protein as Initially Study of Development of Cecal Coccidiosis Killed Vaccine

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INTRODUCTION. The study was carried out to observe the endogenous development of *E. tenella* histomorphologically in chickens subcutaneously injected with *E. tenella* oocyst protein. **METHODS.** A total number of 12 broiler chicks one-day old were divided into 2 groups, each group containing six chicks. Group 1 was as control group injected subcutaneously in the neck with two doses: first dose at 4th day of age with Freund's Complete Adjuvant (FCA) emulsified in PBS and booster dose was given at 18th day of age with Freund's Incomplete Adjuvant (FICA) emulsified in PBS. Group 2 was injected subcutaneously on the neck with two doses: first dose at 4th day of age with 50 μg *E. tenella* oocyst protein emulsified in FCA and booster dose was given at 18th day of age with 50 μg oocyst protein emulsified in FICA. After 14 days of booster, the both groups were challenged orally 1×10^4 of virulent *E. tenella*. The assessment of endogenous development of *E. tenella* in chickens evaluated histomorphologically of cecum and oocyst production examination. **RESULTS AND DISCUSSION.** Injected *E. tenella* oocyst protein chickens were challenged at 32nd day of age, demonstrated that parasite endogenous development in intestine histomorphologically appeared decreased in proliferation and suppressing oocyst production rate around 68% compared with uninjected chicken. The endogenous development disabilities of parasites occur as a result of protective immunity generated resulting from the antigen exposure so that proliferation and multiplication of parasites became decreased. **CONCLUSION.** The study results demonstrated that relatively sufficient protection against coccidia by use the *E. tenella* oocyst protein as material of cecal coccidiosis killed vaccine in broiler after challenge.

Keywords: *E. tenella*, endogenous development, oocyst protein

Rapid test screening of Covid-19 before gastrointestinal procedures, experience in a limited resource hospital

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INTRODUCTION. Corona Virus Disease (Covid-19) is an emerging disease announced by WHO as a pandemic disease since March 2020 while increase of Covid-19 cases in Indonesia started April 2020. Several international guidelines suggested use of polymerase chain reaction (PCR) test as screening tool before starting gastrointestinal procedures. Although PCR is a gold standard, it has limitation as it is expensive and require special expertise therefore difficult to implement in limited resource hospitals. **METHODS**. Due to lack of PCR tests available and in accordance with Indonesian government regulation, thirty patients were screened with rapid test antigen and antibody for Covid-19 before underwent urgency and emergency gastrointestinal procedures such as endoscopy, colonoscopy and abdominal ultrasonography with various indications. Several clinical and laboratory parameters in all patients were assessed. **RESULTS AND DISCUSSION.** No different in clinical and laboratory parameter among patients was found. All procedures were conducted safely and leave no new Covid-19 case amongst endoscopist and health workers in procedure room. **CONCLUSION**. Rapid test can be used in hospitals with limited resources, although a PCR test is still needed to confirm Covid-19 cases. Safe gastrointestinal procedures can still be performed in a pandemic situation in limited resource hospital, although the possibility for disease transmission is still high. A modified guideline is needed in these hospitals in order to conduct safe gastrointestinal procedures.

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Utilization of Activated Carbon of the Peel of Cassaca (*Manihot utilissima*) in Decreasing Iron and Manganese Concentration in the Dug Well Water in Tanjung Sari Village, 10 Sub districts of Medan Selayang

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INTRODUCTION. Water is a very vital requirement for organism. These is clean water. Clean water is used for daily requirement whose quality meets health requirements and can be drunk after cooking (SNI 01-3553-2006). One source of clean water used by human is groundwater, it can cause color on water, example Fe and Mn. The absorption of activated carbon made from cassava peel waste which aims to reduce levels of heavy metals such as Mn and Fe ion in water. The ionization and activation stages are two very important stages. The carbonization stage of activated carbon is carried out using a furnace with temprature variation of 400 ˚C and 500 ˚C and then soaked for 24 hours with Naoh 0,5 N. This study was to determine the effectiveness of activated carbon of cassava peel to reduce Fe and Mn levels in water in Tanjung Sari Kelurahan Medan Selayang. **METHODS.** This study is true experimental design with pretest and posttest design. Sampels in the form of water were treated by adding cassava peel active carbon with levels of 0,1 gr, 0,5 gr and 1,0 gr in every 100 ml of water and 0 gr in each control performed 3 repetitions. **RESULT AND DISCUSSION**. The result achieved a decrease in levels of Mn and Fe in each treatment temprature and adding different actived charcoal, that is temprature of 500 ˚C decreased levels of Fe between 33.8 % - 93.3 %, Mn 20 % - 92 % while at a temprature of 400 ˚C decreased Fe levels between 26.7 % - 92.8 %, Mn 16.8 – 91.8 %. The result of statistical analysis using ANOVA showed a significant difference in Fe and Mn level before and after the addition of activated carbon of cassava peel at 400 ℃Cheating and 500 ℃ heating of 0.1 g, 0.5 g and 1.0 g.

Keywords: Activated carbon of the peel of Cassava, dug well water, *Iron, Manganese.*

Immune Response of VNN (*Viral Nervous Necrosis*) Infected Grouper with Chlorella vulgaris Extract Treatment as An Anti-Virus Candidate

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INTRODUCTION. The quality and health of fish is a guarantee of the success of cultivation. However, the current problem that often occurs in grouper cultivation is diseases, such as VNN (*Viral Nervous Necrosis*) [1]. The information related health condition of the fish will support the next actions, such as a hematological study that can describe the immune response of fish. *Chlorella vulgaris* can be used as an alternative agent to boost fish immunity. This study aims to know the effect of *C. vulgaris* extract treatment as a candidate for VNN antiviral by hematological observations. **METHODS**. The research method was used qualitatively experimental based on the number of blood cells. The treatments are (A) healthy fish, (B) VNN-infected fish, (C) VNN-infected fish with 17 μg/mL *C. vulgaris* extract, (D) VNN-infected fish with 33 μg/mL *C. vulgaris* extract, and (E) VNN-infected fish with 50 μg/mL *C. vulgaris* extract. Then the blood samples were observed using a light microscope. Whereas, water quality parameters analyzed were Temperature, pH, Salinity, and Dissolved Oxygen (DO) as supporting data. **RESULTS AND DISCUSSION.** The results showed that in healthy fish, the number of erythrocytes was quite high up to 28 cells/area of view. This is because, in normal conditions, erythrocytes are blood components in large quantities [2]. Otherwise, there was an increase in basophils value as in treatment (B) of 21 cells/area of view. Meanwhile, a decrease in the number of basophils and neutrophils can be shown along with the administration of *C. vulgaris* especially in treatment (D) obtained 11 cells/are of view and 16 cells/are of view, respectively. Basophils function to mediate the transfer of B cell isotypes in the immune system [3]. The number of neutrophils also increases when there is an infection [4]. Based on the water quality parameters examination, the value of each parameter is still in normal conditions for grouper fish life based on quality standards [5]. **CONCLUSION.** This study shows that *C. vulgaris* extract can increase fish immunity by decreased basophils and neutrophils with the dose which described the quite good condition of blood cells was in treatment D.

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Development of Microfluidic Paper-Based Analytical Devices (µPAD) Methods for Determining Hydroquinone in Facial Whitening Cream Using Phloroglucinol Reagents

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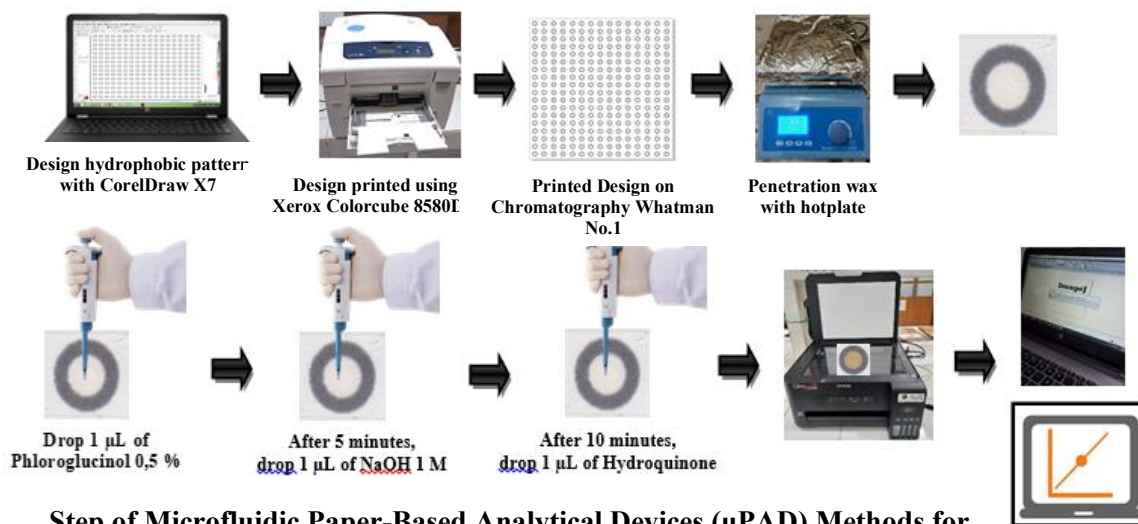[2] Chemistry Department, Faculty of Science, Brawijaya University, Indonesia, hermin@ub.ac.id
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INTRODUCTION. Hydroquinone is one of the active ingredients contained in facial whitening cream functioning as skin depigmentation agent. Since 2008, NADFC has banned the use of hydroquinone in skin whitening creams because hydroquinone has toxic and harmful effects. This study aims to develop a microfluidic paper-based analytical device (µPAD) for hydroquinone analysis in facial whitening creams using phloroglucinol reagents. **METHODS**. The µPAD with hydrophobic barrier for detection zone was fabricated using wax printer with Whatman No.1 chromatographic paper. Detection mode was colorimetry based on the formation of orange hydroquinone-phloroglucinol complex. The colored reaction product on the detection zone of µPAD was scanned and processed with Image-J software to determine the intensity (RGB value). Optimization to the operational and chemical conditions was conducted in order to achieved sensitivity of measurement. **RESULTS AND DISCUSSION.** The optimum conditions with maximum sensitivity was achieved under reagent volume of 1 µL, 0.5% phloroglucinol, 1 M NaOH, and 30 minutes reaction with sequence order of reaction of phloroglucinol-NaOH solution-sample (hydroquinone). Under these optimal conditions, the µPAD produced linear calibration from 10-100 ppm (R^2= 0,9983) and 250-1000 ppm (R^2= 0,9995) with very good selectivity to propylene glycol and resorcinol and satisfactory validity with average recovery close to 100 %. **CONCLUSION.** The proposed µPAD showed very simple and inexpensive technique for hydroquinone analysis which can be applied to cosmetics samples with satisfactory results.

Design hydrophobic pattern with CorelDraw X7 → **Design printed using Xerox Colorcube 8580D** → **Printed Design on Chromatography Whatman No.1** → **Penetration wax with hotplate**

Drop 1 µL of Phloroglucinol 0,5 % → **After 5 minutes, drop 1 µL of NaOH 1 M** → **After 10 minutes, drop 1 µL of Hydroquinone**

Step of Microfluidic Paper-Based Analytical Devices (µPAD) Methods for Determining Hydroquinone

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Propolis Extraction Using Vacuum Resistive Heating Method

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INTRODUCTION. Propolis is a resin produced by bees which contains active ingredients which are believed to have many health benefits because the existence of phenols and flavonoids as antioxidants resource [1]. Propolis antioxidant activity is highest compared to other bee products[2]. In the other hand, Indonesian raw propolis is produced by many farms in different place but bioactive content is unknown[3]. Vacuum resistive heating extractor machine is new method of propolis extraction. This study aims to determine the effect of the origin of propolis on chemical characteristics extract using propolis extractor machine and compared with commercial propolis. **METHOD**. This study used completely randomized design method with the origin of propolis variations. The origin of propolis comes from Makassar, Batu and Bali. The extraction process was carried out in two stages. The first process was at a pressure of 16,6 KPa, 100V and 58°C using water solvent. While the second process was using 70% ethanol-water solvent at 16,6 KPa, 220V, and 37°C. The results were compared with commercial product. **RESULT AND DISCUSSION.** The results showed that there was a significant effect of propolis differences origin on the total phenol and total flavonoids. The highest total phenol in vacuum resistive heating method was 45.72 mg GAE/g that was obtained in Makassar propolis while the lowest total phenol was 41.59 mg GAE/g obtained from Bali propolis. The highest total flavonoids were 15.19 mg QE g that was obtained in Makassar propolis while the lowest total flavonoid was 7,27 mg QE/g obtained from Bali propolis. **CONCLUSION.** the origin of the propolis area affects the results of propolis extraction using vacuum resistive heating technology to the parameters of total phenol and total flavonoids. The highest phenol content was 45.72 mg GAE / g and the highest flavonoid level was 15.9 mg QE / g obtained from propolis from Makassar area. By knowing the difference in the yield of bioactive compounds in propolis, it can be seen which propolis is best for use in producing herbal medicine propolis as a source of antioxidants.

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The Effect of Aloe vera Juice Before Meals on Triglyceride of T2DM Patients

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INTRODUCTION. Diabetes mellitus (DM) is a group of metabolic diseases characterized by an increase in glucose levels in the blood that occurs due to abnormalities in insulin secretion, insulin action or both. Insulin resistance with high blood glucose levels is often found along with high levels of triglycerides, low density lipoprotein (LDL), cholesterol, and low levels of high density lipoprotein (HDL) cholesterol. The International Diabetes Federation (IDF) in 2017 states that the number of DM sufferers has increased by 64.4% over the last eight years and 72.67% of DM sufferers are of productive age (20-64 years). Evidence is growing that extracts of aloe vera derivatives show preventive effects against insulin resistance and lipid-lowering effects as well as reduce the micro and macro-vascular complications of this metabolic disease such as healing diabetic wounds, relieving diabetic nephropathy and retinopathy, reducing the risk of cardiovascular complications. The purpose of this study was to analyze the effect of aloe vera juice before meals on reducing triglycerides. **METHODS**. Analytical research with a randomized experimental study approach using a Pre-post Test Control Group Design. Experiment with how to give aloe vera juice before lunch. Subjects were determined by simple random sampling. **RESULTS AND DISCUSSION.** The results of statistical tests show a significance value of 0.041> 0.05 in the treatment group while a significance value of 0.424> 0.05 in the control group. **CONCLUSION.** It can be concluded that there is an effect of aloe vera juice given before meals on triglyceride levels compared to the control group. As recomendation, further research on giving aloe vera juice before meals against lipid profiles.

Keywords: Aloe vera juice, before meals, triglyceride

The Effect of Kangkong Vegetables (*Ipomea reptans* Poir.) and Swimming on Depression Intensity in Adolescent Male

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INTRODUCTION. Adolescent male are a group at risk of depressive disorders which if left untreated can become a global burden of disease. The content of carbohydrates, vitamins B and C, calcium, zinc, iron, potassium and sodium, flavonoids, alkaloids and steroids in kangkong vegetables has physiological benefits in the metabolism of several hormones in the brain. Swimming also provides a positive effect in improving the metabolism of several hormones in the brain. This study aims to analyze the effect of kangkong vegetables intake and swimming on the intensity of depression in adolescent male. **METHODS**. The study uses a quasi-experimental study design pre-post test control group design, involving 61 male students, taken from 3 senior high schools in Surakarta and grouped into 3: control group by giving swimming 2 times/week for 2 weeks (pool depth 120 cm and swimming duration for 60 minutes/exercise) (G1) (n=22), group by giving 150 grams of kangkong vegetables/day for 14 days (divided into 2 serving) (G2) (n=19) and group by giving combination of kangkong vegetables and swimming (G3) (n=20). Measurement of depression intensity using the Beck Depression Inventory-II questionnaire. **RESULTS AND DISCUSSION.** After 14 days of intervention, there was a decrease in depression intensity score in by the G1 -6.81 ± 3.91 (p=0.001), by the G2 -10.68 ± 8.56 (p=0.001) and by the G3 -11.60 ± 5.84 (p=0.001). **CONCLUSION.** Kangkong vegetables and swimming can reduce the intensity of depression, and the combination of kangkong vegetables and swimming is the greatest decrease in the intensity of depression in adolescent male.
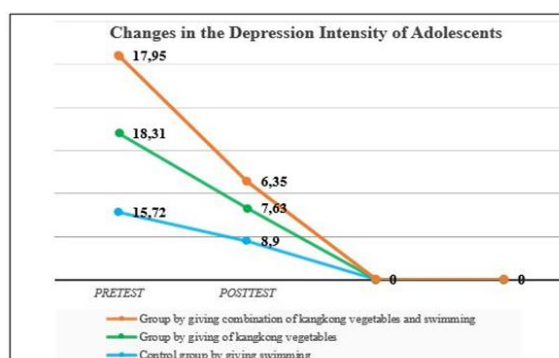
Graphic of Changes on Depression Intensity in Adolescents

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Protective effect of red betel (*Piper crocatum*) as natural antioxidants against hepatotoxicity induced by monosodium glutamate (MSG) in rats

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INTRODUCTION. The use of MSG in food is growing. The excessive consumption of MSG can cause the formation of free radicals in the body. Continous use of MSG will cause eadical accumulation and oxidative stress in the liver, so exposure of MSG damage the liver. Many different natural antioxidants were found to alleviate the toxic effect of various toxic agents via different mechanism. Therefore, the present study aimed at investigating the role of red betel leaves as natural antioxidants in the alleviation hepatotoxicity induced by MSG through assesment of hepatotoxicity biomarkers (ASTand ALT) and histopathology of liver tissues. METHODS. This is experimental study used 25 rats divided into 5 groups as follows : group 1: control ; group 2: received oral 7g/kgbb of MSG; group 3: received oral 7g/kgbb MSG plus 200mg/kg bb red betel leaves extract; group 4:
received oral 7g/kgbb MSG plus 400mg/kg bb red betel leaves extract; group 5: received oral 7g/kgbb MSG plus 400mg/kg bb red betel leaves extract; group 5 : received oral 7g/kgbb MSG plus 600mg/kg bb red betel leaves extract. The rats were sacrificed on twenty ninth day of the experiment. Measuring serum level of aspartate aminotransferase (AST), alanine aminotransferase (ALT) was done. Histopatological examination of liver was performed. **RESULT AND DISCUSSION**.The data of present study showed that the treatment of male rats with MSG (7g/kgbb) as repeated dose for 28 consecutive days was found to induce hepatotoxicity through the elevation in the activities of AST and ALT. Combined administration of any of these red betel leaves extract with MSG to rats partially normalized the altered hepatic biochemical markers, such as ALT. Moreover, MSG caused histological changes in liver, such as hepatocyte of rats. However, co-administration od any of red bettel leaves extract with MSG alleviated to some extent the changed caused by MSG but not as the normal level. **CONCLUSION.** The result suggested that red betel leaves had hepatoprotective effect in MSG hepatotoxic rats. Further studies are warranted to explore and harness red betel leaves antioxidant potential in managing sepecially MSG induced, health dysfunction presented with oxidative stress in animals.

Photoacoustic Signal Modelling and Measuring Toward Glucose Concentration on Liquid

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INTRODUCTION. Diabetes Mellitus is a condition when someone has high level of blood glucose (hyperglycemia) caused by defects in insulin secretion, insulin action, or both. It is estimated by IDF that there are 463 million adults got diabetes on 2019, and 10,7 million of them are in Indonesia. Diabetes often trigger many other diseases. Until now, many blood glucose monitoring in public space still use invasive method. Because of the risk of complications, blood glucose monitoring with non-invasive method must be developed. Photoacoustic is one of the method that potential to use for, because it is non-invasive, has high penetration rate, doesn't make nuclear ionization, and its interaction with body tissue is good. Photoacoustic effect is acoustic wave generated when light interacts with material and gas. Acoustic wave generated by it caused by breaking molecular bond forming a gas and heating effect from repetitive light pulses leading to local thermal expansion based on Boyle—Gay-Lussac law. This study aims to find correlation between glucose concentration on liquid and photoacoustic amplitude as preliminary step into blood glucose monitoring with photoacoustic method. **METHODS**. This study use experiment method and mathematical modelling. We make glucose solution with concentration ranges from 50 mg/dL to 2000 mg/dL and measure it with photoacoustic system setup as shown on Figure 1. We also make mathematical modelling to explain physical meaning of photoacoustic signal in glucose concentration. **RESULTS AND DISCUSSION.** Mathematical modelling we made is quite suitable with experiment data, but there are some data that don't show linearity with the model, especially data from solution which glucose concentration are below 600 mg/dL. **CONCLUSION.** This study show that our experiment setup can measure photoacoustic effect, marked with acoustic wave generated from interacted between solution and modulated laser with 7575 Hz frequency. Mathematical modelling we developed has a trend curve quite suitable with experiment result. Although the result is promising, we found some data from low glucose concentration deviate from trend curve. Next researchers can continue this research with further analysis about this deviation to get better general model.
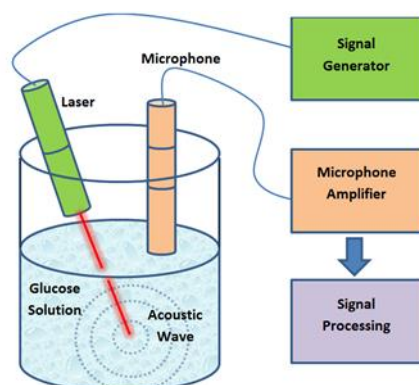

Figure 1. Experimental setup.

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Desulphurisation in Coal Using NaOH and HCl and characteristics with XRD

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INTRODUCTION. Sulfur in coal can be in the form of organic compounds or inorganic compounds such as pyrite, headquartersite, and sulfate. Very small amounts of sulfur can form as sulfates such as calcium sulfate or ferrous sulfate. The sulfur content in coal varies from very small amounts (traces) to more than 4%. **METHODS.** The materials used in this study were coal, sodium hydroxide (NaOH) p.a, hydroxide acid (HCl) 98% p.a, Aquadest and Instruments used in this research were, X-Ray Diffraction (XRD), ovens, magnetic stirrers glassware commonly used in laboratories. **RESULTS AND DISCUSSION**. The results of the XRD analysis (X-Ray Diffraction) identified minerals were Gibbsite minerals with blue peaks, Tridymite minerals marked with red peaks and Quartz minerals marked with brown peaks and After the sample was washed (leaching) using NaOH after drying, the next sample was treated using HCl in the second stage of leaching, from the total sulfur contained in the coal sample from 3.30% to 2.09%, decreased by 37%. **CONCLUSION**. Based on the results of the research conducted, the following conclusions can be drawn, the results of characterization of coal samples showed a total moisture content of 7.91%, flying substance content 20.95%, ash content 20.15%, tethered carbon content 20.95%, while the levels 3.30% sulfur. XRD analysis results obtained mineral gibsite, tridymite and quartz in coal samples. The use of sodium hydroxide (NaOH) and hydrochloric acid (HCl) as leaching agents can reduce total sulfur in coal samples by up to 37%. The initial total sulfur reduction was 3.30% to 2.09%.
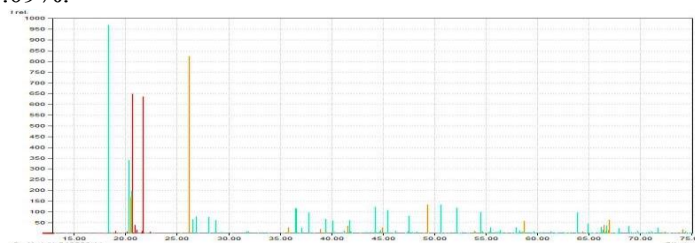
Figure 1. A comparison of the XRD spectrum results in

Table 1. Proximate analysis and total sulfur.

Quality Analysis Parameters	Content "Adb"
Default Water Content of	*7.91%*
Ash content	*20.15%*
Material	*30.26%*
Retained Carbon Content of	*20.95%*
Total Sulfur	*3.30%*

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The glucose sensing insulin secretion with hyperglycemic clamp technique in Sprague Dawley rats

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INTRODUCTION. Diabetes is a risk factor for macrovascular diseases, such as heart attack or stroke, or other microvascular complications. The natural history of type 2 diabetes involves the progression of impaired glucose tolerance (IGT) turn to diabetic mellitus characterized by impaired insulin secretion and development of insulin resistance of peripheral tissue. Therefore, a therapeutic strategy that addresses the enhancement of glucose stimulated insulin secretion (GSIS) and leading to improvement of insulin resistance would be a better treatment for impaired insulin secretion and insulin resistance. We characterized the effect of in-house developed hypoglycemic compound with single administration on GSIS in SD (Sprague Dawley) rats with various blood glucose levels using hyperglycemic clamp technique. **METHODS.** SD rats were anesthetized with isoflurane. After cervical incision, cannulas were inserted into the right jugular vein (for glucose infusion) and the left carotid artery (for blood collection), and rats were fasted overnight. Thirty minutes after compound administration at 10 mg/kg, glucose solution was infused via the jugular vein cannula with syringe pump. **RESULTS AND DISCUSSION.** The blood glucose concentrations were successfully maintained at approximately 250 mg/dL and 400 mg/dL by adjusting the infusion rate of the glucose solution. The plasma insulin levels in the vehicle group were increased following to the elevation of the blood glucose levels, and a biphasic insulin secretion was observed at both blood glucose levels. The plasma insulin levels in the compound treated group were also increased and remained higher than the vehicle group throughout the glucose infusion period. **CONCLUSION.** We successfully established hyperglycemic clamp model and confirmed the enhancement of glucose sensing insulin secretion by hypoglycemic compound in accordance with blood glucose levels.
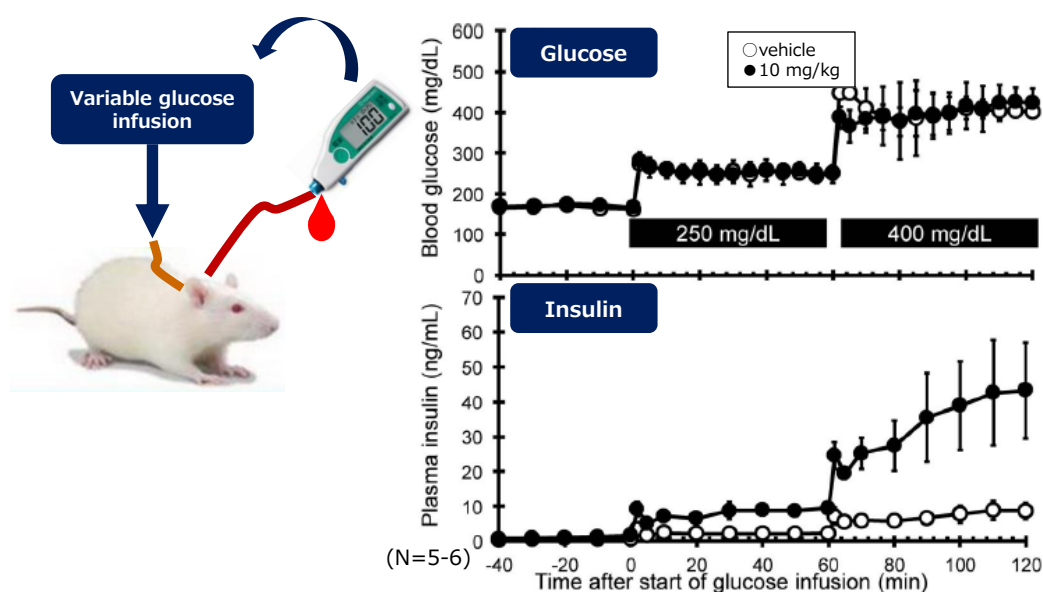
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Lp-PLA2 and VEGF levels correlation in a population in the risk of atherosclerosis based on the Framingham Risk Score (FRS)

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INTRODUCTION. This study aims to determine the relationship or correlation of Lp-PLA2 and VEGF concentrations in the atherosclerosis population classified by the Framingham Risk Score (FRS). **METHODS**. This study used a cross-sectional approach to 158 patients at risk of atherosclerosis based on the Framingham risk score, divided into three groups: low, intermediate, and high risk. The patient's venous blood sample was taken and then measured using the ELISA method with VEGF and Lp-PLA2 antibodies. **RESULT AND DISCUSSION**. The concentration of Lp-PLA2 had a very strong correlation with VEGF expression, both in the low risk group ($r = 0.938$), intermediate ($r = 0.947$), and high ($r = 0.869$) ($P < 0.05$). However, the concentrations of VEGF and Lp-PLA2 did not match the Framingham risk score. **CONCLUSION**. In conclusion, Lp-PLA2 has a significant correlation with VEGF so that it has the potential to be a biomarker of vasa vasorum angiogenesis in atherosclerosis risk population.

Keywords: Atherosclerosis, Lp-PLA2, VEGF, vasa vasorum angiogenesis

Cytoplasm and Nuclear Crude Protein Proportion Observed in Peripheral Blood Mono Nuclear Cells under Senescence-Inducing Stress Exposure

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INTRODUCTION. Premature cellular senescence can be induced by exposing H_2O_2 in consentration-dependent manner. There is protein that contribute to changes driven early alteration in intracellular dynamic. Crude protein proportion in nuclear and cytoplasm were evaluated in this study for capturing acute stress response after 48 hours H_2O_2 exposure. **METHODS.** Viability experiment were performed in isolated human PMBNCs which seeded in 6 plate well. After percentage of the surface of a culture dish covered by adherent cells >60%, cell was treated with 200 μm and 400 μm H_2O_2 for 48 hours incubate in 37^0c. Harvesting cell with tripsin EDTA and nanodrop were performed to visualization crude protein proportion in nuclear and cytoplasm. **RESULTS AND DISCUSSION**. mean the cytoplasm crude protein were found to increased significantly in H_2O_2-treated cell (7.21 mg/ml ± SD 0.1 in 200 μM and 7.55 mg/ml ± SD 0.6 in 400 μM) than non-treated cell (6.45 mg/ml ± SD 0.8) . H_2O_2 treatment led to dose-dependent increase cytoplasm crude protein but not in nuclear proportion rate. Taken together, these finding suggest that elevation protein product in cytoplasm may regulate cellular response viability and acute responses in opposing way during in vitro models of oxidative stress. **CONCLUSION.** These results demonstrate that hydrogen peroxide triggers cellular senescence program with up regulated major cytoplasm crude protein. Elevation nuclear crude protein may contribute to another information related cellular response.

Keyword : crude protein, H_2O_2 exposure, PBMNCs

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Hemodynamics in the obese type 2 diabetic model Spontaneously Diabetic Torii Lepr^{fa} (SDT fatty) rats

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INTRODUCTION. Peripheral artery disease (PAD) is a peripheral blood flow impairment caused by atherosclerotic stenosis, especially found in the legs. The disease decreases quality of life because of intermittent claudication or necrosis of the leg. The hindlimb ischemia model, a well-known PAD model, is induced by femoral artery ligation. In this model, non-metabolic syndrome animals are usually used. In this study, we investigated the usefulness of Spontaneously Diabetic Torii Lepr^{fa} (SDT fatty) rats, a model for obese type 2 diabetes, as a new PAD animal model. **METHODS.** Hindlimb blood flow at 5, 15, and 35 weeks of age was measured with a laser Doppler perfusion imager under isoflurane anesthesia. Hindlimb blood flow atfter ischemic operation in the left leg (0, 7, and 14 days) was also measured. Aorta eNOS/p-eNOS protein levels and platelet activation/coaggretion activity were measured to evaluate oxidative stress/endothelial function and hypercoagulability, respectively. von Willebrand factor (vWF) positive vessels were counted immunohistopathologically as angiogenesis marker after hindlimb ischemia. **RESULTS AND DISCUSSION.** Hindlimb blood flow in SDT fatty rats was significantly lower than that in control Sprague-Dawley (SD) rats under non-ischemic conditions. Furthermore, SDT fatty rats showed a significantly higher plasma NO level, shorter prothrombin time, and shorter activated partial thromboplastin time than SD rats. In addition, the change in blood flow 7 days after induction of hindlimb ischemia and the number of vWF-positive vessels in gastrocnemius muscles were significantly lower in SDT fatty rats than in SD rats. These results suggest that excess production of reactive oxygen species and coagulation activation could be involved in lower blood flow in non-ischemic rats and that decreased angiogenesis could be involved in the poor recovery of blood flow in SDT fatty rats with hindlimb ischemia. **CONCLUSION.** SDT fatty rats might be useful as a new model for PAD with metabolic syndrome.

n=5-6, **P<0.01 vs. SD (Student t test or Aspin-Welch t test)
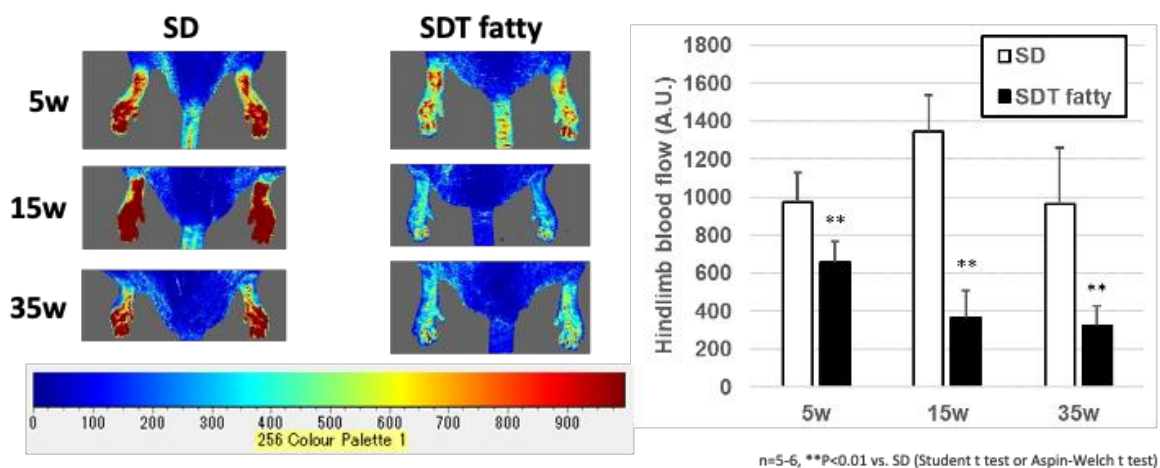
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Bioactive Compound Impacting the Metabolism and Antibacterial Activity of Gadung Tuber (*Dioscorea hispida* Dennst)

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INTRODUCTION. Plant extracts usually continue to represent an untapped source of renewable therapeutic compounds for the prevention of illnesses including metabolic disorders as antihyperglycemia. This study was to determine, identify the chemical compound in leaves and gadung tuber (*Dioscorea hispida* Dennst), α-glucosidase inhibitory effects of leaves and antibacterial activity of tubers. **METHODS**. Identify the chemical compound in leaves and gadung tuber by GC-MS technique, tested to α-glucosidase inhibitory effects was measured with spectrophotometric and test of antibacterial activity was performed in vitro using agar disc diffusion assay. **RESULTS AND DISCUSSION.** The bioactive compound evaluation of leaves presence of : dl-Chimyl alcohol (11,82%); 10 (E), 12(Z)-Conjugated linoleic acid (10,84%); Stigmasterol (9,55%); Heptadecane (5,94%); Campesterol (5,91%). The analysis of gadung tuber revealed the presence of 7-Azabicyclo [4.1.0] heptane, 1-methgyl- (23,16%); n-Hexadecanoic acid (18,85%); 10E , 12(Z)-Conjugated linoleic acis (13,73%); 1, 4, 7, 10, 13, 16 - Hexaoxacyclooctadecane (4,34%); 5-Hydroxymethylfurfural (4,07%). IC_{50} values inhibition of α-glucosidase extract was >300 ppm and glucobay standard was 0.210 ppm. The antimicrobial activity was performed against bacterial *Staphylococcus aureus,* its inhibitory effect. **CONCLUSION.** The result elaborated that Gadung tubers has greatly potential to invade some human pathogenic bacteria as it showed zone inhibition against *Staphylococcus aureus*. The concentration of tubers of Gadung compound requaired to low inhibit of alpha glucosidase activity under the conditions. It is also important in long term study of plant to evaluate the herbal medicinal and therapeutic action of this plant. The further research is required to fully elucidate the bioactive compounds in this plant using vigorous analytical methods to be potentially responsible for the health benefits.
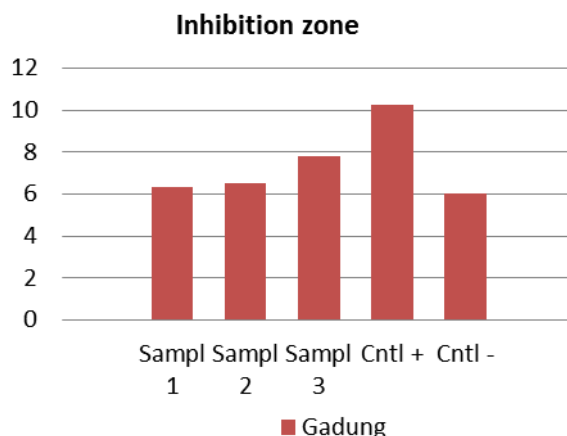
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Improvement of Malang Tofu Quality using Sweet Potato Natural Dyes by Adsoption Technology

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INTRODUCTION. Tofu is one of popular traditional foods in Malang. This food is prepared from precipitation of soyabean extract, so that this food is rich of nutritions too such as protein, carbohydrate, fat, vitamines of B1 and B2, also minerals such as iron and kalium [1]. Physically, quality of tofu can be improved using dyes. However, synthetic dyes such as methanyl yellow can danger the human health [2]. Purple and yellow sweet potatoes have different main antioxidant subtstances, i.e antocyanine [3] and β - caroten [4], respectively. The sweet potatoes are also rich of nutritions such as protein, fat, fiber, vitamines, and minerals [5]. It means that colorization of tofu using extract of sweet potatoes will increase quality of tofu based on color, nutritions, and antioxidant. Colorization of tofu using sweet potatoes has been introduced to Malang culinary society by Inorganic Chemistry lecturers in community service DPP/SPP program 2020. The tofu colorization is one of adsorption applications which are studied in lecturer group of Inorganic Chemistry by using tofu as adsorbent. **METHODS.** Purple and yellow sweet potatoes were peeled, washed, and shredded, then boiled together with tofu in the water, and finally soaked to obtain purple tofu and yellow tofu. The higher concentration of dyes extracts and the longer soaking process, the darker color of tofu. **RESULTS AND DISCUSSION**. There was changing of tofu color before and after colorization process, i.e white tofu to purple tofu and yellow tofu. These different colors are caused by adsorption of antocyanine and β - caroten molecules by tofu. This adsorption is supported by chemical interactions between polar substance in tofu such as protein with polar substance in purple sweet potato such as antocyanine such as dipo-dipol attraction force, between non polar substance in tofu such as fat with non polar substance in tofu such as β - caroten through London force. Boiling yellow sweet potato together with tofu may improve extraction due to attraction force of fat molecules in the tofu toward β - caroten in yellow sweet potato. Beside observation of color, adsorption of antioxidant molecules can be supported by FTIR spectra of the colorized tofu. **CONCLUSION.** Tofu can be colorized by natural dyes such as purple and yellow sweet potatoes by adsorption process. Success of adsorption can be detected from changing of tofu's color and FTIR spectrum.

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Hypolipidemic Effect of Avocado Peel (*Persea americana* Mill.) Extract in Rats with Dyslipidemia

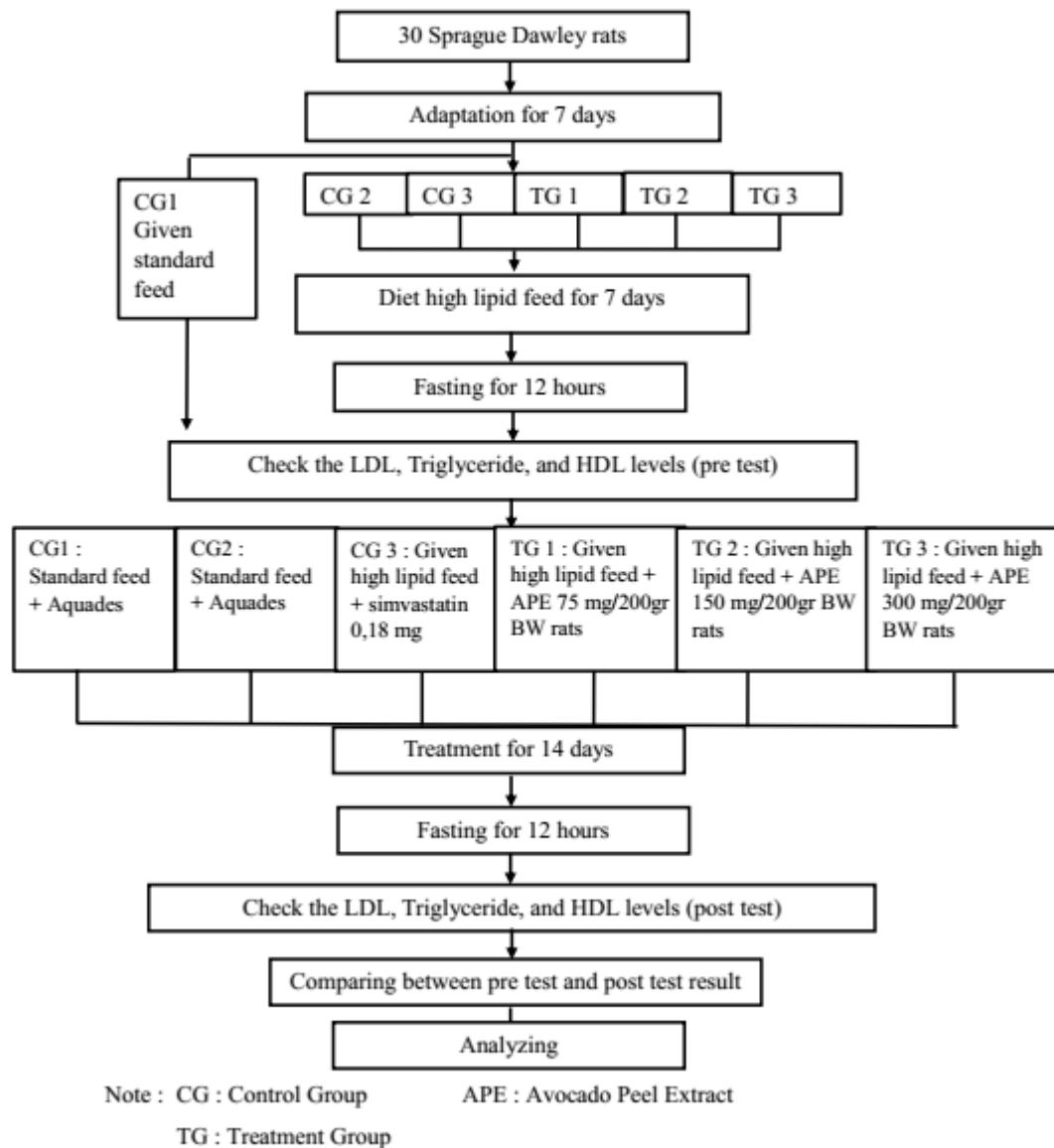**Ulum Nidhamuddin[1]*, Rama Samara Brajawikalpa[1], and Irwan Meidi Loebis[1]**

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INTRODUCTION. Dyslipidemia is a disorder of lipid metabolism and one of the modifiable risk factors for cardiovascular disease. The prevalence of dyslipidemia based on raised total cholesterol in the world was 39%, of which 37% for men and 40% for women. Cholesterol-lowering drugs have been reported to have many side effects. One alternative medicine in reducing blood cholesterol levels by utilizing the potential of the avocado peel. **METHODS**. This research was experimental with a pre and post-test control group design. This research was used 30 Sprague Dawley male rats (*Rattus norvegicus*) divided into 6 groups, namely the normal control group (CG1), negative control (CG2), positive control (CG3) and 3 treatment groups (TG) who received avocado peel extract (APE) at 75, 150, and 300 mg/200gr bodyweight rats. Data were tested using a one-way ANOVA test with a post hoc test. **RESULT AND DISCUSSION**. There were a decrease in low-density lipoprotein (LDL) levels ($P<0,05$) was 17.82, 29.62, and 36.33 mg/dl (TG1, TG2, TG3). Decreased triglyceride levels ($P<0,05$) of 1.62, 14.05, and 29.67 mg/dl (TG1, TG2, TG3). The increase in high-density lipoprotein (HDL) levels ($P<0,05$) was 6.29, 22.63, and 34.32 mg/dl (TG1, TG2, TG3). **CONCLUSION.** Avocado peel (*Persea americana* Mill.) extract showed a hypolipidemic effect by reducing LDL, triglyceride, and increasing HDL levels in rats with dyslipidemia.

Keywords: Dyslipidemia, *Persea americana* Mill., Avocado peel extract

METHODS

```
┌──────────────────────────────────────┐
│        30 Sprague Dawley rats         │
└──────────────────────────────────────┘
                   │
┌──────────────────────────────────────┐
│          Adaptation for 7 days        │
└──────────────────────────────────────┘
     │                  │
┌──────────┐   ┌──────┬──────┬──────┬──────┬──────┐
│ CG1      │   │ CG 2 │ CG 3 │ TG 1 │ TG 2 │ TG 3 │
│ Given    │   └──────┴──────┴──────┴──────┴──────┘
│ standard │                  │
│ feed     │   ┌──────────────────────────────────┐
└──────────┘   │    Diet high lipid feed for 7 days│
               └──────────────────────────────────┘
                              │
               ┌──────────────────────────────────┐
               │        Fasting for 12 hours       │
               └──────────────────────────────────┘
                              │
┌──────────────────────────────────────────────────────┐
│ Check the LDL, Triglyceride, and HDL levels (pre test) │
└──────────────────────────────────────────────────────┘
```

| CG1 : Standard feed + Aquades | CG2 : Standard feed + Aquades | CG 3 : Given high lipid feed + simvastatin 0,18 mg | TG 1 : Given high lipid feed + APE 75 mg/200gr BW rats | TG 2 : Given high lipid feed + APE 150 mg/200gr BW rats | TG 3 : Given high lipid feed + APE 300 mg/200gr BW rats |

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               ┌──────────────────────────────────┐
               │         Treatment for 14 days      │
               └──────────────────────────────────┘
                              │
               ┌──────────────────────────────────┐
               │        Fasting for 12 hours        │
               └──────────────────────────────────┘
                              │
┌──────────────────────────────────────────────────────┐
│ Check the LDL, Triglyceride, and HDL levels (post test)│
└──────────────────────────────────────────────────────┘
                              │
          ┌──────────────────────────────────────┐
          │ Comparing between pre test and post test result │
          └──────────────────────────────────────┘
                              │
               ┌──────────────────────────────────┐
               │              Analyzing             │
               └──────────────────────────────────┘
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Note :   CG : Control Group   APE : Avocado Peel Extract
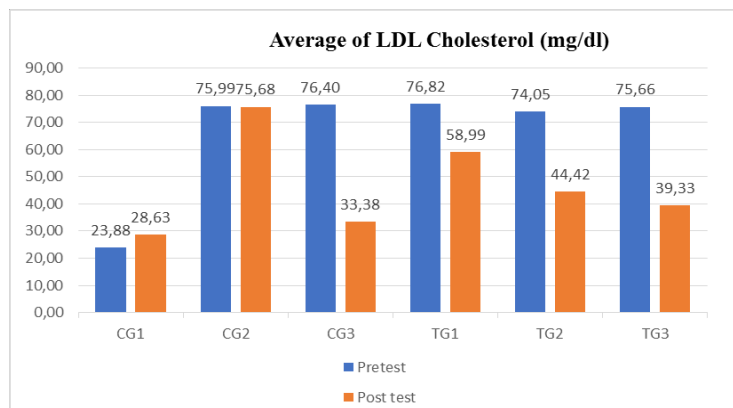
TG : Treatment Group

I. Result
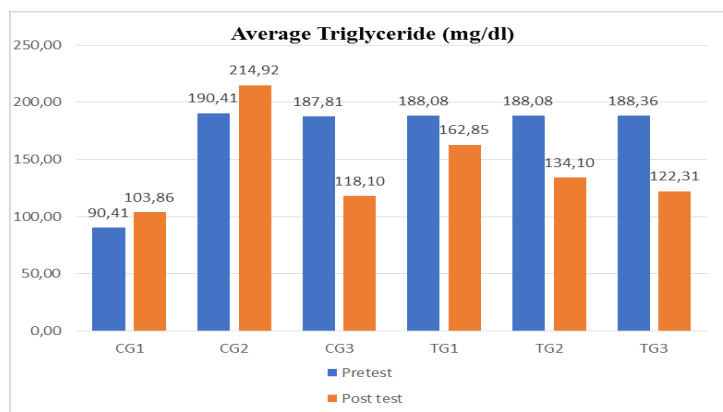

Figure 2. Average of LDL cholesterol
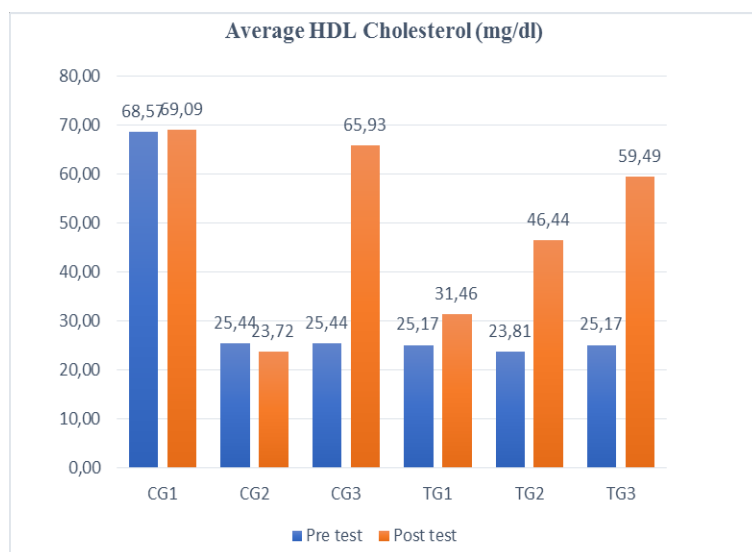

Figure 3. Average of Triglyceride

Figure 4. Average of HDL cholesterol

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The Status of Grouper Tissue Infected by VNN (*Viral Nervous Necrosis*) with *Chlorella vulgaris* Extract Treatment as an Anti-Virus Candidate

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INTRODUCTION. The existence of VNN can be diagnosed through visual observation by observing the behavior and clinical symptoms of fish. Further observations can be conducted microscopically by histological observations to describe the transformation in cell and tissue function [1]. One of the alternatives that can be used as bioactive agent is *Chlorella vulgaris*. This study aims to determine the potential use of *C. vulgaris* extract as a candidate for VNN antiviral by histological observations. **METHODS**. The research method was used qualitative experimental with histopathological techniques with the target organs include the brain, kidney, and eyes which were taken from each treated fish. The treatments are (A) healthy fish, (B) VNN-infected fish, (C) VNN-infected fish with 17 µg/mL *C. vulgaris* extract, (D) VNN-infected fish with 33 µg/mL *C. vulgaris* extract, and (E) VNN-infected fish with 50 µg/mL *C. vulgaris* extract. Clinical symptoms observation was carried out for 14 days, after that the organs were taken for tissue preparation, then observed with a light microscope [2]. Histopathological changes can be assessed using a semi-quantitative scoring method [3]. **RESULTS AND DISCUSSION.** The result shows that symptoms are similar as [4] study, their body color darkens, enlarges the stomach, swims abnormally, and decreases in appetite. This is also supported by histological results, which found several lesions such as vacuolization, hemorrhage, hypertrophy, and necrosis in the infected grouper. The eye and brain organs that experience lesions due to the presence of the *Nodaviridae* virus show abnormal features. After comparing all treatments, treatment (D) still showed a slight change with the percentage of scoring on the kidney, eye, and brain tissue respectively 26.7%, 33.3%, and 33.3%. Based on the scoring method [3], it is still on a moderate category and can be tolerated for fish. Whereas in the infected fish obtained 60%, 73,3%, 73,3%, for kidney, eye and brain respectively. **CONCLUSION.** Based on this study, treatment (D) shows relatively better results if seen from the level of damage and clinical symptoms. However, further research is still needed to determine the effectiveness of *C. vulgaris* extract as an anti-viral candidate.

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Virtual Prediction of Phenolic and Glucosinolate Compounds with Keap1 Protein as Anti-aging by Stimulating Nrf2

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INTRODUCTION. Aging is caused by an imbalance between antioxidants and ROS. Nuclear Factor Erythroid 2-related factor 2 (Nrf2) is a transcription factor that regulates antioxidant genes. Under normal conditions, Nrf2 will bind keap1, and cause degradation of Nrf2. Nrf2 activation can be stimulated by secondary metabolites, such as glucosinolate (glucoraphanin and sulforaphane) and phenolic (kaempferol and quercetin) groups found in broccoli (*Brassica oleracea*). The purposes of this study were to analyze the interaction of the four compounds with Keap1 through molecular docking, to identify interactions that inhibit Keap1, and also to know the bioactivity scores, drug-likeness, and bioactivity prediction of each compound. **METHODS**. The Nrf2-Keap1 protein (ID: 2FLU) structure was retrieved from the protein database, whereas the quercetin (CID: 5280343); kaempferol (CID: 5280863), sulforaphane (CID: 5350), and glucoraphanin (CID: 656556) were obtained from the PubChem Database. Molecular docking was done with HEX 8.0. The docking results were visualized with Discovery Studio 2020. Drug-likeness and bioactivity scores of the compounds were identified using mollinspiration. Prediction of bioactivity was carried out with PASS Online. **RESULT AND DISCUSSION**. The results showed that the binding energy of quercetin with Keap1 was -268.72 kcal/mol, and glucoraphanin with Keap1 was -318.01 kcal/mol. We found that quercetin from the phenolic group and glucoraphanin from the glucosinolate group had strong interaction with Keap1, indicated by the number of interactions occurred and the smaller energy needed. Hence both compounds could inhibit the interaction of Keap1-Nrf2. Consequently, Nrf2 could transcribe antioxidant genes. **CONCLUSION**. The interaction between Keap1 and quercetin may play a role related to ROS reduction activities, such as enhancing HMOXI expression. This study indicates that quercetin has more potential in drug development.
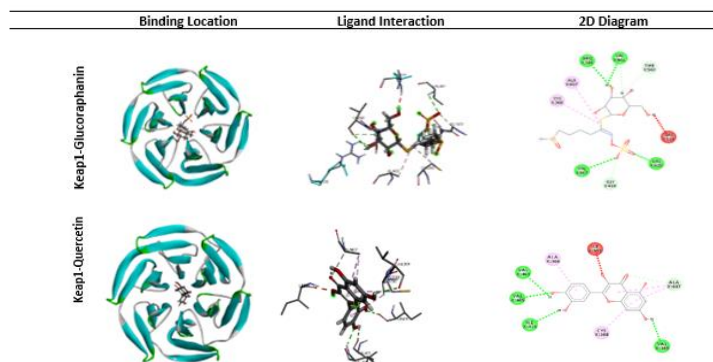
Smart Ammonia Analyzer for Detecting Nitrogen Ammonium Content in Fertilizer

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INTRODUCTION. Nitrogen is an essential nutrient required by majority of plants to enhance metabolic processes for growing. Insufficient supply of nitrogen leads to severe plant disorders in flowering and fruiting. Fertilizer is commonly added to soil to improve the availability of nitrogen in the form of nitrate or ammonium in order to give high rates of photosynthesis and plant growth. Meanwhile, there are many false fertilizers available in markets which become hot issue of concern to farmers in buying fertilizer. Therefore, this project is focused on developing a smart method as a means for quality detection of nitrogen fertilizer. **METHODS**. The smart ammonia analyzer was constructed on a normal smartphone which filled with Qpython3 software functions as an information processing application to analyze the level of nitrogen-ammonium and Color Grab application to proceed the RGB image of coloured product reaction of nitrogen-ammonium to be measured.The image of blue indopheno as the coloured product of the nitrogen was developed on a paper containing phenate reagent by releasing nitrogen ammonia from sample. The conditions for maximum nitrogen ammonia released as well as the maximum colour of blue indophenol were studied by monitoring the blue colour with the smartphone. The readings of RGB Image showed that the blue indophenol gave results to best sensitivity under R (Red) value which is then converted by the software to absorbance and concentration of nitrogen. Validation of the proposed smart analyzer was managed by implementing to nitrogen fertilizer samples. **RESULTS AND DISCUSSION.** The measurement process using the constructed **"Smart Ammonia Analyzer'** involving taking image by smartphone camera, measuring image intensity on position with RED readings, and analyzing process to change the RED-value to concentration of nitrogen-ammonium. The chemicals used for colour formation of blue indophenol were 0.2 M NaOCl, 0.5 M HCl, 0.003 M MnSO4 M, and 2 M phenate with 0.1 M of NaOH for releasing agent of nitrogen fertilizer as ammonia. The developed smart ammonia analyzer resulted linear relation between the absorbance of blue indophenol image to concentration of nitrogen ammonia ($y = 0.0181x + 0.2834$, R $= 0.9726$) and has been succesfully applied to nitrogen fertilyzer. **CONCLUSION.** Development of smart ammonia analyzer has been achieved to provide an easy, inexpensive, and fast device for detecting quality of nitrogen fertilyzer with satisfactory results. Differ from previous mode, the smart ammonia analyzer provides software to obtain direct nitrogen concentration without processing through Excell.
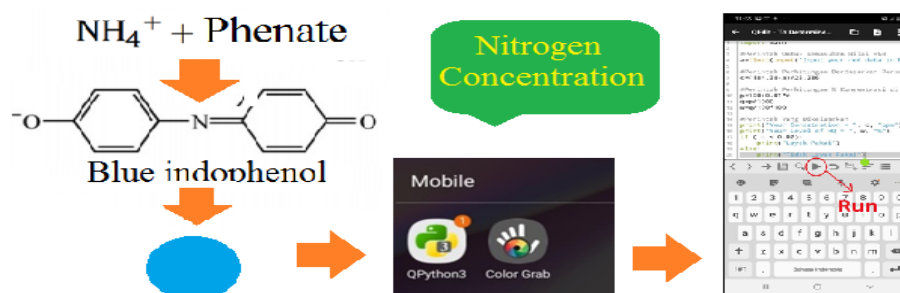
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Root Colonization And Diversity Of Arbuscular Mycorrhyzal Fungi Associated With Lesser Yam (*Dioscorea esculenta*)

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INTRODUCTION. Lesser yam (*Dioscorea esculenta*) can be applied as a functional food due to the high content of inulin, an ingredient of food products and prebiotics. Hence, it is important to increase and promote yam tuber production by using beneficial microbes such as arbuscular mycorrhizal fungi (AMF). This research was aimed to investigate the root colonization and diversity of AMF associated with lesser yam growing at two altitudes. **METHODS.** Soil and root samples were collected from different altitudes, lowlands and highlands. The percentage of root colonization was measured using the staining method and relative quantification using qPCR. The diversity of AMF was analyzed by using molecular approach T–RFLP with a specific primer pair AML1–AML2 and measured by Shannon–Wiener index. **RESULTS AND DISCUSSION**. Results indicated that root samples from lowlands had a higher percentage of root colonization and significantly different than highlands. A total of identified 17 AMF species belonging to 9 genera: *Scutelluspora, Septoglomus, Sclerocystis, Ambispora, Gigaspora, Acaulospora, Claroideoglomus, Funneliformis,* and *Glomus* were determined based on genebank database. The genus of *Acaulospora* was the most dominant and abundant, followed by *Glomus* and *Gigaspora.* The disparity of the altitude conditions may result the difference of the diversity and the percentage of root colonization in plant root. **CONCLUSION**. The use of these three dominant genera as potential AMF inoculum may be more effective to improve lesser yam tuber production. However, further studies should be performed in order to obtain the benefit of utilizing these genera for biofertilizer inoculum to promote lesser yam plant growth.

KEYWORDS: Glomeromycota, q-PCR, Relative Abundance, T-RFLP, Yam Tuber

Smart Molecule of Natural Genetics Resource

COMMITTEE

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	Setiawan Noerdajasakti, SH., M.H
	.

Hepatoprotective Effect of *Rhodomyrtus tomentosa* Fruit Juice in Rats Fed With High Fat High Cholesterol Diet

Ernawati Sinaga, Suprihatin, Purnama Sari, Vivitri Dewi Prasasty

Introduction

- Hepatic diseases is an alarming public health problem

- One of the main cause of hepatic diseases is daily lifestyle, including high high fat high cholesterol diet

- Medical treatments are often difficult to achieve and have limited efficiency

- Developing nutraceuticals from natural products

Rhodomyrtus tomentosa

- Wild fruit plants thrives in tropical region of Asia, Afrika, and America, including Indonesia

- The fruit juice consist of polyphenols and has many medicinal potential

Objective

Prove the effectiveness of *R. tomentosa* fruit juice as hepatoprotective agent against high fat high cholesterol diet

Methods
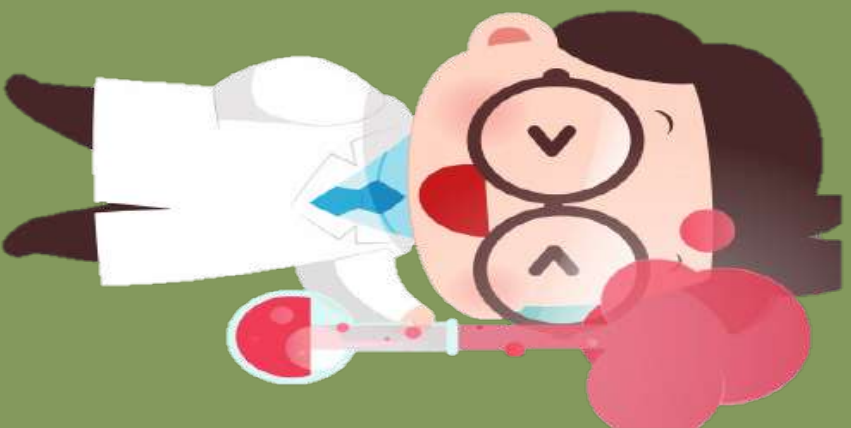
30 Male Sprague-Dawley Rats (200-220 g)

HFHCD for 75 days

RTFJ 1.25, 2.5, 5 g/kgbw or 5 mg/kgbw Simvastatin once daily for 75 days

Euthanized

Serum: ALT & AST

Liver: Histopathology

Results
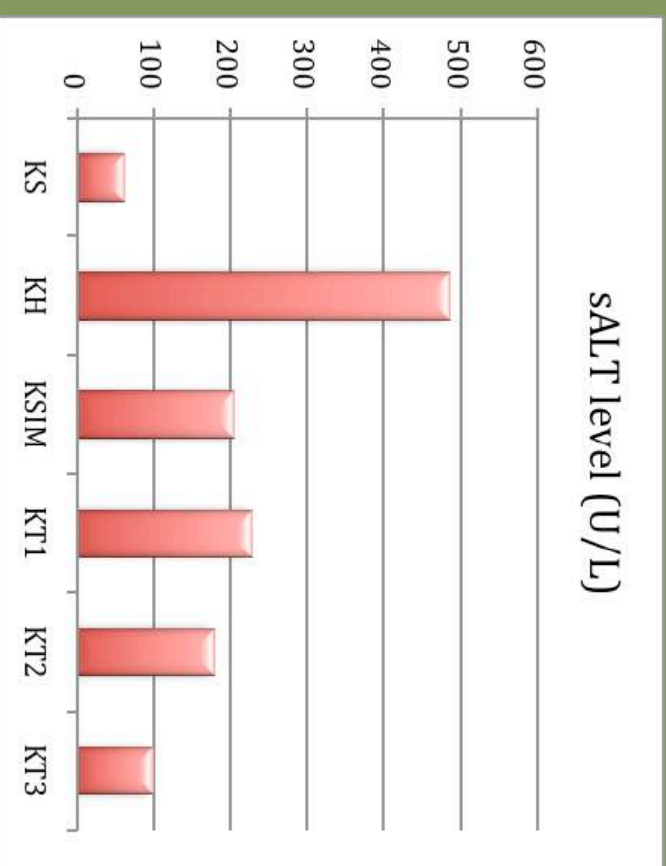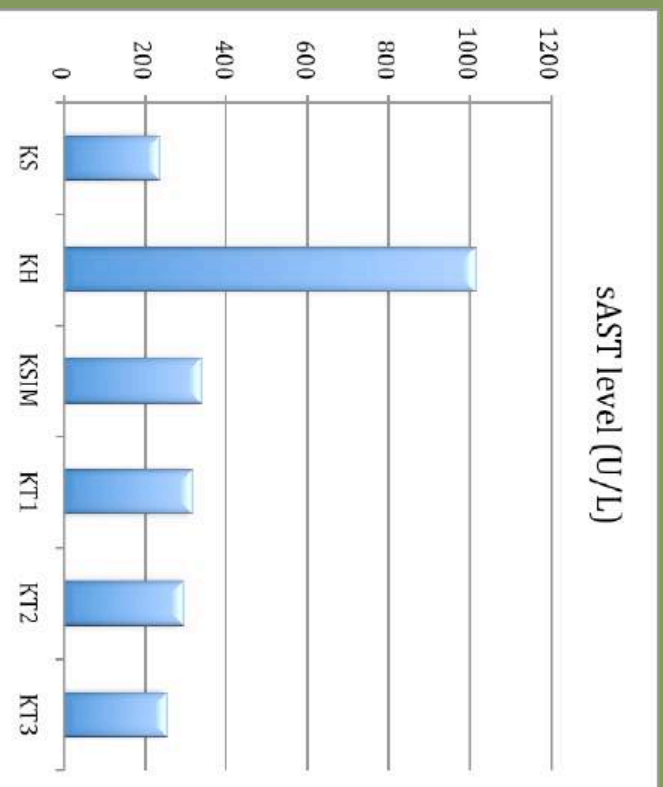
Serum alanine aminotransferase and serum aspartate aminotransferase levels in rats fed with high fat high high cholesterol diet.

(KS=healthy control group; KH=Rats fed with HFHCD without treatment; KSIM= Rats fed with HFHCD treated with simvastatin; KT1, KT2, KT3= Rats fed with HFHCD treated with RTFJ doses 500, 1000, and 2000 mg/bw respectively)

Results

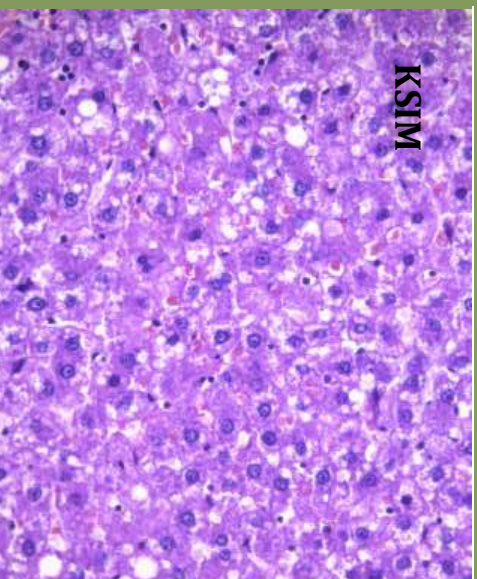**Histopathological images of liver rat's fed with high fat high cholesterol diet.**

(KS=healthy control group; KH=Rats fed with HFHCD without treatment; KSIM= Rats fed with HFHCD treated with simvastatin; KT3= Rats fed with HFHCD treated with RTFJ 2000 mg/bw)
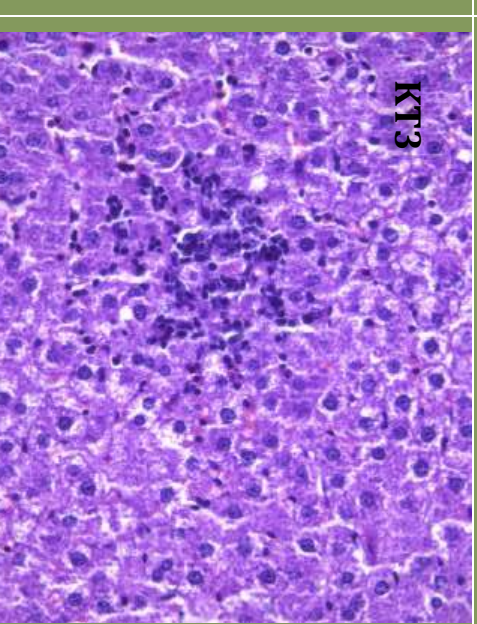

KSIM

KS

KT3

KH
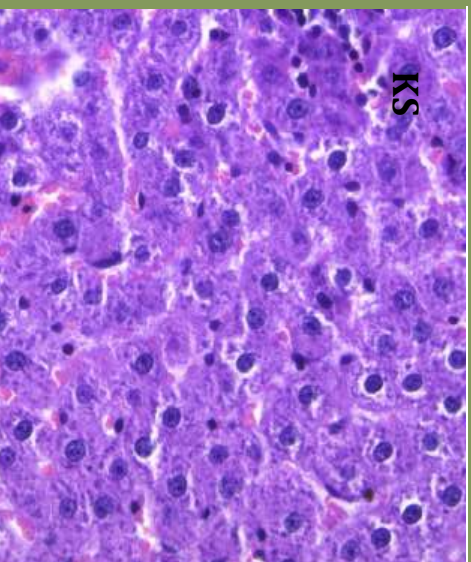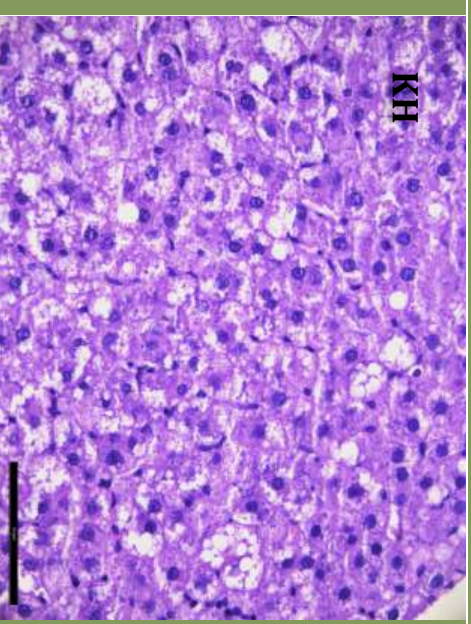
Conclusions

R. tomentosa fruit juice possess significant hepatoprotective activity in rats fed with high fat high cholesterol diet, and therefore could be develop further as nutraceutical to prevent hepatic disorder due to high fat high cholesterol diet.

Acknowledgement

Thank you