



The 2019 International Joint Symposium

8th APPEN Conference

(Asia Pacific Pharmacy Education Network)

2nd HPC Conference

(Halal Pharmaceuticals & Cosmetics)

ABSTRACT BOOK

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“SYNERGIZING BEST PRACTICE IN PHARMACY EDUCATION AND SCIENCE”



The 2019 International Joint Symposium
8th APPEN Conference
(Asia Pacific Pharmacy Education Network)
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(Halal Pharmaceuticals & Cosmetics)



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ABSTRACT
CLINICAL AND COMMUNITY
PHARMACY



CP001

The importance of bioethics subject in healthcare professionals' education in Indonesia

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Patient oriented medication become more important. Healthcare professionals should understand that every type of care given to the patient must be conducted in order to achieve patient safety. That's why all kinds of relations which involved intervention to human being must be made in accordance bioethical principles. The purpose of this research is to elaborate the concept of bioethics and explain the importance of bioethics educations in healthcare professionals' education in Indonesia. This research is a normative research. Data were obtained by means of literature search using "google machine" with "bioethics" as keyword. Data were analyzed using qualitative method. Raw data were reduced to the most relevant data by doing content analysis. The relevant data were used to analyze the purpose of the research. The research found that there were four basic principles in bioethics, that shall be used to solve all problems that might occur or happen during medication care. In order for the healthcare professionals to be able to understand patient's need for patient oriented medication, they need to know the concept and application of bioethics. For such purposes healthcare professionals must be equipped with sufficient knowledge and education of bioethics. The research concluded that bioethics education is a must for healthcare professionals.

Keywords : *Bioethics, healthcare education.*



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CP002

Analysis of factors affecting compliance with diabetes mellitus patients in using insulin correctly with approach theory of health belief model (HBM) (Study at PHC hospital in Surabaya)

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Diabetes mellitus is a group of metabolic diseases with hyperglycemia caused by abnormal insulin secretion, insulin action, or both. Therapy DM patients can be given with OAD or insulin injection. The use of insulin needs special attention because the failure of therapy in patients using insulin large enough cannot be done properly. Problems in insulin use include disruption of physical activity, lack of information and misunderstanding about how to use insulin, which causes rejection of patients, fear of needles, fear of self-harm, anxiety. That can cause the opposite of insulin therapy. To analyze the factors that influence DM patients in using insulin that actually use the Health Belief Model (HBM) theory. This study uses quantitative cross sectional data collection methods. Samples were DM patients at PHC Hospital Surabaya in April-May 2019 who received insulin therapy and met the inclusion criteria (n = 84), the sampling technique was purposive sampling. Data analysis techniques used multiple linear regression and cross tabulation. The results of this study show evidence of perception (0.006) perception of severity (0.047), perceived usefulness (0.026), and perceived confidence (0.042) of patients using insulin correctly ($p < 0.05$). Perception factors that support a large part in relation to patients in using insulin so that problems occur in patients to be obedient in using insulin.

Keywords : *Diabetes melitus, health belief model (HBM), insulin.*



CP003

Knowledge and perception of pharmacy students about herbal medicine and chemical medicine at Ngudi Waluyo University

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Herbal medicines and chemical drugs are commonly used by Indonesian people to overcome various diseases. A pharmacist must have basic competencies regarding herbal and chemical medicine to be able to provide excellent services to the public about medication. This research aimed to determine the level of knowledge and perceptions of pharmacy students about herbal and chemical medicine at Ngudi Waluyo University. This study was a observational descriptive research with a cross sectional approach. Sample was chosen randomly and given a questionnaire. The results showed that the level of knowledge of Pharmacy students averagely was high. The level of knowledge of sixty-eight students were classified as high, forty students were fair, and ten students were less. The perception of students of herbal and chemical medicine was various due to the 14 question asked. Generally, the Pharmacy students were aware and critical of herbal medicine's safety, effectivity, availability, and the cost. The Pharmacy students had a good understanding that not all herbal medicines were safe, effective, easy to get and inexpensive. On the other hand, the Pharmacy's students were neutral when asked about the efficacy and the cost of chemical medicine, that might be caused by the wide variations of chemical medicine that they knew. But they were agree that chemical medicine was more practical, easier to use and easier to get than the herbal medicine. In conclusion, the Pharmacy students in Semarang Regency had a fair judgement between the herbal and chemical medicine which was influenced by their knowledge and perception.

Keywords : *Knowledge, perception, herbal medicine, chemical medicine, pharmacy student.*



CP004

The contemporary role and potential of pharmacist contribution for community health using social media

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Social Media (SM) is everywhere and it impacts all aspects of life including healthcare. SM can be used for promoting health which is the primary roles of pharmacist To identify pharmacist activity in SM and explore the potential for pharmacist contribution using SM Focus Group Discussions (FGDs) were conducted in four cities in Indonesia representing unique cultures and socio-economic condition. The researcher collaborated with Pharmacist Association to select pharmacist from different background as participant. The discussions were audiotaped, transcribed and thematically analyzed 42 pharmacists participated in the FGDs. Four themes were identified: pharmacist use of SM, current initiatives using SM, public acceptance and opportunities for role expansion. WhatsApp was the most used SM and had meaningful contribution to spread information and change patient's behavior. Participants used SM mainly for personal purposes, but when it came to pharmacy and health issues, they were among the first to be contacted by patients or countered misleading information in SM. Several participants actively used SM for sharing health information, promoting use of medicines and encouraging medication compliance. Public had a high trust to information provided by pharmacist in SM. While participants believed pharmacist can play a role in educating and influencing health of the communities, they considered being active in SM as burdensome, time consuming and potential for jeopardizing professional and individual status due to virtual interaction through SM SM has become a venue for pharmacist to improve healthcare. SM may facilitate pharmacist contribution, yet whether pharmacist continue to uptake such role cannot be guaranteed.

Keywords : *Pharmacist, social media, role, health*



CP005

The correlation between type 2 diabetes mellitus risk factor using the finnish diabetes risk score (FINDRISC) questionnaire with random blood glucose

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Diabetes Mellitus is a metabolic disorder characterized by an increase in blood glucose levels due to a disruption either in insulin secretion, insulin activity or both. In 2017, Indonesia was in the top 10th and ranked 6th in the world as a country with people that affected by diabetes 20-79 years reaches 10.3 million people The aim of this study was to evaluate the risk level of educational staff working in Universitas Airlangga who could be affected by type 2 Diabetes Mellitus in the next 10 years and to see the correlation between risk factors for DM 2 using the FINDRISC questionnaire with the random blood glucose test. This study was a cross-sectional study using simple random sampling. This study used the Finnish Diabetes Risk Score questionnaire (FINDRISC) for screening the risk of developing DM 2 over the next 10 years. Screening was carried out in 327 staffs of Universitas between March-April 2019. The results shows that the risk level of DM 2 in the next 10 years to 147 respondents (44.3%) with low risk, 125 respondents (37.7%) were slightly elevated, 16 respondents (4.8%) with high risk and 4 respondents (1.2%) were at very high risk. There was a positive correlation between the random blood glucose level of respondents on DM 2 total risk score ($p=0.000$, $r_s=0.187$). A significant correlation was found between the total risk score measured by FINDRISC questionnaire and random blood glucose test. Although the majority of the respondents showed a low risk for developing diabetes mellitus in teh next 10 years, a routine medical check is advised as primary prevention for developing chronic diseases.

Keywords : *Diabetes mellitus, screening, FINDRISC, risk factor*



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CP006

Homecare pharmacy project as an innovative patient-oriented communication, information, and education learning program

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Third year pharmacy students require to learn communication, information, and education for patients counselling. This paper aimed to introduce the homecare pharmacy project as an innovative patient-oriented learning program for student. Students were divided into 3-4 members' groups and asked to implement homecare pharmacy to degenerative patients. The 6 weeks' project was supervised by the lecturers, and the intended outcomes from the project were to increase patients' knowledge and compliance to therapy. At the end of the program, evaluations were given by the patients and students were require to present their projects in front of the class. The project helped students to learn first-hand about communication and education strategy for degenerative patients.

Keywords : *Homecare, pharmacy, student, project, communication, education, degenerative*



CP007

Profile of pharmacological therapy adherence and non-pharmacological therapy adherence of hypertensive patients

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Hypertension is a chronic disease that requires long term therapy, therefore adherence to of pharmacological therapy and non-pharmacological therapy are important in order to optimize outcome therapy. The aim of this study was to determine the profile of pharmacological therapy adherence and non-pharmacological therapy adherence of hypertensive patients. This study is a descriptive study with non-random and 116 hypertensive patients in Dukuh Kupang Community Health Center agreed to participate. Adherence measurement was performed by using three methods: ARMS questionnaire, pill-count, and life style questionnaire. The result of ARMS indicated that the majority of respondents, 92.2% (n = 116), had moderate levels of adherence while the rest, 7.8% (n = 116) had high level of adherence. Meanwhile the results of measurement of adherence to treatment by pill-count method showed that more than 50 percent of respondents (57.8%, n = 116) adhered to the therapeutic regimen and the rest (42.2%, n = 116) were not compliant. Patient adherence to non-pharmacological therapy measured by lifestyle questionnaire showed that majority of respondents, 94% (n=116), had moderate level of adherence while the rest had high and low level of adherence respectively 5,2% and 0.8%. Respondents who were not compliant with both pharmacological therapy and non-pharmacological therapy ranged from 48% to 94%. Therefore education about the importance of pharmacological and non pharmacological therapy adherence to the success of therapy still needs to be intensified.

Keywords : *Adherence, antihypertensive drug, hypertensive patient, primary health center, ARMS, lifestyle, pill count*



Pharmacist contributions in the treatment of diabetes mellitus in southeast asia: a narrative review

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The growing burden of Diabetes Mellitus (DM) in Southeast Asia put pharmacists in the ideal position to provide management of DM. This narrative review aims to describe evidence of pharmacist contribution in improving DM in Southeast Asia. A literature search was conducted to identify relevant research articles published from 2010 to 2018 in four databases (Scopus, Pubmed, MEDLINE, and Springerlink) describing pharmacist roles and activities intended to improve management of DM in Southeast Asian countries. Results were synthesized narratively and divided into three main sections: (1) the role of a pharmacist in DM management, (2) the impact of pharmacist role and (3) barriers to the implementation of services in DM management. A total of thirteen studies were identified of which six studies mentioned services that were conducted exclusively by a pharmacist and the remaining collaborated with other health professionals. A number of pharmacist services were reported including dispensing, patient education and medication review, most of which were research trials reflecting limited data supporting their applicability in practice. Barriers related to individual, organizational and public recognition were described. The Pharmacist can contribute to improving DM management in a variety of settings. However, the sustainability of pharmacist service was questionable given the lack of formalized support and program. Action research on pharmacist intervention in DM is recommended.

Keywords : *Pharmacist, role, contribution, diabetes mellitus, review.*



CP009

Pharmaceutical services for demand of natural medicine for diabetes mellitus treatment in Surabaya drugstores

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Many people with diabetes mellitus use natural medicine as alternative treatment. However, the majority of natural medicine users did not understand information written on the label and unaware of potential side effects and interactions. Therefore, service providers have responsibility in providing information related to natural medicines. To do so, sufficient knowledge about natural medicines is important. This study aimed to investigate the availability of natural medicine for diabetes mellitus, pharmaceutical service for demand of natural medicine for diabetes mellitus, types of recommendation given by drugstore staff and knowledge about medicine safety. Scenario of specific product requests was presented by a simulated patient to 41 drugstores in Surabaya. Data were recorded and documented in a checklist. The drug requested was not available in all visited drugstores. Instead, 21 (51.2%) service providers gave recommendations for other medicines, mostly in the form of herbal medicine and non-medicines. Very few drugstore staff assessed patients (n=4; 9.76%). Medicine information provided was related to dosing (n=15; 71.4%), drug mechanism (n=4; 19.0%), drug interactions (n=2; 9.5%) and the time drug should be taken (n=10; 47.6%). Only four service providers (9.8%) answered correctly about the meaning of “fitofarmaka” logo on the packaging, while 23 service providers (56.1%) stated that the drug requested was safe. The availability of “fitofarmaka” products for diabetes mellitus was deficient. Service providers were lacking of care regarding patient conditions and had less knowledge of natural medicine.

Keywords : *Natural medicine, drugstore, pharmaceutical service, diabetes mellitus, simulated patient.*



CP010

The service on requesting of natural medicine as immunostimulant in Surabaya drugstores

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Infectious disease can occur when the immune system was disrupted, either by bacteria, viruses or fungi. Immuno-stimulant consumption can help body to strengthen immune system. Immunostimulant products have been available in different types of medicines, including the one that is classified as phytopharmaca, a registered natural product in Indonesia that has undergone clinical trials. This study aimed to examine the availability of an immunostimulant phytopharmaca product, the service provision of drugstore staff in response to the product request, and drugstore staff's knowledge about phytopharmaca. A scenario of an immunostimulant phytopharmaca product request was simulated in 41 drugstores in Surabaya. The product was only available at six (14.6%) visited drugstores, while at 18 (43.9%) drugstores the request was replaced with similar immunostimulant but different dosage form or other product known as food supplement. Eleven (26.8%) drugstore staff assessed a simulated patient prior to fulfilled the request or provided other recommendations. Those who delivered products only provided information on dosage and time to use the product, mainly after being asked. Only one (2.4%) drugstore staff correctly mentioned that the logo on the product packaging was phytopharmaca. It can be concluded that the availability of immunostimulant products in drugstores was likely in the form of food supplement. As a consequence, drugstore staff had limited knowledge about registered herbal products, particularly the phytopharmaca. Further research was needed to investigate why drugstore staff was unlikely to assess their client and deliver information regarding requested products.

Keywords : *natural medicine, simulated patient, immunostimulant, drugstore*



CP011**Natural medicines in Surabaya: its use, knowledge, and attitudes among the elderly**Aminatush Ummah*, Wahyu Utami, Anila Impian Sukorini, Hanni Prihhastuti Puspitasari

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Natural medicine has been used from generation to generation, but only a few understand the function of plants used as natural medicine. Limited knowledge about natural medicine may cause harm, particularly among the elderly who experience decreased function of their organs and are vulnerable to chronic health problems. The purpose of this study was to examine knowledge, attitude and the use of natural medicine by the elderly in Surabaya. First step was randomly selecting “Puskesmas”, followed by sampling elderly people, members of purposively selected “Posyandu lansia”. A survey was then conducted to elderly people who were willing to complete a questionnaire. A total of 116 participated in the study. Almost two-third of respondents (n=86) used natural medicine, mainly in the form of “jamu”(n=78, 90.7%), either using traditionally-made ingredients or registered products. Only eight (9.3%) used standardised herbal products. About 70% of respondents never discussed the use of natural medicine with their doctor. Natural medicine was commonly used to treat chronic conditions such as hypertension, hypercholesterolemia and hyperuricemia. The majority (n=94, 81.03%) agreed about the absence of side effects after consuming natural medicine. Knowledge about natural medicine registered products available in Indonesia was only showed by less than 20% of respondents. Respondents’ attitude towards natural medicine was positive, indicating that natural medicine is safer than prescribed synthetic medicines from their doctor. To conclude, positive attitude with limited knowledge about safety issue of natural medicine may contribute to the occurrence of serious health problems among elderly people with chronic conditions.

Keywords : *natural medicine, elderly, knowledge, attitude, practice .*

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CP012

Pharmaceutical services for requests of natural medicine as immunostimulant in Surabaya pharmacies

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Immunostimulant in the form of natural medicines have been used as a complementary treatment for infectious diseases. The literature reported that service providers' knowledge of interactions and side effects of natural medicine is inadequate. Service providers at pharmacies have also been reported to provide limited medicine information to patients collecting natural medicines. This study aimed to investigate the availability of natural medicines as immunostimulant, provision of patient assessment, recommendations, and information about natural medicine for immunostimulant, as well as knowledge of natural medicines. This observational study was conducted using a simulated patient method in 90 randomly selected pharmacies in Surabaya. The drug requested was available in 73 pharmacies (81,1%), the remaining recommended other immunostimulant in the form of food supplement. Only a small number of service providers (n=22, 24,4%) assessed patient simulated. Drug information delivered was about dosing and time to use. Sixteen (17,8%) service providers correctly answered "fitofarmaka" logo. Five (33,3%) pharmacy staff who provided food supplement answered that there was no difference between the requested product and the recommended product. In conclusion, natural medicines as immunostimulant were available in the majority of pharmacies. Despite that, there is room for improvement in provision of patient assessment and natural medicine information. There is also a need to improve knowledge of natural medicine so that pharmacy staff may satisfactorily perform in response to natural medicine requests.

Keywords : *Natural medicine, pharmacy, simulated patient, immunostimulant.*



CP013

Knowledge, attitudes, and usage of natural medicine among mothers in Surabaya

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The usage of natural medicines has been common among mothers who want to maintain their children health. Previous studies have shown that despite having poor knowledge, mothers have a positive attitude towards the use of natural medicines. This study investigated knowledge, attitudes and practice of natural medicines usage among mothers of toddlers in Surabaya. A survey was conducted with purposively selected mothers of toddlers who were members of “Posyandu balita” from five randomly selected “Puskesmas” in Surabaya. A total of 116 mothers completed a self-administered questionnaire. About half of respondents (n=59) reported providing natural medicines for their toddlers to relieve fever or cough, to increase appetite or as immunity booster. Almost all of 59 respondents provided traditionally-made natural medicine either homemade by themselves or by sellers. Respondents had poor knowledge about types of natural medicine products available in Indonesia, but their knowledge about safety issue of natural medicines usage was regarded sufficient. Respondents’ attitude towards natural medicines was positive, the majority agreed with statements: “traditional medicine is safe due to its nature” (n=87, 75%), “natural medicines are safer than modern medicines” (n=86, 74.1%), and “natural medicines have side effects” (n=80, 69%). In conclusion, traditionally-made natural medicines remain popular despite the availability of natural medicine products, leading to having poor product knowledge. Although attitude towards natural medicines was found positive, knowledge related to some issue about their safety needs to be improved to avoid undesired effects.

Keywords : *Natural medicine, mothers, knowledge, attitude, practice.*



CP014

Pharmaceutical services for requests for natural medicine to treat hypertension in Surabaya pharmacies

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Medicines made from herbs have been widely reported as safe due to its nature. Despite that, it can cause side effects. Although natural medicines can be used for self-medication, its use for treatment chronic conditions such as hypertension should be taken into consideration. To enable providing appropriate information, pharmacy staff should have proper knowledge about natural medicines. This study aimed to investigate the availability of natural medicine for hypertension in pharmacies, information collected by pharmacy staff in patient assessment, types of recommendation and information related to medicines given by pharmacy staff, as well as their knowledge of medicine safety. Scenario of specific product requests was presented by a simulated patient to 90 randomly selected pharmacies in Surabaya. The drug requested was not available in all visited pharmacies. Sixteen (17,8%) pharmacy staff recommended drugs, non-drugs, and referrals to doctors. Only two (2,2%) pharmacy staff assessed patient simulated. Drug information was provided by pharmacy staff about dosage and time of use. Fifteen (16,7%) pharmacy staff answered that the meaning of logo on the packaging was “fitofarmaka” and the most common pharmacy staff answered it was considered safe. In conclusion, the availability of “fitofarmaka” products for hypertension in pharmacies was very lacking. Lack of knowledge about natural medicines may contribute to limited information collected regarding the patient and information provided related to natural medicine products.

Keywords : *Natural medicine, pharmacy, pharmaceutical service, hypertension, simulated patient.*



CP015

The self medication services profile of phytopharmaca drug products for diabetes mellitus patients at some of community pharmacies in Surabaya

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The development of herbal research in Indonesia has increased the availability of registered herbal products. One type of the products is called phytopharmaca. The literature, however, showed that herbal medicine has been commonly used as a complement to prescribed medicines among patients with chronic diseases, including diabetes mellitus. Inappropriate use of herbal medicines in chronic conditions can be avoided if pharmacists as a medicine expertise provided relevant information to such patients. This study investigated the availability of a phytopharmaca requested for diabetes mellitus, pharmacists' performance in assessing patient, providing recommendations and information, as well as their knowledge about phytopharmaca. A simulated-patient study was conducted in 90 randomly selected pharmacies in Surabaya. Twenty (22.2%) pharmacies provided the product requested. Only three (3.3%) pharmacy staff assessed a simulated patient. As the product requested unavailable, seven (7.7 %) pharmacy staff recommended antidiabetic synthetic medicines, while five (5.5%) suggested other herbal products in the form of "jamu". Medicine information on dosing and time for use was only delivered in 27 (30%) pharmacies, mostly provided when requested. A third pharmacy staff correctly identified the type of herbal product requested but many of those who recommended other products were unable to provide correct answers about the difference of both products It can be concluded that the availability of registered herbal products for diabetes mellitus was limited. Herbal medicine usage among patients with chronic diseases may become problematic if pharmacists or pharmacy staff have



limited knowledge, with little efforts to assess patients and deliver sufficient medicine information.

Keywords : *Phytopharmaca, pharmacy, diabetes mellitus, simulated patient.*



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CP016

The relationship between adherence barriers and medication adherence in hypertensive patients (Study at primary health care centers in Surabaya)

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Hypertension is defined as a continuous increase in arterial blood pressure. The prevalence of hypertension in Indonesia in 2018 showed that 34,11% people ≥ 18 years old had hypertension. In Surabaya about, 10,43% people had hypertension in 2016. In Indonesia at least 50% of patients prescribed with antihypertensive drugs did not take as recommended. Adherence barriers potentially determine the medication adherence in hypertensive patients. This study was aimed to identify the relationship between barriers to adherence and medication adherence in hypertensive patients at primary healthcare centers in Surabaya. A cross sectional study using accidental sampling was conducted. The barriers medication was measured using The Identification of Medication Adherence Barriers Questionnaire (IMABQ) and the adherence was measured using Adherence to Refills and Medications Scale (ARMS). A cross sectional study using accidental sampling was conducted. The barriers medication was measured using The Identification of Medication Adherence Barriers Questionnaire (IMABQ) and the adherence was measured using Adherence to Refills and Medications Scale (ARMS). About 341 hypertensive patients were participated in this study. The majority of the respondents showed scores of IMAB-Q and ARMS 20 and 16, respectively. The result shows a relationship between medication adherence barriers and medication adherence ($p=0,000$; $r=0,292$). The most frequent barrier faced by respondents was worried to experience the side effects of the drug. It is important to improve the role of pharmacists in community by serving proper counseling, monitoring, and education to eliminate adherence barriers and thus improve adherence.

Keywords : *Adherence, barriers in adherence, correlation, hypertension, IMABQ, ARMS.*



CP017**A study to assess the adherence of patients with diabetes mellitus at community health care center in East Surabaya**

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Diabetes mellitus is a metabolic disorder, which is characterized by hyperglycemia. Adherence to treatment regimens and a healthy lifestyle is important to achieve therapeutic goals so that the quality of life of patients improves. The aim of this study is to determine the profile of drug prescription and the adherence of patient with diabetes mellitus at community health care center in East Surabaya. A descriptive study with accidental sampling that using pill count and self report method that is ARMS questionnaire and lifestyle questionnaire. The study was conducted on 196 respondents and the results showed that the most prescribed oral antidiabetic drug was a combination of metformin 500 mg and glimepirid 2 mg (89.8%). Two thirds (62.8%, n = 196) respondents complied using drugs according to the pill-count method while the rest, 47.2% (n = 196), were non compliance. Measurement of adherence to refill and treatment using the ARMS questionnaire method showed that more than 60 percent (67.3%, n = 196) respondents had moderate adherence while others had high and low adherence rates respectively, 24.5% and 7.1 %. More than three quarters (79.1% n = 196) of respondents had moderate compliance with healthy lifestyle, while the rest had the following level of compliance with healthy lifestyle: high 16.8% and low 4.6%. Oral antidiabetic drugs that the most prescribed in Gading Community Health Care Center were combination of metformin 500 mg and glimepiride 2 mg. There are still many diabetic patients who are non-adherence and fewer adherences with their treatment as we.

Keywords : *Diabetes mellitus, antidiabetic oral, patient adherence.*



CP018**The correlation between the risk level of diabetes mellitus using the Australian type 2 diabetes risk assessment tool (AUSDRISK) questionnaire with random blood glucose test (Study in staffs of Universitas Airlangga)**

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Diabetes mellitus is a metabolic disorder due to lack of insulin or the inability of the body to use insulin efficiently. This studied targeted healthy people who have a high risk for developing type 2 diabetes mellitus. This study aimed to see the relationship between risk factors for diabetes mellitus (DM) with Random Blood Glucose test in staffs of Universitas Airlangga Surabaya. This study was a cross-sectional study using simple random sampling. The risk level of DM was measured using the questionnaire The Australian Type 2 Diabetes Risk Assessment Tool (AUSDRISK). The AUSDRISK questionnaire predicts the risk for having type 2 DM in the next five years. About 327 staffs from non health science faculties in Universitas Airlangga in Surabaya participated in this study. The results show that there was a positive correlation between age ($p=0,000$; $r=0,446$), waist circumference ($p=0,000$; $r=0,640$) with the total scores of AUSDRISK. The results were also showed significant differences between GDA ($p=0,000$), gender ($p=0,000$), family history of diabetes mellitus ($p=0,000$), high blood sugar ($p=0,000$), antihypertensive drugs ($p = 0,001$), smoking ($p=0,000$), physical activity ($p=0,000$) and vegetable fruit consumption level ($p=0.003$) with the total score of AUSDRISK. This study also showed that there was a positive correlation between random blood Glucose ($p=0,000$; $r=0,227$) with the total score of AUSDRISK. In conclusion, the higher the total score obtained based on the AUSDRISK questionnaire, the higher the risk for developing type 2 diabetes mellitus in the next five years. The development of diabetes for the next five years can be predicted through screening using AUSDRISK.

Keywords : *AUSDRISK, diabetes mellitus, risk assessment, screening.*



CP019

The correlation between the risk level of diabetes mellitus type 2 with random blood glucose test using the Canadian diabetes risk questionnaire (CANRISK) questionnaire

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Diabetes mellitus (DM) is a metabolic disorder due to abnormality of insulin secretion, insulin action, or both. This study aimed to screen people who look healthy but have the risk of developing type 2 diabetes. In addition, this study also determined the relationship between random blood glucose and the risk of developing type 2 diabetes mellitus based on The Canadian Diabetes Risk Questionnaire (CANRISK) in staffs of Universitas Airlangga. This study was cross-sectional study with a simple random sampling technique. The instrument used was the CANRISK questionnaire. About 332 respondents participated in this study. The results show that there was a positive correlation between the total score of the CANRISK and the age ($p=0,000$; $r_s=511$), BMI ($p=0,000$; $r=657$), waist circumference ($p=0,000$; $r=673$). In a differential test analysis, there was significant differences between gender ($p=0,000$), history of hypertension ($p=0,000$), history of high blood glucose ($p=0,000$), family history of DM ($p=0,001$) and education ($p=0,001$) in the risk category of the CANRISK. Whereas for physical activity, fruit or vegetable consumption, ethnicity, childbirth ≥ 4 kg, there were no significant differences in the risk category of the CANRISK. The study also showed that there was a positive correlation between random blood glucose level ($p=0,000$; $r=0,280$) with the total score of the CANRISK. In conclusion, the higher the total score obtained based on the CANRISK questionnaire, the higher the risk for developing type 2 diabetes mellitus in the next 10 years. The development of diabetes for the next 10 years can be predicted through screening using CANRISK.

Keywords : *CANRISK, diabetes mellitus, risk assessment, screening.*



CP020

A review of the implementation of chronic disease management program (PROLANIS) in Indonesia

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Chronic Disease Management Program (Prolanis) is part of the health care service in Indonesia which involving healthcare facility and the national health coverage or Badan penyelenggara Jaminan Sosial (BPJS) to provide a proactive health service approach for patients with chronic diseases particularly Diabetes Melitus and Hypertension. Prolanis aims to achieve the optimal quality of life in chronic disease patients through effective and efficient healthcare services including cost. Some private clinics and public primary healthcare facilities in Indonesia has implemented the Prolanis, however the results of the program implementation has not been reviewed clearly. To review the implementation of Prolanis in healthcare facilities in Indonesia. A literature search (up to August 2019) through Google Scholar database using the terms of Prolanis, BPJS indexed with terms related to blood pressure or hypertension in Indonesia. The references, citations and similar articles for the identified articles were used to identify additional sources. About 24 articles were identified through the first search using the key terms although only 8 articles met the inclusion criteria. This review show that implementation of Prolanis in the healthcare facilities in Indonesia is varied in terms of the activities and services provided. The healthcare professional involved in the implementation of Prolanis were also varied. There were some obstacles faced by the healthcare facilities including the availability of funding, the healthcare facilities and infrastructure, the unavailability of Standard Operating Procedure (SOP) as well as the limitation of human resources involved in the Prolanis. The implementation of Prolanis in Indonesia has not been optimized as there were some obstacles during its implementation in the healthcare facilities

Keywords : *BPJS health, chronic disease, Prolanis, primary healthcare facilities.*



Student scope of practice in pharmacies: definitions, student competencies, and guidelines for implementation

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Student practice in pharmacies for pharmacist profession education is one of the stages of professional education that students experienced after graduating from a pharmacy bachelor degree. This practice aims to produce competent pharmacists in accordance with Indonesian Pharmacist Competency Standards which are approved by the Indonesian Pharmacy Higher Education Association (APTFI) and the Indonesian Pharmacist Association (IAI). The purpose of student practice in a community pharmacy is to provide sufficient knowledge and experience about the role of community pharmacists in pharmacies. To achieve these objectives, educational institutions must arrange an educational stage that must be completed, student competencies, procedural skills, as well as the knowledge of duties, authority, and responsibilities of the pharmacist in community setting. This guidelines have been adapted to APTFI decisions number: 13/APTFI/MA/2010 concerning: Student practice for pharmacist profession education standard. This review provides background on the definition of the student practice, evidence to support the student practice, the need for the student practice, student competencies and objectives for the student practice, barriers to implementation of the student practice, and elements critical for successfully implementing the student practice. Student practice in pharmacies get a minimum load of 4 credits. 1 credits is equivalent to 8 hours per day for 1 week with 5 working day or 40 hours/week. The activity includes student competencies in: (1) professional communication, (2) prescription and non-prescription drug services, (3) integration of pharmaceutical scientific knowledge, (4) problem solving, (5) information management, and (6) personal development.

Keywords : *Student practice in pharmacies, competencies.*



CP022

Study of co-prescription of drugs potentially interact with warfarin in Indonesian ambulatory patients

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Despite growing use of DOAC, the most prescribed oral anticoagulant currently in Indonesia is warfarin. Efficacy and safety of warfarin are influenced by various factors including drug-drug interaction. Patients in ambulatory care often receive more than one prescription leading to potentially drug-drug interactions. However, there is no data from Indonesia has been published. to assess the prevalence of other drugs potentially interacting with warfarin and their interaction risk. It was a descriptive cross sectional study. We identified warfarin prescriptions issued between January 2015 and December 2019 using electronic prescription and electronic medical record. Analysis of interaction risk was performed using Medscape. During 4 years, there were 50 patients fulfilling inclusion criteria with 715 prescription issued. From 50 patients, 94 % at least received 1 concomitant drug. The four most commonly interacting drugs prescribed during warfarin therapy were spironolactone (58%), simvastatin (54%), allopurinol (32%) and low dose acetyl salicylic acid (20%). Furthermore, there were 38% patients received concomitant drugs classified as serious interaction as follow allopurinol, amiodarone and fenofibrate. As much as 16% patients had adverse outcomes and some of this may associated with warfarin-drug interaction. This study indicates that the prevalence of co-prescription with potentially interacting drugs during warfarin therapy in ambulatory patients is high. Strategy to identify and manage warfarin-drugs interaction is warranted to avoid potential adverse events.

Keywords : *Warfarin, co-prescription, drug-drug interaction, Indonesian ambulatory patients.*



CP023

Utility analysis of kidney disease outpatients with anemia undergoing hemodialysis

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Anemia and quality of life in chronic had a significant correlation on kidney disease patients with regular hemodialysis. End Stage Renal Disease care expands the number of chronic kidney disease patients, the focus will need to shift from simply prolonging life to providing a better Quality Of Life. The aim of this study was to evaluating the quality of life of kidney disease outpatients with anemia undergoing hemodialysis. This cross sectional study was conducted with 65 patients, collected from August to September 2018. We included outpatient chronic kidney disease with anemia undergoing hemodialysis. Quality of life was assessed with EQ-5D-5L include five levels of severity in each of the existing. Five EQ-5D dimensions (mobility, self care, usual activities, pain/discomfort, anxiety/depression). The EQ-5D-5L consists of 2 pages that werw the EQ-5D-5L descriptive system and the EQ Visual Analogue scale (EQ VAS). The EQ-5D-5L consists of 2 pages that were the EQ-5D-5L descriptive system and the EQ Visual Analogue scale (EQ VAS). The EQ VAS records the respondent's self-rated health on a 20 cm vertical, visual analogue scale with endpoints labelled 'the best health you can imagine' and 'the worst health you can imagine. The results obtained that the therapy for patients chronic kidney disease with anemia in hospital at Yogyakarta. There were 24 patients (36.92%) received combined eritropoyetina alpha and amino acid therapy, and 21 patients (32.31%) received eritropoyetina alpha therapy. The conclusion were the average utility value of chronic kidney disease patients with anemia was 0.648, while the average utility value of EQ-VAS was 72.

Keywords : *EQ-5D-5L, EQ VAS, hemodialysis, chronic kidney disease, anemia.*



Evaluating current practice and policies in the use of injectable medicines for treating myalgia

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Myalgia in patients can be associated with a large array of conditions including injuries, infections, and inflammations. Treatment for myalgia may include the use of oral, topical and injectable medicine (IM). However, the use of IM has been restricted by WHO due to usual hazards associated with inappropriate medicine use, risks of disease transmission and more expensive spending for using IM. Accordingly, the Ministry of Health of Indonesia (MoH) has limited the use at the level of <1% in every primary care center (Puskesmas) across the nation. This study, therefore, reported the current practice of using IM for myalgia in Pamekasan Indonesia. This study reviewed official documents such as rational drug use report, medicine use databases, and drug request report. The documents were obtained from the district health office or public domain from 2015 to 2017. Data were then collated, extracted and presented as frequencies. The rate of use of IM for myalgia in Pamekasan was 38.5%. Cyanocobalamine HCl and Diphenhydramine HCl were the most used IM for treating myalgia. All twenty Puskesmas in Pamekasan conducted injection practice above the recommended level reflecting a major gap between practice and policy implementation. This study implied a substantial effort is needed to enforce the policy. The use of IM for myalgia in Pamekasan from 2015 to 2017 was significantly higher than the recommended level reflecting a major problem in the practice. This is an alarming call for the local healthcare stakeholders to improve such situation.

Keywords : *Myalgia, injectable medicine, primary care center.*



Cost consequences analysis of antihypertensive in outpatients department of PKU Muhammadiyah Gamping Hospital

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Hypertension is a catastrophic disease that requires a long time for treatment and has an impact on the cost of treatment. It needs to be studied on the context of pharmacoeconomic studies which will calculate not only from the treatment effectiveness, but also the costs for maintenance the disease. The purpose of the study was to determine the costs and the outcome of antihypertensive therapy based on the patient's perspective. The research method used analytic observational model with a cross-sectional design and the sample was outpatient hypertension at PKU Muhammadiyah Gamping Hospital who had received antihypertensive therapy for at least 1 month. The characteristic of respondents were described as percentages, similarly the outcome of therapy and the cost of treatment. The results showed that the average direct medical costs, direct non-medical costs, and indirect costs based on patient perspectives consecutively were Rp.359.408,-; Rp.24.617,-; and Rp. 40.583,-. The highest therapeutic outcome was shown by a single antihypertensive Calcium Channel Blocker (CCB) with a value of 60%. The total costs for outpatients hypertensive therapy was Rp. 424.607,- and the highest effectiveness therapy was CCB.

Keywords : *Hypertension, cost-consequences, pharmacoeconomic, patient perspective.*



CP026

Exploration of barriers affecting job satisfaction among community pharmacist

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Understanding job satisfaction among community pharmacist is of importance because it may affect roles and performance. Several barriers in practice may affect job satisfaction. To explore barriers affecting job satisfaction among community pharmacist. This study extracted data from the National Community Pharmacy Survey 2018 which was a national survey conducted between September 2018 and February 2019. The results for this study were produced from online questionnaire using accidental sample of community pharmacies registered in East Java. The questionnaire asked pharmacist's agreement towards 22 factors which may act as barriers affecting job satisfaction. Data were analyzed using descriptive statistics. Of the sample of 1,015 possible pharmacies, 507 consented to participate (50%). The majority of respondents were Female (83.4%) and most respondents were on age 31-40 yo (41.6%). Most respondents perceived ten factors such as lack of recognition and lack of remuneration as barriers affecting job satisfaction. These factors were consistently ranked as primary barriers in many studies. Interestingly, over than half of the respondents disagreed that other ten factors such as communication and skills were included as barriers which contrasts with many studies particularly in developing countries. Respondents provided equal responses to another two factors namely lack of staffs and opportunities for continuing education reflecting these factors may or may not be considered as barrier. This study identified some significant barriers affecting job satisfaction among community pharmacists. In general, barriers can arise from individual, management and environmental issues suggesting a specific approach to reduce these barriers.

Keywords : *Job satisfaction, barriers in practice, community pharmacy.*



CP027

Cost of illness in type 2 diabetes mellitus patients with sulphonylurea monotherapy at several primary health care centre in Surabaya

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Cost of illness in type 2 Diabetes Mellitus patients with sulphonylurea monotherapy at several primary health care centre in Surabaya is all costs arising from type 2 Diabetes Mellitus. This study aimed to determine the cost of illness in patients Diabetes Mellitus Type 2 with monotherapy of sulphonylurea at 10 primary health care centre that have the highest number of DM patients in the Surabaya. This study was a cross sectional study using purposive sampling. Calculation cost of illness uses a list of questions. This study was conducted on 30 patients with Diabetes Mellitus Type 2 at 10 primary health care centre in the Surabaya. Sulphonylureas were prescribed at several primary health care centre, that were Glibenklamid and Glimepirid. The total cost in type 2 Diabetes Mellitus patients with sulphonylurea monotherapy at several primary health care centre in Surabaya Rp25.684.718,-/year. The biggest cost was the indirect cost which was the cost of lost productivity Rp 185.632,- ± 200.011/year. The lowest cost was the cost of side effects Rp 0,-. This study provide important data regarding cost of illness in type 2 diabetes mellitus patients with sulphonylurea monotherapy and can be used to guide further research and policy.

Keywords : *Cost of illness, type 2 diabetes mellitus, sulphonylurea, primary health care centre.*



Cost of illness in type 2 diabetes mellitus patients with two oral antidiabetic drug at primary health care centre in Surabaya

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Diabetes mellitus is a chronic metabolic disorder that will pass long-term therapy and requires a considerable cost. The purpose of this study was to describe cost of illness in type 2 diabetes mellitus patients with two oral antidiabetic drug at primary health care center in Surabaya. This research was a cross sectional study with purposive sampling method. The study was conducted at 10 primary health care centre in Surabaya which had the highest number of diabetes mellitus patients. The inclusion criteria of this study were type 2 diabetes mellitus patients with two oral antidiabetic drugs with a minimum duration of at least 3 months, and coming to the primary health care centre in January - March 2019. The perspective used in this research was societal. Costs calculated were direct medical cost, non-medical costs and indirect costs. The total respondents obtained were 105 respondents. The number of female patients was 74 (70.48%). Most respondents age between 55-64 years were 36 (34,39%). Based on patients profession, housewife were the most. Combination of two oral antidiabetic drugs most widely prescribed was metformin 500 mg and glimepiride 2 mg accounted for 60 (57.14%) patients. Calculation of cost of illness in one year was Rp 121.995.343,88. Direct medical costs were the largest costs that must be paid. This study provide important data regarding cost of illness in type 2 diabetes mellitus patients with two oral antidiabetic drug and can be used to guide further research and policy.

Keywords : *Cost of illness, type 2 diabetes mellitus, oral antidiabetic drug, primary health care centre.*



CP029

Cost of illness on type 2 diabetes mellitus with insulin therapy in several community health care centers in Surabaya

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Diabetes mellitus requires lifelong treatment to control patient blood sugar levels, resulting in increased therapeutic service costs to improve the patient's quality of life. The purpose of this research was to identify the cost of illness in Type 2 Diabetes Mellitus (T2DM) patients with insulin therapy. This study was conducted from January to March 2019 in 15 community health care centers in Surabaya. The respondent were T2DM patients who get insulin therapy as monotherapi or in combination. This research was a cross-sectional study with total sampling technique. The perspective used in this research was societal perspective. The costs component were direct medical cost consisting of drug costs, doctor consultation fees, laboratory examination fees, blood sugar test costs, and the cost of drug side effects. Direct non-medical cost consisting of transportation costs and administrative costs, and indirect costs which was the cost of decreasing productivity. Results showed that the average value of the cost of illness in patients with T2DM with insulin therapy in 15 community health care centers in Surabaya was Rp6,496,186 ± Rp4,048,491 per patient per year. The largest cost component was drug cost Rp5,556,028 ± Rp3,754,363 with a percentage of 85.53% of the total cost. The second largest cost component was cost of decreasing productivity Rp365,900 ± 469,050 with a percentage of 5.63% of the total cost. To conclude, drug costs have a major effect on the cost of illness in patients with T2DM with insulin therapy.

Keywords : *Cost of illness, type 2 diabetes mellitus, insulin, community health care centers, societal perspective.*



CP030

Factors affecting active medication information services towards pregnant and breastfeeding woman with chronic disease

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Active medication information services towards pregnant and breastfeeding woman with chronic disease is one of pharmacist's commitment to carry out responsible pharmaceutical practices with the aim of achieving definite outcomes that improve patient's quality of life. Health Belief Model Theory approach explains pharmacist's behaviour influenced by beliefs and cues to action. This study aimed to analyse factors affecting the practice of community pharmacists for actively giving the drug information service for women with chronic diseases during pregnancy and breastfeeding with Health Belief Model. A cross sectional study in community setting i.e. puskesmas and private (independent and chain retail) pharmacy in Surabaya was done. About 62 pharmacists in pharmacy and 267 pharmacists in the community agreed to participate in this study. The results showed that pharmacists' knowledge ($p < 0,001$) had significant influence towards perceived self-efficacy to give medication information service actively. Pharmacists' perceived self-efficacy ($p = 0,006$) and cues to action ($p = 0,007$) had significant influence towards overall practice of pharmacists to give medication information service actively in community setting. However, if analyzed separately there are different factors affecting pharmacy practices in puskesmas and private pharmacy. A different approach is needed to improve practice of pharmacists at puskesmas and private pharmacy for actively giving the drug information service for women with chronic diseases during pregnancy and breastfeeding. Providing continuous learning programs through seminars and training related to medication use during pregnancy and breastfeeding to pharmacists is needed to optimise the confidence and the ability of pharmacist in providing services.

Keywords : *Community pharmacies, active medication information services, pharmacists, beliefs.*



CP031**The relationship between the level of education and accuracy of insulin injection techniques in DM patients with measurement of H bA1C values**

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The one of diabetes therapy is insulin. The insulin injection technique must be done accurately and it needs an educational process in diabetes mellitus patients. The level of education is one of the determinants of the ease of the patient's understanding of the education provided. The aim of this research is to know the relationship of education level with the accuracy of insulin injection techniques through HbA1c values. This research was stated as ethical conduct with the issuance of Ethical Clearance Number 400/042/K.3/302/2019. The research method used was cross-sectional with sampling using a purposive sampling technique according to the inclusion criteria, diagnosed with DM and using insulin therapy with/without a combination of oral antidiabetic drugs (OAD), having HbA1c levels of data \pm 3 months from the time of study, willing become research respondents by signing informed consent. The study was conducted by filling out questionnaires Forum for Injection Technique & Therapy Expert Recommendation (FITTER). and interviews. The results 50 subject with primary education were able to perform insulin injection techniques accurately as much as 20%, secondary education was 14%, higher education was 2 %. All of this results have HbA1C value $>$ 6,5%. Statistical analysis between levels of education with the accuracy of the insulin injection technique was carried out through the Somers' correlation test ($p = 0.81$, $r = -0.03$). This study shows there is no relationship between the level of education with the accuracy of insulin injection techniques in patients with diabetes mellitus through HbA1c.

Keywords : *Diabetes mellitus, insulin injection techniques, education level, FITTER.*



Knowledge, attitude, practice of pharmacist towards management of hypertension in Puskesmas

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Hypertension is one of the major health problems in the world and one of the most important contributors to death in the Indonesia. Complication due to hypertension leads to myocardial infarction, stroke, and renal failure when hypertension is not treated appropriately. Pharmacists especially in primary care center (Puskesmas) play an important role in the management of hypertension. The purpose of this study was to assess Knowledge, Attitude and Practice (KAP) of pharmacists working in Puskesmas in Surabaya towards management of hypertension. A cross sectional survey was conducted from March to July 2019 in 63 Puskesmas in Surabaya. A questionnaire was developed from literatures to assess KAP and administered to pharmacists. Data was analyzed using SPSS version-17 and presented in descriptive variables. The mean age of participants was 34.6 ± 4.9 years (24-45 years old) and 82,5% were females. 74.6% of the respondents have more than 5 years of experience work in Puskesmas. Majority of respondents were knowledgeable (85.9%) and had good attitude (75%) about management of hypertension, respectively. Only 59.4% of pharmacists had good practice regarding appropriate use, effectiveness, safety and adherence of medications in hypertension. Pharmacists had satisfactory knowledge and attitude but showed unsatisfactory practice on the management of hypertension. There is a need of more continuing education, workshops, and seminars for pharmacists in order to improve pharmacists' performance.

Keywords : *Knowledge, attitude, practice, hypertension, management.*



CP033

Evaluation of patients' knowledge on their warfarin therapy in tertiary hospital setting

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Warfarin is widely used for the prevention and treatment of vascular and thromboembolic diseases. The therapeutic range is narrow, thus it requires close monitoring when used in the outpatient and on long term. Warfarin has been found to be associated with a number of complications especially life-threatening bleeding if patients are overdosed. Patients' knowledge on warfarin can improve anticoagulation control with decrease in adverse drug reaction and other associated complications. This study was aimed to assess the patient knowledge level of warfarin therapy among the registered patient for warfarin. A prospective study design was implemented in this study, whereby 100 of outpatients on Medication Therapy Adherence Clinic (MTAC) were interviewed by using a self-completed questionnaire study based on Buku Rawatan Antikoagulasi (Warfarin) from Kementerian Kesihatan Malaysia consisting 7 questions. The excellent answers would be having scores 7. The collected data were analyzed by using software named Statistical Package for Social Sciences version 24.0 (SPSS 24.0). Difference mean of categorical variables were assessed using Chi square test or Fisher exact. The 97% of them do have Buku Rawatan Antikoagulasi. Majority of sample population were Malay ethnic (63%), age above 50 years old (71%) and education level were secondary school (49%). Of 88% of study population are on warfarin therapy due to cardiovascular disease with duration of therapy less than 2 years (54%). While almost (96%) study population knows their dose and color of warfarin with overall knowledge of study population was moderate (26.7 ± 8.2 ; 59%). There is no significant difference was found



between age group, and duration of Warfarin therapy toward knowledge level. A significant difference ($p \leq 0.05$) was found only patients' education background toward knowledge level. Warfarin knowledge was moderate among the study population which can be assume related with their education level since mostly from secondary school.

Keywords: *Warfarin, Anticoagulation knowledge assessment, Narrow therapeutic index*



CP034

Colistin induced numbness and giddiness in hospitalized patients receiving intravenous colistin: a case report

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Colistin is an old antibiotic, which is rarely used due to high adverse drug reaction (ADR) of nephrotoxicity. The colistin usage is now at increasing trend due to emergence of multidrug-resistant (MDR) gram negative bacteria. To the best of our knowledge, there is lack of report on numbness and giddiness related with colistin use at present. This case is to report numbness and giddiness in a patient after intravenous (IV) administration of colistin. MN is a 24-years old, Malay female, referred from ENT department due to persistent left ear discharge. This problem has been persistent since December of 2018, which presented with continuous yellowish-white discharge albeit with no blood discharge. No fever, pain, or vertigo is complained following the discharge. She was prescribed with 3mg Tarivid® (Ofloxacin) eardrop. She was diagnosed with left ear Cholesteatoma in January 2019. She had modified radical mastoidectomy (MRM) prior to hospital admission on 13 August 2019. A specimen from left ear is positive with of multiple resistant organism (MRO) Pseudomonas. IV Colistin 6 MU was given as STAT which been diluted in 200cc NS/2 hours and followed by 4.5 MU BD diluted in 100cc NS/1hour. She complaint of numbness around her lips area and giddiness post IV Colistin administration. She does not receive other medication except colistin therapy. The doctor decided to withhold the IV colistin and thereafter, these symptoms subside. After three days, IV Colistin is administered again with different dilution; 4.5MU BD diluted in 500cc NS/3 hours. The patient did not experience the same ADR post IV Colistin administration. According to Naranjo ADR causal relationship scale, numbness and giddiness is categorized under probable scale. Colistin has probable risk to induce numbness and giddiness. These ADRs can be avoided by reducing its concentration and prolong the infusion time.

Keywords: *Colistin, multidrug-resistant, pseudomonas, discharge, numbness, giddiness.*



CP035**The influence of patients' knowledge and attitude towards adherence using amoxicillin in Arjuno health center, Klojen district, Malang city**

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With the development of infectious diseases, the use of antibiotics is increasing. Penicillin is an antibiotic that is widely used like amoxicillin. Inappropriate use of amoxicillin increases the risk of resistance. Accuracy is shown from its compliance in using amoxicillin. Compliance with drug use is a behavior that is influenced by knowledge and attitudes about antibiotics and their use. In this study, we want to know the effect of knowledge and attitudes of patients on their adherence in using amoxicillin antibiotics in Arjuno Health Center, Klojen District, Malang. This study was an analytic observational study by giving questionnaires to 100 respondents who met the inclusion criteria in April 2019. Survey data include knowledge, attitudes, and compliance of patients in using amoxicillin antibiotics. Data analysis was performed to determine the effect of knowledge and attitudes of patients on adherence in using amoxicillin antibiotics. The results showed that patients who had good knowledge about amoxicillin antibiotics and their use were 39%, quite good 20%, not good 24%, and not good 17%. Patients have a positive attitude towards amoxicillin antibiotics and their use is 45%, has a negative attitude of 55%. Patients were adherence in using amoxicillin 47% antibiotics, 53% non-adherence. The conclusion showed that knowledge significantly influences adherence, while attitude does not significantly influence compliance in using amoxicillin antibiotics. While together the knowledge and attitudes of patients significantly influence their adherence in using amoxicillin antibiotics.

Keywords: *Amoxicillin, adherence, health center, Malang city.*



CP036

Use of Rapid-Acting and Intermediate-Acting Combination Insulin in Patients Diabetes Mellitus Type 2

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One of the therapies used to treat type 2 Diabetes Mellitus (DMT2) disease is with combination insulin which combines rapid-acting insulin with intermediate-acting insulin (premix). The purposes of this study are to examine the profile of premix insulin therapy related to blood glucose concentration and to identify the drug-related problem (drug interactions) due to the use of premix insulin with the other drugs that taken by DMT2 patients. This study was a prospective observational study with cross-sectional data that analyzed descriptively with inclusion criteria ie patients with the diagnosis of DMT2 with or without complication or comorbid disease who received rapid-acting and intermediate-acting combination insulin with or without combination oral antidiabetic therapy (OAD) in the outpatient unit in Universitas Airlangga Hospital Surabaya in 2017. The research instruments used are data collecting sheet, patient medical record, laboratory data (fasting and postprandial blood glucose concentration). A total of 118 patients received premix insulin therapy, but 80 patients included in the inclusion criteria. Based on the use of insulin type, 30% aspart/protamine aspart 70% combination were used 91,25% by DMT2 patients; a combination of 25% lispro insulin/protamine lispro 75% were used 8.75% by DMT2 patients. Based on fasting blood glucose concentrations, patients who could achieve the target of 80-130 mg/dl were 30.3%. Based on the postprandial blood glucose concentration, patients who achieved the target ≤ 180 mg/dl were 35.1%. Drug interactions may occur in patients who use premix insulin with glimepiride,




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lisinopril, and gemfibrozil. The result showed there were many patients have not reached the target of fasting blood glucose concentrations (69.7%) and postprandial blood glucose concentrations (64.9%).

Keywords: *Diabetes Mellitus type 2, premix insulin, blood glucose*





ABSTRACT
PHARMACEUTICAL
TECHNOLOGY



PT001**Effect of PEG 400 on elasticity of scaffold of diclofenac sodium with chitosan gelatin matrix**

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PEG 400 is one of the polymers that can be used to increase the elasticity of scaffold. Elasticity has an important role in scaffold to help regenerate cartilage faster and reduce friction of cartilage with surrounding bones, so that the PEG 400 concentration is optimized to find optimal PEG 400 concentration on the elasticity of scaffold of diclofenac sodium with chitosan gelatin matrix. Investigate effect of PEG 400 concentration (0,0%; 0,5%; 1,0%; 3,0%; 5,0%) on elasticity of chitosan-gelatin-glutaraldehyde scaffolds. Scaffold diclofenac sodium was made with PEG 400 at concentration of 0.5%;1.0%;3.0%;5.0% with chitosan and gelatin matrix that were cross-linked with glutaraldehyde. Scaffold of diclofenac sodium with chitosan gelatin matrix was tested using autograph and observed stress, strain, stress-strain curves, and elastic modulus. The results of optimization PEG 400 will be evaluated by characteristics scaffold and release of diclofenac sodium. The increase of PEG 400 concentration can improve elasticity of scaffold and optimal concentration at 0,50%. Scaffold has elastic character, perfectly plastic. Scaffold containing PEG 0.50% has porosity of 36% and pores diameter of more than 100%, percentage of living cells of 84.555%, swelling ratio of 285,33±15,01% to 657,40±13,13%., diclofenac sodium can be sustained release completed in 542 hours and the release was following zero order kinetic. The existence of PEG 400 can influence scaffold elasticity, thus it can be used as scaffold plasticizer of diclofenac sodium with chitosan-gelatin matrix.

Keywords : *Drug delivery system, elasticity, PEG 400, pre-freezing method, scaffold.*



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PT002**The effectivity of glutaraldehyde as a crosslinking agent on characteristics and diclofenac sodium release from chitosan-gelatin-PEG400 scaffold**

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Chitosan-gelatin-PEG-400 composite were used as biomaterial scaffold implant for cartilage tissue engineering. It was used as replacement of defective cartilage and a biodegradable drug delivery system (DDS) for the administration of diclofenac sodium in treatment of osteoarthritis. The materials, are exclusively composed of diclofenac sodium, matrix chitosan gelatin PEG-400 and crosslinked by glutaraldehyde we're manufactured as scaffold of the mixed components. The purpose of this study was investigate effect of Glutaraldehyd concentration (0,00%; 0,25%; 0,50%; 1,00%; 2,50%) on characteristic and the release diclofenac sodium from chitosan-gelatin-PEG400 scaffolds. The scaffolds were make used the pre-freezing method with drying temperature of -56 ± 5 °C for 24 hours. The scaffolds were characterized in vitro. Crosslinking reaction was required to control porosity, pores size, swelling, degradation, MTT assay and diclofenac sodium release from chitosan-gelatin scaffolds at conditions of pH and temperature body were studied for 4 weeks. In vitro characteristics of chitosan-gelatin-PEG400 scaffolds crosslinked with glutaraldehyde (GA) were able to increase the swelling ratio ranging from $195.79 \pm 7.04\%$ to $793.49 \pm 6.92\%$ and minimize weight loss up to $50.98 \pm 0.82\%$, percentage of living cells $>60\%$, optimal porosity at $106,94 \pm 9,38$ % with pore size 135.48 ± 89.70 μm , diclofenac sodium can be sustained release in 542 hours and the release was following zero order kinetic That chitosan-gelatin-PEG400 scaffold is a potential candidate for cartilage tissue engineering and drug delivery system of diclofenac sodium.

Keywords : *Chitosan-gelatin-PEG400, drug delivery system, glutaraldehyde, pre-freezing method, scaffold.*



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PT003

Evaluation of ketoconazole tablet prepared using dry granulation technique with filler-binder and disintegrant excipient

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Ketoconazole is one of high-dose treatment drug with flowability issue so that it is commonly formulated using wet granulation technique. However, the technique impacts stability of ketoconazole which it turns reddish during drying process. This research was conducted to study tablet quality of ketoconazole as function of certain excipients in dry granulation technique. Combination of spray dried lactose (SDL) and Avicel PH 102 as filler binder and sodium starch glycolate (SSG) as a disintegrant were used for the purpose. Ketoconazole tablets were formulated based on Factorial Design 22 method, namely experimental design with 2 factors and each factor has 2 levels of concentration to obtain four formulas. Factors were combination of SDL and Avicel PH 102 with level of weight ratio of 2:1 and 4:1, and SSG with level of 2 and 4% (w/w). Evaluation was performed on granule properties, as well as tablet properties, then statistically analyzed using Minitab 18 software. Higher level of SDL-Avicel PH 102 showed an increase in tablet hardness and % dissolved of ketoconazole, a decrease in tablet friability and disintegration time. Higher level of SSG increased tablet hardness, and lowered disintegration time as well as the % dissolved of ketoconazole. According to overlay contour plot, all four formulas fall in feasible area. All formulas meet quality specification required for tablet dosage form and the optimum formula is obtained from formula 2 as it showed the best dissolution profile.

Keywords : *Ketoconazole, spray dried lactose, Avicel PH102, sodium starch glycolate, dry granulation.*



PT004

Drug development: optimization buccal mucoadhesive bilayered tablet of simvastatin using design factorial

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Simvastatin have the ability to reduce Low-Density Lipoprotein Cholesterol and increase High Density Lipoprotein Cholesterol. Simvastatin has low bioavailability caused by high first-pass metabolism effect, and short biological half-life (3 hours). The purpose of this research was to prepare the mucoadhesive bilayer tablet of simvastatin by using mucoadhesive polymers such as Carbopol, HPMC, in different concentration and to determine the influence of count variation of polymer on the physical properties and drug release, as well as assess the ability of simvastatin permeation on the optimized formulation. The determination of formulas with 23 design factorial using Design Expert Software® as 8 formulas. Tablets were prepared by direct compression method. Tablets were subjected for physicochemical characterization test such as weight, weight variation, dimensions, thickness, hardness, swelling index, time and mucoadhesive strength, drug content, in vitro drug release study, surface pH, and stability in saliva simulation. Optimized formulas of buccal mucoadhesive bilayer tablet formulation was subjected for in vitro drug permeation through sheep buccal mucosa on 8 hours. The test results showed that Carbopol and PEG 6000 significantly increase the swelling index and strength adhesions, while the HPMC significantly lower the swelling index and strength adhesion. PEG 6000 significantly increases drug release, while Carbopol and HPMC significantly lowering of drug release. The optimum formulas consist 9,75% Carbopol, 20,35% HPMC, and 20,35% PEG 6000. In vitro drug permeation was found 22,02±0,14% in 8h, lag time 0,05h, fluks 0,068 $\mu\text{g}\cdot\text{cm}^{-2}\cdot\text{hour}^{-1}$, and diffusion coefficient 7,5 $\text{cm}^2\cdot\text{jam}^{-1}$.

Keywords : *Simvastatin, buccal bilayer, carbopol, HPMC, permeation.*



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PT005

Dissolution of p-methoxycinnamic acid (pMCA)- β -cyclodextrin (β -CD) inclusion complex prepared by solvent drop grinding method

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Para-methoxycinnamic acid (pMCA) is a major substance synthesized from *Kaempferia galanga* L. pMCA has an analgesic effect but it has a very low solubility in water (0,71 mg/ml at 25°C) so it has limitations in formulation process. The purpose of this study was to determine the dissolution profile of p-MCA- β -CD inclusion complex. Therefore, to improve the solubility, pMCA was complexed with β -cyclodextrin (β -CD). pMCA- β -CD inclusion complex was prepared in 1:1 molar ratio with 3 hours solvent drop grinding method. Dissolution test were prepared apparatus 2 (paddle apparatus). The media is 500 mL aquadest pH 6,5 \pm 0,5 with temperature at 37 \pm 0,5°C and rotation speed 75 rpm. Level of pMCA was measured by visible spectrophotometer at maximum wavelength of pMCA, 285,8 nm. The result of this study showed pMCA, physical mixture non grinding and grinding, and inclusion complex of pMCA- β -CD ED60 s' were 23,14 \pm 2,86; 23,19 \pm 0,70; 32,20 \pm 1,07; and 61,61 \pm 1,04 respectively. The result was calculated by one-way ANOVA statistical analysis. It show that sig 0.000 (P<0.05), and it indicated that inclusion complex of pMCA- β -CD can increases the dissolution rate of APMS. The inclusion complexes are shown to have different dissolution profile when compared with the single compound of pMCA, and the physical mixture of pMCA- β -CD either non grinding or grinding. That inclusion complex of pMCA- β -CD can increases the dissolution rate of APMS.

Keywords : *p-methoxycinnamic acid, β -cyclodextrin, inclusion complex, solvent drop grinding method, dissolution.*



PT006

Characterization of p-methoxycinnamic acid - β -cyclodextrin inclusion complex (prepared by co-grinding method)

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p-methoxycinnamic acid (pMCA) is a hydrolyzed substance from ethyl p-methoxycinnamate, a major substance isolated from *Kaempferia galanga* L. pMCA has an analgesic activity but, it has a very low solubility in water (0.712 mg/ml). Therefore, to increase the solubility of pMCA, it was complexed with β -cyclodextrin (β CD). The purpose of this study was to characterize pMCA- β CD inclusion complex prepared in 1:1 molar ratio by co-grinding method. The inclusion complex was characterized by Differential Thermal Analysis (DTA), Powder X-Ray Diffractometer (PXRD), Fourier Transform Infrared Spectroscopy (FTIR), then compared to non-grinded pMCA, grinded pMCA, non-grinded β CD, grinded β CD, non-grinded physical mixture, and grinded physical mixture. The DTA study showed the intensity of endothermic peak of inclusion complex was decreased and shifted to different temperature. The diffractogram of inclusion complex showed the decresion of the pMCA peak lines. The FTIR spectra of inclusion complex showed that absorption band of carboxyl and alkene group from the pMCA were loss, and its aromatic group was shifted. The inclusion complex is shown to have different characteristics when compared with non-grinded pMCA, grinded pMCA, non-grinded β CD, grinded β CD, non-grinded physical mixture, and grinded physical mixture. These changing of characteristics proved that the inclusion complex was formed.

Keywords : *P-methoxycinnamic acid, β -cyclodextrin, inclusion complex, co-grinding method, characterization.*



PT007

Dissolution of p-methoxycinnamic acid (pMCA) - β -cyclodextrin (β CD) inclusion complex made using co-grinding method

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P-methoxycinnamic acid (pMCA) is a promising active compound which has antibacterial, anticancer and antiinflammation effects originally obtained from *Kempferia galanga* Linn. However, pMCA is poorly soluble in water (0,712 mg/mL water at 25°C) which can affect to low bioavailability and onset of action of pMCA. Therefore, forming inclusion complex with β -cyclodextrin (β CD) was made to improve its solubility and dissolution. The pMCA- β CD inclusion complex formed when pMCA, as the guest compound, enters the β CD cavity as the host compound. The aim of this study is to investigate the dissolution profile of pMCA- β CD inclusion complex made using co-grinding method. The inclusion complex was made at 1:1 stoichiometry ratio using high energy ball mill for three hours. The size was measured using light microscopy and the dissolution test was done using water with a pH of $6,5 \pm 0,5$ at $37 \pm 0,5$ °C, performed with apparatus II (paddle) at 75 rpm for 60 minutes. pMCA was measured by Spectrophotometer UV – Vis at 285,8 nm. The size showed that inclusion complex has smaller size compared to both pMCA and pMCA- β CD physical mixture. The dissolution profile showed that pMCA- β CD inclusion complex has higher dissolution rate and ED60 compared to both pMCA and pMCA- β CD physical mixture. The pMCA- β CD inclusion complex shows higher dissolution by 3.5 times compared to the pMCA.

Keywords : *Co-grinding, dissolution, inclusion complex, p-methoxycinnamic acid, β -cyclodextrin*



PT008

Characterization of p-methoxycinnamic acid (pMCA)- β -cyclodextrin inclusion complex prepared by solvent drop grinding method

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p-Methoxycinnamic acid (pMCA) is hydrolyzed from ethyl p-methoxycinnamic. pMCA has analgesic and anti-inflammatory effect and low solubility in water (0.712 mg/mL) at temperature of 25°C. The low solubility of pMCA affect to poor bioavailability and its onset of action. To overcome this problem, pMCA- β CD inclusion complex was formed with solvent drop grinding method. The inclusion complex is formed by a mechanical interaction between substances which was improved by the existence of solvent. The purpose of this study was determine the characterization of pMCA- β CD inclusion complex prepared in 1:1 molar ratio with solvent drop grinding method compared to pMCA and physical mixture of pMCA- β CD. The inclusion complex, pMCA, and physical mixture of pMCA- β CD were characterized by X-Ray Diffraction analysis (XRD) at 2 from 5 to 40°, Fourier Transform Infrared Spectroscopy (FTIR) at 4000-450 cm⁻¹, and Differential Thermal Analysis (DTA) at 30-300°C with the speed of heating is 10°C/min. The diffractogram of pMCA- β CD inclusion complex showed the lower intensity of the pMCA peak lines. The DTA study showed the endothermic peak of inclusion complex was shifted to higher temperature at 175.2°C. FTIR spectra showed the loss of pMCA's aromatic group and O-H carboxylic functional group in inclusion complex spectra. There was alteration in pMCA- β CD inclusion complex characteristics by solvent drop grinding method compared with pMCA and physical mixture of pMCA- β CD.

Keywords : *Characterization, inclusion complex, solvent drop grinding method, p-methoxycinnamic acid, β -cyclodextrin.*



PT009

The influence of stabilizer type on the physical properties of granule and tablet of dried hesperetin nanosuspension

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Nanosuspension is drug crystals sized <1000 nm dispersed in a stabilizer solution. The nanosized crystals could enhance drug solubility and dissolution rate. Nevertheless, nanosuspensions have to be solidified therefore drug will be more stable and convenience for the patients. One particular method is by using nanosuspension as granulating liquid in wet granulation. The granules obtained then compacted into tablets. This research was aimed to investigate the influence of different stabilizer types on the physical characteristics of granules and tablet of dried nanosuspensions. The drug model used was Hesperetin (HPT), a BCS class II drug. Nanosuspensions of HPT- sodium dodecyl sulphate (SDS, anionic surfactant) = 20.83 : 1 (w/w) and HPT-poloxamer 188 (PLX 188, nonionic surfactant) = 2.50 : 1 (w/w) were produced using wet beads milling. Particle sizes obtained were <225 nm. PVP K-30 (5% w/w) was then added into each nanosuspension and used to granulate 250 g mixture of MCC PH101- lactose (1:1 w/w) and primogel® (2% w/w). Granules obtained were added with MgS (1% w/w) then compacted. The percent fines of HPT-PLX 188 granule was higher than HPT-SDS granule whilst all of granule evaluations fulfilled the requirement. Tablet hardness were 11,17±1,00 kP and 9,44±1,43 kP for HPT-PLX188 and HPT-SDS, respectively. Tablet friability of HPT-PLX188 was less than 1% whilst HPT-SDS was >1%. Tablet disintegration of both formulas were less than 5 min. Dissolution profiles of both formulas did not show immediate release profile. The use of PLX188 as stabilizer produced better physical properties of tablet compared to SDS.

Keywords : *Hesperetin, poloxamer 188, sodium dodecyl sulphate, wet granulation, binder addition.*



PT010

Effect of glutaraldehyde on bio screw bovine hydroxyapatite-gelatin with of addition of alendronate as bone fixation material

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Glutaraldehyde (GTA) is one of the cross-link agents that increases the stability of Bovine hydroxyapatite (BHA)-Gelatin (Gel) effectively. The aims of GTA in BHA-gel bio screw for decreases swelling effect of gelatin. Glutaraldehyde as cross-link agent and gelatin are create Schiff's bases form with covalent bonds. Furthermore, function of alendronate in bio screw is strengthen the matrix and reduce peri-prosthetic incidence in bio screw implatation. The aimed of this study to determined the effect of glutaraldehyde and alendronate addition in BHA-Gel bio screw. BHA-gel-alendronate granules was soaked glutaraldehyde with variatif 0,5%; 1%; and 1,5%. Contentration of ale was made for 1%. The bio screw was made from granule, then become a pellet, and then changed pellet to screw. After screw was done, it was analyzed with torque test, compressive strength test, and MTT test. From this observation, it has parabolic profile. The result of this study , GTA can reduce torque strength and compressive strength bio screw. Besides, this formulation is not toxic.

Keywords : *Glutaraldehyde, alendronate, torque, compressive strength, MTT.*



PT011

The effect of stabilisator on particle size and dissolution rate of dried hesperetin nanosuspensions : a preliminary study

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Nanosuspension is drug crystals in nanometer size that are dispersed in stabilizer solution. The stabilizer used can be ionic or nonionic surfactant, polymer or combination of both. Nanosuspensions need to be solidified to increase drug stability and patient's convenience for oral dosage form. Pellets coated with nanosuspensions is one particular method that can be done to solidify nanosuspensions. Nevertheless, the interaction of stabilizer, coating materials and coating process could alter release of drug nanosuspension. The aim of this study was to determine the effect of different stabilizers type and their interactions with methylcellulose as a coating polymer on the nanosuspension particle size and dissolution rate of dried nanosuspensions. Hesperetin (HPT), a BCS class II drug, was used as a drug model. Nanosuspensions of HPT:Poloxamer 188 (P188, nonionic stabilisator) = 1:0.4 (%w/w) and HPT:sodium dodecyl sulphate (SDS, anionic stabilisator) = 1:0.05 (%w/w) were separately prepared using wet beads milling. Methylcellulose (coating polymer) was then mixed in each nanosuspension at concentrations: 25, 50, 100 (%w/w) followed by PEG and tartrazine. Nanosuspensions were then dried at 50°C in an oven. Dried nanosuspensions were re-dispersed in water and measured for their particle size and dissolution. Results showed that particle size of all re-dispersed dried nanosuspensions containing coating materials were <900 nm. However, dissolution study showed only HPT nanosuspensions – methylcellulose = 1 : 1 could release 98% HPT but in 3 hours. This indicated that both stabilizer could retain the particle size in nanometer range but failed to release HPT immediately.

Keywords : *Nanosuspension, hesperetin, poloxamer-188, sodium dodecyl sulphate, methylcellulose.*



PT012

Coenzyme Q10 nanostructured lipid carrier as inducer of skin fibroblast cell and its irritability test in mice model

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Coenzyme Q10 is an antioxidant that can prevent lipid peroxidation, this function helps to prevent collagen and elastin damage and helps avoid wrinkles. Coenzyme Q10 has several disadvantages to be formulated in topical dosage forms, such as low water solubility, large molecular weight, and high lipophilicity makes it retained in the stratum corneum, causing low skin penetration. That is, causing Coenzyme Q10 to require the right formulation to get products with good bioavailability, effective, and can penetrate into the skin layer. To determine the ability of Coenzyme Q10 in Nanostructured Lipid Carriers in increasing the number of fibroblasts in the skin of mice and the safety of the preparation when applied on it. This research is an experimental laboratory where research results are analyzed using one-way ANOVA to determine differences between variables. From the results of the characterization test results are obtained; pH $4,454 \pm 0,006$; particle size 69.73 ± 0.93 nm ; polydispersity index 0.348 ± 0.050 ; and has a morphological form of spherical droplets observed using the Transmission Electron Microscope. Antiaging activity test was carried out by observing collagen density and the number of fibroblasts in histopathological preparations after 14 days of using NLC Coenzyme Q10 preparations. The irritation test results after 24 hours of application preparation showed that NLC Coenzyme Q10 did not irritate the skin of the male mice back. Coenzyme Q10 in Nanostructured Lipid Carriers can increase the amount of fibroblasts and does not cause irritation to the skin of mice.

Keywords : *Fibroblast, ubiquinone, irritation, histopathology, NLC.*



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PT013

Potential of low molecular weight gelling agent N-palmitoyl-glycyl-histidine (Pal-GH) as a new component of a topically applied gel formulation

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N-palmitoyl-glycyl-histidine (Pal-GH) can be a new low molecular weight gelling agent. Pal-GH exhibited thixotropic behavior, low viscosity, and high dissolving properties for a wide range of hydrophilic to lipophilic drugs. Metronidazole (MTZ) was selected as a hydrophilic model drug in this study. to increase the skin permeation of MTZ, a hydrophilic drug, after the topical application of Pal-GH gel The skin permeation of MTZ was evaluated by using a vertical type diffusion cell. A combined effect of chemical penetration-enhancers (CPEs), such as isopropyl myristate (IPM), PG, ethanol (EtOH), diethylene glycol monoethyl ether (transcutol®, TRANS), and dimethyl sulfoxide (DMSO), was also evaluated on the skin permeation of MTZ. The three-dimensional network structure of Pal-GH gel and its combination with several CPEs was evaluated by using TEM, to find out a relation between the rheological properties and skin penetration-enhancing effects. As results, 5% Pal-GH gel containing 1% MTZ (F5MTZ) exhibited a 2.7-fold higher MTZ permeation through excised hairless rat skin than its solution. Furthermore, Pal-GH 5% with PG 4% (F5PG-MTZ) and Pal-GH 5% with IPM 10% (F5IPM-MTZ) further increased the skin permeation of MTZ when compared to F5MTZ. Interestingly, F5PG-MTZ markedly increased the skin penetration of MTZ, although no enhancement effect was observed by MTZ PG solution (PGMTZ). Thus, highly dense and twisted fibrous structures were correlated with the thixotropic behavior of Pal-GH gel formulations. Pal-



GH formulations containing PG or IPM enhanced the skin permeation of MTZ, suggesting the usefulness of Pal-GH gel to improve the skin permeation of hydrophilic drugs.

Keywords : *Skin permeation, MTZ, hydrophilic, Pal-GH.*



PT014

Formulation of anti-acne emulgel containing kersen leaf extract (*Muntingia calabura* L.) and antibacterial activity test against *Propionibacterium acnes*

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Acne is a skin disease caused by *Propionibacterium acnes*. The use of chemical drugs to treat acne causes some unwanted effects, thus it is important to formulate and evaluate anti-acne from natural ingredients whis is considered to be safe. Kersen leaves extract (*Muntingia calabura* L.) is well known for its antimicrobial properties because it contains flavonoid, tannins and saponins. The purpose of this research are to determine whether the anti-acne emulgel containing kersen leaves ethanol extract has antibacterial activity against *Propionibacterium acnes* and to determine its antibacterial activity on *P. acnes* bacterial growth at different concentrations. Kersen leaves extract was obtained by maceration method using 70 % ethanol solvent. The ethanol extract was used to prepare anti-acne emulgel. The formulated emulgel was evaluated for various parameters including physical characteristic, pH, homogeneity, type of emulsion, dispersion and adhesion property. Moreover, antibacterial activity was carried out using disc diffusion assay. The results showed that the formulated emulgel of kersen leaves extract was half-solid, brownish-green, homogeneous, O/W emulsion type, and had a characteristic odor of kersen leaves. The emulgel had also good dispersion and adhesion properties, while the pH level of emulgel from all formulation was in the pH range of facial skin. According to the diffusion assay, the anti-acne emulgel of kersen leaves extract has antibacterial potency against *P. acnes* and it showed the highest inhibitory activity at concentration of 12 percent. It can be concluded that the antibacterial activity of the formulated emulgel increased with an increase in ethanol extract concentration.

Keywords : *Kersen leaves extract, antibacterial activity, emulgel, Propionibacterium acnes.*



PT015

Preparation of peel off cosmetic of virgin coconut oil from *Cocos nucifera* L. and anti acne activity against propionibacterium acnes : effect of polyvinyl alcohol concentration

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Virgin Coconut Oil (VCO) of *Cocos nucifera* L. contained lauric acid that already known has an antibacterial activity against *Propionibacterium acnes* has been investigated to improve the severe of pimple. This research was based on the virgin coconut oil activity on the cosmetic formulation as a natural antimicrobial. The VCO was extracted, characterized into cosmetic peel off gel and were tested for antibacterial activity against *Propionibacterium acnes* ATCC 11827 in nutrient agar. In this research, VCO 20% and 30% was formulated as a component of VCO emulgel peel off containing Polyvinyl Alcohol (PVA) in various concentrations (8% and 10%). The VCO emulgel peel off was then studied for viscosity, pH, drying time, spread ability, particle size, size distribution, zeta potential, stability thermal cycling evaluation on the temperature $40^{\circ}\pm 2^{\circ}\text{C}$ and $4^{\circ}\text{C}\pm 2^{\circ}\text{C}$ in 3 cycle as well as anti acne activity. Growth inhibition test was carried out by agar disk diffusion. The selected formula was formula 1 containing 20% of VCO and 8% of PVA. This formula had pH that suitable with skin pH, had stability showed in zeta potential value and stability test, had good spread ability, and also produced high anti acne activity.

Keywords : *Anti acne activity, propionibacterium acnes, PVA , virgin coconut oil.*



PT016

The influence of polymer composition in matrix type-transdermal patch to anti-inflammatory effect of meloxicam (Composition of polymer: sodium alginate, hydroxyl propyl methyl cellulose E15, and ethyl cellulose N22)

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Meloxicam is an NSAID drug that can cause gastric irritation in oral administration. Transdermal drug delivery system as matrix type-patch can avoid its side effect. This study aimed to determine the effect of hydrophilic and hydrophobic polymer composition to anti-inflammatory effect of matrix type-meloxicam patch. Two formulations of meloxicam patches were composed of sodium alginate, hydroxyl propyl methyl cellulose E15 (HPMC E15) and ethyl cellulose N22 (EC N22) in ratios of 4.5: 5: 1.5 as a formula 1 and 5: 4.5: 1.5 as formula 2. The matrix type-transdermal patch of meloxicam was prepared by mixing all dispersion polymers matrix and meloxicam. The matrix type-transdermal patch was evaluated for organoleptic properties, weight variation, moisture content, surface of patch morphology, drug content and homogeneity. All independent variables had no significant effect on the dependent variables (p-values < 0.05) using independent Sample T-test except the moisture content. The rat paw edema test was performed to evaluate the anti-inflammatory effect of matrix type-transdermal meloxicam patch. The results showed that the area under curve (AUC) edema of formula 1 < formula 2. Its means that the formula 1 had provided more effective anti-inflammatory effect than formula 2.

Keywords : *matrix type-transdermal patch; meloxicam; sodium alginate; HPMC E15; EC; anti-inflammatory effect.*



PT017

The effect of dual loading primaquine and chloroquine on the integrity of liposomal bilayer membrane

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Primaquine (PQ) has been known as an effective anti-malaria drug for sporozoites treatment in hepatic phase. However, it has been reported that PQ cause hemolysis in glucose-6-phosphatedehydrogenase deficiency patient. Chloroquine (CQ) has been known affecting PQ metabolism, reducing PQ toxicity and increasing its efficacy. The results of previous study showed that encapsulation efficiency of dual loading PQCQ and also the drug release was lower than their single drug loaded liposomes. This might be due to the interaction between PQCQ and phospholipid in liposomal bilayer membrane. To analyze the membrane physicochemical characteristics and the calcein release profile in determining the effect of dual loading PQCQ on the integrity of liposomal bilayer membrane. Liposome was prepared by thin film hydration method. Drug loading was carried out using pH gradient. The membrane physicochemical characteristics were analyzed using Fourier Transform Infrared Spectroscopy, Powder X-Ray Diffraction, and Differential Thermal Analysis. The results will be confirmed by calcein release profile using dialysis method. The FTIR spectra showed an intensity decreasing of the absorption band on the alkyl group's wave number. The diffractogram analysis showed sharper peaks pattern that imply a more crystalline properties of the liposome. The thermogram analysis showed disappearance of endothermic peaks which are identical to the endothermic peak of used phospholipid. Meanwhile, the results of calcein release showed an increasing release profile compared to the single drug loaded liposomes. The dual loading of PQCQ affected the integrity of liposomal bilayer membrane. PQ effect was stronger than CQ caused an increasing of membrane fluidity.

Keywords : *Primaquine, chloroquine, liposomes, dual loading, bilayer membrane, release of calcein.*



PT018

The enhancement of andrographolide bioavailability by solid dispersion forming using chitosan as matrix

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Andrographolide (ADG), a diterpene lactone substance from *Andrographis paniculata* plants has pharmacological activities like anti-inflammatory, hepatoprotective, anticancer, and anti-malarial. However andrographolide has a high cellular permeability and low solubility. Andrographolide-chitosan solid dispersion (SD ADG-Chi) can be used to improve solubility and dissolution of andrographolide so the bioavailability andrographolide can be also improved. The aim of this study was to determine the bioavailability (Parameter AUC_{0-∞}) of andrographolide-chitosan solid dispersion. SD ADG-Chi prepared by solubilization and spray drying method. Bioavailability test was performed using New Zealand male rabbits divided into three treatments group: ADG, ADG-Chi physical mixture, and SD ADG-Chi with given orally. Blood samples were taken at specific interval times during 3 hours. Andrographolide concentration in plasma was determined using HPLC. The results of bioavailability test (parameter AUC₀₋₁₈₀) andrographolide-chitosan solid dispersion system increased 3.1 times compared to ADG and statistically different compared to ADG and ADG-Chi physical mixture. It can be concluded that SD ADG-Chi was able to increase the bioavailability of ADG.

Keywords : *Andrographolide, chitosan, solid dispersion system, bioavailability.*



PT019

Effects of gelatin and glutaraldehyde concentrations on characteristics of cantigi (*Vaccinium varingiaefolium* Miq.) extract loaded gelatin nanoparticles as antioxidant

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Cantigi is an endemic plant of sub-alpine area of Mount Tangkuban Parahu in Bandung, Indonesia. Previous study showed ethanol extract of young red leaves had antioxidant activity. To determine the effects of gelatin and glutaraldehyde concentrations on the characteristics of Cantigi extract loaded gelatin nanoparticles and to evaluate the antioxidant activity of nanoparticles. Cantigi leaves were extracted by maceration using n-hexane, ethyl acetate, and ethanol 96%. The ethanol extract was dried, made into nanoparticles by varying gelatin (0.1; 0.2; and 0.3 g) and glutaraldehyde (0.1; 0.2; and 0.3 mL) amounts, and conducted at 500 rpm and 40 °C for 3 hours. Nanoparticles were evaluated for particle size, zeta potential, morphology, and antioxidant activity. Nanoparticles with glutaraldehyde amount variation had particle sizes (PS) of 105.9±26.2; 37.1±8.7; and 32.5±7.4 nm; polydispersity indexes (PI) of 0.508; 0.717; and 0.563; zeta potential values (ZPV) of 0.55; 0.89; and 0.78 mV; and antioxidant activities (IC₅₀) of 56.15±0.16; 53.67±0.10; and 51.57±0.39 ppm, respectively. Then, nanoparticles with gelatin amounts variation had PS of 22.5±5.1; 37.1±8.7; and 83.3±21 nm; PI of 0.604; 0.717; 0.326; ZPV of 1.27; 0.89; 0.18 mV; and antioxidant activities of 51.58±0.19; 53.67±0.12; and 55.46±0.04 ppm, respectively. Nanoparticle morphology was spherical. Cantigi leaf extract can be made into gelatin nanoparticles; the smaller the concentration of the polymer used and higher the concentration of the glutaraldehyde, the smaller the resulted particle size



and increased antioxidant activity. Antioxidant activities of nanoparticles was lower than those of the extract (IC₅₀ 16.84±0.30 ppm).

Keywords : *Vaccinium varingiaefolium* Miq, *Cantigi*, *ethanol extract*, *gelatin nanoparticles*, *antioxidant*



PT020

Effect of ratio D- α -tocopheryl polyethylene glycol 1000 succinate and poloxamer P84 on physical characteristic and stability of mixed micelles (for delivery system of hesperetin)

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Hesperetin is a flavonoid compound of citrus fruit that has a wide pharmacological effects. Nevertheless, its poor solubility in water limits its use as a therapeutic molecule. Mixed micelles were developed to increase the solubility of hesperetin. Mixed micelle from combination of D- α -tocopheryl polyethylene glycol 1000 succinate (TPGS) and poloxamer P84 (P84) are known to have synergism effect to improve quality of micelle. The mixed micelles were prepared by thin film hydration method. Dynamic light scattering method showed that particle size of mixed micelle TPGS : P84 ratio 1 : 4 was bigger than the ratio 1:1 and 1:2. In general, particle size of mixed micelles were smaller compared to TPGS-only micelle. CMC value of mixed micelles TPGS:P84 was lower than CMC of TPGS and P84 only. Mixed micelles also exhibited greater encapsulation efficiency than TPGS-only micelle. The lowest CMC and the highest encapsulation efficiency was obtained in mixed micelles TPGS:P84 with ratio 1:4. Stability test by diluting micelle using phosphate buffer showed no precipitation of the mixed micelles. The physical stability of micelles under storage condition was observed at 25°C for 7 days. TPGS-only micelle showed precipitation after 3 days storage but mixed micelles showed no precipitation. In conclusion, increasing amount of poloxamer P84 in mixed micelles could form bigger particle size, lower CMC, greater encapsulation efficiency and good stability.

Keywords : *Mixed micelles, TPGS, poloxamer P84, hesperetin, physical characteristic, stability.*



PT021

The stability and irritability study of the combination of chitosan-*Aloe vera* spray gel as wound healing

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Chitosan is a natural polysaccharide widely used in various clinical applications including regeneration of skin tissue. *Aloe vera* has properties in healing burns on the skin, anti-inflammatory effect, and leaves a protective layer on the skin after drying so it protects the wound. The purpose of this study was to determine the physical stability and the possibility of irritation that occurs from the chitosan-*Aloe vera* spray gel application. The spray gel stability test includes the organoleptic, viscosity, and pH was carried out by Thermal Cycling and centrifugation method. The irritation test was performed by the Draize Rabbit Test method. Chitosan-*Aloe vera* spray gel characteristics have a weak yellow color, clear, and a strong *Aloe vera* odor. pH of the spray gel was $4,88 \pm 0,01$; and the viscosity was $36,50 \pm 0,23$ cps. The result from the chitosan-*Aloe vera* spray gel stability test showed a decrease of viscosity, while from the centrifugation test study the viscosity remained stable (unchanged). There was no difference in the pH and organoleptic observations from both tests. Based on the scoring and analysis of the reaction in rabbit skin, the Primary Irritation Index (PII) obtained was 0,56. According to the response category from the acute dermal irritation test, it can be concluded that chitosan-*Aloe vera* spray gel had a slightly irritating effect.

Keywords : *Chitosan, Aloe vera, spray gel, stability, irritability.*



PT022

Antioxidant activity of capsule containing *Sargassum polycystum* nanoparticles

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Brown seaweed (*Sargassum polycystum*) contains fucosantin which has antioxidant properties. In this study, brown seaweed was extracted and nanoparticles containing the resulting extract was generated with chitosan as a polymer matrix and sodium tripolyphosphate as a synthetic cross linker by the ionic gelation method. The nanoparticles were characterized and their activity were tested using DPPH (1,1-diphenyl-2-picrylhydrazyl) method. The extract and nanoparticles were dried by the freeze dryer and were formulated into capsules. The nanoparticles showed 328.7 nm in diameter and -0.54 mV in zeta potential with IC50 for their antioxidant activity of 97.51 ppm. The capsules had disintegration time of 8 minutes and 10 seconds. Accordingly, the nanoparticles could be a proper strategy to develop the extract to improve its active compounds stability.

Keywords : *Brown seaweed, fucoxhantin, extract, nanoparticles, capsules.*



PT023

Review articles: the potential of liposome technology as a system for the development of Central Nervous System (CNS)

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About 80% of the total sufferers of central nervous system disease worldwide are found in developing countries. Modifying drug compounds, a lot of effort is done to modify the dosage form and drug delivery system. This effort is inseparable from the role of pharmaceuticals that utilize science and technology to overcome the limitations of several dosage forms and drug delivery systems. One of the drug delivery systems is through inhalation technology. Inhalation technology can be combined with liposome technology to increase bioavailability and fast onset time. The liposome is a technology composed of the basic ingredients of the phosphatidylcholine bilayer layer with a size of 25 nm-2.5 μm . Besides phosphatidylcholine is also an effective lung surfactant to improve the absorption of the drug. There has also been a comprehensive review of developing liposomes. Some central nervous system medications sometimes have a partition coefficient and low bioavailability. Antiepileptic drugs with liposome technology are expected to increase absorption as an alternative to non-invasive treatment.

Keywords: *Liposomes, CNS, absorbance, nanoparticle.*



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ABSTRACT
PHARMACEUTICAL
CHEMISTRY



PC001

Synthesis, cytotoxicity, antimicrobial activity of N-ethyl-N-(ethylcarbamoyl)-4-nitrobenzamide, and its in silico molecular docking

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We reported that N-ethyl-N-(ethylcarbamoyl)-4-nitrobenzamide (BEU-14) was synthesized, and evaluated for cytotoxicity and antimicrobial activity against *S. aureus*, *E. coli*, *B. subtilis*, *P. aeruginosa*, and *C. albicans*. The purpose is to investigate its potency as antitumor or antimicrobial agent in terms of IC₅₀ and MIC respectively BEU-14 was synthesized by one step reaction of N,N'-diethylurea with p-nitrobenzoyl chloride and characterized by IR, ¹H-NMR, ¹³C-NMR, and mass spectral analysis. Cytotoxicities on MCF7 and VERO cells was tested by MTT assay. Antimicrobial activities were determined by broth dilution test. Docking simulation was performed to topoisomerase (PDB.1S14), FabH (PDB.5BNM), and ribonucleotide reductase (PDB.2EUD). The spectral data revealed that the compound is BEU-14 as designed. The results showed that cytotoxicity of BEU-14 to MCF7 was higher than hydroxyurea, unfortunately it was also more toxic to normal cells. The compound showed antimicrobial activity against the tested microbes, and its activity against *P. aeruginosa* was the highest with MIC of 50 µg/mL. The compound was more potent against Gram negative than Gram positive bacteria. In molecular docking studies, the compound exhibited highest binding affinity at active site of ribonucleotide reductase, a targeted enzyme for cytotoxic activity. The compound was more promising as antibacterial agent.

Keywords : *N-ethyl-N-(ethylcarbamoyl)-4-nitrobenzamide, synthesis, cytotoxicity, anti-microbial activity, docking study.*



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PC002

Determination of epigallocatechin gallate (EGCG) and caffeine in domestic black tea products by TLC-densitometry

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Black tea contains EGCG and caffeine which have pharmacological effect. The concentration of EGCG and caffeine is not informed in the label of black tea products. This study aims to determine the concentration of EGCG and caffeine simultaneously in domestic black tea products using thin layer chromatography (TLC)-densitometry. Sample preparation was carried out by extraction of the powder of black tea product using 40 ml water at 80oC for 40 minutes with stirring and followed by extraction using ethyl acetate. The selected mobile phase was a mixture of chloroform: ethyl acetate: n-butanol: formic acid of (2:1:0.3:0.7) and the stationary phase was silica gel GF254. The resolution (R_s) among EGCG and caffeine with their nearest spots were 1.00 and 0.67. The selected wavelength for scanning analyt spots was 275 nm. The EGCG area was linear ($r = 0.9991$; $V_{xo} = 3.02\%$) in the concentration range of 80-800 ppm. While caffeine was linear ($r = 0.9998$; $V_{xo} = 0.89\%$) in the concentration range of 200-2000 ppm. The limit of detection and limit quantitation of EGCG and caffeine were 7.96 ppm, 26.52 ppm and 5.59 ppm, 18.62 ppm, respectively. The accuracy of EGCG and caffeine using standard addition method were $99.44 \pm 7.83\%$ and $96.59 \pm 5.22\%$, respectively. The values of validation parameter indicated that TLC-densitometry method can be used for determination of EGCG and caffeine simultaneously. The concentration of EGCG in sample coded V, W, X, Y, Z were between 0.10-0.17%, while caffeine concentrations were between 0.35-0.56%. All samples were analyzed under conditions as received by consumers.

Keywords : *Key words: EGCG, caffeine, TLC-densitometry, black tea product.*



PC003

Determination of epigallocatechin gallate (EGCG) and caffeine in domestic green tea products using TLC-densitometry

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Many studies have shown that green tea contains high antioxidant activity of EGCG. Green tea also contains caffeine which could increasing blood pressure. This study aims to determine the concentration of EGCG and caffeine simultaneously in domestic green tea product using TLC-densitometry. Sample preparation was carried out by extraction EGCG and caffeine in green tea leaves with 40 mL water at 80 °C for 40 minutes with stirring. Then the analyte were extracted with ethyl acetate. The TLC-densitometry was validated previously using standard EGCG and caffeine. The stationary phase used is silica gel GF254. The mobile phase of chloroform : ethyl acetate : n-butanol : formic acid (2:1:0.7:0.3) was optimum for separation EGCG from caffeine with R_s 3,89. Detector was set at λ of 275 nm. Limit of detection (LOD) and limit of quantitation (LOQ) for EGCG were 7,95 ppm and 26,51 ppm. LOD and LOQ for caffeine were 5,59 ppm and 18,62 ppm. EGCG was linear at a concentration of 400-1800 ppm ($r=0,9974$) and caffeine at 80-720 ppm ($r=0,9994$). The accuracy and precision of EGCG and caffeine using standard additions were 95,30% and 5,28%, 98,1% and 2,91% respectively. These findings indicate that the TLC-densitometry method can be used for the determination of EGCG and caffeine concentrations simultaneously. This study obtained the concentrations of EGCG in sample A, B, C, D, E were $2.14\pm 0.01\%$, $2.20\pm 0.02\%$, $2.13\pm 0.04\%$, $1.67\pm 0.06\%$, and $1.50\pm 0.02\%$ respectively and for caffeine were $0.68\pm 0.03\%$, $0.71\pm 0,02\%$, $0.70\pm 0.03\%$, $0.61\pm 0.01\%$, and $0.72\pm 0.05\%$ respectively.

Keywords : *EGCG, caffeine, green tea product, TLC-Densitometry, validation.*



PC004

Bioavailability study of andrographolide-chitosan solid dispersion: validation of HPLC assay for the quantification of andrographolide in rabbit plasma

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Andrographolide (ADG) from *Andrographis paniculata* plants has many pharmacological activities, but within Biopharmaceutical Classification System (BCS) class II. From the previous study, the solubility and dissolution of andrographolide was improved by solid dispersion system using chitosan (Chi) and carboxymethyl chitosan (CM Chi), thus its bioavailability is expected to enhance. For bioavailability test, the assay methods should be selective and sensitive for drug determination in blood sample. The aim of study was to validate the assay method using HPLC for quantification andrographolide concentration in rabbit plasma for preliminary study of ADG-Chi and ADG-CM Chi solid dispersion bioavailability test. Methods: ADG concentration in plasma was determined by HPLC method. The assay was performed using Zorbax XDB C18 column (150mm x 4,6mm, 5 μ m) with a mobile phase of methanol and water (60:40), at 0.8mL/min flow rate and UV detection of 229 nm. The validation parameter determined were linearity, selectivity, accuracy and precision. Results: The results showed a good linearity with $r = 0,9998$. The accuracy was analyzed by adding the standard ADG and good recovery values were obtained for all concentrations used. The 4,88 resolution value for selectivity test indicated a good selectivity if the development method. The method showed an adequate precision, with % KV $\leq 15\%$. The HPLC method developed in this study showed good selectivity, linearity, accuracy and precision, so that it can be applied for the quantification ADG in rabbit plasma. In conclusion, this method can be used for ADG quantification in rabbit plasma to determine the bioavailability parameter of ADG-Chi and ADG-CM Chi solid dispersion systems.

Keywords : *bioavailability, andrographolide, HPLC, validation.*



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PC005

***In silico* pharmacokinetic evaluation of sixteen O-hydroxycinnamic acid derivatives by pKCSM web tool as an attempt to improve the potency as anti-angiogenesis**

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Prior to the pharmacodynamics characteristic, physiochemical and pharmacokinetic properties considerably contribute to the efficacy of a drug compound. Our previous *in silico* and *in vitro* research resulted that *o*-hydroxycinnamic acid derivatives showed anti-angiogenesis activity. This research aimed to evaluate the *in silico* ADMET properties of the sixteen ortho derivatives through pKCSM online calculation to increase the effectiveness as anti-angiogenesis. 16 tested compounds, i.e. *o*-hydroxycinnamic derivatives, with modification of -OH phenolic and -OH carboxylate, were drawn using the swissADME web tool, and converted to a SMILEY structure. After that, using these data, the calculation of absorption, distribution, excretion and toxicity (ADMET) was conducted using the pKCSM online tool. The result showed that substitution of -OH carboxylic to thiourea derivatives gave the highest *caco2* permeability which predict the absorption of orally administrated drug. The log P data of all derivative compounds ranged from 1.49 to 3.87, stating that the compound was predicted to have a high skin permeability. None of the test compounds are thought to cause mutagenic toxicity through the AMES toxicity test. The hepatotoxicity test also shows that almost all of the *o*-hydroxycinnamic derivatives do not cause hepatotoxic. All sixteen compounds tested meet Lipinski Rules of five, which means that it is prospective to developed as drug candidate.

Keywords : *hydroxycinnamic acid derivatives; pKCSM; in silico pharmacokinetic.*



PC007

Molecular docking of novel 5-O-benzoylpinostrobin derivatives as EGFR wild type and L858R-T790M-V948R mutant inhibitor

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Previous studies have shown that 5-O-benzoylpinostrobin derivatives show potential as anti-breast cancer, with the highest potential being shown as HER2 inhibitors, a protein's member of the epidermal growth factor receptor (EGFR) family. Overexpression of EGFR itself is known to be one of the causes of other cancer, including in non-small cell lung cancer (NSCLC). Thus, it is possible that 5-O-benzoylpinostrobin derivatives can also inhibit the overexpression of EGFR in NSCLC. In the case of NSCLC, mutations of EGFR are often found in several amino acids such as L858R, T790M, and V948R. The aims of this study were to determine the potential of 5-O-benzoylpinostrobin derivatives as an inhibitor of wild type EGFR and L858R-T790M-V948R mutant. Docking was performed using AutoDock Vina 1.1.2 on both wild type EGFR and L858R-T790M-V948R mutant. The parameters observed consisted of free energy of binding and amino acid interactions of each ligand. Docking results showed that all 5-O-benzoylpinostrobin derivatives showed a higher affinity for both wild type EGFR and L858R-T790M-V948R mutant, with the highest affinity shown by 4-methyl-5-O-benzoylpinostrobin and 4-trifluoromethyl-5-O-benzoylpinostrobin. Both ligands have the similarity of interacting amino acids compared to reference compounds between 76 to 88%. Specifically, docking results for all test ligands were higher in mutant EGFR than in the wild type, indicates the potential of the ligand in NSCLC therapy where a mutation to EGFR occurs. These results confirm that 5-O-benzoylpinostrobin derivatives have the potential as an EGFR inhibitor in both wild type and L858R-T790M-V948R mutant in NSCLC.

Keywords : *5-O-benzoylpinostrobin, EGFR, molecular docking, NSCLC, pinostrobin.*



PC008

Optimization of robusta green coffee fermentation using response surface methodology

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Kombucha coffee is fermented coffee bean, which is extracted using a combination of Bacteria and yeast, i. e., a symbiotic colony of Bacteria and yeast (SCOBY). Kombucha coffee can be obtained by optimizing the three variables, namely sugar concentration, incubation temperature, and duration of fermentation using Response Surface Methodology (RSM) this study aimed to optimize three variables that influence the fermentation Robusta Green Coffee beans using Kombucha culture to obtain low caffeine content and high level of chlorogenic acid RSM calculation are based on test data using High Performance Liquid Chromatography on the caffeine and chlorogenic acid content of 14 samples of Kombucha coffee. Modelling used a Central Composite Experimental Design (CCD) The optimization study using RSM showed that the lowest concentration of caffeine and chlorogenic acid was obtained at a sugar concentration of 6.77 % (b/v), incubation temperature of 25 C, and incubation time of 18 days. The optimization of fermentation using RSM on caffeine and chlorogenic acid content from Kombucha coffee required an additional variable which is the amount of Kombucha culture inoculums, as well as the variables of sugar concentration, incubation temperature and duration of fermentation.

Keywords : *Response surface methodology, green coffee, caffeine, chlorogenic acid, kombucha.*



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In vitro* acetylcholinesterase inhibitory activity of the ethyl acetate subfractions of *Agelas nakamurai

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Marine sponges have been the source of fascinating metabolites with potent bioactivities. In our previous study we have investigated the potency of several marine sponges collected from Tabuhan Island Banyuwangi as acetylcholinesterase (AChE) inhibitor, and discovered that the methanolic extract gave strong inhibition against AChE enzyme. The aim of the current study was to examine the acetylcholinesterase inhibitory activity of the ethyl acetate subfractions of *Agelas nakamurai* collected from the same location as the previous study. The fractionation was performed on vacuum liquid chromatography by using gradient elution with mobile phase combination of dichloromethane and methanol in order of increasing polarity; to produce 11 subfractions. The AChE inhibitory activity assay was carried out according to the Ellman's method. The results showed that at 100 $\mu\text{g}/\text{mL}$, subfractions 2 to 6 inhibited AChE $\geq 50\%$. The IC_{50} values of subfractions 2 to 6 were then determined, which showed that subfraction 3 gave the strongest activity with IC_{50} value of 3.78 $\mu\text{g}/\text{mL}$. Phytochemical screening was conducted on subfractions 2 to 6 by using thin layer chromatography method, visualized with Dragendorff and Anisaldehyde H_2SO_4 dyes. The results indicated the presence of alkaloid and terpenoid in the active subfractions. These results suggested that these compounds may contribute to the inhibitory activity of ethyl acetate subfractions of *Agelas nakamurai*.

Keywords : *Agelas nakamurai*, *Alzheimer's disease*, *acetylcholinesterase inhibitor*, *marine sponge*.



Synthesis of 4-Hydroxybenzohydrazide derivatives from Methyl 4-hydroxybenzoate as antibacterial

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Infectious disease by bacteria is one of the most common diseases in many countries. New antibacterial synthesis is needed because many antibacterial are already resistant. The compounds of 4-hydroxybenzohydrazide derivatives: (N'-(2-Fluorobenzylidene)-4-hydroxybenzohydrazide, N'-(4-Bromobenzylidene)-4-hydroxybenzohydrazide, and N'-(4-Chlorobenzylidene)-4-hydroxybenzohydrazide) as antibacterial generally contain azometin(-HN-N=CH-) and halogen groups. Testing the compounds carrying out *in silico* was performed before synthesis to predict their activities. The synthesis was carried out by microwave. The results were identified by FT-IR, 1H-NMR, 13C-NMR and MS. The antibacterial testing was performed by agar diffusion methods using *Bacillus subtilis* FNCC 0059 and *Escherichia coli* ATCC 25922 as bacterial tests. The synthetic compounds N'-(2-Fluorobenzylidene)-4-hydroxybenzohydrazide, N'-(4-Bromo benzylidene)-4-hydroxybenzohydrazide, and N'-(4-Chlorobenzylidene)-4-hydroxy benzohydrazide were obtained by 94%, 83%, and 78% yield respectively. Rerank scores of *in silico* study was lower than starting material (methyl 4-hydroxybenzoate). All compounds showed antibacterial activity against *Bacillus subtilis* FNCC 0059 and *Escherichia coli* ATCC 25922. The compound N'-(4-Chlorobenzylidene)-4-hydroxybenzohydrazide has the greatest antibacterial activity, and prospectively be developed as a new antibacterial.

Keywords : *Synthesis, antibacterial, 4-hydroxybenzohydrazide derivatives.*



PC011

Comparative studies of total soluble solid determination of *Curcuma longa* rhizome extract using refractometer and moisture analyzer

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Lots of data on the activity of *Curcuma longa* L. (Zingiberaceae) or turmeric has been scientifically proven such as anti-inflammatory, anti-human immunodeficiency virus, anti-bacterial, antioxidant, anti-parasitic, antispasmodic, and gastrointestinal effects; and able to inhibit carcinogenesis and cancer growth. The use of turmeric is also very widespread in herbal products. To get reproducible extracts, it is very important to optimize the extraction process. The easiest and fastest parameter to use for optimizing the extraction process is to use the total soluble solid value. Determination of total soluble solid can be done by several methods such as the brix value or using the amount of dry residue after evaporation. The results of the research show that both methods can be used to determine the time to get the optimal amount of extract.

Keywords: *Curcuma longa*, extraction process, total soluble solid, brix value, moisture content.



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PC012

Optimization of the extraction process of *Piper retrofractum* fruit using total soluble solid parameter

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Piper retrofractum (Cabe Jawa) fruits are widely used as an aphrodisiac. The potential activity of Cabe Jawa has been demonstrated in both traditional and preclinical testing. The extraction process is a major problem in the application of herbal extract production in the industry. For this reason, optimization of the extraction process is highly needed to obtain reproducible active ingredients. The determination and quantification of total soluble solids in the extract are important for quality control and assurance of extract produce. The determination of total soluble solid in the extract can be done in several different ways, from the standard hand-held refractometer to use the moisture content analysis to determine the dry matter that remains after moisture removal. The results showed that the total soluble solid determined by the Brix value and the amount of dry matter after removal of moisture can be used to determine the optimal extraction time.

Keywords: *Piper retrofractum*, extraction process, total soluble solid, brix value, moisture content.





ABSTRACT
PHARMACEUTICAL
BIOLOGY



PB001

The potency of bull seminal plasma protein in different extender on frozen goat semen process for support artificial insemination effectivity

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The purpose of this study was determine the potency of bull seminal plasma protein as antioxidant in different extender on frozen semen measured by motility, viability, integrity of plasma membrane, percentage of necrosis and DNA fragmentation. The goat semen samples were diluted in egg yolk citrate supplemented with bull seminal plasma protein of 2,5 (P1), skim milk supplemented with bull seminal plasma protein of 2,5 (P2) and egg yolk skim milk supplemented with bull seminal plasma protein of 5 (P3) mg/ml extender, respectively. Cryopreserved semen packed in 0,25 ml straws were thawed individually in 37°C water bath for 30 second. The quality of frozen semen evaluated microscopically (sperm motility, viability, integrity of plasma membrane, necrosis and DNA fragmentation). The results showed that P1 had the highest post-thaw sperm motility, viability and integrity of plasma membrane and the lowest sperm necrosis and is DNA fragmentation compared to the other groups ($p < 0,05$). The best semen extender with supplemented bull seminal plasma protein observed in this study is egg yolk citrate.

Keywords : *Quality of sperm, goat sperm, bull seminal plasma protein, extender.*



PB002

The effect of green tea (*Camellia sinensis*) extract in egg yolk skim milk extender on post-thawed merino sheep sperm quality

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The purpose of this research was to determine the best dosage of green tea extract in egg yolk skim milk extender for post thawed Merino sheep sperm quality that measured by motility, viability, membrane integrity, DNA damage and the level of malondialdehyde post thawed. The treatment was divided into four groups: (T0) egg yolk and skim milk extender, (T1) 0.05 mg green tea extract, (T2) 0.10 mg green tea extract and (T3) 0.15 mg green tea extract in 100 ml egg yolk skim milk extender. Semen was collected twice a week with artificial vagina and stored at -196°C on liquid nitrogen as straw. The sperm quality was observed after thawing at 37°C for 15 seconds on water bath. The data were analyzed by SPSS One Way Analysis of Variant (ANOVA) followed by Duncan test. The result showed that the best sperm quality was T1, motility 43.80%, viability 55.84%, membrane integrity 36.90%, DNA damage 6.80% and MDA level 7762.50 nmol/ml with addition 0.05 mg green tea extract. The conclusion of this research was addition of green tea extract in egg yolk skim milk extender increased the quality of Merino sheep sperm post thawed.

Keywords : *Egg yolk skim milk, green tea extract, Merino sheep sperm, post thawed quality.*



PB003

Effect of media Ph and incubation temperature on the inhibitory activity of *Bacillus tequilensis* BSM-F symbiotic *Halichondria panicea* from Cabbiya Madura waters against *Staphylococcus aureus* ATCC 25923 and *Eschericia coli* ATCC 25922

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Production of antibacterial metabolites is influenced by components of growth media, environmental factors such as pH, temperature, concentration and composition of media, dissolved oxygen, and production time. The optimization study needs to be done because the pH medium and incubation temperature affect the stability of Polyketide Synthetase (PKS) and Non-Ribosomal Peptide Synthase (NRPS) enzymes; by which antibacterial metabolites produced from *B. tequilensis* BSM-F. This research aims to determine optimum media pH and incubation temperature on the inhibitory activity of metabolites produced by *Bacillus tequilensis* BSM-F symbiotic *Halichondria panicea* from Cabbiya Madura Waters in Potato Dextrose Agar (PDA), Starch Casein Agar (SCA), and International Streptomyces Project (ISP-4) agar media. The fermentation was performed in solid state media and the inhibitory activity against *Staphylococcus aureus* ATCC 25923 and *Eschericia coli* ATCC 25922 was assayed by diffusion agar method at various media pH and incubation temperatures. Inhibitory growth zone diameter was measured for indicating the activities. It was found that the largest inhibition zone was obtained on the PDA media pH 8 after incubation for six days at 32°C. The SCA media showed optimum at pH 6-7 after incubation at 37°C for 3 days. Furthermore, by using the ISP-4 agar media, the optimum condition was achieved at pH, temperature, and incubation time were 8, 37°C and 3 days respectively. Inhibitory activity of *Bacillus tequilensis* BSM-F symbiotic *Halichondria panicea* has optimum pH and temperature specific to each media.

Keywords : *Bacillus tequilensis* BSM-F, incubation temperature, inhibitory activity, media, pH.



PB004

Identification of marine sponge *Halichondria panicea* symbiotic bacteria isolated from Cabbiya Madura coast and optimization of media for producing its antibacterial metabolite

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One of the antibacterial sources is derived from marine sponge-symbiotic bacteria. The purpose of this study was to identify sponge-symbiotic bacteria with *Halichondria panicea* isolated from Cabbiya Madura Coast and optimize media for producing its antibacterial metabolite. The identification of selected bacteria was carried out by 16S rRNA genes analysis. Solid-state fermentation used to obtain maximum antibacterial activity was performed by agar diffusion method against *Staphylococcus aureus* ATCC 25923 and *Escherichia coli* ATCC 25922. Two of six isolates of bacteria screened their inhibitory activities were called as BSM-D and BSM-F. The largest growth inhibitory zone diameter 12.47 ± 0.45 mm against *Staphylococcus aureus* ATCC 25923 was exhibited by BSM-F. Based on the phylogenetic tree, the BSM-F showed the characteristics closest to *Bacillus tequilensis* strain 10b with a similarity of 98.72%. Furthermore, antibacterial metabolite produced by *Bacillus tequilensis* BSMF was found in Potato Dextrose Agar (PDA), TSA (Tryptic-Soy Agar), Saboroud Dextrose Agar (SDA), SCA (Starch-Casein Agar), International Streptomyces Project (ISP)-2, ISP-4, ISP-5, and ISP-7 solid-state fermentation media. The inhibitory activity of *Bacillus tequilensis* BSM-F was exhibited in the PDA media after 72 hours incubation. It was found that the optimum average activity index were 1.98 ± 0.04 and 2.25 ± 0.03 against *Staphylococcus aureus* ATCC 25923 and *Escherichia coli* ATCC 25922 respectively. *Halichondria panicea* symbiotic bacteria identified as *Bacillus tequilensis* and the optimum media for producing its antibacterial metabolite is PDA.

Keywords : *Antibacterial, Halichondria panicea, marine bacteria, PDA.*



PB005

Effect of carbon and nitrogen sources on the antibacterial activity of *Bacillus tequilensis* BSM-F symbiotic with *Halichondria panicea* sponge from Cabbiya Madura seawater

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Production of antibacterial metabolites is influenced by several factor, one of which is the nutrients in the production media. So, in this research the addition of nutrient such as carbon sources as energy for bacteria and nitrogen sources for protein synthesis is needed so that it can produce optimum metabolite antibacterial activity of *Bacillus tequilensis* BSM-F symbiotic with *Halichondria panicea* sponge from Cabbiya Madura Seawater. This research aimed to determine optimum of carbon and nitrogen source in producing metabolite antibacterial activity of *Bacillus tequilensis* BSM-F symbiotic with *Halichondria panicea* sponge from Cabbiya Madura Seawater. The fermentation was done by using solid state media while inhibitory activity against *Staphylococcus aureus* ATCC 25923 and *Escherichia coli* ATCC 25922 by diffusion agar method. Inhibitory activity was denoted as activity index, by which ratio of inhibitory zones and bacterial colony diameter was measured. It was found that the highest inhibitory activity index against *Staphylococcus aureus* ATCC 25923 and *Escherichia coli* ATCC 25922 was obtained on glycerol as carbon source and casein as nitrogen source. The optimum condition was achieved at the concentration of glycerol and casein 1,5% w/v respectively. The highest inhibitory activity index of *Bacillus tequilensis* BSM-F symbiotic with *Halichondria panicea* sponge was obtained in glycerol and casein at the concentration 1,5% w/v respectively.

Keywords : *Bacillus tequilensis* BSM-F, carbon source, nitrogen source, inhibitory activity index.



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PB006

The evaluation of antiulcer activity using *Armoracia rusticana* (horseradish) extract in ethanol- induced rats

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Peptic ulcer are painful sores in the lining of the stomach or in the protective lining of the duodenum (the upper part of the small intestine) or the stomach, areas that come into contact with stomach acids and enzymes. Ethanol-induced gastric ulcers serve as a common ulcerogenic agent. The present study is to investigate the potential of ethanolic Horseradish extract to attenuate ethanol (0.6 mg/kg, orally) induced peptic ulcer and histopathological changes in rats gastric mucosa. In this study 30 Sprague-Dawley (150-250g) female rats were divided into 5 groups (6 each). Groups 1 served as negative control given normal saline and food for 8 days. Group 2 served as positive control received ethanol 95% (0.6 mg/kg,p.o.) on the 8th day. Group 3 treated with Omeprazole (20 mg/kg/day,p.o.), group 4 with Horseradish extract (500 mg/kg/day,p.o.) and group 5 with Horseradish extract (1000 mg/kg/day,p.o.) for 8 consecutive days, then followed by ethanol 95% (0.6 mg/kg/day,p.o.) administration on the 8th day. The rat stomach was dissected and the macroscopic and histopathology examination were carried out. This study showed that ethanol extract of Horseradish has gastro-protective effect in ethanol-induced ulcer model. Treatment with this extract also suppressed areas of gastric ulcer formation and it also showed flattening of gastric mucosal compared to rats pre-treated with normal saline and the histopathological findings showed the marked prevention of gastric mucosal ulcer and no leukocyte infiltration compared to animals treated with only normal saline. This study revealed that the treatment of ethanol-induced



rats with Horseradish extract significantly ameliorates the peptic ulcer formations in the first part of the small intestines, the duodenum.

Keywords : *Peptic ulcer, horseradish gastroprotective.*



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PB007

Wound healing properties of *Coriandrum sativum* L. leaves extract and its formulated ointment in wistar rats

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Wound is referred as any physical injury that breaks the skin layer. Wound healing is known as the regeneration of tissues whereby the new layer of skin is formed. Wound healing follows a cascade of events starting with homeostasis to remodelling. Although there are many studies conducted using various plants but wound healing properties of coriander leaves are limited. This research was conducted to determine the wound healing properties of formulated methanolic extract of *Coriandrum Sativum* L leaves (MECSL) in Wistar rats. MECSL extract was done using methanol in a soxhlet extractor for 36 hours at 60°C. MECSL ointment was formulated and physical stability testing were recorded. Animals were divided into four groups (n=6). Group-1 control, Group-2 and 3 were treated with 10% and 20 % of MECSL ointment respectively. Group-4 was treated with standard povidone ointment. The parameters observed were percentage of wound contraction. MECSL ointment was applied topically on the excision wound for two times per day for three weeks. Statistic was carried out using ANOVA Dunnet's multiple comparison test. The 20% MECSL ointment has shown a significant wound-healing activity which was evidenced by decrease in the period of epithelialization and increase in the rate of wound contraction. 20% MECSL ointment have proved to possess wound healing properties and a higher concentration of the extract has facilitated as a good choice of remedy for wound healing.

Keywords : *Wound healing ointment, Coriandrum Sativum L., wistar rats.*



PB008

Characterization of "kacang" goat skin collagen and their potency as an antioxidant

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Collagen have been interesting material for many utilization such as food, pharmaceutical, medical and cosmetic in various product target, consequently collagen should be prepared as well as type of application. The objectives of this research is to prepare collagen from Goat skin and to investigate the character and their potency as an antioxidant. The materials used were male "Kacang" Goat skin aged one year. Goat skin was sliced into small size and the extracted by curing with 0.1% (w/v) pepsin in 0.5 M acetic acid for 24, 48 and 72 hours at 40C. The observed variables were molecular weight by SDS-PAGE, microstructure using Scanning Electron Microscope (SEM), thermal stability by differential scanning calorimetric (DSC) and the antioxidant potency was mesured by DPPH inhibition analysis. The result showed the molecular weight range from 25 to 180 kDa, microstructure showed the collagen fibril crosslink, thermmal stability showed the collagen strat to denaturate at 62.28 0C, highest dissolved in 1% NaCl concentration. The DPPH inhibition analysis showed in the 60 min after hydrolysis showed the highest antioxidant activity. In conclusion, "Kacang" goat skin collagen prepared by pepsin in 0.5 M acetic acid has potential application for food and non food ingredients.

Keywords: *Goat skin, pepsin treatment, collagen characteristic, antioxidant activity.*



PB009

Antimalarial activity study of andrographolide-chitosan solid dispersion and histopathological effect in *Plasmodium berghei* infected mice

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Andrographolide (ADG) is a diterpene lactone derived from the herb sambiloto (*Andrographis paniculata* Ness.) which have some pharmacological effects. Its poorly soluble in water causes limited absorption and bioavailability. Solid dispersion systems can be used to increase the solubility and dissolution rate of medical substances with low water solubility. The purpose of this study was to determine the antimalarial activity of andrographolide-chitosan solid dispersion system and histopathological effect in the liver and spleen in *Plasmodium berghei* infected mice. The solid dispersion systems of andrographolide-chitosan (SDS ADG-CTS) was prepared by the solubilization-spray drying method. In vivo antimalarial test was done using Peter's 4 days suppressive test. The result showed the andrographolide-chitosan solid dispersion systems increased the parasitaemia inhibition up to 1.6 times compared to ADG. The degeneration and necrosis of liver cell of mice given with SDS ADG-CTS were lower compared to ADG otherwise, the degeneration of spleen cells between the two groups was similar. To conclude, the solid dispersion of ADG using chitosan as matrix could enhance the activity, so can be used as a guide to developing other solid dispersion systems of polymer for poorly soluble plant compounds and synthetic drugs.

Keywords : *Andrographolide, chitosan, solid dispersion, in vivo antimalarial test, histopathology .*



PB010

The effect of 70% ethanol and aqueous extract of *Rusa unicolor* antler against anti-inflammatory and anti-osteoarthritis

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Rusa unicolor antler from Kalimantan, Indonesia has been traditionally used to control pain and improve dysfunction in osteoarthritis. The objectives of the present study were to investigate anti-inflammatory and anti-osteoarthritis activities of 70% ethanol and aqueous extracts of *Rusa unicolor* antler. Anti-inflammatory activity of *Rusa unicolor* antler extracts were evaluated by in vitro assay using LPS-induced RAW 264.7 cells. In addition, their cartilage protective effects were also determined in vitro assay using SW1353 cells by calculated the stimulation of collagenase and elastin. The aqueous extract of *Rusa unicolor* antler showed stronger anti-inflammatory activity than the 70% ethanol extract through inhibiting production of NO and PGE₂ in LPS-induced RAW 264.7 and it stimulated collagen and elastin in SW1353 cells higher than their 70% ethanol extract. Both of 70% ethanol and aqueous extracts of *Rusa unicolor* antler had anti-inflammatory and anti-osteoarthritis, they promote to ameliorate the progress of osteoarthritis by inhibiting local inflammation and protecting articular cartilage by preventing destruction of collagens and elastin. Therefore, the 70% ethanol and aqueous extracts of *Rusa unicolor* antler is a potential therapeutic agent for reduction of cartilage damage that occurs in osteoarthritis.

Keywords : *Rusa unicolor* antler, NO inhibition, elastin, collagenase.



PB011

Plasma blood of primaquine and chloroquine in mice after intravenous administration of liposome

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Malaria is divided into two types, namely erythrocytic and hepatic malaria. Primaquine (PQ), which belongs to the 8-aminoquinoline group, is the only effective antimalarial drug in the hepatic phase, but this drug has the effect of hemolytic anemia in patients with glucose-6-Phosphate dehydrogenase (G6PDase) deficiency. Chloroquine also has potent activity against the asexual stage (erythrocytic stage), but has no activity against hypnozoites. The use of primaquine with chloroquine in therapy has been reported to increase the effectiveness of primaquine and can reduce the toxicity of primaquine. In this research to determine the levels of primaquine and chloroquine as liposome preparations in the blood. this liposome prepared by thin film hydration technique at diferent mol percent ratio. they were then evaluated for physicochemical properties including particle size , zeta potential, and efficiency. Liposomes and free drugs injected equivalent to doses of primaquine and chloroquine, which are 3.5 mg and 1.8 mg / kg BB mice. After 24 hours of drugs administration, the blood level of primaquine and chloroquine wiil be determination using HPLC. The result shored about 86,21% anf 72,92% injected dose of chloroquine were observe for liposome chloroquine and liposome combination of chloroquine and primaquine, while it is only 14,62% detected after free drugs administration. An the other hand , primaquine not be quantified because no specific read well before during the analysis. It can be that the chloroquine drug in the preparation of liposomes has proven effective compared to free drug, as evidence condition liposome could improve systemic blood syrculation of chloroquine.

Keywords : *Primaquine, chloroquine, liposomes, biodistribution, in vivo release studies.*



PB012

The potency of snail (*Achatina fulica*) slime-derived elastin as a natural anti aging

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Snail *Achatina fulica* is one of the most extensively studied snails due to its economic, ecological and medical importance. Snail slime is mainly composed of allantoin, glycolic acid, collagen, and elastin. Collagen and elastin are the most important protein involved in the process of skin aging prevention. This work is aimed to explore and characterize the protein presence in snail slime of *Achatina fulica* for promising candidate protein to slow the skin aging process. Snail slime was collected by manual stimulation of the snail body. The protein in snail slime was then characterized with SDS PAGE, and quantified using Lowry method with small modification, as well as the protein chromatogram analysis. Based on SDS PAGE, it was found bands representing the molecular weight of proteins of 114.97, 79.67, 68.80, 63.93, and 50.06 kDa. The protein content of snail slime was 127.94 µg/mL. The chromatogram analysis using Sirius red/fast green showed that snail slime was positive for collagen, whereas Verhoeff-Van Goeven staining showed the positive sign of elastin. Based on this early results, we conclude that both collagen and elastin, two most important proteins which are able to delay the natural aging process were present in the snail slime. Further study to test the potential effect of this snail slime, animal experimentation induced by intensive light to generate aging is ongoing.

Keywords : *Achatina fulica*, anti aging, elastin, collagen, sirrius red.



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PB013

***In vitro* anticancer activity of acetone extract of *Solanum mammosum* CGS callus culture against HeLa and T47D cancer cells**

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Breast cancer and cervical cancer were ranked first and fourth of the leading cause of death of women in the world. One of natural compound that was reported on having cytotoxic activity against various cancer cells with high selectivity is betulinic acid. It was can be found in acetone extract of *Solanum mammosum* CGS callus culture bred at Biotechnology Laboratory, Faculty of Pharmacy, Universitas Airlangga. Aim of this study was to identify the anticancer activity and selectivity of betulinic acid and the acetone extract, and to determine the betulinic acid content in the acetone extract. Anticancer activity was done using MTT assay on HeLa cervical cancer cells, T47D breast cancer cells and Vero normal cells in vitro. The determination of betulinic acid was done using TLC method using hexane, ethyl acetate, and acetic acid at 7:3:0,3 v/v ratio as mobile phase and densitometric determination was done after derivatization using anisaldehyde-H₂SO₄ reagent at λ 540 nm. The anticancer activity test showed that IC₅₀ value of the acetone extract towards HeLa and T47D cells is 120.51±4.67 μ g/mL and 2357.79±379.04 μ g/mL respectively, and IC₅₀ of betulinic acid against HeLa and T47D cells is 19.31±3.59 μ g/mL and 38.87±4.30 μ g/mL respectively. The selectivity of the acetone extract and betulinic acid was proved by their inactivity towards Vero normal cells. The content of betulinic acid was found about 0,76% w/w in *Solanum mammosum* CGS callus' simplicia. Those results suggested that acetone extract of *Solanum mammosum* CGS callus culture may be a good candidate for anticancer agent.

Keywords : *Solanum mammosum*, callus culture, anticancer, HeLa, T47D.



PB014**Anti-hepatitis c activity combination of *Ruta angustifolia* extract and ribavirin**

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Hepatitis C virus infection is a global health problem which chronically infected among 71 million people in the world. This infection has a risk to develop liver cirrhosis and hepatocellular carcinoma which the major cause of morbidities. Since the current HCV therapy has been develop by direct-acting antivirals (DAA), however most patients get a limited access due to the high cost. Therefore, further development anti-HCV agent still needed to get active and cost-effectiveness drugs. Ribavirin is antiviral agent that has been used for treat several virus infections both DNA or RNA. Ribavirin was known to inhibit HCV infection by regulated immune system in host cells and interfere the replication of HCV by inhibit HCV RdRp. Our Current study examined the effect of combination between ribavirin and *Ruta angustifolia* extract. *R. angustifolia* is a natural resource which was reported to possess a strong anti-HCV activity. The current study evaluated combination treatment of *R. angustifolia* extracts and ribavirin by *in vitro* culture cells of Huh 7it. The result was demonstrated an enhancement effect of extract to anti-HCV activity of ribavirin with 3.5-fold higher. The 50% inhibitory concentration of ribavirin by single treatment was $10,43 \pm 0,18$ $\mu\text{g/ml}$ while in combination with *R. angustifolia* extract was $2,80 \pm 0,03$ $\mu\text{g/ml}$. Further analysis of combination by CompuSyn software mediated a synergistic effect among the combination with combination index value of 0.691. These results suggested that combination of Ribavirin and *R. angustifolia* should be considered in developing anti-hepatitis C virus agents.

Keywords : *Anti hepatitis C, Ruta angustifolia, ribavirin.*



PB015

Concentration and time exposure determination of methanol extract from *Carica papaya* leaves in the larvicidal activity against *Aedes aegypti* larvae

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Dengue Haemorrhagic Fever (DHF) is a disease caused by dengue virus which is transmitted through *Aedes aegypti* mosquito bite. Efforts to control the widespread of the vectors have been made using biological agents and also chemical compound. Chemicals known as a standard protocol have raised concerns about resistance and harmfulness to the environment. Hence, the present study was aimed to explore the larvicidal activity of papaya (*Carica papaya*) leaf extract against *Aedes aegypti* larvae in regards to the optimum concentration and time exposure. Preparation the obtained extract was diluted to make a serial concentration. These solutions were made by pipetting 0.65 mL, 1.25 mL, 2.5 mL, 5.0 mL, and 10.0 mL of extract into 10.0 mL volumetric flasks and dilute with distilled water. The test solution was poured into a glass jar contained 90 mL of distilled water and filled with 20 third instar larvae. Each experiment was replicated four times. The larval mortality was recorded in 24h and calculated as a percentage of total larvae used in the experiment. The table above shows the value of LC50 And LT50 from toxicity assay of papaya leaf extract. According to the LT50 value, it can be seen that the lowest LT50 of 1,006h occurred at the concentration of 11000 ppm. Moreover, calculated LC50 is 4929,344 ppm. Based on these results, papaya leaves have the ability to *Aedes aegypti* larvaside so that it can help in breaking the chain of development of *Aedes aegypti*.

Keywords: Larvicidal activity, papaya leaf, methanol extract, *Aedes aegypti*.





ABSTRACT
HALAL
RESEARCH



Halal Cosmetics in Indonesia; how should it be regulated?

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As a country with majority of moslem, the needs of halal cosmetics for national were increasing from time to time. Besides there are also many requirements from neighboring countries. The aim of this research is to elaborate on how shall halal cosmetics be regulated to support the high demand of halal cosmetics for national needs and export. This research is a normative research. Data were obtained by literature search using “google machine” with main keyword “halal cosmetics” and supported by “legal” and “regulations” to complete the search. Data were analyzed using qualitative method. Raw data obtained were reviewed using content analysis to reduce to the most relevant data. The relevant data were analyzed to answer the aim of this research. The research found that Law No.33 Year 2014 regarding Halal Products Guarantee and Government Regulation No.31 Year 2019 as the implementation regulation are not sufficient enough. Analysis proved that some implementation regulations are still required. To support the need for export, since there were differences in halal standard, the harmonization of “halal” regulations must be discussed among the countries. This will lead to the production of bilateral agreement, multilateral agreement or a convention. The research concluded that some regulations must be issued to support the growing need for halal cosmetics internationally.

Keywords : *Halal cosmetics, halal regulations.*



HL002

Questionnaires evaluation: Knowledge, attitude and perception regarding halal dietary supplements among sport students' in public universities of Malaysia

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A “Knowledge, Attitudes, and Perception (KAP)” survey could be a representative study of a selected population that aims to gather knowledge on what is identified, believed and done in relation a specific topic. We conducted this survey to get a better understanding of students' knowledge of current halal dietary supplement, their attitudes toward halal dietary supplement, and perception of protection in Malaysia. The purpose of this study is to assess the validity and reliability of questionnaire survey for Knowledge, Attitude and Perception (KAP) regarding halal dietary supplements among sport students' in public universities of Malaysia (UITM, UM and UPSI). The validity was evaluate via expert and also participant. Questionnaire will be improved according to expert and participant comments or recommendations. Second is reliability, where can be measured by Cronbach's alpha test. Cronbach's α was applied to test validity and internal consistency of the questionnaires. The study was conduct on sample of student ($n=65$) at Management and Science University was recruited on February 2019. Majority of the subject were 19 to 28 years old. Female 66.2% and male 33.8%. The questionnaire shows $\alpha \geq 0.915$. Which mean questionnaires have excellent internal consistency. Malaysia is one of the essential and uprising stakeholders in the world's halal market. So with proper questionnaire, we can evaluate students understanding about Knowledge, Attitude and Perception (KAP) regarding halal supplement.

Keywords : *Questionnaires, Cronbach's alpha test, validity, evaluation, reliability.*



HL003

Knowledge, attitude and perception regarding halal dietary supplements among sport students' in public universities of Malaysia

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This is a cross-sectional study. It was disbursed between April 2019 and May 2019, using module and self-administered questionnaires to evaluate the Knowledge, Attitude and Perception (KAP) regarding halal supplement among sport students in public universities of Malaysia (UITM, UM and UPSI). Aim for this study is to find out the awareness level of halal dietary supplement among sport students' in three public universities. The study was conducted on a sample of n=167. Inclusion criteria was a full time students of sport school of public university in Malaysia. Data was collected through module presentation and pre-post questionnaires. Results discovered that student have a good knowledge and positive attitude and perception regarding halal supplement. Mean knowledge score out of maximum possible 8 was 7.62 ± 0.84 , mean attitude score out of maximum possible score of 50 was 44.99 ± 6.23 , while mean perception score out of maximum possible score of 75 was 65.59 ± 7.74 . Mean overall KAP score out of maximum possible score of 167 was 118.19 ± 10.21 . There was a significant, positive and fair correlation (0.25 - 0.5) between knowledge and attitude ($r= 0.403$, $p<0.01$), knowledge and perception ($r= 0.431$, $p<0.01$) and attitude and perception ($r= 0.497$, $p<0.01$). Result shows that the better knowledge the students have on halal supplement, the better their perception and attitude is towards halal supplement. P value of 0.05 or less was taken as statistically significant.

Keywords : *Knowledge, attitude, perception, KAP, halal.*



HL004

Vaccine manufacturing : a halal approach

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Halal is arabic word meaning lawful, permissible according to Islamic law. The opposite meaning of Halal is Haram which mean unlawful, prohibited and forbidden. Nowadays, Halal products are not only focused on food and beverages but also in all products including vaccines and pharmaceuticals. Vaccine administration has been an obstacle in this recent years due to anti-vaccine activities, one of the issue because vaccine is not Halal. Aim of this article has the objective to investigate ingredients and manufacturing process of vaccine that can be Halal to consume. Relevant literatures were reviewed based on following keywords : vaccine, vaccine manufacture, vaccine produce, Islamic perspective, Muslim perspective about vaccine also Professor Nidom Foundation research development in antigen propagation from aquaculture cells (one of it was from Zebra fish) and edible vaccine (banana) The use of some substitute materials from aquaculture and plant based gives hope in the vaccine Halal process. Zebra fish cells can be use for media substitute propagation of vaccine antigen, meanwhile the edible vaccine is still in progress. This article summarize the concept of Halal and Haram source in vaccine manufacturing so it can help vaccine manufacturer, scientist to search or study about replacing compounds that are Subhat or Haram in vaccine manufacturing.

Keywords : *Vaccine, manufacture, halal, islamic perspective.*



HL005

Determination of palm oil adulteration with lard used in some pharmaceuticals by using differential scanning calorimetry and Raman spectroscopy techniques

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Palm oil has been used in a lot of industries such as food, cosmetics, and pharmaceuticals. Previous studies reported that lard included in palm oil through economic profits and easy processing properties. There are public concerns in terms of food safety and halal consumption. Islamic law prohibits Muslims from consuming or using pork and pork-derived products such as lard. The aim of the study was determined of lard adulteration in palm oil. Lard was extracted from adipose tissues of pigs. Palm oils (n=2) were adulterated with lards (n=2) at different ratios ranging from 0.5%-55%. Differential Scanning Calorimetry (DSC) thermal properties were obtained for adulterated, lard and palm oil samples. DSC profiles of lard-adulterated samples showed an adulteration peak related to the lard content. Additionally, Raman spectra were obtained for all samples. PLSR (partial least squares regression) and PCR (principal component regression) were applied to the normal, first-derivative, and second-derivative spectra of adulterated samples. Quite desirable R² values of 0.99 were obtained in developed calibration and cross-validation PLSR and PCR methodologies. In this study, a new methodology was performed for detection and quantification of lard in palm oil by using Raman spectroscopy combined with chemometrics of PLSR and PCR analysis. Obtained results were successfully confirmed by using differential scanning calorimetry (DSC) analysis. Developed methodology could be successfully used for quantification of lard in some palm oil used pharmaceuticals.

Keywords : *Palm oil, adulteration, lard, DSC, raman spectroscopy.*



Analysis of pharmacist attitude in the pharmaceutical industry of halal certification and their readiness to produce halal medicine

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Since the issuance of Law 33 of 2014 concerning Guaranteed Halal Products, the Government has an obligation to remind all parties that the Law should be carried out properly without exception including halal medicine, bearing in mind that the majority of Indonesian citizens are Muslims, who are obliged to seek treatment with halal medicine. Regarding the availability of halal drugs is dependent on the attitude of the pharmacists who practice in the pharmaceutical industry towards halal certification or halal medicine, including their readiness to produce halal drugs. This study aims to determine the pharmacist's attitude towards the halal nature of the drug and its readiness to produce halal medicine, as well as the relationship between the attitude and readiness. This study uses a cross-sectional observational design, the research variable is the attitude and readiness of the pharmacist to produce halal drugs, with 206 pharmacists who carried out professional practice in the pharmaceutical industry in East Java. The instrument used was a valid and reliable questionnaire. The results showed that, the majority of respondents had attitudes with the category of agreeing to halal certification on drugs which were 51.54%, and had readiness with a high category for producing halal drugs, which were as many as 58.74% Pharmacists. The results of the statistical analysis between attitude and readiness obtained $p = 0.00$. The majority of pharmacists' attitudes agree with regard to the certification and halal of the drugs produced. The attitude of pharmacists is related to their readiness to produce halal drugs.

Keywords : *Medicine, halal, attitude, readiness.*



HL007

Prospectivity of red passion fruit (*Passiflora edulis* Sims) as a halal source of resistant probiotic againts vancomycin and erythromycin

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Probiotics are living bacteria that consumed in sufficient quantities can have an beneficial effect on health. Lactic acid bacteria of certain species are nonpatogenic and belong to a group of bacteria that has a generally recognized as safe (GRAS) status which is usually used as a probiotic. Red passion fruit (*Passiflora edulis* Sims.) contains Lactic acid bacteria. The purpose of this study was to determine the probiotic characteristics of lactic acid bacterial isolates from red passion fruit and sensitivity against vancomycin and erythromycin. Isolation of lactic acid bacteria from red passion fruit with selective medium Man Rogosa Sharpe (MRS) Agar. The growing isolates were identified phenotypically based on biochemical and morphological characteristics according to Bergey's Manual of Determinative Bacteriology. Lactic acid bacterial isolates were further tested for their probiotic characteristics including resistance to low pH (2.5 and 3), NaCl salt (1%, 4%, and 8%), phenol (5%), and sensitivity against vancomycin and erythromycin. Based on the results of the study, two isolates mm2 and mm3, namely gram-positive bacteria in the form of a coupled rod, negative catalase, non motile, negative indole test, did not form sulfid, positive citric simmons test, and TSIA test showed that the isolate was heterofermentative. Probiotic



characteristic test results showed that the isolates of mm 2 and mm 3 were able to survive at pH 2.3 and 3, salt tolerance in general, resistance to phenol, and susceptibility pattern against vancomycin and erythromycin. Therefore, red passion fruit has the potential to produce lactic acid bacteria isolates which can be further developed as halal probiotic products.

Keywords : *Passiflora edulis* Sims., *lactic acid bacteri*, *probiotic*, *vancomycin*, *erythromycin*.



HL008

Inhibitory activity of aqueous extract and cell free fermentation broth of passion fruit against ESBL and MRSA as alternative halal source of antibacterial substances

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Exploration of medicinal raw materials from halal ingredients is now an important issue especially in predominant Muslim countries. Moreover, the certification of raw materials and pharmaceutical preparations are mandatory requirement by BPOM. Passion fruit from *Passiflora edulis forma flavicarpa Sims.* is a unique fruit available in various varieties with nutraceutical compounds that have many medicinal properties. The aims of this study were to evaluate the inhibitory activity of aqueous extract and cell free fermentation supernatant (CFFS) of passion fruit against Extended Strain Beta Lactamase (ESBL) and Methicillin Resistant *Staphylococcus Aureus* (MRSA) to produce alternative halal source of antibacterial substances. The aqueous extract was obtained from fermentation of the passion fruit pulp in sterile purified water after making it into 10% aqueous solution while the CFFS was derived from Microbiology Laboratory of Faculty of Pharmacy, Airlangga University. The inhibitory assay was determined by performing broth dilution in nutrient broth by two-fold serial dilution of the extracts and was incubated at 37°C for 24 hours. Then, the Optical Density (OD) at 580 nm of all solutions including the positive and negative control were measured. The



minimum inhibitory concentration of the aqueous_extract and CFFS were determined using the agar diffusion method. Based on the OD observation, the inhibition profile on both ESBL and MRSA was similar. There was a sudden decrease by 2.5 times of OD from the 50% of the extracts against positive control on both ESBL and MRSA. The effect of the extracts on MRSA shows a stagnancy starting at a concentration of 25% earlier than its effect on ESBL. The results demonstrate that the extracts of passion_fruit can serve as a potential halal antimicrobial agent in food and medicine.

Keywords : *Antibacterial activity, passion fruit, fermentation supernatant, aqueous extract, ESBL, MRSA*



HL009

Comparison of characteristic design of halal capsules from fruit peel waste extraction

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A study has been conducted on the quality of halal capsule design made from pectin from two types of fruit skin peel, cocoa peel and coffee fruit peel as a by-product of the food industry. Pharmaceutical characterization of cocoa peel and coffee peel in making halal and economical capsule shells in pectin-based. After each fruit peel waste through the extraction process, the pectin obtain formulated with other ingredients, print used a dip method with a pin bar and dipping pen, were then organoleptic evaluated, tested for size and weight diversity, tested for disintegration used a disintegration tester and tested for elongation used the favigraph method. Chocolate fruit peel capsule shell design, pectin composition 1%; CMC-Na 10%; CaCl₂ 0.03% and aquadest 88.97% had a physical appearance of light brown, cloudy, odorless, and soft. Evaluated capsule shell body diameter of 7.31 mm; diamater lid 7.495 mm; the disintegration timewhich was 9 minutes 5 seconds and the elongation test obtained was 19.87% and the tensile strength test obtained was 417.44 grams. The design of capsules shell of coffee fruit peel had a composition of 0.78% pectin, 5.00% carrageenan and 94.22% aquadest produce capsule shells with a physical appearance that was brownish white, clear, odorless and hard. The results of evaluation of capsule shells, including capsule weight 50.4 mg, capsule length 22.39 mm, capsule body diameter 7.58 mm and the longest disintegration time was 5 minutes 26 seconds. The results showed that capsules models from cocoa peel and coffee peel waste met some pharmaceutical requirements. In otherwise the formulation need optimization.

Keywords : *Capsules, fruit peel, pectin.*



HL010

Formulation, Stability Assessments, and Activity Test against Staphylococcus aureus of Non-Alcoholic Spray Gel Hand-Sanitizer Containing Geranium and Peppermint Essential Oil

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Hand sanitizer gel is a practical cleansing agent that could rapidly disinfect the skin of the hand without using water. However, most hand sanitizers on the market use alcohol as a bacterial exterminator. The main constituent of Geranium essential oil is citronellol (26,7%), while Peppermint essential oil (*Mentha piperita*) contains menthol (29-48%); both of them have an antibacterial effect. This study was conducted to determine the effect of differences in geranium essential oil (1.25%; 2.5%; 5%) in spray gel preparations on a physical characteristic (organoleptic, drying time, pH, viscosity) and stability of the preparation. We also evaluate the activity of the product against *Staphylococcus aureus*. The data were then analyzed using one-way ANOVA and HSD posthoc statistical methods with a confidence level of 95%. Based on the physical characteristics test, the preparation has the same physical organoleptic, which is the liquid form, aromatic, and has a yellowish-white color. Based on statistical results using One Way ANOVA, there was no difference between each formula on the drying time ($p > 0.05$). However, the differences of Geranium oil concentration affected the pH and viscosity of the preparations ($p > 0.05$). The diameters of the bacterial



inhibition zone were F1 ($6,42 \pm 0,54$) mm, F2 ($9,27 \pm 0,55$) mm, and F3 ($10,90 \pm 0,65$) mm. The results indicated that the geranium essential oil (1.25%; 2.5%; and 5%) on the hand sanitizer spray gel produced a good inhibitory effect on *Staphylococcus aureus*. The increase of geranium oil produced higher inhibition zones.

