State Secretary
Incorporate Perak

2nd INTERNATIONAL CONFERENCE OF PHARMACY AND HEALTH SCIENCES

INTEGRATING RESEARCH, INNOVATION, TECHNOLOGY AND PRACTICES TOWARDS SUSTAINABLE HEALTH

10 - 12 September 2018

Casuarina@Meru Hotel
Ipoh, Perak

ORGANIZED BY

UniKL UNIVERSITI KUALA LUMPUR

Royal College of Medicine Perak

Faculty of Pharmacy and Health Sciences

IN COLLABORATION WITH

University of Medicine and Pharmacy Ho Chi Minh City, Vietnam

UniKL INSTITUTE OF MEDICAL SCIENCE TECHNOLOGY (MESTECH)

UniKL MALAYSIAN INSTITUTE OF CHEMICAL & BIOENGINEERING TECHNOLOGY (MICET)

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BIOSYNTHETIC POTENTIAL OF ENDOPHYTES FROM MEDICINAL PLANTS

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The drug resistant microbes and chemical drugs with harmful side-effects are the two major problems that have push the world to develop or invent new pharmaceutical compounds. Compounds obtained from natural product of plants and microbes have an efficient beneficial effects on microbes and can be develop into new pharmaceutical products. Even novel bioactive compounds are isolated from plants by ethno-botanical knowledge. However, plant availability is one of the limiting factor in isolation procedure. Huge amounts of plant requirement to isolate bioactive compounds, further raises concern about biodiversity conservation. One of the alternative in addressing these concern is isolating the microbes from medicinal plant sources. Endophytes are such asymptomatic microorganisms, mostly fungi or bacteria, residing the intracellular region of the plants. These microbes act as a biological defense for the plants against pathogens, secrete various plant growth promoting substances and involve in stress resistance. Recently, endophytes found to have immense potential in possessing a wide range of biological activities such as antibiotic, antiviral, anticancer, anti-inflammatory, antioxidant activities due to their biological association within their host medicinal plants. Therefore, plants habitat on ancient land mass can lodge endophytes with active natural products and those plants exploited for using as a traditional medicine can be considered. This paper highlights the potential applications of endophytes which could be used to develop a new pharmaceutical product.

Keywords: *Antioxidant activities; bioactive compounds; endophytes; medicinal plants; pathogens.*

PHYSICOCHEMICAL CHARACTERIZATION AND *IN VITRO* SKIN PERMEATION PROFILE OF *Hibiscus rosa sinensis* MUCILAGE

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Introduction: The physicochemical characteristics of *Hibiscus rosa-sinensis* (HRS) mucilage to act as a drug penetration enhancer for transdermal drug delivery system were investigated.

Material and Methods: HRS mucilage was obtained through water based extraction of HRS leaves and characterized for its pH, viscosity and molecular weight. Caffeine as a model drug was incorporated into three different concentrations of HRS gels of 1, 1.5 and 2.0 % w/w (namely CL1, CL1.5 and CL2), as well as deionized water for control group. The gels were subsequently characterized for their viscosity, crystal behaviors and particle size. The cumulative *in vitro* drug release and drug permeation of caffeine were examined by vertical diffusion cells for 24 h using Tuffryn membrane and excised rat skin, respectively.

Results: HRS mucilage exhibited excellent physicochemical properties with pH of 6.8, specific viscosity of 2.84 ± 0.03 and molecular weight of $1.8617 \times 10^9 \pm 3.0659 \times 10^8$. The results indicated that all HRS gels showed a comparable drug release in 24 h at about 50% of drug content. Nevertheless, the drug permeation propensity of CL1 and CL2 were higher when compared to mucilage free-solution and CL1.5. This was possibly due to the mucosal adhesive and skin permeation enhancing effect of HRS mucilage that were supported by the larger particle size and amorphous formation in comparison to CL1.5 and control group.

Conclusion: The outcome suggested that HRS mucilage is potentially useful as a drug penetration enhancer for transdermal drug delivery system.

Keywords: *Hibiscus rosa sinensis; mucilage; penetration enhancer; drug permeation; transdermal drug delivery system*

THE EFFECT OF GOAT MILK CONSUMPTION ON BLOOD CALCIUM AND HEMOGLOBIN IN SOCCER PLAYERS

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Introduction: Calcium is the main mineral that is required to support the performance of the football players. In addition to calcium, iron is also the micro-minerals needed to improve the physical components of a soccer player. This study aims to analyze the effect of goat milk on calcium and blood hemoglobin levels in junior soccer players.

Material and Methods: This study was an experimental study with a pretest-posttest design. Research subjects were 21 soccer players, male, aged 12-17 years. The treatment was 250 mg fresh goat milk, given 3x/week (every Tuesdays, Thursdays, and Sundays), given every afternoon (between 18.00 pm-18.30 pm) after playing football for 90-120 minutes and given for 21 days. Examination of blood calcium levels was conducted using O-cresolphthalein complexone. Examination of hemoglobin levels was performed using the method of calorimetry. Data were analyzed using an independent sample t-test ($p<0.05$).

Results: The results showed that the average calcium level increased from 9.43 mg/dL to 9.50 mg/dL; ($p>0.05$) and the mean blood hemoglobin level increased from 14.25 g/dl to 14.55 g/dl ($p>0.05$) after consuming goat's milk.

Conclusions: Consumption of goat milk does not significantly increase blood calcium and hemoglobin levels in soccer players. It may be necessary to consume goat milk regularly and for the long term so that goat milk can act as one of the nutrients that can improve performance for athletes.

Keywords: *Goat milk; calcium; hemoglobin; soccer*

DETERMINATION OF THE SUCCESS OF TRADITIONAL TOXICOLOGY PRACTICE

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Traditional medicine is an inexpensive, safe and culturally accepted medical system. The World Health Organization has suggested to practice traditional medicine. Currently Siddha, Ayurveda, Unani and Deshiya sikitsai are practicing and existing in Srilanka. *Nanjiyal* (Toxicology) in Siddha system were consists of plant, metal and mineral toxins and animal's venoms. Traditional practitioners rarely practicing the Siddha toxicology in northern and eastern part of Srilanka. Dr.Mrs.K. Thavamanidevi is a traditional practitioner, 4th generation Reg 7111, practicing *visakadi vaithiyam (V.V)*. Focus is to assess the favorable result through traditional toxicology practice. Data were collected from the practitioner orally and from the records which were maintained by her. Akathiyar kulambu , Neelakandan maaththirai and Thaalangai ennai are using in *V.V* by the practitioner. Out of 145 patients of both sex 13.1% of male and 17.24% of female were highly affected by scopion bite and 1.37% of male and 0.68% female were lessley affected by the Snake bite. Taste of the plants using in animal venom as follows, 57% of bitter and 19% of astringent . Actions of plants as follows 13.04% of antidode action and 10.1% of antiseptic action. According to the results of the study favorable results can obtain from traditional toxicology treatment methods.

Keywords: *Nanjiyal; akathiyarkulambu; neelakandamathirai*

THE BINDING MODE OF XANTHOANGELOL, 4-HYDROXYDERRICIN, AND CYNAROSIDE WITH DIPEPTIDYL PEPTIDASE-IV (DPP-IV)

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Introduction: *Angelica keiskei* (Apiaceae) has recently been cultured in Mount Rinjani, Indonesia. This plant is commonly used to reduce blood sugar and its molecular mechanism has not been explored. Our previous work has successfully isolated xanthoangelol, 4-hydroxyderricin, and cynaroside. Dipeptidylpeptidase-IV (DPP-IV) is a serine exopeptidase that cleaves Xaa-Pro dipeptides from the N-terminus of oligo- and polypeptides. It appears that DPP-IV is associated with glycolipid- and cholesterol-rich membrane microdomains.

Objective: To study the molecular binding mode of xanthoangelol, 4-hydroxyderricin, and cynaroside with DPP-IV.

Material and Methods: Molecular docking simulation of xanthoangelol, 4-hydroxyderricin, and cynaroside was performed using the protein crystal structure of DPP-IV complexed with sitagliptin (PDB code:1X70) and studying its ligand-protein interaction. Sitagliptin, a known DPP-IV inhibitor, was used as the standard.

Results: Sitagliptin shows hydrophilic interaction with Glu205 and Glu206, and hydrophobics interaction with Phe357 and Tyr662, amino acid residues in the enzyme's binding pocket (docking score -9.24 kcal/mol; inhibition constant 0.172μM). The docking reveals that xanthoangelol (docking score -8.34 kcal/mol; inhibition constant 0.873μM) interacts with Glu205, and Phe357, and cynaroside (docking score -7.64 kcal/mol; inhibition constant 2.60μM) interact with Tyr662 and Phe357, whilst 4-hydroxyderricin (docking score -7.42 kcal/mol; inhibition constant 3.99μM) interacts with Glu206, and Phe357.

Conclusion: Xanthoangelol, 4-hydroxyderricin, and cynaroside, phytoconstituents in *A. keskei*, shows similar interaction to that of sitagliptin, a known DPP-IV inhibitor, therefore these compounds might be potential in inhibiting DPP-IV. Of those, xanthoangelol is the best in the docking score and inhibition constant. Its docking score, which refer to affinity, is almost equal to sitagliptin.

Keywords: *Dipeptidylpeptidase-IV inhibitor; 4-hydroxyderricin; xanthoangelol; cymaroside; molecular docking*

PHARMACOKINETIC PROFILE OF EQUOL IN COMBINATION OF 70% ETHANOLIC EXTRACT BAWANG DAYAK BULBS (*Eleutherine bulbosa* (Mill.) Urb.) AND COWPEA (*Vigna unguiculata* (L.) Walp.) AND THE EFFECT ON HYPOESTROGEN RATS

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Introduction: Pharmacologic treatment for postmenopausal syndrome (hot flashes, vagina dryness, painful and uncomfortable sex) such as hormone replacement therapy (HRT) can increasethe risk of endometrial cancer due to non-specific action to estrogen receptors (ER). Selective Estrogen Receptor Modulators (SERMs) are more likely to have less side effects compared to HRT, but their effectiveness in resolving all the symptoms of menopause is still not ideal. This research combined ethanol extract of 70% Eleutherina bulbosa (EEB) and Vigna unguiculata (EVU) to obtain an ideal SERM effect as both are known to have activity in ER primarily on uterine morphology, vaginal histopathology, and hot flushes. The second one is to see the pharmacokinetic interaction that can affect the level of equol from EVU which has a role in reducing hot flashes.

Material and methods: A total of 32 Sprague-Dawley rats were used and divided into 8 groups. All rats were ovariectomized (OVX) except the sham group. Sham and negative group: CMC 0.5%, positive group: raloxifene 1.08 mg/200 g BW, EVU: 100 mg/200g BW, combination group D1-D4: dose of EVU was 100 mg/200 g BW and EBB was 36 mg, 18 mg, 9 mg, 4.5 mg/200 g BW. Observation of hot flashes was performed at week 0, 1, 4 while uterine weight and vaginal epithelium morphology were recorded and observed at the end of the treatment.

Results: A combination group could decrease hot flashes and increased vaginal epithelial thickness without increasing the uterine weight compared to EVU group.

Conclusion: The combination was better than EVU alone in reducing the postmenopausal syndrome in hypoestrogen rats.

Keywords: *Eleutherina bulbosa; vigna unguiculata; equol; hot flashes; vaginal epithelium*

IN-VITRO ANTIOXIDANT AND CYTOTOXIC PROPERTIES OF EMBELIN NANOPARTICLES

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Introduction: Embelin is a major constituent of *Embelia ribes*, has a wide range of pharmacological effects including antioxidant and anticancer. However, the potential of Embelin as a chemotherapeutic agent is limited due to its hydrophobicity. In the recent years, nanoscience and nanotechnology research was developed extraordinarily in the diagnosis and treatment of disease. Earlier studies reported that the silver nanoparticles of phytocompounds showed better therapeutic activity due to the synergistic effect and also increase the water solubility. Hence in the present study we are interested to formulate and develop a nanoformulation of Embelin silver nanoparticles and evaluate its antioxidant and cytotoxic properties.

Material and Methods: The Embelin silver nanoparticles was prepared using silver nitrate solution and characterized by FT-IR, SEM and Zeta potential measurement. *In-vitro* antioxidant and cytotoxic studies were conducted for Embelin and its synthesized nanoparticles using DPPH and MTT assay method, respectively.

Results: The synthesized Embelin silver nanoparticles was hydrophilic nature with particle size ranges from 19.06-22.64 nm. In the DPPH method Embelin nanoparticles showed 83.69 ± 5.03% of inhibition at 500 µg/ml and the activity was well comparable with Embelin. In MTT assay, Embelin nanoparticles at 10 and 25 µg/ml exhibited significant reduction in cancerous cell growth when compared to Embelin.

Conclusion: This findings indicating that the Embelin nanoparticles was an efficient nanocarrrier for delivering Embelin to cancer cells. In future, Embelin nanoparticles will be further tested in *in-vivo* models to confirm its safety and efficacy.

Keywords: *Embelin; silver nanoparticles; antioxidant; cytotoxicity*

ADHERENCE TO TYROSINE KINASE INHIBITORS AND MOLECULAR RESPONSE AMONG ADULT CHRONIC MYELOID LEUKEMIA PATIENTS DIAGNOSED AT CHRONIC OR ACCELERATED PHASE IN A REGIONAL REFERRAL HOSPITAL IN PERAK

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Introduction: The use of tyrosine kinase inhibitors (TKIs) in managing chronic myeloid leukemia (CML) improved patients' survival. However, lack of patient's adherence may compromise response rates.

Objectives: To evaluate the adherence to TKIs, major molecular response (MMR) and factors associated with both adherence and MMR.

Methods: Cross sectional study using retrospective data of all adult CML patients diagnosed after Jan 2011 and who had been on imatinib or nilotinib for ≥ 12 months in a regional referral hospital in Perak. Patient's adherence from initiation of therapy until achievement of MMR was determined using medication possession rate (MPR) from pharmacy dispensing record.

Results: A total of 151 patients were screened and 71 patients were included. There were 39.4% of patients who achieved MMR with the Bcr-abl ≤ 0.1% at 12th months of treatment. The mean MPR with imatinib and nilotinib were 0.94 (±0.14) and 0.96 (±0.10) respectively. Patients were more compliant with nilotinib, 85.2% of them had the MPR >0.9 as compared to imatinib (74.3%). Nausea and vomiting (OR 0.245; 95% CI 0.073, 0.827; p=0.023) and CML phase at diagnosis (OR 0.196; 95% CI 0.036, 1.061; p=0.059) were found to be associated with patients' adherence. There were no association found between patients' adherence and molecular response (OR 1.031; 95% CI 0.345, 3.085; p=0.956).

Conclusions: Our patient showed a satisfactory level of response and optimal adherence rate. Nevertheless, there were still 25% (imatinib) and 17% (nilotinib) of patients with the MPR ≤0.9. Active intervention should be implemented in order to improve TKIs adherence among CML patients.

Keywords: *CML; adherence; molecular response*

BIOSYNTHESIZED GOLD NANOPARTICLES USING *Lignosus rhinocerotis* AND CHITOSAN AS A HEALING ACCELERATOR FOR DIABETIC WOUND

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Introduction: Management on diabetic wounds by offering correction of biological abnormalities caused by hyperglycaemia and prevention of infection is currently not available. This could be attained by applying an approach that combining inhibition of prostaglandin transporter (PGT) which will promote wound healing using Dicer subtract small interfering RNA (DsiRNA) and gold nanoparticles (AuNPs) with antibacterial properties.

Materials and Methods: AuNPs were produced via green synthesis using different concentrations of cold and hot sclerotium of *Lignosus rhinocerotis* extract (CLRE and HLRE, respectively), a type of mushroom, also known as Tiger Milk Mushroom. Chitosan (CS) was added into the formulation as stabilizer to prevent particle aggregation.

Results: Chitosan stabilized AuNPs (CS-AuNPs) exhibited surface Plasmon resonance (SPR) band at a wavelength of 533 nm as determined by UV-vis spectrometer. Particle size of CS-AuNPs synthesized using CLRE and HLRE formed an average particle size in the range of 202 ± 49 to 273 ± 79nm and 190 ± 31 to 322± 28 nm, respectively. FTIR spectra suggested the involvement of protein and polysaccharides in CLRE and HLRE as reducing biomolecules, reducing gold ions into AuNPs. CS-AuNPs formed were spherical, triangular, pentagonal and irregular in shape. X-Ray Diffraction analysis confirmed that CS-AuNPs synthesized using HLRE had a better crystallinity compared to CLRE. CS-AuNPs synthesized by both types of extracts displayed effective antibacterial activity against Gram-negative bacteria (*Pseudomonas aeruginosa* and *Escherichia coli*) and Gram-positive bacteria (*Staphylococcus aureus*).

Conclusions: The multi-actions of these nanocomposites are expected to be useful as healing promoter for diabetic wound treatment.

Keywords: *Green Synthesis; tiger's milk mushroom; metal nanoparticles; antibacterial agent; diabetes mellitus*

NIGHT SHIFT-WORK AND RISK OF BREAST CANCER: AN ANALYSIS OF PUBLISHED STUDIES

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Introduction: A growing number of studies investigated that night shift-work which involves circadian disruption is probably 'carcinogenic' to humans. Melatonin, a hormone responsible in regulating circadian rhythm reaches its highest level at night and controls by the exposure of light through retina. Melatonin is normally produced in dim light, therefore the disturbance to the production of melatonin in night shift-work workers reduce its level. While melatonin inhibits breast cancer through cytostatic and cytotoxic effects, its reduction may increase the risk to get breast cancer.

Method: This review was conducted to summarize the evidences of night shift-work and its correlation to the risk of breast cancer among women. Selected articles discussing night shift-work and breast cancer were reviewed and summarized. These articles were retrieved from searches of computerized databases and search engines using keywords "*Night shift work*", "*Female*", and "*Breast cancer*". Articles included were published within the year 2010 to 2018, written in English and must cover specifically only breast cancer.

Results: A number of 15 studies (N=15) were selected for discussion. Analyses found that there are differences between the results in Caucasian women and Asian Women. High risk of breast cancer was found in Caucasian women. Most studies suggested that biological mechanism like melatonin hypothesis supported the correlation. The reduction of melatonin is also believed to cause an increase to estrogen level in the body.

Discussion: It is recommended to conduct more studies among Asian women from various occupations for further investigations. Perhaps later some regulations can be imposed to protect women from the risk of getting breast cancer due to night shift-work.

Keywords: *Night shift-work; female; breast cancer*

DEVELOPMENT OF INHALABLE PACLITAXEL AND CURCUMIN FORMULATION FOR LUNG CANCER THERAPY

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Introduction: Chemotherapy is a first-line treatment for advanced stage of lung cancer in which chemotherapeutic drugs are administered intravenously for systemic circulation. Even though the basic principle of chemotherapeutic drug is to inhibit the proliferation of cells growing at an abnormal state, it should not be overlooked that most chemotherapeutic drugs is toxic to neighboring healthy tissues. Owing the route of administration, the delivery of chemotherapeutic drugs is often not target-specific, hence the unavoidable toxic effects.

Material and Methods: Inhalation of chemotherapeutic agents could be an effective approach to deliver sub-optimal concentration of chemotherapeutic drugs at tumor region while significantly reduces the toxicity effects towards healthy local tissues. In this study, inhalable formulations containing paclitaxel (PAX) and curcumin (Cur) has been engineered via milling technique.

Results: These inhalable formulations demonstrated superior aerosol performance as fine particle fractions (FPF) were above 60% while mass median aerodynamic diameter (MMAD) ranged between 2–3 μm. In addition, the efficacies of mono-therapy (PAX or Cur alone) or co-therapy were evaluated with human lung carcinoma (A549), human lung adenocarcinoma (Calu-3) and non-cancerous human bronchial epithelial cells (Beas-2B). It was noted that co-formulation of PAX and Cur demonstrated synergistic killing against A549 cells compared to mono-therapy. In addition, the viability of Beas-2B cells was low when PAX alone was used based on MTS, apoptosis and cell cycle assays. The introduction of Cur significantly improved the viability of Beas-2B cells.

Conclusions: PAX and Cur particles could be delivered via pulmonary administration for lung cancer treatment. The presence of Cur provided protective effects towards healthy cells.

Keywords: *Curcumin; paclitaxel; inhalation; lung cancer*

COMBINATION THERAPY OF SILVER AND CURCUMIN NANOPARTICLES INHIBITS THE FORMATION OF BACTERIAL BIOFILM

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Introduction: Endotracheal tubes, although regarded as life-saving medical devices, are often complicated with hospital-acquired infections. Endotracheal intubations harbor the colonization of bacteria in the lung, which often develop into super-resistant biofilms. Therefore, in this study hydrogel coatings loaded with anti-biofilm agents (silver nanoparticle, AgNPs and curcumin nanoparticles, Cur-NP) have been investigated to inhibit the bacterial biofilm formation on the tubes. AgNP are effective anti-biofilm agent which exert bactericidal effects on bacteria whereas curcumin has displayed natural anti-biofilm properties through the inhibition of bacterial quorum sensing systems.

Material and Methods: Poly (vinyl alcohol)/polyvinylpyrrolidone) (PVA-PVP) hydrogels encapsulating encapsulate AgNPs and CurNPs which mimicked mechanical properties comparable to commercial endotracheal tubes were prepared using physical freeze-thawing technique. Physicochemical characterizations of AgNP/CurNP loaded hydrogels were examined using transmission electron microscopy (TEM) and Fourier transform infrared spectroscopy (FTIR).

Results: TEM revealed that the average diameter of AgNPs and CurNPs was 30 nm and no significant aggregation was observed during the freeze and thawing procedures. FTIR demonstrated that both AgNPs and CurNPs interacted with the hydroxyl groups of PVA-PVP, probably due to the formation of intramolecular hydrogen bonds. The hydrogels containing combination of AgNPs and CurNPs showed excellent bactericidal activities and simultaneously inhibited completely the biofilm formation of *Pseudomonas aeruginosa* and *Staphylococcus aureus*.

Conclusions These hydrogels containing combination of AgNPs and CurNPs shows promising potential to be used as coating for commercial endotracheal tubes.

Keywords: *Pseudomonas aeruginosa; biofilm; lung infection; Staphylococcus aureus*

FORMULATION OF A SIMPLE RECTAL PREPARATION CONTAINING KETOPROFEN AND COMPLIANT WITH BRITISH PHARMACOPOEIA

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Background: Anti-inflammatory preparations available in Malaysia are oral, parenteral, and topical forms. Suppositories are only available for children. The rectal route offers several advantages as rapid onset of pharmacological effect and avoids first-pass hepatic metabolism. Ketoprofen has excellent anti-inflammatory, antipyretic and antinociceptive activities. The aim of the present study was to formulate and characterise a ketoprofen suppository.

Methods: The suppositories were prepared via fusion method. Once formulated, the suppositories were assessed for quality with reference to British Pharmacopoeia standard. The suppositories were formulated with different bases at different ratio, to provide 50mg of ketoprofen fixed dose each.

Results: The melting range was measured for each formulation to ensure that they melted at around 37°C. Once the optimal combination of bases and their respective ratio was determined, the suppositories underwent quality control evaluations, namely organoleptic properties, weight variation, hardness, liquefaction time and range.

Conclusions: The optimal formulation was found to be 0.5:94.5:5 for Gelucire 50/13, cocoa butter, and ketoprofen, respectively. This formulation exhibited a pleasant white, glossy and homogeneous appearance, non-brittle, and melt at body temperature. Furthermore, they were easy to handle as they did not require refrigeration. The preparation fulfilled the requirements specified in the British Pharmacopoeia and Quality Assurance.

Keywords*: Ketoprofen; British Pharmacopoeia; Gelucire 50/13; active pharmaceutical ingredient*

IN-VITRO ANTIOXIDANT, ANTIMICROBIAL POTENTIAL AND GC-MS ANALYSIS OF *Epiphyllum oxypetalum*

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Introduction: *Epiphyllum oxypetalum* is traditionally being used widely to cure bloody phlegm and cough, uterine bleeding and shortness of breath. In the present study, the antioxidant and antimicrobial activities of methanolic extract of *E. oxypetalum* leaves were evaluated along with GC-MS analysis to find the active constituents responsible for these activities.

Material and Methods: Methanolic extract of *E. oxypetalum* leaves was prepared by maceration extraction method. The extract was evaluated for *in-vitro* antioxidant activity using DPPH method. The methanolic extract was also evaluated for antimicrobial activity against *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Klebsiella pneumoniae*, *Escherichia coli* and *Candida albicans* using disc diffusion method. Gas Chromatography Mass Spectrometry (GC-MS) analysis was also performed to identify the phytoconstituents present in the methanolic extract of *E. oxypetalum* leaves.

Results: The methanolic leaves extract of *E. oxypetalum* showed potent DPPH inhibition activity at high concentration. In the antimicrobial study, the extract produced zone of inhibition ranges from 1.5 - 3.6 mm in the tested microorganisms. Furthermore, GC-MS revealed the presence of major phytoconstituents for instance n-hexadecanoic acid, lup-20(29)-en-3-one, dodecanoic acid, hexanoic acid and phenol,2,6-dimethoxy.

Conclusion: This study provides scientific evidence that methanol extract possess potent antioxidant and antimicrobial activity. Additional studies are needed for purification, characterization and elucidation of bioactive compounds. Its antioxidant and antimicrobial properties need to be confirmed by *in vivo* study.

Keywords: *Epiphyllum oxypetalum; antioxidant; antimicrobial; GC-MS analysis*

ISOLATION AND CHARACTERIZATION OF *Nephelium lappaceum* L. SEED STARCH AS PHARMACEUTICAL EXCIPIENT

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Introduction: *Nephelium lappaceum* L. (Family-Sapindaceae), populary known as 'Rambutan', is an evergreen tree, native to Malaysia but grown in other parts of the world. The seeds of rambutan are believed to contain starch. The seeds of rambutan are discarded during the fruit processing or consumption and can be used as an alternative source of starch. In recent years, the search for starch from new sources has evoked tremendous interest due to its diverse industrial use in the manufacture food products, textiles, paper, adhesives, and pharmaceuticals. In pharmaceutical and cosmetic industries, starch is used as binder, disintegrant, demulcent, mild astringent, adsorbent, diluent and in dusting powders, thickener in oral liquids, protective colloid in suspensions and gelling agent in gels. It is also used for starching and sizing of fabrics, as indicator in iodiometric analysis and as an antidote in iodine poisoning.

Material and Methods: Isolation of starch from the seeds of *N. lappaceum* was performed using standard recommended method. Proximate analysis such as ash values and moisture content of the isolated starch was determined as per recommended pharmacopoeial procedures. The analysis for protein content, crude fat content, amylose content and crude fibre content were also performed.

Results: The results of the proximate analysis, analysis for protein content, crude fat content, amylose content and crude fibre content of the isolated starch from *N. lappaceum* seeds were found to be satisfactory to meet the requirements for pharmaceutical starches.

Conclusions: The outcomes of the study suggested that the isolated *N. lappaceum* seed starch may be used as a pharmaceutical excipient in drug delivery system.

Keywords: *Starch; Nephelium lappaceum L; isolation; rambutan; pharmaceutical excipients*

GENERIC MEDICINE PURCHASE BEHAVIOUR AMONG MALAYSIAN CONSUMERS

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Introduction: Generic medicines are drugs produced by non-patent holding manufacturers when the original patent of a drug is due. The World Health Organization (WHO) defines generic medication as 'a pharmaceutical product which is intended to be interchangeable with an innovator product that is manufactured without a license from the innovator company and marketed after the expiry date of the patent or other exclusive rights'. There has been mixed reaction among consumers when it comes to the purchase and consumption of generic medicine. This study aims to study drivers that affect consumers' purchase of generic medicines among Malaysians.

Material and Methods: A questionnaire was designed with 35 questions and respondents who are pharmaceutical product users were interviewed face to face to collect data. Purposive Sampling technique was used to select participants and SPSS software used to analyse the research statistical data.

Results: Three independent variables were found to have significant impact towards the purchase of generic medicines. Consumers' perception of quality being the strongest predictor (β= 0.391, t= 5.923) followed by perceived price (β= 0.36, t=5.597) and product knowledge (β= 0.22, t=3.465). There was no relationship between country of origin impact to purchase although this was often debated.

Conclusions: Consumers' perception of quality was the most important factor when it comes to the purchase of generic medicines followed by price and product knowledge. Relevant stakeholders i.e. government and pharmaceutical industry have a role to play in educating the consumers on these pertinent factors that affects the consumption behavior of generic medicines in Malaysia.

Keywords: *Generic medicine; country of origin; product quality; product knowledge*

A PRELIMINARY STUDY TO ASSESS KNOWLEDGE OF COMMUNITY PHARMACISTS REGARDING DRUG-RELATED PROBLEMS IN ELDERLY CARE

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Introduction: Drug-related problems (DRPs) encompass various circumstances involving pharmacotherapy that may interfere with optimal therapeutic outcomes among patients. These issues are much prevalent among elderly patients who are the leading consumers of medicinal products. Community pharmacists equipped with competent knowledge and skills to recognise DRPs of such nature can help to prevent and resolve most of the unwanted sequelae.

Methods: A cross-sectional survey using self-administered questionnaires was conducted among 239 community pharmacists in Klang Valley between August and October of 2017. The survey instrument comprised of four clinical cases adapted from a clinical knowledge measurement tool developed by Williams et al (2012). These cases mimicked common scenarios of medication use among elderly in community pharmacy practice. This study aimed to assess the participants' knowledge in identifying DRPs and the associated interventions in their routine practice.

Results: A total of 160 community pharmacists responded to the survey (response rate = 67%) with 5 respondents excluded due to incomplete responses. Approximately 60% of the participants worked in independent pharmacies while the rest practiced in chain pharmacies. An overall mean score of 44.4% ±14.6 measured on the knowledge scale was reported, with two thirds of the respondents attained scores between 35% to 65%. Comparatively, a good performance on information gathering skills was documented (mean score = 71.8% ±24.1). On the other hand, knowledge to identify DRPs (mean score = 39.9% ±13.1) and recommend appropriate interventions (mean score = 31.4% ±24.5) were mediocre.

Conclusions: The need to improve clinical knowledge and skills among community pharmacists should be further explored in order to optimise their role as pharmaceutical care providers.

Keywords: *Community pharmacists; drug-related problems; elderly care*

PHYTOCHEMICAL SCREENING, TOTAL PHENOLIC AND FLAVONOID CONTENT AND ANTIBACTERIAL ACTIVITY OF METHANOLIC EXTRACT OF *Murraya koenigii* LEAVES

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Background: *Murraya koenigii*, locally known as curry leaf is a highly valued plant for its medicinal properties and characteristic aroma. It is used traditionally to treat various types of ailments including diarrhoea and vomiting. However, the scientific studies of this plant is still lacking. Thus, this study was conducted to investigate the phytochemical constituents, quantification of phenolic and flavonoid contents and antibacterial activities of methanolic extract of *Murraya koenigii* leaves.

Materials and Methods: Preliminary phytochemical screening of methanolic extract of *Murraya koenigii* leaves was performed for alkaloids, flavonoids, tannins and saponins according to the standard procedures. Total phenolic content (TPC) and total flavonoid content (TFC) were determined by Follin-Ciocalteu and aluminium chloride colorimetric method respectively. Antibacterial activities were tested against *Staphylococcus aureus* (ATCC 25923) and *Staphylococcus epidermidis* (ATCC 12228) using disc diffusion method.

Results: Phytochemical analysis of methanolic extract of *M. koenigii* leaves showed the presence of alkaloids, flavonoids and tannins. TPC and TFC was found to be 3.1928 mg GAE/g and 3.6948 mg GAE/g respectively. The extract exhibited significant antibacterial activity against *Staphylococcus aureus* and *Staphylococcus epidermidis* with inhibition zone ranged from (11.7 ± 2.4 mm) to (19.3 ± 3.3 mm).

Conclusion: This study demonstrated that *M. koenigii* leaves contain a significant content of phenolic and flavonoid, which have supportive action of antibacterial activity. Thus, *M. koenigii* leaves could be effective for prevention of bacterial infections and may be considered as an alternative to antibiotic regimens.

Keywords: *Murraya koenigii; phytochemistry; antibacterial; Staphylococcus aureus; Staphylococcus epidermidis*

SILVER (I) - AND PALLADIUM (II)-*N*-HETEROCYCLIC CARBENE COMPLEXES: SYNTHESIS, STRUCTURES AND *IN VITRO* ANTICANCER STUDIES

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N-Heterocyclic carbenes (NHCs) complexes have received a great deal of attention and at present as new broad-spectrum antimicrobial and anticancer agents, which encourage the biological activity against numerous pathogens and human cancer cell lines. The metal-NHC complexes provide a range of versatile structural diversifications for the targeted biological applications with promising acceptable results. The aims of this study here was to develop new metal-NHC complexes and investigate the cytotoxic effect against cancer cell line. The newly designed Ag(I)-NHC and Pd(II)-NHC complexes bearing symmetrically and unsymmetrically nitrile functionalized have been synthesized, starting from the corresponding mono-benzimidazolium bromide salts. The resulting benzimidazolium salts (**1** and **2**) were subsequently deprotonated with the basic metal source Ag_2O by *in situ* deprotonation method to obtain a mononuclear Ag(I)-NHC complexes (**3** and **4**). The mononuclear Pd(II)-NHC complexes (**5** and **6**) were prepared *via* transmetalation from their respective mononuclear Ag(I)-NHC complexes, respectively. All compounds were characterized by physic-chemical and spectroscopy techniques (FT-IR, ^{1}H- and ^{13}C-NMR). Single crystal structural studies of mononuclear Ag(I)-NHC complex revealed that the Ag(I) ion exhibits a linear geometry of quasi-parallel pairs of aromatic benzimidazole planes. The synthesized compounds were then screened for potential cytotoxicity on breast cancer cell line (MCF-7), using MTT assay. All the Ag(I)-NHC complexes show better activity with IC_{50} values ranging from 3.7±0.4 – 4.1±0.5 µM, while Pd(II)-NHC complexes show the IC_{50} values ranging from 13.9±1.6 – 14.2±1.9 µM in comparison with the standard drug, Tamoxifen (IC_{50} = 11.2±1.8 µM). All the respective benzimidazolium salts, however were found to be inactive. The anticancer activity is corresponding to the increasing lipophilicity order of the complexes as 5 < 6 < 3 < 4 (0.49, 0.56, 1.25 and 1.27, respectively). Conclusively, the study showed that the Ag(I)-NHC complexes are more active than the Pd(II)-NHC complexes, and the lipophilicity assay indicates that the activity of the complexes correlates well with the lipophilicity of the complexes.

***Keywords*:** *Benzimidazolium salts; N-Heterocyclic carbenes; Ag(I)-NHC; Pd(II)-NHC; anticancer studies.*

KNOWLEDGE, ATTITUDE AND PERCEPTION (KAP) OF DRUG ABUSE AMONG PHARMACY UNDERGRADUATE STUDENTS IN MAHSA UNIVERSITY

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According to United Nations Office on Drugs and Crime (UNODC), every year there are about 190000 persons die because of illegal substances usage. In Malaysia, drug abuse issue has been rampant for many years. Lately, the illicit drug used has upsurge substantially among the youngsters. The aim of this study was to evaluate the knowledge, attitude and perception (KAP) of pharmacy undergraduate students (diploma and degree) in MAHSA University of drug addiction. Ethical clearance was obtained from the Research Management Centre, Mahsa University (RMC/EC21/2018). A cross-sectional study was carried out involving 200 pharmacy students in MAHSA University. The pharmacy undergraduate students were given a self-administered questionnaires regarding the knowledge, attitude and perception of drug addiction. The questionnaires was adapted and modified from a research study conducted by Bryan *et al.* (2000) in Ireland to fit in the Malaysian scenario. The survey study was conducted from January to March 2018. The data were collected and analyzed using the Statistical Package for Social Science (SPSS) ® version 22. Respondents were given full cooperation in this study. There was no missing data obtained in this research study. Result showed that the MAHSA's pharmacy undergraduates appeared to have a good general awareness on the illegal drugs. About 95.0% and above of the respondents reported that they had heard of cocaine and heroin, while 80.0% and above had heard of amphetamines, ecstasy and cannabis. About 50.0% of the respondents had heard of lysergic acid diethylamide (LSD). Overall, this study reported that the knowledge and perception level of pharmacy undergraduate students (diploma and degree) in MAHSA University to drug addicts were moderate. In addition, the pharmacy students demonstrated poor attitude level towards drug addicts. The outputs of the study will hopefully have encouraged the government to proactively make a comprehensive approach in fighting the drug related issues among young adults in Malaysia.

Keywords: *Drug addiction; knowledge; attitude; perception; pharmacy undergraduate students; Malaysia*

HEARING IMPAIRMENT FROM EXPOSURE TO AIRCRAFT NOISE AND ITS EFFECT ON BLOOD PRESSURE

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Background: This study was carried out at Kuala Lumpur International Airport which is the largest airport in Malaysia. The objectives of this study were (1) to examine the prevalence of hearing impairment and hypertension among noise exposed airport workers and (2) to explore the relationship between hearing impairment and hypertension.

Methods: A cross sectional study on airport workers randomly chosen among those attending hearing conservation programme was conducted. A total number of 248 samples were recruited. Sitting blood pressure measurement, external ear examination and pure tone air conductance audiometry were conducted. Questionnaires on personal and work exposure history was obtained prior to intervention.

Results: The prevalence of hypertension and hearing impairment was 32.66 and 11.30 respectively. There was a significant association between hearing impairment with age, exposure duration and smoking but not with gender. Comparison of mean diastolic blood pressure (DBP) using independent t-test without controlling for other covariates, showed that it was significantly higher in hearing impaired subjects as compared to normal subjects (94.74 versus 82.18). But after controlling for potential confounders such as age, exposure duration, gender and smoking (using ANCOVA analysis) the outcome was still significantly different where the adjusted DBP mean was 85.98 versus 83.10, P= 0.023

Conclusion: Risk factors for hearing impairment identified in this study were not different from other studies. The association between hearing impairment and hypertension was also established. Clinicians need to consider excessive exposure to noise when evaluating hypertensive patients and further investigation is needed to explain the plausible biological mechanisms behind the phenomenon.

Keywords: *Noise exposure; hearing impairment; hypertension*

RADIATION AWARENESS AMONG SECONDARY SCHOOL STUDENTS IN PERAK, MALAYSIA

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Introduction: Currently, the number of student enrolment for Radiography programme in Universiti Kuala Lumpur Royal College of Medicine Perak is the lowest compared to other programmes. Hence, this study was conducted to determine students' tendency to further their study in radiography or related programme and determine the radiation awareness among the secondary school students.

Materials and Methods: A survey was conducted on 429 secondary school students under national standard curriculum. Convenient sampling was used as method of data collection. 75.5% of the data were collected from seven government secondary schools in Perak, while the remaining were collected from visitors of our institution.

Result: The result showed the average score of basic knowledge regarding radiation with mean score of 59.53% and standard deviation of 18.89%. Meanwhile, printed reading materials were the highest type of information source and video game was the lowest with 25.9% and 0.2% respectively. 46.2% claimed that they are fear to radiation and all of them agreed that the radiation disaster incidences was the main reason. 92.3% claimed that they will seek for their parents' opinion and 17.5% claimed to follow their parents' choice with regard to the choice of future career while 50.8% claimed that they may continue their higher education in radiography or related programme. Result also showed that fear of radiation affects the students' tendency to choose radiography or related programme as their choice [$p<0.05$]. All data were tabulated and analysed by using IBM SPSS Statistic version 23. Meanwhile, descriptive and inferential statistical tests were used for data analysis.

Conclusion: It can be concluded that the radiation awareness among secondary school students in this study was average and the tendency to further study in radiography or related programme is quite low mainly due to their fear to radiation disaster incidence.

Keywords*: Radiation Awareness; student's awareness; radiation fear; radiation perception*

COMPARISON OF PATIENT COMFORT BETWEEN ISO-OSMOLAR AND LOW-OSMOLAR CONTRAST MEDIA IN CONTRAST-ENHANCED COMPUTED TOMOGRAPHY OF ABDOMEN

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Introduction: Contrast-enhanced computed tomography (CECT) can cause patient discomfort due to contrast media injection. Previous clinical studies have shown that iso-osmolar contrast media (IOCM) iodixanol causes less patient discomfort than low-osmolar contrast media (LOCM) iopamidol when administered intravenously using power injector in CT Abdomen.

Material and Methods: This was a prospective, randomized, double-blind, study of IOCM iodixanol 320 mg I/mL or LOCM iohexol 300 mg I/mL on patient discomfort. The presence of discomfort (heat, pain, coldness) and intensity was verbally rated by patients on a 0-10 scale and converted into three categories (0, none; 1-5, moderate; 6-10, severe). Patients participated must at least 18 years old female or male. The selection of patients for a CECT scan of the abdomen was based on uniformity of volume and injection rate. Patients were randomly allocated in a 1:1 ratio to one of the two contrast groups. Randomization was performed locally. Image quality was evaluated by qualified CT radiographers as secondary outcome.

Results: 50 patients enrolled at one hospital, 25 received IOCM and 25 received LOCM. Patients received IOCM experienced significantly less moderate/severe discomfort with heat sensation is the main contributor. Respondent n (22) or 88% claimed no heat sensation using IOCM while n (25) or 100% claimed otherwise using LOCM. IOCM vs LOCM, moderate heat discomfort (n(3) or 12% vs. n(24) or 96%; sig=.000,$P<0.05$), and (n(0) vs n(1) or 4%) with severe discomfort. Pain discomfort (n(8) or 32% vs n(11) or 44% ; sig=0.392, $p<0.05$). Cold discomfort (n(4) or 16% vs n(12) or 48%; sig=0.015, $p<0.05$). Image quality maintain with optimal diagnostic value without image blurring due to discomfort.

Conclusion: Patients receiving IOCM iodixanol had significantly lower moderate-to-severe or severe discomfort than patients receiving LOCM iohexol, with heat being the major contributor. Patient discomforts due to contrast injection did not causing blurring of image. These data support that CM osmolality may be a key determinant of patient discomfort.

Keywords: *CT Abdomen; contrast media; intravenous; iso-osmolar (iodixanol); low-osmolar (iohexol); patient discomfort.*

BMT DIGITAL LEARNING RESOURCE IN BLENDED LEARNING ENVIRONMENT FOR BASIC MOVEMENT THERAPY COURSE: A MIXED-METHOD APPROACH

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Introduction: The evolution of technologies and the development of new media designed for educational purposes are expanding. This study aimed to evaluate BMT Digital Learning for undergraduate physiotherapy students in blended learning approach. Based on instructors' and students' perceptions towards learning content design along with multimedia design guidelines, BMT Digital Learning has been designed and developed carefully aiming at improving students' skill performance in basic movement therapy.

Material and Methods: This study employed mixed method approach to gather data from semi-structured interviews as design guideline for BMT Digital Learning application. A quantitative method using quasi-experimental design was used to evaluate students' score performance while descriptive statistic was used to evaluate learning content design. A differences between post-test and pre-test scores were analysed using t-test statistical analysis. A total of 103 students from Universiti Kuala Lumpur Royal College of Medicine Perak (UniKL RCMP) were divided into two groups. The Control group received standard teaching sessions (N=51) while the Treatment group received the same standard sessions but additionally used BMT Digital Learning Resource application (N=52). Written test on basic movement therapy was done by students before and after the intervention.

Results: The treatment group showed a significantly higher score performance as compared to the Control group. There was a significant difference in the scores for blended learning intervention (M=9.09, SD=0.77) and face-to-face method only (M=8.70, SD=0.91) condition; t (101) = -2.33, p = 0.022. Whereas, the learning content design used in the BMT Digital Learning showed that response towards the used of text in bulleted point and graphics has the highest mean score of 2.83.

Conclusion: The results strongly suggested that the use of BMT Digital Learning Resource application is suitable for practical procedure purposes.

Keywords*: Blended learning; physiotherapy; educational technology; mixed method; multimedia design*

POSTER PRESENTATIONS

LIST OF POSTER PRESENTERS

No	Name & Address	Country	Topic
	PHARMACY		
PP 1	Anh-Thu Thi Le Faculty of Pharmacy, University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam.	Vietnam	Synthesis and Anti-Pancreatic Lipase Activities of Some Heterocyclic Chalcone Derivatives
PP 2	Muhammad Syamin As Suhaimi Mortaza Faculty of Pharmacy and Health Sciences, Universiti Kuala Lumpur Royal College of Medicine Perak, Ipoh, Perak, Malaysia.	Malaysia	Synthesis and Characterisation of Paracetamol Nanoparticle
PP 3	Nurul Hilwah Hayatie Othman Faculty of Pharmacy and Health Sciences, Universiti Kuala Lumpur Royal College of Medicine Perak, Ipoh, Perak, Malaysia.	Malaysia	*Prunus amygdalus var. dulcis* (Almond) as Sleep Aid: A Pilot Study in Individuals with Sleep Problem-Related Symptoms
PP 4	Siti Syakirah Yussof Faculty of Pharmacy and Health Sciences, Universiti Kuala Lumpur Royal College of Medicine Perak, Ipoh, Perak, Malaysia.	Malaysia	Antibacterial and Antifungal Activity of *Allium Fistulosum* Extracts from Different Types of Solvent
PP 5	Farah Hanani Aripin Faculty of Pharmacy and Health Sciences, Universiti Kuala Lumpur Royal College of Medicine, Perak, Malaysia.	Malaysia	Antibacterial and Anticancer, Effect of Biologically Sythesized Zinc Oxide Nanoparticles Against MCF-7 Breast Cancer Cells
PP 6	Yagnesh Naga Satya Faculty of Pharmaceutics, GITAM Institute of Pharmacy, GITAM (Deemed to be University), Rushikonda, Visakhapatnam, Andhra Pradesh, India.	India	Design, Optimisation and Evaluation of Aceclofenac Fast Dissolving Tablets Employing Starch Malonate - A New Superdisintegrant
PP 7	Humaira Hamdi Mohd Najib Hamdi Faculty of Pharmacy and Health Sciences, Universiti Kuala Lumpur Royal College of Medicine Perak, Ipoh, Perak, Malaysia.	Malaysia	Knowledge of Antibiotics And Awareness of Antibiotic Resistance Among the Public of Selected Areas in Kedah
PP 8	Nihayatul Ilyia Jamal Abd Nasi Faculty of Pharmacy and Health Sciences, Universiti Kuala Lumpur Royal College of Medicine Perak, Ipoh, Perak, Malaysia	Malaysia	Knowledge of Childhood Vaccination and Awareness of Impacts of Non-Vaccination Among Residents in Tangkak, Johor
PP 9	Dr. Zabidah Ismail Faculty of Pharmacy, Mahsa University, Bandar Saujana Putra, Selangor, Malaysia.	Malaysia	Body Fat Content of Obese Patients in Selangor
PP 10	Norliana Zabidi Faculty of Pharmacy and Health Sciences, Universiti Kuala Lumpur Royal College of Medicine Perak, Ipoh, Perak, Malaysia.	Malaysia	Evaluation of Anti-Inflammatory and Antioxidant Effect in Leaves and Barks of *Tamarindus indica* L.

PP 11	Renita Dewi Faculty of Pharmacy, Universitas Indonesia, Depok, West Java, Indonesia.	Indonesia	Antiosteoporosis Activity Test of 70% Ethanolic Extract Combination of Dayak Onion Bulbs (*Eleutherine bulbosa* (Mill.) Urb) and Cowpea (*Vigna unguiculata* (L.) Walp.) on the Hypoestrogen Rats.
PP 12	Jannatul Naimah Solehah Shafei Faculty of Pharmacy and Health Sciences, Universiti Kuala Lumpur Royal College of Medicine Perak, Ipoh, Perak, Malaysia.	Malaysia	*In Vitro* Evaluation of Antioxidant and Anti Diabetic Effects of *Muntingia calabura*
PP 13	Farah Amandasari Faculty of Pharmacy, Universitas Indonesia, Depok, West Java, Indonesia.	Indonesia	The Effect of 70% Ethanolic Extract of Dayak Onion Bulbs (*Eleutherine bulbosa* (Mill.) Urb.) and Cowpea (*Vigna unguiculata* (L.) Walp.) on Cardiovascular Parameters of Hypoestrogen Model Rats
PP 14	Mohd. Haz Hairul Amran Centre for Drug Delivery Research, Faculty of Pharmacy, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia.	Malaysia	Development of Intravenous 20% W/W Lipid Emulsion from Superolein Palm Oil with Response Surface Methodology and its Physical Stability
PP 15	Ilisarah Elias Faculty of Pharmacy and Health Sciences, Universiti Kuala Lumpur Royal College of Medicine Perak, Malaysia.	Malaysia	Suboptimal Administration of the Prescribed Parenteral Nutrition In Patients
PP 16	Rara Merinda Puspitasari Faculty of Pharmacy and Health Sciences, Universiti Kuala Lumpur Royal College of Medicine Perak, Malaysia.	Malaysia	Identification of Potentially Inappropriate Medications (PIMS) in Geriatric Patient at Government Hospital in South Jakarta Using STOPP Criteria
PP 17	Nur Syafiqah Shoeb Faculty of Pharmacy and Health Sciences, Universiti Kuala Lumpur Royal College of Medicine Perak, Malaysia.	Malaysia	Study of Antibacterial Property of Silver Nanoparticles Synthesized Using *Bacillus cereus* (ATCC 14579) in Combination with Different Antibiotics
PP 18	Dr. Ravindran Jaganthan Pathology Unit, Preclinical Dept., Faculty of Medicine, Universiti Kuala Lumpur Royal College of Medicine Perak, Ipoh, Perak, Malaysia.	Malaysia	Cytotoxic Effect of Fucoidan Extracted from *Sargassum cinereum* against Caco-2 Cell Line
PP 19	Ezzatul Raihah Pauzzi Faculty of Pharmacy and Health Sciences, Universiti Kuala Lumpur Royal College of Medicine Perak, Ipoh, Perak, Malaysia.	Malaysia	Antibacterial Activity of Malaysian Traditional Vegetables (Ulam) against Enteric Pathogens Using Methanolic Extraction
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PP 21	Dr. Henny Rachdiati Faculty of Pharmacy and Health Sciences, Universiti Kuala Lumpur Royal College of Medicine Perak, Ipoh, Perak, Malaysia.	Malaysia	Formulation, Evaluation and Microbial Stability of Virgin Coconut Oil Based Cream
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SYNTHESIS AND ANTI-PANCREATIC LIPASE ACTIVITIES OF SOME HETEROCYCLIC CHALCONE DERIVATIVES

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Introduction: Obesity is a social burden. The number of people with clinical obesity is on a rise, with 500 million accounts worldwide. However, medication for long-term treatment is still limited. Designing formulas with the aid of a computer is an effective and cost saving solution. In this study, chalcone derivatives were selected for screening, synthesizing and evaluating of activity against pancreatic lipase - a target of anti-obesity drugs.

Materials and methods: We have used molecular docking method to screen substances on potential target using enzymes lipase 1LPB code from protein data bank. Some formulas that have good docking scores were selected to synthesize using Claisen-Schmidt reaction with the help of sonication irradiation. After that, synthesized chalcones and some other formulas available were selected to test anti-lipase inhibitory activity by spectrophotometric method at a wavelength of 405 nm on a 96-well plate.

Results: The formulations were prepared and docked by Sybyl-X 2.0 and LeadIT 2.0.2 software. Chalcone derivatives were synthesized using Claisen-Schmidt reaction with the help of sonication irradiation. All of them were tesed biological activity and found that there are 4 derivatives showing high anti-lipase inhibitory activity with $IC_{50} \leq 20$ µM, 5 derivatives showing moderate activity with 20 µM < IC_{50} < 150 µM and the others 14 having $IC_{50} > 150$ µM. In which, compound V23 has the highest activity with IC_{50} = 2,72 µM.

Conclusions: The study has screened, synthesized and evaluated 23 heterocyclic chalcone derivatives and found that all of them do have lipase inhibitory activity.

Keywords: *Heterocyclic chalcone; anti-lipase; molecular docking*

SYNTHESIS AND CHARACTERISATION OF PARACETAMOL NANOPARTICLE

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Introduction: This research is conducted to formulate new method which can use to deliver paracetamol in more efficient and to evaluate the physicochemical properties of the formulated paracetamol.

Material and Methods: Pure drug sample of Paracetamol was procured from Chemistry Lab, Faculty of Pharmacy and Health Sciences, Universiti Kuala Lumpur Royal College of Medicine Perak. Paracetamol nanoparticles were formulated by using a solvent and anti-solvent precipitation method. The paracetamol is dissolved in ethanol and subsequently added to chill pluronic F-127 aqueous solution and homogenized at 6,000 rpm for 2 min, followed by incubation. The process is repeated by using different concentration of pluronic F-127. Polydispersity index and particle size of the sample was determined by using dyanamic light scatering. Later, the paracetamol is coated with different types of polymer and physical and chemical characterization of the paracetamol nanoparticle is determined by using High Performance Liquid Characterization (HPLC).

Results: Pluronic F-127 concentration was effectively regulated the size of paracetamol nanoparticle. It shows higher concentration of pluronic F-127, resulted in smaller the particle of nanoparticle paracetamol. Moreover, there are significant differences in term of physical and chemical stability, paracetamol release profile and degradation profile when coated with different types of polymer such as polyvinyl alcohol (PVA), polyvinyl pyrolidone (PVP) and dextran.

Conclusion: The conversion of paracetamol into nanoparticle size and coated with polymer can significantly improve the significantly improve the stability, release and prevent degradation of paracetamol. This novel method can help increase the half-life of the paracetamol in body, by avoid the enzymatic degradation of the drug by utilizing polymer as carrier.

***Keywords**: Nanoparticles; nanotechnology; paracetamol; fever*

Prunus amygdalus var. dulcis (ALMOND) AS SLEEP AID: A PILOT STUDY IN INDIVIDUALS WITH SLEEP PROBLEM-RELATED SYMPTOMS

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Introduction: Insomnia is a common type of sleep disorder that are known as the inability to have inadequate sleep. Benzodiazepine (BZD) is a hypnotic types of medication that is commonly used to treat sleep problem-related symptoms particularly insomnia. Long-term used of BZD may result in dependence toward the medication. This study aimed to determine the potential effect of *Prunus amgdalus var. dulcis* in improving sleep in individuals with sleep problem-related symptoms.

Materials and methods: The study consists of thirteen healthy volunteers (female, n=7; male, n=6) recruited by convenient sampling among UniKL RCMP students. Each participants required to download sleep better apps in mobile phone to record the data of participants for 14 consecutive days in tracing sleep-wake pattern and consumed 400mg/kg of almond thirty minutes before sleeps during intervention week. Participants also completed a set of self-report questionnaire and Pittsburgh Sleep Quality Index (PSQI), to assess sleep quality within one month time.

Results: 53.85% of participants has an improvement in total sleep time (TST), 38.46% had an improvement in sleep efficiency (SE) with normal SE and 53.85% of participants has reduced sleep onset latency (SOL) length of time to accomplish transition from full wakefulness to sleep.

Discussion: 30.77% of participants has an improvement in all of their sleep parameter after consuming almond during intervention week including TSL, SE and SOL. The consumption of almond in one-week interval has a potential effect of contributing good sleep in an individual with sleep-related symptoms.

Conclusion: This study concluded that *Prunus amygdalus var. dulcis* (Almond) has the potential effect in improving individual with sleep related-symptoms.

Keywords: *Prunus amygdalus var. dulcis; Pittsburgh sleep quality index; total sleep time; sleep efficiency; sleep onset latency*

ANTIBACTERIAL AND ANTIFUNGAL ACTIVITY OF *Allium fistulosum* EXTRACTS FROM DIFFERENT TYPES OF SOLVENT

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Introduction: *Allium fistulosum*, known as spring onion, is a promising source of the some bioactives such as flavonoids, saponins, and alkaloids that exhibited various biological activities. The study present is to investigate and compare the antibacterial and antifungal activity from different *Allium fistulosum* extracts.

Material and Methods: Phytochemical study was performed to identify the compounds in each extracts which are ethanol 95%, ethyl acetate and n-hexane extract of *Allium fistulosum* against some common causative microorganisms for local infection such as *Pseudomonas aeruginosa, Staphylococcus aureus, Streptococcus pneumonia, Klebsiella pneumonia* and *Candida albicans*. Disc diffusion method was used in the antibacterial and antifungal studies.

Results: Only ethanol extract reported have antibacterial activity against *Streptococcus pneumonia* from this study. The highest concentration (700mg/ml) of ethanol 95% extract showed the widest inhibition zone (d= 8.3mm). Antifungal activity was showed in ethyl acetate and n-hexane extracts. Result revealed that n-hexane extract exhibited the widest inhibition zone (d= 15.5mm) against *Candida albicans* at 500mg/ml of concentration.

Conclusion: *Allium fistulosum* was found to have anti-fungal and also antibacterial properties against *Streptococcus pneumonia*, therefore it needs further investigation.

Keywords: *Allium fistulosum; antifungal; antibacterial; n-hexane; ethyl acetate; ethanol*

ANTIBACTERIAL AND ANTICANCER, EFFECT OF BIOLOGICALLY SYTHESIZED ZINC OXIDE NANOPARTICLES AGAINST MCF-7 BREAST CANCER CELLS

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Introduction: Nanobiotechnology has been emerging as one of the preferred line in medicinal field. Biosynthesis of the zinc oxide nanoparticles (ZnONPs) using *Bacillus cereus* was chosen due to the ability to produce high yield and inexpensive nanoparticles. The aim of this study was to extracellularly synthesize the ZnONPs from *Bacillus cereus* (ATCC 14579) and to evaluate its antibacterial and anticancer effect against MCF-7 breast cancer cells.

Material and Methods: Cell free extract of bacterial culture were added with zinc nitrate solution, the color change indicates the synthesis of ZnONPs. These nanoparticles were characterized by UV-visible spectroscopy, Fourier infra- red spectroscopy (FTIR) and Transmission electron microscopy (TEM). Antibacterial property and synergistic effect of ZnONPs was studied using the disc diffusion test. Anticancer effect was evaluated against breast cancer MCF-7 cell line by MTT assay.

Results: UV–Visible spectroscopy analysis showed absorption peak at 340 nm while FTIR spectroscopy determined that primary amine and amides groups are associated with the nanoparticles. These nanoparticles are spherical and were 50 -70 nm in size by TEM analysis. These ZnONPs exhibited good antibacterial and synergistic property when combined with different antibiotics against *Staphylococcus aureus* (ATCC 2323), *Staphylococcus epidermidis* (ATCC 1222), *Salmonella enterica* (ATCC 3566) and *Escherichia coli* (ATCC 25922). The anticancer effect of ZnONPS showed IC50 value at 80µg/ml against MCF-7 cells on dose dependent manner.

Conclusion: ZnONPs were proved to have an excellent antibacterial and anticancer property.

Key words*: Zinc Oxide nanoparticle; Bacillus cereus; UV-vis Spectroscopy; FTIR Spectroscopy; TEM Analysis; Antibacterial Property.*

DESIGN, OPTIMISATION AND EVALUATION OF ACECLOFENAC FAST DISSOLVING TABLETS EMPLOYING STARCH MALONATE-A NEW SUPERDISINTEGRANT

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The purpose of the present study is to synthesize and evaluate a novel superdisintegrant (starch malonate) in the formulation of fast dissolving tablets of poorly soluble drugs. Starch malonate was synthesized by esterification process. The synthesized starch malonate was subjected to physical and micromeritic evaluation. To establish as starch malonate as a superdisintegrant, fast dissolving tablets of aceclofenac were prepared employing starch malonate in different proportions by direct compression method employing 2^3 factorial design. All fast dissolving tablets prepared were evaluated for drug content, hardness, friability, disintegration time and other dissolution characteristics like PD_5, DE_5 and K_1.The starch malonate prepared was found to be fine, free flowing slightly crystalline powder. Starch malonate exhibited good swelling in water. The swelling index was 50% all micrometric properties indicated good flow and compressibility needed for solid dosage form formulation. All the fast dissolving tablets formulated employing starch malonate were of good quality with regard to drug content, hardness and friability and fulfilled the official (IP/USP) requirements of compressed tablets with regard to the above mentioned physical properties. Starch malonate was found to be a superdisintegrant with enhanced dissolution efficiency of aceclofenac and hence it could be used in the formulation of fast dissolving tablets of poorly soluble drugs to provide immediate release of the drug within 5minutes and to have better bioavailability.

Keywords: *Fast dissolving; superdisintegrant; starch malonate; dissolution efficiency*

KNOWLEDGE OF ANTIBIOTICS AND AWARENESS OF ANTIBIOTIC RESISTANCE AMONG THE PUBLIC OF SELECTED AREAS IN KEDAH

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Introduction: It is known that high rate of antibiotic utilization causes an increasing rate of antibiotic resistance. The issue of antibiotic resistance causes higher medical cost, longer hospital stays and higher mortality risk. The purpose of this study is to investigate the level of knowledge of antibiotic and awareness of antibiotic resistance, determine the demographic characteristics affecting both levels and to investigate the relationship between level of knowledge of antibiotics and awareness regarding antibiotic resistance with practice of antibiotic use.

Materials and Methods: The questionnaire was distributed among the public in Alor Setar, Sungai Petani, Sik and Baling through online (Google Form) and offline (by hand) distribution. Statistical Package of Social Science 16 (SPSS 16) was used to obtain the descriptive statistics and p-value of the data.

Results: From a total of 395 respondents, 77.5% of them had moderate level of knowledge regarding antibiotic. Level of knowledge had a statistically significant association with age, marital status, current employment status and estimated monthly income of respondents ($p<0.05$). On the other hand, 74.4% of respondents had high level of awareness surrounding the issue of antibiotic resistance which had a significant association with the respondents' education level ($p<0.05$). The knowledge and awareness affected some practices of antibiotics use among the respondents ($p<0.05$).

Conclusion: Gaining more knowledge about antibiotic and spreading the awareness of antibiotic resistance among the public is important. However, it is also important that the public be aware that their usage habits can also affect the increasing rate of antibiotic resistance.

Keywords: *Antibiotic; antibiotic resistance; practice of antibiotic use; Kedah; Malaysia*

KNOWLEDGE OF CHILDHOOD VACCINATION AND AWARENESS OF IMPACTS OF NON-VACCINATION AMONG RESIDENTS IN TANGKAK, JOHOR

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Introduction: Childhood vaccination became a big issue in Malaysia in recent years because many people doubt vaccines' benefits and vaccine hesitancy became worse than initially thought. The purpose of this study is to identify socio-demographic factors affecting the knowledge levels on childhood vaccination, to determine the awareness of impacts of non-vaccination and to measure the knowledge levels on childhood vaccination and awareness levels of impacts of non-vaccination among residents in Tangkak, Johor.

Materials and method: Data was collected through offline (printed questionnaires) and online (Google Form) distribution. Statistical Package for Social Science (SPSS) was used to analyse the data and find frequency, p-value and correlation coefficients' value.

Results: Some socio-demographic factors affected knowledge levels of childhood vaccination such as age, education level, family income, marital status and employment status ($p<0.05$). Not all respondents knew about the type of vaccines such as Diphtheria vaccine and Measles vaccine. Besides, the main source of childhood vaccination information was provided by medical staff. About 60% of respondents had enough general information of knowledge of childhood vaccination and awareness of impacts of non-vaccination. There was a positive significant relationship between knowledge levels of childhood vaccination towards awareness levels of impacts of non-vaccination among residents ($p<0.05$) and its correlation coefficient value was 0.453.

Conclusion: There was an association between certain socio-demographic factors towards knowledge levels of childhood vaccination and about 51.9% of respondents were aware of the bad impacts of non-vaccination. Lastly, the relationship between knowledge levels of childhood vaccination towards awareness levels of impacts of non-vaccination among residents is significantly positive.

Keywords: *Vaccination; socio-demographic factors; knowledge; awareness; Tangkak*

BODY FAT CONTENT OF OBESE PATIENTS IN SELANGOR

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As the prevalence of obesity rises internationally in the last few decades, it has turned into a considerable worldwide health issue. We aimed to investigate the body fat content among obese people in Selangor. We also intended to identify the relationship between body fat (BF%) content and body mass index (BMI) among obese persons. Descriptive cross-sectional study was used to conduct the population survey and stratified sampling was used for the sampling method. Ethical clearance was obtained from the Research Management Centre, Mahsa University (RMC/CA09/2017). The cross-sectional study was conducted for about 3 months around Selangor area. A total of 216 obese persons were recruited in this study. The result obtained shows that a total number of 2 (0.9%) obese people had <25% body fat, 52 (24.1%) had 25 to <30% body fat, 34 (15.7%) had 30 to <35% body fat, 58 (26.9%) had 35 to <40% body fat and a majority of 70 obese persons had ≥40% body fat. According to the BMI-cut off classifications of WHO, 178 (82.4%) obese persons were having Class I Obesity, 28 (13.0%) were having Class II Obesity and 10 (4.6%) were having Class III Obesity. This observation is alarming as these young adults. It was observed that there was a strong and positive statistical relationship between BF% and BMI when both were paired without controlling for gender and age ($r=0.465$, $P<0.01$). The results showed that there is a strong positive association between BMI and BF%. At the same time, age and sex are predictors for this worrisome association.

Keywords: *Obesity; body mass index; body fat content*

EVALUATION OF ANTI-INFLAMMATORY AND ANTIOXIDANT EFFECT IN LEAVES AND BARKS OF *Tamarindus indica* L.

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Introduction: *Tamarindus indica* is a plant from family Leguminase that used as folk medicine for treating numerous diseases including inflammation. Several report have suggested that the plant extract and their constituents as possible anti-inflammatory and antioxidant agent.

Material and Methods: The methanolic extract of bark and leaves of *Tamarindus indica* were used to analyze phytochemical and evaluated for different in vitro biological activity. Total polyphenols and flavonoids concentration of the methanolic extracts were evaluated by spectrophotometer using the Folin-ciocalteau's reagent and aluminum chloride methods. The antioxidant activity in 2, 2 diphenyl-1-picrylhydrazyl (DPPH) assay was performed on both of the extracts to assess free radical scavenging. Methanolic extract of barks and leaves also screened for anti-inflammatory activity using denaturation of Bovine Serum Albumin.

Results: Both extract of *Tamarindus indica* yielded nine different phytochemical compound. Total phenolic and total flavonoids content exhibited for barks was significantly higher than leaves. The barks reported a high activity of free radical inhibition with IC_{50} 177.58 µg/mL compared to leaves with IC_{50} 3036.54 µg/mL. Thus, a strong positive correlation between the polyphenols and flavonoids content in antioxidant activities. In contrast to antioxidant results, the value obtained in percentage inhibition of protein denaturation for leaves was slightly higher than leaves. Inverse proportion of the data corresponding to antioxidant, TPC and TFC suggested the presence of other active anti-inflammatory compounds in the plant.

Conclusion: Based on these observed activities, the folkloric claims of effectiveness of these plants as safe anti-inflammatory and antioxidant agents may be justified.

Keywords: *Tamarindus indica; TPC; TFC; anti-inflammation; albumin denaturation; antioxidant; DPPH*

ANTIOSTEOPOROSIS ACTIVITY TEST OF 70% ETHANOLIC EXTRACT COMBINATION OF DAYAK ONION BULBS (*Eleutherine bulbosa* (Mill.) Urb) AND COWPEA (*Vigna unguiculata* (L.) Walp.) ON THE HYPOESTROGEN RATS

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Introduction: Cowpea and dayak onion bulbs extracts were proven to have an effect on bone, cause the content of daidzein and eleutherinol has been known that have an affinity to bind with estrogen receptor selectively. The objective of this study to determine the effects of dayak onion bulbs and cowpea extract combination on the level of bone calcium, bone weight, and the scoring of bone marrow fat in the hypoestrogen rats compared with the single dose of cowpea extract.

Material and Methods: This study used 32 female rats were divided into 8 groups. The sham and the negative group received CMC 0,5%, the positive group received raloxifene 1,08 mg/200 g BW, the cowpea group was given cowpea extract 100 mg/200 BW. The dose variation was given 70% ethanolic extract combination of dayak onion bulbs and cowpea with four doses variation 36 mg/200 g; 100 mg/200 g BW, 18 mg/200 g; 100 mg/200 g BW, 9 mg/200 g; 100 mg/ 200 g BW, and 4,5 mg/200 g; 100 mg/200 g BW. Ovariectomy was performed on all groups except the sham to obtain the condition of hypoestrogen.

Results: The result showed that dayak onion bulbs and cowpea extract combination were able to elevate the level of bone calcium and bone weight significantly, and reduced the scoring of bone marrow fat higher than a single dose of cowpea extract.

Conclusion: The results showed that dayak onion bulbs and cowpea extract combination could be developed to be a drug for osteoporosis in the future.

Keywords: *Bone calcium; bone marrow fat; bone weight; cowpea; dayak onion bulbs*

IN VITRO EVALUATION OF ANTIOXIDANT AND ANTIDIABETIC EFFECTS OF *Muntingia calabura*

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Introduction: The prevalence of the incidence of diabetes mellitus has been rising throughout years and have become the major health problems in the developing countries. Diabetes mellitus promotes the production of free radicals that lead to the tissue damage and many diabetic complications. The use of synthetic antioxidant and synthetic anti diabetics drugs are known to have side effects that can impact the patients' quality of life. Thus this study focused on finding the natural antioxidant and anti-diabetic from plant source. The aim of this study was to evaluate *in vitro* antioxidant and anti-diabetic effects of *Muntingia calabura* leaves.

Material and Methods: The ethanolic extract of *Muntingia calabura* leaves was used to determine the presence of phytochemical. Total phenolic content was determined by using the Folin-Ciocalteu method. Total flavonoid content was determined using the aluminum chloride ($AlCl_3$) colorimetric method. The antioxidant activity was analyzed by evaluating the scavenging activity of the extract using the DPPH free radical scavenging activity method. The anti-diabetic assay of the ethanolic extract of *Muntingia calabura* leaves was performed using α-glucosidase inhibitory method.

Results: The total phenolic and flavonoid content of *M.calabura* was 4.47003 ±0.0005 mg GAE/ g and 9.813 ± 0.00099 mg QE/ g respectively. *M. calabura* exhibited antioxidant activity with the IC_{50} of 782.61 µg/ml. α-glucosidase inhibitory assay found that the minimum and maximum inhibitory activity of *M.calabura* were 60.71% and 79.76% respectively.

Conclusion: *M. calabura* leaves can exhibit excellent antioxidant and antidiabetic properties.

Keywords: *Muntingia calabura; antioxidant; anti-diabetic; DPPH scavenging; α-glucosidase*

THE EFFECT OF 70% ETHANOLIC EXTRACT OF DAYAK ONION BULBS (*Eleutherine bulbosa* (Mill.) Urb.) AND COWPEA (*Vigna unguiculata* (L.) Walp.) ON CARDIOVASCULAR PARAMETERS OF HYPOESTROGEN MODEL RATS

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Introduction: A naphtoquinone derivate called Eleutherinol has strong affinity to bind with estrogen receptor alpha (ER-α) and can be found in Dayak onion bulbs (*Eleutherine bulbosa* (Mill.) Urb.). The cowpea (*Vigna unguiculata* (L.) Walp) contain Daidzein that acts on estrogen receptors beta (ER-β). This study was aimed to investigate the effect of both extract on blood pressure and serum lipid profile of hypoestrogen model rats.

Material and Methods: Thirty-six of female *Sprague-Dawley* were randomly assigned to eight groups as followed, SHAM, OVX, RAL (Raloxifene 1 mg/200 g BW), Cowpea 100 mg/200 g BW with Dayak onion bulbs: 36 mg/200 g BW (D1); 18 mg/200 g BW (D2); 9 mg/200 g BW (D3); 4,5 mg/200 g BW (D4), and single dose of cowpea 100 mg/200 g BW (D5). All groups, except the SHAM, were ovariectomized to obtain the conditions of hypoestrogen. The extracts was given orally for 28 days. Blood pressure and lipid profile were measured after 28 days treatment.

Results: Combination of extract at D2 (18 mg/200 g BW Dayak onion bulbs and 100 mg/200 g BW cowpea) significantly decrease blood pressure and serum lipid profile of hypoestrogen model rats. The combination is better than single dose of 100 mg/200 g BW cowpea.

Conclusion: The results indicated that combination extract of Dayak onion bulbs and cowpea could be developed to be a drug for menopause woman in the future.

Keywords: *Blood pressure; cowpea; dayak onion; hypoestrogen; lipid profile*

DEVELOPMENT OF INTRAVENOUS 20% W/W LIPID EMULSION FROM SUPEROLEIN PALM OIL WITH RESPONSE SURFACE METHODOLOGY AND ITS PHYSICAL STABILITY

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Background: Intravenous lipid emulsions plays many important roles in both nutritional and pharmacological therapy, including as a source of essential fatty acids and delivery vehicle for drugs. Recently, intravenous lipid emulsion combined with vitamin E was reported to help protect patients against parenteral nutrition-associated liver disease caused by oxidation. As it rich with natural vitamin E, palm oil has the potential to be an alternative intravenous lipid emulsion for the future. The current study aims to develop a stable intravenous lipid emulsion from superolein palm oil by optimizing the preparation parameters, namely homogenization pressure, homogenization cycles and lecithin as an emulsifier, using response surface methodology.

Methods: Mean droplet size, as the response variable was measured using laser diffraction and dynamic light scattering method. The emulsion was prepared using superolein palm oil and medium chain triglycerides oil (1:1), stabilized with egg lecithin and homogenized using high speed and high pressure homogenizers.

Results: The emulsion prepared using optimized parameters of 800 psi, 7 cycles and 1.2 g lecithin, produced a milky emulsion with droplet size of 253.63 ± 3.98 nm, polydispersity index of 0.047 ± 0.041, zeta potential of -35.9 ± 2.26 mV, viscosity of 1.74 ± 0.04 cP, $PFAT_5$ of 0.00% and pH of 7.84 ± 0.05. It was physically stable for 6 months in 4ºC, 25ºC and 40ºC storage temperatures.

Conclusion: This physically stable lipid emulsion complies with USP<729> requirement and has high potential for antioxidant effect.

Keywords*: Superolein; intravenous lipid emulsion; MCT; RSM*

SUBOPTIMAL ADMINISTRATION OF THE PRESCRIBED PARENTERAL NUTRITION IN PATIENTS

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Introduction: Parenteral nutrition is the administrating a composition of nutrients into the body when a person cannot eat enough or any food. Patients with nutritional support often gets about approximately half from the required amount of parenteral nutrition which is called suboptimal administration. Study is done to identify the potential risk factors and the causes of this incidence. To study the incidence of suboptimal administration and electrolyte imbalance of the prescribed parenteral nutrition in patients. This study also aims to access the amount of nutrients delivered to patients.

Materials and Method: A retrospective-survey based research was conducted in Hospital Kuala Lumpur. A total of 27 sample size was collected within a duration of 3 years backward. Data was then analysed by comparing the amount of nutrition given and the post-level of albumin, creatinine and protein.

Results: Based on the 27 sample size, level of albumin, creatinine and protein show a slight decrease for most patients. For protein, albumin and creatinine, the percentage of decreasing are 37%, 48.2% and 44.4% respectively. The results of decreasing in the parameters are much higher compare to increasing or fluctuating which take more than over one-third of the sample size after been given the parenteral nutrition.

Conclusion: The result showed that the patients receiving parenteral nutrition did received a suboptimal administration of protein. Hypothesis is accepted.

Keywords: *Parenteral Nutrition; suboptimal administration; albumin; creatinine; protein*

IDENTIFICATION OF POTENTIALLY INAPPROPRIATE MEDICATIONS (PIMS) IN GERIATRIC PATIENT AT GOVERNMENT HOSPITAL IN SOUTH JAKARTA USING STOPP CRITERIA

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Introduction: The prevalence of older patient is increasing globally nowadays. Based on some researches, geriatric patient in Indonesia commonly suffered from more than 4 diseases, thus they need complex medications. Polypharmacy and comorbidities in geriatric patients caused them susceptible to experience with Potentially Inappropriate Medications (PIMs). Screening Tool for Older Peoples' Prescription (STOPP) criteria consist of a list of PIMs. It can be used in geriatric patient medications screening.

Material and Methods: This observational study used cross-sectional and cluster sampling method. The medical record used was from the ambulatory geriatric patient in January-September 2015 retrospectively. Identification of PIMs from patient medication was using STOPP criteria. The data then collected and analyzed using descriptive statistic.

Results: An amount of 69 patients (42.33%, n=163) was identified with at least one PIMs, and from that totally 105 medications were identified as PIMs. The highest number of PIMs was found in the age range of 60-74 year-old (70,94 ± 7,532 year-old on average). The patient identified with PIMs mostly hospitalized in more than 9 days (36.23%), took more than 8 medications (89.85%) and was having more than 4 comorbidities (26.09%). The most prevalence PIM found was the use of omeprazole concomitantly with clopidogrel (22,95%); followed by the used of NSAIDs in the patient with GFR <60ml/dL (20,95%).

Conclusion: PIMs commonly occurs in geriatric patient and it is likely could increase patient drug related problems, morbidity, mortality, and medical cost. STOPP criteria can be used in clinical practice as a tool to identify PIMs and furthermore prevent its implications.

Keywords: *Geriatric patients; STOPP criteria; PIMs*

STUDY OF ANTIBACTERIAL PROPERTY OF SILVER NANOPARTICLES SYNTHESIZED USING *BACILLUS CEREUS* (ATCC 14579) IN COMBINATION WITH DIFFERENT ANTIBIOTICS

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Introduction: Silver nanoparticles (AgNPs) are well known as antibacterial agents. Incorporation of toxic chemicals in synthesizing nanoparticles can cause environmental pollution as well as adsorption on the particles surface therefore making it impractical for medical purposes. The current study focused on the biosynthesis of safe and stable AgNPs using *Bacillus cereus* and subsequently to evaluate its antibacterial activities and synergistic effects against various pathogens.

Material and Methods: The cell free extract of *B.cereus* was challenged with silver nitrate solution. The synthesized AgNPs were characterized using UV-Visible spectroscopy, Fourier Transform Infrared (FTIR) spectroscopy and Transmission Electron Microscopy (TEM). AgNPs were evaluated for its antibacterial effect against *S.aureus, S.epidermidis, S.enterica* and *E.coli*. Synergistic effects of AgNPs were studied in combination with piperacillin, levofloxacin, amikacin, rifampin, ofloxacin and moxifloxacin by disc diffusion method**.**

Results: The change of color from light yellow to dark brown indicated the reduction of silver ion into AgNPs. UV-Visible spectroscopy showed the absorbance peak at 360 nm which confirms the formation of AgNPs. FTIR analysis revealed bands at 1635.24 cm^{-1} and 3255.66 cm^{-1} that represents primary amine and amide group that were associated with the nanoparticles. TEM analysis revealed that nanoparticles were spherical in shape of size less than 50 nm. The synthesized nanoparticles demonstrated a good antibacterial activity against various pathogens. It also showed good synergistic effects in combination with antibiotics.

Conclusion: Biological method presented the ability to synthesize AgNPs with controlled shape and size with excellent antibacterial and synergistic properties.

Keywords: *Silver nanoparticles; polyvinyl pyrrolidone; antibacterial activity; synergistic study*

CYTOTOXIC EFFECT OF FUCOIDAN EXTRACTED FROM SARGASSUM CINEREUM AGAINST CACO-2 CELL LINE

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Introduction: Colon cancer is one of the major medical, social, and economic problem in Malaysia. Most colorectal cancer patients in Malaysia present at a late stage with a poor prognosis which can obviously increase the health burden due to the higher treatment cost and poor quality of life in the late stages. Hence, biologically active compounds and metabolites from marine organisms, with anticancer potential and with less toxicity could be a big leap in scientific community. Fucoidan is a marine sulfated polysaccharide, which is extracted from brown seaweed that has a wide range of bioactivities including anti-cancer properties. However, the underlying mechanism of fucoidan on cell line Caco-2 remains to be elucidated. The present study assessed the cytotoxic effect of fucoidan against Caco-2 cell line.

Material and Methods: The cytotoxicity of the compound was evaluated by MTT assay. Caco-2 cells were grown in 96 well plates (at a density of 1 × 104 cells/well). Standard drug was prepared as stock solution with distilled water. The cultured cells were treated with fucoidan to increasing concentrations (10, 50, 100, 250, 500, 750 and 1000 µg/ml) and made triplicate for each concentration and untreated cells were maintained as control. The morphological examination of nuclei, mitochondrial membrane potential, reactive oxygen species (ROS) formation and detection of apoptotic efficacy of fucoidan were assessed by different staining methods.

Results: Fucoidan showed dose-dependent inhibition in the growth of Caco-2 cells. IC50 value of the compound was found to be 250 µg/ml. AO/EB, Hoechst and annexin V/PI staining established the apoptosis induction by the compound in cancer cells. The compound was also found to increase ROS production and augment mitochondrial membrane permeability.

Conclusion: Several studies have sightseen the usage of fucoidan against cancer and our evaluation also comparable to other published studies. Fucoidan is a valuable compound in anti-cancer and apoptotic effect and promising for the development of anticancer drug.

Keywords: *Fucoidan; cytotoxic; colon cancer; Caco-2 cells*

ANTIBACTERIAL ACTIVITY OF MALAYSIAN TRADITIONAL VEGETABLES (ULAM) AGAINST ENTERIC PATHOGENS USING METHANOLIC EXTRACTION

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Introduction: Malaysian traditional vegetables (Ulam) are the preferred option for the treatment of gastro-intestinal problems because they do not exhibit multidrug resistance issues and have less side effects. The present study was aimed to investigate the phytochemical constituents of phenolic and flavonoid quantitatively and to assess the antibacterial activity of methanolic extracts of *Diplazium esculentum* leaves, *Solanum torvum* fruits, *Anacardium occidentale* leaves and *Eudia Redlevi* leaves against three enteric pathogens, which are *Escherichia coli*, *Salmonella typhimurium* and *Shigella sonnei*.

Material and Methods: Methanolic extracts of the Ulam were obtained using Soxhlet extraction method. The concentrated crude extracts were subjected to preliminary phytochemical screening to identify the presence of phytoconstituents. Total phenolic content was determined quantitatively using the Follin-Ciocalteu and total flavonoid content with the aluminium chloride. The antibacterial activity was assessed by using disc diffusion method.

Results: The extracts of the Ulam have shown positive result in inhibiting the activity of enteric pathogens indicated by the presence of zone of inhibition. *Anacardium occidentale* and *Solanum torvum* exhibited the highest total phenolic content and total flavonoid content respectively.

Conclusion: The presence of phenolic and flavonoid contents have been associated with the antibacterial activities in Malaysian traditional vegetables (Ulam). This study proved that *Diplazium esculentum* leaves, *Solanum torvum* fruits, *Anacardium occidentale* leaves and *Eudia Redlevi* leaves are the potential source of antibacterial properties. They could be used as natural antibacterial medicines and better choice towards gastro-intestinal problem patients for their immediate treatment.

Keywords: *Antibacterials; diplazium esculentum; solanum torvum; Anacardium occidentale; Eudia redlevi*

THE ANTIBACTERIAL INVESTIGATION OF *Anacardium occidentale, Solanum torvum and Euodia redlevi* AGAINST GASTROENTERIC PATHOGENS ISOLATED FROM OUTBREAK PATIENTS IN MALAYSIA

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Introduction: 'Ulam' is a group of traditional Malay vegetables which is typically consumed raw in a form of local salad and is recognised as a popular dish in Malay culture. 'Ulam' contains very high nutritional values that keeps Malaysian old folks healthy. Some are also believed to have therapeutic effect in treating abdominal pain and diarrhea. These symptoms are frequently observed in any foodborne-related gastroenteritis. In search of potential natural sources that can combat the pathogens causing the outbreak in Malaysia, we aimed to investigate the antibacterial activity of three types of 'ulam', *Anacardium occidentale (pucuk gajus), Solanum torvum (terung pipit)* and *Euodia redlevi (tenggek burung)* against gastroenteric pathogens isolated from patients' samples involved in gastroenteritis outbreak which were obtained from the National Public Health Laboratory, Sungai Buloh.

Materials and Methods: Our investigation involved the phytochemical screening to test the presence of alkaloids, flavonoids, saponins and phenols in the extracts. In determining the total phenolic content (TPC), the Follin-Ciocalteu method were carried out and we conducted Kirby-Bauer Disk Diffusion method to test the antimicrobial activity of all plant extracts.

Results: Result shows that all four phytochemicals were found to be present in all plant extracts while the TPC of *Anacardium occidentale, Solanum torvum* and *Euodia redlevi* were determined to be 42.45, 15.608 and 18.45 mgGAE/g respectively. All plant extracts showed to have antibacterial properties in which *Anacardium occidentale* and *Euodia redlevi* exhibits a moderate antibacterial activity whilst *Solanum torvum* shows a slight antibacterial property.

Conclusion: As a conclusion, this study suggested that all three plants could be potential natural sources of antibacterial agents.

Keywords: *Anacardium occidentale; Solanum torvum; Euodia redlevi; Follin-Ciocalteu; antibacterial*

FORMULATION, EVALUATION AND MICROBIAL STABILITY OF VIRGIN COCONUT OIL BASED CREAM

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Introduction: Coconut (*Cocos nucifera* L.) is a tropical palm tree, which is widely distributed throughout Asia, Africa, America Latin and in Pacific regions, that has abundance of nutrients and benefits. Virgin coconut oil nowadays is commonly used in manufacturing of soaps, hair oil, cosmetics and other industrial products. A tropical environment, with warm humidity make a preferable condition for growth of microorganisms which is responsible to cause infectious disease, spoilage of food, cosmetics and pharmaceutical products. The aim of this study was to formulate and evaluate a cream formulation based on virgin coconut oil and to undergo microbial stability testing.

Material and Methods: The o/w emulsion based cream was formulated by using wet gum method in order to form vanishing cream. Furthermore, the formulated Virgin Coconut Oil (VCO) cream was tested for its cosmetic values using DPPH scavenging assay. Moreover, the formulation was subjected to standard evaluation process on the following parameters like pH, rheology, skin irritation, removal, identification of emulsion type and microbial quality stability test in temperatures at 4°C, 27°C, and 37°C for three months. The antibacterial sensitivity of the formulation was tested against and *Escherichia coli* ATCC 25922 and *Staphylococcus aureus* ATCC 25923.

Results: The formulated cream have recorded acceptable antibacterial sensitivity against *Staphylococcus aureus* ATCC 25923 but it fails to record sensitivity against *Escherichia coli* ATCC 25922. The evaluation of the formulated cream showed good results in parameters like identification of emulsion type: O/W, removal: easy, irritancy test: no skin irritation, pH: 7.1 -7.3. Stable during 14 weeks of storage time when effectiveness test performed.

Conclusion: The virgin coconut oil based cream was found stable in its microbial quality and accelerated stability studies, the organoleptic properties at 4°C and 37°C was found to be stable since there were no significant changes. However, the minor changes was observed in colour of the cream at incubator temperature during 14 week of stability testing.

Keywords: *Virgin coconut oil; DPPH; accelerated stability; microbial stability*

PRACTICE, REASONS AND KNOWLEDGE ON SELF-MEDICATION AMONG STUDENTS OF HIGHER EDUCATIONAL INSTITUTIONS IN IPOH

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Introduction: Self-medication started to root among the public community. Moderate to high prevalence of self-medication (exceeding 50% of respondents) is observed in Malaysia and some other countries, especially among students. Some people simply self-medicated without having proper knowledge. This research helps to increase understanding on the practice of self-medication, specifically among students with the different educational background.

Objective: This research aimed to find out the patent of self-medication practice among students, to identify the reasons behind self-medication and to determine the relationship between healthcare backgrounds towards knowledge on self-medication practice.

Materials and Methods: Printed questionnaire were manually distributed among students and online survey constructed on Google forms. Random stratified sampling method is done in selected higher educational institutions in Ipoh area with a calculated minimum sample size of 385 students. The data obtained is then analyzed by SPSS.

Results: 365 of the respondents (93.1%, n=392) practiced self-medication. 281 of them were from healthcare related courses (77%, n=365) that shown a significant relationship between healthcare background to self-medication practice ($p<0.001$). Three main reasons of self-medication were identified among respondents included lesser severity of symptoms/ illness (26.8%), ease and convenience (14.5%) followed by low medications cost (14.3%). The healthcare background also influenced the respondents' knowledge in recognizing symptoms, determine whether the condition is suitable to self-medicate and to choose the appropriate products to treat the condition ($p<0.05$).

Conclusion: The major findings was that majority of the respondents' practice self-medication. It is related to healthcare background significantly. The most common reasons for self-medication practice are minor ailments, ease and convenience and lower cost. Majority of the respondents with healthcare backgrounds showed a good knowledge of self-medication.

Keywords: *Self-medication; practice; reasons; knowledge; higher educational institutions*

ANALYTICAL METHOD DEVELOPMENT AND DISSOLUTION PROFILE OF DULOXETINE AND METHYLCOBALAMIN USING Q-ABSORBANCE RATIO METHOD IN TABLET AND CAPSULE DOSAGE FORM

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Introduction: Diabetic peripheral neuropathy is the most common complication and greatest source of morbidity and mortality in diabetic patients. Combination of Duloxetine and Methylcobalamin is used as an antidiabetic agent. The current study is to develop a simple, accurate and precise spectrophotometric method and dissolution profile for duloxetine and methylcobalamin using Q absorbance ratio method in tablet & capsule dosage forms.

Methods: The developed method for duloxetine and methylcobalamin was determined using mixed standards and in tablet and capsule formulation. Dissolution study of tablet and capsule were carried out using USP type I dissolution test apparatus in 900mL of 0.1N HCl and phosphate buffer maintained at 37^{o}C $\pm$ 0.5^{o}C at 50 rpm.

Results: The absorption maxima of duloxetine was found to be 254 nm and isobestic point for duloxetine and methylcobalamin was found to be 288 nm. The developed Q absorbance ratio method showed 19.90 mg/mL and 0.48 mg/mL respectively for duloxetine and methylcobalamin for mixed standards. However, dosage form recorded 19.59 mg/ml (97.95 % of label claim) and 0.49 mg/ml (98 % of label claim) of duloxetine and methylcobalamin respectively in tablet formulation. The capsule formulation found to have 30.02 mg/mL (100.06 % label claim) and 1.48 mg/mL (99.05 % label claim) of duloxetine and methylcobalamin respectively. The average percentage of drug release in dissolution studies was 99.68 % and 99.28 % for tablet formulation and 99.38 % and 99.18 % for capsule formulation.

Conclusion: Thus the proposed UV spectrophotometric method is simple, rapid, economical, reproducible and accurate for simultaneous estimation of duloxetine and methylcobalamin in raw material and combined oral dosage formulations using Q absorbance ratio method.

Keywords: *Duloxetine; methylcobalamin; Q-absorbance ratio method; dissolution.*

A SYSTEMATIC REVIEW AND META-ANALYSIS OF THE IMPACT OF COLLABORATIVE PRACTICE BETWEEN COMMUNITY PHARMACIST AND GENERAL PRACTITIONER ON ASTHMA MANAGEMENT

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Objective: To evaluate the impact of collaborative practice between community pharmacist (CP) and general physician (GP) in asthma management.

Method: An extensive search was carried out in 10 databases (PubMed, Medline/Ovid, CINAHL, Scopus, Web of Science, Cochran central register of controlled trials, PsycARTICLES®, Science Direct, Education Resource Information Centre, PRO-Quest), and grey literature using selected MeSH and key words, such as " community pharmacist", "general physician" "medicine use review". After screening, 23 studies were used for evidence synthesis. The risk of bias was assessed by Cochrane risk of bias tool (EPOC). Studies were included only if there was a definite evidence of collaborative practice between CPs and GPs in management of asthma, such as CPs conducting medications reviews, or providing education and counselling. The studies need to report at least one of the outcomes which include clinical, humanistic, and economical.

Results: A total of 23 studies (6 RCTs, 4 C-RCT, 3 controlled trials, 3 case control, and 7 pre-post) were included for meta-analysis. The collaboration between CP and GP has shown consistently improvements in: medication use, inhalation techniques, diseases knowledge, control of asthma, and quality of life However, clinical finding on lungs functions were not significantly improved. The collaboration was shown to be value for money, but the economic outcomes lacked RCT s designs and thus the evidence may not be considered as strong as it was for clinical and humanistic outcomes.

Conclusion: The findings from this review established a strong evidence in approval of the positive impact of collaborative practice between CP and GP in the management of asthma.

Keywords: *Asthma management; community pharmacist; general physician; medicine use review*

LEVEL OF AGREEMENT AMONG VARIOUS HEALTH CARE STAKEHOLDERS ON COLLABORATION BETWEEN COMMUNITY PHARMACIST (CP) AND GENERAL PRACTITIONER (GP) FOR A ″COLLABORATIVE MEDICATION THERAPY MANAGEMENT″ (CMTM) MODEL FOR CHRONIC DISEASES (CDS) IN MALAYSIA: A DELPHI STUDY

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Objective: Current study is the first attempt to build consensus and appraise the level of agreement (or disagreement) among various health care stakeholders on the possibilities of a CMTM model for CDs in Malaysia through Delphi technique.

Method: This Delph study was conducted as per the COSRT guidelines (Diamond 2014). Based on a systematic literature search, an online survey was designed on QuestionPro (an online survey tool). After face and content validity of the survey, an expert panel was constructed by inviting various health care stakeholders in different organizations and professional bodies which represent GPs, CPs, and Nurses, across Malaysia. Survey had 96 statements to rate using 5-point Likert scale (strongly agree to strongly disagree) and 36 ranking statements where experts were asked to rank in terms of feasibility of various aspects of the CMTM model. Consensus was pre-defined to be the point where >85% of the respondents falls in either agree or disagree category for each statement. Delphi operates in a reiterative fashion in rounds, where at the end of each round aggregate response (pooled opinion in the form of percent agreement among panel members) is presented to all experts and asked to reconsider their response in the light of the reasoning of other experts and aggregate response, if it appeals to them. This reiteration continues till there is a stability (no change) in the response of experts in two consecutive rounds. Response rate was 70.73% and 100% for 1st and 2nd round respectively.

Results: The percentages, Median and IQR were calculated on the responses of experts at the end of the first round and it revealed that consensus was achieved on 105 statements and there was conflict over 27 statements. In round-2, 14 statements out of 27 conflicted statements reached the consensus after due considerations of the experts, while, 13 statements failed to stretch up to consensus. No further round was executed, as after round-2 stability in response of experts reached to 100% (Wilcoxon Signed Rank test). The inter-rater agreement was computed in both rounds using Intra-class correlation coefficient (ICC) (Two-way mixed model-absolute agreement, $p < 0.001$) that is interpreted to be in between good to excellent level of agreement. Further subgroup analysis based on profession (GP, CP, Nurses) was carried out using Kruskal Wallis H-test ($p < 0.01$), while differences in response based on experience and education were analyzed using Mann-Whitney U-test ($p < 0.017$).

Conclusion: This study demonstrates a significant level of agreement among different health care professionals for a future role of CPs in CMTM model of CDs. Generally, there is a consensus to at least run a pilot trial of this CMTM model in major cities of Malaysia. It also highlights certain flash points where there were differences. However, study holds importance for policy makers, as the agreements or disagreements expressed in the survey may be utilized to foresee and generate guidelines, and strategies to lay the foundation of a CMTM model for CDs in Malaysia

Keywords: *CMTM; chronic disease; community pharmacist; general practitioner*

VIRTUAL SCREENING OF SAPONIN DERIVATIVES TARGETING ENZYMES ENDOTHELIAL NITRIC OXIDE SYNTHASE AND CYTOCHROME P450 2E1

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Introduction: Saponin derivatives from Vietnamese ginseng are proven for their antioxidative stress. eNOS and CYP2E1 are proposed to be attractive targets for development of inhibitors against oxidative stress. Therefore, the aim of this study was to evaluate binding abilities of saponin derivatives on both enzymes eNOS and CYP2E1 using molecular docking.

Materials and Methods: The crystal structures of eNOS (PDB ID: 3NLE) and CYP2E1 (PDB ID: 3E6I) were retrieved from the protein data bank. These proteins were treated by BIOVIA Discovery Studio 2016 and Autodock Tools; the polar hydrogen atoms were added and water was removed. 50 saponin derivatives from Vietnamese ginseng were computationally analyzed for their binding affinities and the interactions with eNOS and CYP2E1 using Autodock Vina 1.5.6. The structures were downloaded from the PubChem and the Drugbank databases.

Results: The docking results showed 50 saponin derivatives fitted well into the binding site of eNOS and CYP2E1 with binding energies from -7.2 kJ/mol to -9.1 kJ/mol for eNOS and from -6.2 kJ/mol to -8.8 kJ/mol for CYP2E1, respectively. Ginsenoside Rc, vina-ginsenoside R3, vina-ginsenoside R20, ginsenoside Re, notoginsenoside R1 and 20(R)-ginsenoside Rh1 were potential compounds for antioxidative stress activity. The antioxidative abilities of ginsenoside Rc, ginsenoside Re and *20(R)*-Ginsenoside Rh_1 have been proved from previous experiments. Notoginsenoside R1 could also decrease level of oxidative stress and inflammation in atherosclerotic mice. These evidences demonstrated the inhibiting abilities of top 6 compounds against eNOS and CYP2E1.

Conclusion: This study contributed to the understanding of the saponin derivatives interactions with eNOS and CYP2E1 enzymes.

Keywords: *Oxidative stress; virtual screening; saponin; eNOS; CYP2E1*

VIRTUAL SCREENING, ORIENTED-SYNTHESIS AND EVALUATION OF LIPASE INHIBITORY ACTIVITY OF BENZYL AMINO CHALCONE DERIVATIVES

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Introduction: Nowadays, obesity is becoming one of the most common problems to the global health. Molecular design with the aid of computing method is an efficient and cost-saving solution in the initial research of potential new drugs for the treatment of obesity. This study focused on benzyl amino chalcone derivatives as they have a benzyl group that can mimic the hydrophobic effect of the long chain carbon of Orlistat, a drug used to treat obesity.

Materials and Methods: Initially, some molecular structures were prepared and docked into the protein by using AutoDock Vina version 1.5.6. These structures having good docking scores were selected to be synthesized using a Claisen-Schmidt reaction. Afterwards, the synthesized chalcones were tested for biological activity against pancreatic lipase by spectrophotometric determination at a wavelength of 405 nm, using p-nitro phenyl palmitate as the substrate. The co-crystallized ligand of pancreatic lipase enzyme was redocked into the enzyme and the RMSD (Root-Mean-Square Deviation) was 1.4976 Å which showed the ligand and the protein preparation could regenerate the practical experiment.

Results: As the docking results, the binding affinities of top ten compounds varied from -8.6 and -10.2 kcal/mol. Biological testing resulted in 4 derivatives with IC50 >120 µM, 8 derivatives with 60 µM < IC50 < 120 µM and 2 derivatives with IC50 < 60 µM. In addition, the docking results also confirmed the key role of amino acid Ser152 in interacting with the ligands. The results showed that benzyl amino chalcone derivatives had moderate to weak pancreatic inhibitory activities compared to Orlistat and other flavonoids such as Theaflavin and its gallate derives whose IC50 ranged from 0.106 µM to 1.203 µM.

Conclusion: 102 chalcone derivatives using in silico approach, synthesized 14 biologically potential derivatives and evaluated for their lipase inhibitory activities.

Keywords*: Pancreatic lipase enzyme; virtual screening; benzyl amino chalcone derivatives*

SYNTHESIS AND BIOLOGICAL ACTIVITIES OF SOME NEW 2-ACETAMIDOBENZOTHIAZOLE DERIVATIVES

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Introduction: Infectious diseases are one of the most important current threats to public health because of the emergence of multidrug resistant bacteria. Therefore, research and synthesis new classes of antimicrobial agents are essential. In the present study, a series of novel amides containing 1, 3-benzothiazole were synthesized, characterized and evaluated for their antibacterial and antifungal properties.

Materials: anilines, ammonium thiocyanate, monochloroacetyl chloride, morpholine, 4-methylpileridine, N-phenylpiperazine

Methods: In this research, we synthesized some new 2-acetamidobenzothiazole derivatives. The evaluation of the synthesized compounds for antibacterial and antifungal activities were carried out by using agar diffusion method.

Result: Six 2-cyclolaminoacetamidobenzothiazole derivatives were obtained. All of the newly synthesized compounds were characterized by melting point, thin layer chromatography, structural elucidation by UV, IR, ^{1}H-NMR, ^{13}C-NMR and MS. Tests on biological activity showed that 2 of the synthesized derivatives (3a, 3b) were effective against all of studied bacterial and fungal strains. 3b showed higher antibacterial effect against the MRSA (MIC_{3b} = 32 mg/ml), 3a showed higher antifungal effect against the T. mentagrophytes (MIC_{3a} = 8 mg/ml), T. rubrum (MIC_{3a} = 8 mg/ml).

Conclusion: We have discovered some new 2-acetamidobenzothiazole derivatives and preliminary bioassay results showed that some of these synthesized derivatives displayed moderate antibacterial activities against various bacterial species. Therefore, we propose syntheses some 2-acetamidobenzothizoles derivatives with the other substituents on anilines and cycloamines nucleus like trichloro, dichloro, fluoro, methoxy, etc. survey and screen to obtain high effect on biological activities.

Keywords: *Benzothiazole; morpholine; N-phenylpiperazine; antibacterial activity; antifungal activity*

DOCKING OF NATURAL COMPOUNDS ON ZIKA VIRUS

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Introduction: Zika is a dangerous virus that causes minor headaches, especially Guillain-Barré syndrome (or adult neurological syndrome) leading to the illness and dozens of deaths worldwide. However, there is currently no vaccine or FDA-approved effective drug for Zika infection. Therefore, the research was carried out with the main objective of selecting a good binding agent on Zika virus through molecular docking approach.

Material and Methods: The target non-structural proteins, namely NS3 (Pdb id: 5MFX) and NS5 (Pdb id: 5KQR) with their co-crystallized structures were selected and the ligands were taken from the natural compounds. The binding sites of each protein target were identified through the experimental structures. Molecular docking was carried out using AutoDock Vina software to investigate the interactions of binding ligands and proteins. The good binding agents as potential inhibitors were selected in terms of the binding affinities (or docking scores of compounds) and the interactions between the protein and the ligands.

Results: The investigated natural compounds were well-bound substances into the target proteins, in particular the polyphenolic compounds. The top ones were Geraniin (-11,1 kcal/mol) and Chebulagic acid (-9.6 kcal/mol), Epigallocatechin gallat (-9.2 kcal/mol), Nimbolid and Nasarin (-8.6 kcal/mol) for NS5. The polyphenolic compounds have been proposed as potential antiviral compounds.

Conclusion: The compounds belonging to the polyphenol group are taken for further study in discovering the potential Zika virus inhibitors.

Keywords: *Molecular docking; Zika virus; natural compounds; antiviral drug*

MOLECULAR DOCKING OF SAPONIN COMPOUNDS FROM *PANAX VIETNAMENSIS* TO PEROXIREDOXIN 5 ENZYME

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Introduction: Peroxiredoxin 5 is a novel thioredoxin peroxidase which identified in mammals recently It belongs to peroxiredoxin family that catalyzes the reduction of hydroperoxides and neutralizes other reactive oxygen species. Hence, peroxiredoxin 5 is considered as a target for antioxidant compounds. This study focuses on the interactions of the saponins in Vietnamese ginseng (*Panax vietnamensis*) with the enzyme to explore the potential compounds for antioxidative stress activity of saponins in Vietnamese ginseng against Peroxiredoxin 5 through molecular docking.

Material and Methods: Molecular docking of ligands into protein was conducted using Autodock Vina. The structures of 49 substances, divided into three main groups: Ocotillol, Protopanaxadiol and Protopanaxatriol were considered as ligands. The structure of peroxiredoxin (Pdb id: 1HD2) was retrieved from the protein data bank The binding energy is calculated based on hydrogen bonds, ionic interactions, aromatic ring interaction, hydrophobic interaction, etc. between the ligands and the protein.

Results: The saponins from *Panax vietnamensis* were well-bound into the peroxiredoxin 5 with their binding energies ranged from -5.7 kcal/mol to -8.2 kcal/mol. The best compounds were Vinaginsenoside R5 (-8.2 kcal/mol), Vinaginsenoside R3 (-7.7 kcal/mol), Ginsenoside Rh_1 (-7.5 kcal/mol), Vinaginsenoside R8 (-7.5 kcal/mol), Vinaginsenoside R23 (-7.6 kcal/mol), Ginsenoside Rb_2 (-7.7 kcal/mol). These results were in agreement with the experimental data.

Conclusions: In summary, the good saponin compounds as potential inhibitors of peroxiredoxin 5 through molecular docking were Vinaginsenoside R5, Vinaginsenoside R3, Ginsenoside Rh_1, Vinaginsenoside R8, Vinaginsenoside R23 and Ginsenoside Rb_2.

Keywords*: Peroxiredoxin 5; Panax vietnamensis; saponin; antioxidative stress; molecular docking*

IN SILICO STUDY OF ANTIVIRAL DRUGS AGAINST PROTEINS OF EBOLA VIRUS

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Introduction: Ebola virus is a fatal virus that causes severe hemorrhagic fever in human and animals. There is no FDA-approved vaccine or medicine against Ebola viral infection. Thus, this study aims to identify potential compounds for anti-Ebola virus using *in silico* approach.

Materials and Methods: The *in silico* approach requires the 3D crystallized structure of protein and ligand. The 3D structures of Ebola target protein VP40 was retrieved from Protein data bank with the PDB ID of 1H2C. Ligands were taken from some drugs which are in clinical testings (group 1) or from other anti-viruses potential compounds (group 2). The 3D structure of ligands was retrieved from Pubchem database. Ligands were docked into the protein by using AutoDock Vina program

Results: The in silico results showed that the compounds could bind in the active site of the target protein well. The binding affinities of compounds were from -4,8 and -7.9 kcal/mol for group 1 while the binding affinities of group 2 varied from -5.5 and -9.2 kcal/mol. The top compounds identified were silybin (-9.2 kcal/mol) and toremifen (-7.9 kcal/mol). They had good interactions with the target through hydrogen bonds and the hydrophobic interactions.

Conclusion: This study results provided the potential structures for drug discovery of Ebola virus.

Keywords: *Ebola virus; potential inhibitor; binding affinity; in silico; molecular docking*

DISCOVERY OF POTENTIAL DRUGS FOR VARIOLA VIRUS

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Introduction: Smallpox is a contagious disease, caused by Variola virus belonging to the Orthopoxvirus genus. Nowadays, there is no specific drug available and the treatment only depends on the vaccine. The study was conducted to identify potential compounds for Variola antiviral drug discovery.

Material and Methods: Target proteins were the H1 phosphatase protein (Pdb id: 2P4D) and thymidylate kinase protein (VarTMK). The homology model of VarTMK was constructed from the vacTMK (2V54) using Swiss-Model workspace. The ligands include 3 compounds being tested for anti-Variola activity and 62 other antiviral drugs, which were downloaded from the PubChem and the Drugbank database. All ligands were computationally analyzed for their affinities and protein interactions using Autodock Vina program.

Results: The homology model of VarTMK was successful built having 90.73% of the same residues with the core regions of vacTMK's plot The results showed that 65 ligands which fitted well into the binding sites of the two target proteins. Their binding energies ranged from -2.5 to -8.8 kcal/mol for H1 phosphatase enzyme and -3.5 to -10.6 kcal/mol for VarTMK. The best compound is Raltegravir with the docking score of -10.6 kcal/mol for the VarTMK. In addition, two other compounds having good affinities are Dolcergravir (-9.5 kcal/mol), Rilpivirine (-9.6 kcal/mol).

Conclusion: This study explored the potential drugs could be used for Variola virus drug discovery.

Keywords: *Variola virus; smallpox; H1 phosphatase; VarTMK; drug discovery*

KNOWLEDGE, ATTITUDE AND PRACTICE OF MEDICAL AND HEALTH SCIENCES STUDENTS IN IIUM KUANTAN REGARDING HUMAN PAPILLOMA VIRUS VACCINATION

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Introduction: Human Papilloma Virus (HPV) is the major causal agent for fourth most frequent cancer in women which is cervical cancer. HPV vaccine is already available as the primary prophylactic method for cervical cancer. The objective of this study was to assess the level of knowledge, attitude and practice regarding HPV and its vaccination among medical and health sciences students in the International Islamic University Malaysia (IIUM).

Materials and Methods: This study was conducted from November until December 2017. Pre-tested and validated questionnaire was distributed among third year students from faculties of medicine, dentistry, pharmacy and allied health sciences.

Results: The results showed that the level of knowledge was good for medicine and dentistry students while poor for pharmacy and allied health sciences students. Medicine students showed the highest level of knowledge compared to other faculties (p=0.000016). The majority of students had a positive attitude towards HPV vaccination. Small percentage of students were fully vaccinated (13.65%, 37) with no significant difference between different faculties.

Conclusion: In conclusion, the levels of knowledge and attitude of the respondents were high and positive, respectively. More awareness, healthcare programs and campaigns should be run at the campus.

Keywords: *KAP; health sciences; HPV; Malaysia*

IN VITRO ANTIOXIDANT AND ANTI-DIABETIC ACTIVITY OF *Ziziphus spina-christi* LEAVES EXTRACT

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Introduction: Diabetes mellitus is projected to be one of the major causes of death throughout the world. New alternatives are required as the current effective oral therapy for the treatment of diabetes causes side effects. The aim of this study was to investigate the antioxidant and antidiabetic activity of *Ziziphus spina-christi* leaves extract.

Materials and Methods: The methanolic extract of the *Ziziphus spina-christi* was tested for antioxidant activity using scavenging activity of DPPH (1,1-diphenyl-2-picryl-hydrazyl). Total phenolic and flavonoid contents were estimated by Folin Ciocalteau reagent and Aluminium chloride colorimetric estimation method respectively. Antidiabetic activity was tested using glucose uptake by yeast cell method.

Results: Antioxidant activity of *Ziziphus* extract was expressed as percentage of DPPH radicals' inhibition. The values in percentage showed from 50.47 to 92.34 %. The total phenolic content of *Ziziphus* extract was 149 ± 1.0 mgGAE/g. The total flavonoid content of Ziziphus extract was 13.13 ± 0.02 mg RE/g. Glucose uptake by yeast cell method was expressed in percentage of increasing in glucose uptake by yeast cell. The values in percentage varied from 11.76 to 84.38 %.

Conclusion: *Ziziphus spina-christi* is a potential source of natural antioxidant to prevent diabetes mellitus due to scavenging activity.

Keywords: *Ziziphus spina-christi; antioxidant; antidiabetic; phenolic; flavonoids*

PERCEPTION TOWARDS PHARMACEUTICAL CARE PRACTICE IN COMMUNITY PHARMACIES: A CROSS-SECTIONAL SURVEY AMONG COMMUNITY PHARMACISTS IN KLANG VALLEY

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Introduction: As a result of professional movements ignited in United States nearly three decades ago, the concept of pharmaceutical care has stirred profound changes in the role of pharmacists over years. With the aim to attain optimised outcome of drug therapy in a responsible manner, implementation of such model of care expanded vast opportunities in pharmacy practice. In this context, pharmaceutical care practice could be the key for local community pharmacists to hasten the role transition from being a medicine supplier to a care provider.

Methods: A pre-tested self-completion questionnaire was distributed to 240 community pharmacists in Klang Valley from August to October 2017. The survey instrument collected data pertaining to pharmacists' awareness and attitude towards pharmaceutical care, provision of pharmaceutical care services and barrier factors to such practice.

Results: Eighty-nine percent of the pharmacists responded to the survey (n = 213). Over 85% of the respondents demonstrated good understanding of pharmaceutical care concept and positive attitude towards the professional role. Majority reported medication counselling (97.2%), health screening activities (97.2%) and prescription checking (88.3%) as the pharmaceutical care services that they engaged with most of the time. On the other hand, insufficient communication with physicians (71.4%), time constraints (67.6%) and shortcomings in pharmacy law (63.8%) were deemed the main barriers to optimal implementation of pharmaceutical care in community pharmacies.

Conclusions: A very positive perception captured among the pharmacists favours the implementation of pharmaceutical care services in community pharmacies. Strategic initiatives are needed to explore and address barriers to the desired goal.

Keywords: *Community pharmacists; pharmaceutical care; pharmacy services*

AWARENESS OF ADJUNCTIVE MANAGEMENT IN PERIODONTAL DISEASES

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Introduction: Periodontal disease is a disorder of the tissues surrounding and supporting the teeth caused by groups of specific microorganisms. Local antimicrobial appears as attractive agent to halt the disease progression. The objective of this study was to assess the present status on the use of local antimicrobial in periodontal diseases management.

Materials and methods: This study was a cross-sectional study among periodontists in the national universities. Self-administered online questionnaires were distributed through email. Ethical approval was obtained. The data was analyzed by using Statistical Package for Social Sciences (SPSS) Version 21 using Chi-square test.

Results: A total of seventeen periodontists participated in this study. 53% of them were from government universities with professional experience less than 10 years. Most of the respondents practiced in Kuala Lumpur and Selangor (63%). Majority of them were aware about the availability of local antimicrobial in the country. All respondents agreed the importance of local antimicrobial as adjunctive management. However, 53% of the periodontists never use local antimicrobial in managing periodontal diseases.

Discussion: All respondents believed that local antimicrobial was an important adjunct to periodontal treatment. Most of them agreed on effectiveness of antimicrobial as adjunctive treatment in managing periodontal diseases.

Conclusion: Majority of periodontists had awareness of adjunctive local antimicrobial in periodontal disease management.

Keywords: *Awareness; local antimicrobial; periodontal disease*

EVALUATION OF ANTIDIABETIC ACTIVITY OF *Momordica charantia* FRUIT USING METABOLOMICS APPROACH

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Introduction: *Momordica charantia* Linn (Cucurbitaceae) has been widely commercialized based on traditional usage as an antidiabetic product. However, the scientific evidence of its antidiabetic activity is not sufficient. Hence, the major aims of this research were to evaluate the antidiabetic activity of *M. charantia* fruit through proton-nuclear magnetic resonance (^{1}H-NMR) spectroscopy based metabolomics approach.

Material and Methods: The 80 % ethanolic extract of *M. charantia* was force fed to obese-diabetic (ob-db) rats. Rats were divided into four groups: healthy, ob-db treated with 300 mg/kg bw metformin, ob-db treated with 300 mg/kg bw of *M. charantia* and ob-db rats.

Results: The results showed that the administration of the 80% ethanolic extract of 300 mg/kg bw for 4 weeks significantly ($P < 0.05$) reduced the blood glucose level. However, the data obtained from the metabolomics showed that the metabolite profiles of the serum and urine of rats could not be fully normalized by the 80% ethanolic extract and metformin. The identified biomarkers in serum and urine were 2-hydroxybutyrate, leucine, adipate, alanine, acetate, succinate, 2-oxoglutarate, dimethylamine, creatine, creatinine, betaine, glucose, taurine, phenylacetylglycine, allantoin and hippurate.

Conclusion: The metabolomics approach indicated that the 80% ethanolic extract of *M. charantia* fruit and metformin have altered energy, amino acid, purine, creatine, bile, and gut microflora metabolisms of the serum and urine profiles of the streptozotocin ob-db rats.

Keywords: *Momordica charantia; antidiabetic; metabolomics*

EFFECT OF *Hibiscus sabdariffa* CALYCES EXTRACTS ON ARTERIAL STIFFNESS IN DOCA-SALT INDUCED HYPERTENSIVE RAT MODEL

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Introduction: Physiological processes such as aging and pathological processes such as hypertension and diabetes mellitus cause arterial stiffness which is closely related to cardiovascular diseases. *Hibiscus sabdariffa* calyces extract is potentially a good source of antioxidants due to high anthocyanin content but its high reactivity during processing may deteriorate its antioxidant capacity. Therefore, this study is to determine the most antioxidant-rich extract from different extraction methods which is then used for measurement of protective effect of arterial stiffness in deoxycorticosterone acetate (DOCA)-salt induced hypertensive rat model.

Material and Methods: *Hibiscus sabdariffa* calyces was subjected to maceration or reflux boiling method with water or 50% ethanol. The extracts were then concentrated using rotary evaporator or spray-dryer. Total phenolic content and DPPH (1,1-diphenyl-2-picrylhydrazyl) radical scavenging activity were determined while the two major anthocyanins namely dephinidin 3-sambubioside and cyanidin 3-sambubioside were quantified using HPLC. The effect of both water and 50% ethanolic extract on arterial stiffness was determined through pulse wave velocity in uninephrectomized DOCA-salt hypertensive rat model at the end of 4 weeks treatment.

Results: Both spray-dried *Hibiscus sabdariffa* calyces water and 50% ethanolic extracts possess highest antioxidant activity and contain highest amount of the major anthocyanins (0.83% and 0.90% in *Hibiscus sabdariffa* calyces water and 50% ethanolic extracts respectively). Treatment with *Hibiscus sabdariffa* calyces extracts attenuated arterial stiffness in DOCA-salt induced cardiovascular remodeling.

Conclusion: Different extraction method affected the antioxidant capacity in the *Hibiscus sabdariffa* calyces extracts while treatment with anthocyanin-rich *Hibiscus sabdariffa* extracts showed protective effect against arterial stiffness in DOCA-salt induced hypertensive rats.

Keywords: *Antioxidant; Hibiscus sabdariffa; arterial stiffness; pulse wave velocity*

DIURETIC EFFECT OF WATERCRESS (*Nasturtium officinale)* ETHANOL EXTRACT

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Introduction: Diuretic is a drug of choice for hypertension, hypercalsemia, diabetes insipidus, heart failure, kidney failure, etc. Nowadays, herbal diuretic is widely used as replacement or adjuvant therapy. Watercress (*Nasturtium officinale*) is used as nutraceutical and suspected has diuretic effect. This research aim is to evaluate diuretic effect of watercress extract.

Material and Methods: The watercress extract is made using soxhlet in ethanol 50%. The dose of the extract were 13.5, 27, and 54 mg/kg bw, and furosemide 3.6 mg/kg bw is used as reference. Diuretic effect is tested according the protocol of modified Lipschitz method on male Wistar rats. Observation of the diuretic effect were cumulative urine volume for 6 and 24 hours, and total secretion of sodium and potassium ion. Sodium and potassium was measured using *Flame Photometry*.

Results: Watercress extract at dose of 54 mg/kg bw had the highest cumulative urine secretion compared to other doses and significant different compared to control group ($p<0.05$). It also gave the faster onset compared to furosemide. All dose of watercress extract significant increased sodium and potassium ion secretion compared to control group ($p<0.05$). The extract at dose 54 mg/kg bw secreted sodium and potassium 1.5 times higher than furosemide.

Conclusion: It can be conclude that watercress extract had potency as diuretic.

Keywords: *Diuretics; ethanol extract; watercress; Nasturtium officinale*

IDENTIFICATION OF COMPOUND FROM CALLUS RESULT OF PLANT TISSUE CULTURE *Homalomena cordata* SCHOTT

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In previous research, has conducted induction kalus nampu in the leaves. After various regulatory substances added to grow with some variation of concentration, kalus on plants nampu is not formed. After the analysis of secondary metabolite by Thin-Layer Chromatography methods (TLC) using n-hexane: ethyl acetate (7:3), there is a spot that appeared on the extract yield in nampu with tissue culture method whereas in plant extract is not visible. Based on this, a further identification was conducted and produced the thin purple stains on the visual appearance after sprayed using Liebermann - Burchard. Spots in the insulation with Thin Layer Chromatography Preparation methods on the identification with the use of Uv-Vis spectrophotometry and Infrared spectrophotometry. Both identify the presence of a component of a steroid compound detection. Presence at a wavelength of 255 nm and are readable on the UV-Vis spectrophotometry showed the existence of a cluster chromophore on isolates The identification using infrared spectrophotometry yields the existence of C = C bond, Ar-H at 802,39 cm^{-1}. Alkene >C = CH_2 or CH_2 = CH and C-O at 1103.28 cm^{-1}. The existence of – C– on Aromatics shown in 1226.73cm^{-1}. C-H on-CH_2-Aliphatic shown in 1365.60 cm^{-1}. At. C–H on – CH_3-aliphatic aimed at wavelength 1465.90 cm^{-1}. The presence of Carbonyl C – bond shown in 1739.79 cm^{-1}. On the wavelength 2360.87 cm^{-1} to 2337.72 cm^{-1} indicates C –bond aliphatic. Identification of instrument using UV-Vis, IR, and spray with Liebermann – Burchard, the compound was suspected of steroids.

Keywords: *Plant tissue culture; nampu leaf; TLC; steroids*

HYPOGLYCEMIC ACTIVITY OF WATER EXTRACT OF *Merremia mammosa* L. ON WISTAR RATS

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Introduction: Diabetes mellitus is a non-infectious metabolic disease characterized by an increase in blood glucose levels above normal values. One of the plants used by the community to treat diabetes mellitus is *Merremia mammosa* L. The purpose of this study was to determine the potential of *Merremia mammosa* L. tuber in reducing blood glucose levels.

Material and Methods: Hypoglycemic activity test of water extract of *Merremia mammosa* L using glucose tolerance method induced using glucose 2 g/kg bw. The dosage of water extract of *Merremia mammosa* L used is 81.25 mg/kg bw, 162.5 mg/kg bw and 325 mg/kg bw given orally and the standard group given glikuidon dose 2.7 mg/kg bw. Glucose levels were measured in the 0,30,60,90,120, 150, and 180 minutes using a spectrophotometer visible at a wavelength of 546 nm.

Results: Blood glucose levels of the control group, glikuidon 2.7 mg/kg bw, water extract of *Merremia mammosa* L dose 81.25 mg/ kg bw, 162.5 mg/ kgbw and 325 mg/kg bb in the 180th minute respectively were 128, 80 ± 23.83; 95.83 ± 8.19; 106.71 ± 8.19; 110.73 ± 17.63; 101.33 ± 12.77 mg/dL.

Conclusion: Based on the results of the study showed that the extract of bidara bulb water extract dose 325 mg / kg has a better hypoglycemic effect.

Keywords: *Diabetes mellitus; Merremia mammosa L; glucose tolerance method*

PREPARATION, CHARACTERIZATION AND SOLUBILITY STUDY OF ALBENDAZOLE-OXALIC ACID CO-CRYSTAL

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Introduction: Albendazole (ABZ) is an anthelmintic drug that belongs to class II in the biopharmaceutics classification system (BCS), so its absorption in the gastrointestinal tract is limited by its solubility and the dissolution rate. The aim of this study was to prepare albendazole-oxalic acid (ABZ-OXA) co-crystal, characterize and investigate the effect of this co-crystal on the solubility and dissolution rate of albendazole.

Material and Methods: The ABZ-OXA co-crystal by grinding a mixture of albendazole and oxalic acid dihydrate with the addition of a few drops of acetone-ethanol (9:1) solvent mixture and characterized by powder X-ray diffraction (PXRD), differential scanning calorimetry (DSC), Fourier transform infrared (FTIR) and polarization microscopy methods. The solubility test was performed in water at 25°C and in pH 1.2, 4.5 and 6.8 buffer solutions at 37°C. The *in vitro* dissolution test was carried out by the paddle method in 900 mL of pH 1.2; 4.5 and 6.8 buffer solutions.

Results: The PXRD pattern of the ABZ-OXA mixture after grinding showed the emergence of new peaks and the disappeared of ABZ - OXA main peaks, that indicates the ABZ-OXA co-crystal formation. The ABZ-OXA co-crystal has differences in DSC thermogram, FTIR spectrum and crystal habit with its pure components. The co-crystal ABZ-OXA solubility test results showed an increase in significant solubility in water and entire pH compared to pure ABZ as well as shown in the in vitro dissolution test results.

Conclusions: It was concluded that ABZ and OXA could form co-crystal, which can increase the solubility and dissolution rate of albendazole.

Keywords: *Albendazole; oxalic acid; co-crystal; solubility; dissolution rate.*

FORMULATION AND EVALUATION OF PEEL-OFF GEL MASK SALISYLIC ACID WITH ADDITION OF DRY POWDER FROM *Aloe vera* (*Aloe barbadensis* Mill)

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Introduction : Salicylic acid has been known as a chemical peeling agent. Several studies have examined the effects and safety of salicylic acid but salicylic acid has a side effect mild burning sensation. *Aloe vera* (*Aloe barbadensis* Miller) has known to have benefit such as promotion of wound healing, anti-inflammatory, moisturizing properties. The aim of this study is to determine the effect of *Aloe vera* gel freeze-dried powder to cope with heat sensation of gel mask containing salicylic acid.

Material and Methods: This research includes several stages of work, namely preparation of materials, collection of materials, determination of plants, making dry powder of aloe gel (*Aloe barbadensis* Mill) and making a peel-off gel mask. Preparation of peel-of gel mask formulations containing 4% salicylic acid powder and dry powder of *Aloe vera* leaves in various concentrations, F0 (0%), FI (2%), FII (4%), and FIII (6%).

Results: The results show that *Aloe vera* gel freeze-dried powder is a natural, effective ingredient for reducing the side effects of salicylic acid. The study of mild burning which is observed in a group of 30 patients is indicated in 11 patients used F0, 5 patients used F1, 1 patient used F2, and none at F3.

Conclusion: F3 is the most effective in softening and moisturizing the skin (dry powder containing 6% *Aloe vera* gel freeze-dried powder)

Keywords: *Aloe barbadensis Miller; Salicylic acid; freeze dry; gel mask*

SYNTHESIS AND EVALUATION OF BENZIMIDAZOLE-2-THIONE'S ACYL DERIVATIVES AS POTENTIAL ANTIMICROBIAL AGENTS

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Introduction: Presently, more and more strains of bacteria and fungi have become resistant to antimicrobial drugs. So, we should have more professional research in order to find new antimicrobial drugs which have higher antibacterial and antifungal activities.

Material and Methods: In this research, we synthesized and screened against these referenced strains of bacteria and fungi of five new compounds from the benzimidazole-2-thione (BI2T).
Material: Carbon disulfide, *o*-phenylenediamine, thionyl cloride, acetic anhydride, benzoyl cloride, salicylic acid, thiosalicylic acid, potassium hydroxide, pyridine.

Method:

- Synthesis benzimidazole-2-thione (2)
- Synthesis acyl derivatives of benzimidazole-2-thione (3a-3e).
- Characterization of structure, the purification and the specific parameters of the all new compounds.
- The evaluation of the synthesized compounds for antibacterial and antifulgal activities was carried out by using agar diffusion method.

Results: Synthesis 5 acyl derivaties of benzimidazole-2-thione (3a-3e). All of the newly synthesized compounds were characterized by melting point, thin layer chromatochraphy, structural elucidation by UV, IR, ^{1}H-NMR, ^{13}C-NMR and MS. This research also presents the result of the investigation antibacterial and antifungal activities of the BI2T acylization on the *Escherichia coli* ATCC 25922, *Staphylococcus aureus* (MRSA) ATCC 43300, *Pseudomonas aeruginosa* ATCC 27853; *Streptococcus faecalis* ATCC 29212 and *Candida albicans* ATCC 10231. The result of this research showed that 3a and 3b derivatives have antibacterial and antifungal activities on three referenced strains of bacteria and fungi. 3d and 3e derivatives shows activity on *Staphylococcus aureus* (MRSA) ATCC 43300. 3c derivative doesn't have any activities on these bacteria and fungi.

Conclusions: We have discovered some new benzymidazole-2-thion's acyl derivatives and reliminary bioassay results that some of these synthesized derivatives displayed moderate antibacterial activities against various bacterial species. These results are the basic for synthesis new antimicrobial drugs which can be suitable for this current.

Keywords: *Benzimidazol-2-thione, acyl derivatives, antimicrobial agents, antibacterial activity, antifungal activity.*

INCIDENCE OF INFECTION IN NEONATES ON PARENTERAL NUTRITION

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Premature infants are commonly put on parenteral nutrition because of the under-developed organs especially pertaining to the GI system. However, cases of infections due to PN often occur in these patients. This retrospective study was conducted to identify the incidence of infection in neonates once receiving PN and note the common antibiotics used. To achieve the objective of the study, the study has been conducted in a general hospital. Thirty-five (N=35) cases were collected. Patients included in the study were preterm infants of less than thirty-seven weeks admitted to the Neonatal Intensive Care Unit (NICU) and receiving PN. According to the finding, from the 35 premature babies that were administered PN, five cases of nosocomial sepsis (N=5; 14%) were identified with nosocomial infections. The common antibiotics used were gentamicin plus C-penicillin. These antibiotics were used for the treatment of nosocomial sepsis. In conclusion, there were incidences of nosocomial sepsis found in the NICU preterm infants receiving PN. However, the source of infection was not ascertained in this study.

Keywords: *Infection; neonates; parenteral nutrition*

A CLASS OF NEW 2,9-BIS(ALKYLATED)-*β*-CARBOLINE INTERCALATORS: EXPERIMENTAL AND COMPUTATIONAL STUDY OF BINDING INTERACTION WITH CT-DNA

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Introduction: Binding affinity towards DNA for small molecules is very important in the development of new therapeutic reagents.

Materials and Methods: Interaction between 2,9-bis(alkylated)-*β*-carbolin-3-ium bromide derivatives of 2,9-bis(2-fluorobenzyl)-*β*-carbolin-3-ium bromide **(CDR1)** and 2,9-bis(4-fluorobenzyl)-*β*-carbolin-3-ium bromide **(CDR2)**, with calf thymus DNA (CT-DNA) were studied by UV-visible absorption, fluorescence and molecular docking. The absorption and emission spectra of MeOH solution of *β*-carbolin-3-ium bromide derivatives were studied for their binding activity by titration with increasing amount of CT-DNA.

Result and Discussions: The UV-visible observation, results showed that **CDR1** and **CDR2** interact CT-DNA with high affinities, ($K_b = 10^4\ M^{-1}$). The fluorescence study represents the quenching effect of ligands on bound ethidium bromide to DNA. Both **CDR1** and **CDR2** quenching process obeys the linear Stern-Volmer equation ($K_{sv} = 10^4\ M^{-1}$) in extended range of the ligand concentrations. Suggesting, the docking studies were used to predict the mode of interaction of the drug with DNA.

Conclusion: Both *β*-carbolin-3-ium bromide derivatives were found to exhibit DNA binders/intercalating potencies.

Keywords: *UV-visible absorption; fluorescence; binding constant; β-Carbolin-3-ium bromides; interaction with DNA*

A PROTOTYPE OF PAPER PRODUCED FROM POMELO (ALBEDO WASTE) AS A NATURAL pH INDICATOR PAPER

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Introduction: Commercial pH indicator paper is typically composed of synthetic chemicals it may potentially hazardous, costly to user and the pH indication is difficult to read for colored solutions. The aim of this study was to explore another alternative, cost effective, eco-friendly natural indicator pH paper by using Pomelo albedo waste and Butterfly Pea Flower extracts.

Material and Methods: Pomelo albedo waste were cut, boiled, compressed and oven dried to produce papers. The produced papers were then immersed in the Butterfly Pea flower extract, dried at room temperature to produce natural pH indicator paper strips. The effectiveness of the natural pH strips were examined in various product samples. The observed colour changes on the natural pH strips were compared with universal pH paper to confirm its' effectiveness in the pH indication of the product tested.

Result: From observation, the prototype natural pH paper showed better colour indication especially for low pH and high pH testing compared to universal pH paper.

Conclusion: This study concluded that the prototype of paper produced from Pomelo (albedo waste) can be used safely as a natural pH indicator paper. However, full extent of the usage of this pomelo-based natural pH indicator paper can only be tested in future studies as the current study is still in its early stage.

Keywords: *Pomelo; albedo; waste; butterfly Pea Flower; pH paper*

LARVICIDAL ACTIVITY OF DINUCLEAR SILVER(I)-*N*-HETEROCYCLIC CARBENE COMPLEXES: SYNTHESIS, CHARACTERIZATION AND LARVICIDAL ACTIVITY OF BIS-IMIDAZOLIUM DINUCLEAR SILVER(I)-N-HETEROCYCLIC CARBENE COMPLEXES

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A novel research was carried out to obtain bis-imidazolium salt that linked by xylyl derivatives moiety (**1-4**) and reacted with Ag_2O to facilitate the formation of dinuclear Ag(I)-*N*-heterocyclic carbene (NHC) complexes (**5-8**), respectively. All the synthesised ligand salts and complexes have been characterized by ^{1}H- and ^{13}C-NMR, FTIR spectroscopy and elemental analysis. Only single crystal of compounds **3**, **5**, and **7** were grown and their molecular structures were elucidated by single crystal X-ray diffraction analyses. Larvicidal studies against the *Ae-aegypti* and *Culex quinquefasciatus* were carried out on all synthesized compounds following World Health Organization standard larval susceptibility test. All the imidazolium salts were found inactive while the activity of the dinuclear Ag(I)-NHC complexes varies with the nature of ligands.

Keywords: *Imidazole, Ag(I)-NHC complex, X-ray diffraction, larvicidal, Ae-aegypti, culex quinquefasciatus.*

UNDERSTANDING LEVEL, KNOWLEDGE AND PRACTICES IN EVIDENCE-BASED PRACTICE AMONGST RADIOGRAPHERS IN KLANG VALLEY

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Introduction: Evidence-based practice (EBP) has been acknowledged as a standard in healthcare and the principles and practice of EBP are broadly promoted and gradually being accepted by numerous professional bodies. Radiography has changed over the years and this had led to a growing demand for an interest in the use of evidence as a basis for making diagnostic care decisions. This demands evidence-based treatment and cost-effectiveness has challenged a lot of practices and brought pressure to endure on health care professionals to gain knowledge and develop skills. Thus, this study was intended to assess the understanding level, knowledge and practices in evidence-based practice amongst radiographers in Klang Valley.

Material and Methods: Questionnaire surveys were chosen as a method for the data collection in this study. The questionnaire was published online and the link was distributed to all radiographers working in all government and private hospitals in Klang Valley.

Results: 180 radiographers completed the questionnaires and showed that they understand and had sufficient knowledge about EBP.

Conclusion: There was a difference between the radiographers' level of understanding, knowledge and practices in EBP based on their qualification of study. There was also a relationship between the radiographers' number of years working and their practices in EBP. However, there were several barriers such as lack of collective support among colleagues, lack of generalization of research findings and inapplicability of research findings to individual patients being a challenge for its incorporation into practice. Therefore, efforts to advance EBP in radiographers should focus on reducing these barriers.

Keywords: *Evidence-based practice (EBP); understanding level; knowledge; practice; barriers*

EVALUATING THE RELATIONSHIP OF BODY MASS INDEX AND WAIST CIRCUMFERENCE ON THE IMAGE QUALITY OF ABDOMINAL COMPUTED RADIOGRAPHY

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Introduction: Body sizes of patients undergoing x-ray examination vary in accordance with the range of body mass index (BMI) and waist circumference (WC). The aims of this study were to evaluate the relationship of BMI and waist circumference on the image quality of abdominal computed radiography (CR).

Method: Anteroposterior (AP) supine abdomen projection was conducted on 69 patients from Hospital Raja Perempuan Bainun, Ipoh using a Siemens Multixtop general x-ray unit and CR Carestream Direct view Max CR reader. Samples were categorized into normal BMI (n = 23), overweight (n = 23), and obese (n = 23). Image quality was measured physically in signal to noise ratio (SNR) and subjectively, visual grading analysis (VGA) based on the European Commission (CEC) image criteria. Data were analyzed by using analysis of variance (ANOVA) and Pearson's correlation for comparison and relationship between BMI, WC and the image quality.

Results: Results showed a significant difference ($p < 0.01$) in image quality of VGA_{mean} (normal 4.40 ± 0.15, overweight 4.35 ± 0.13, obese 4.03 ± 0.34) and SNR_{mean} (normal 59.76 ± 1.34, overweight 59.32 ± 1.37, obese 59.03 ± 1.30). A moderate to high negative correlation exists for BMI and WC on the image quality, BMI vs SNR ($r = -0.73$), BMI vs VGA ($r = -0.7$) and WC vs SNR ($r = -0.83$), WC vs VGA ($r = -0.79$) with ($p < 0.01$).

Conclusion: This study suggests that WC has a higher negative linear relationship compared to BMI and could also be used as a better image quality predictor for CR abdominal examination.

Keywords: *Computed radiography; obesity; image quality; waist circumference; BMI*

ABDOMINAL COMPUTED TOMOGRAPHY RADIATION DOSE FOR SIX HOSPITALS OF NORTHERN PENINSULAR MALAYSIA

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Introduction: Computed tomography (CT) is an advanced imaging modality. Its powerful ability to perform more precise diagnosis cause it to be used widely in several countries. The risk of radiation to human health has always been a concern among researchers including Malaysia. This is due to the fact that the number of CT scanner and CT procedure in Malaysia had increased more than 15% from 2009 to 2010and it is expected that the number will keep increasing year by year. The aim of this research was to study the variation of radiation dose (dose descriptors) to the patients of six selected hospitals. in the northern peninsular Malaysia. The dose descriptors include weighted CT Dose Index (CTDIw), volume CT dose index (CTDIvol), dose-length product (DLP) and effective dose (E).

Material and Methods: The data had been collected using questionnaires distributed to the hospitals. The data was analysed by using CT Expo v 1.4 in order to calculate the dose descriptors.

Results: The result showed that there are variations of dose descriptors in all hospitals and the overall result is higher than previous studies.

Conclusions: It is important for every hospital to implement the recommended guideline by established bodies in order to reduce the radiation dose to the patient.

Keywords: *Computed tomography; CT; abdominal; radiation dose; dose descriptors*

EFFICACY OF MUSCLE ENERGY TECHNIQUE WITH TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION ON QUADRATUS LUMBORUM IN ACUTE UNILATERAL LUMBAR STRAIN

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Introduction: Low back pain, the most frequent self-reported type of musculoskeletal pain, is often recurrent and has important socio-economic consequences. Muscle energy technique (MET) is a manual medicine treatment procedure that involves the voluntary contraction of the subject's muscle in a precisely controlled direction, at varying levels of intensity, against a distinctly executed counterforce applied by the therapist. Transcutaneous electrical nerve stimulation (TENS) is used as a treatment modality because it offers a non-invasive procedure to reduce both acute and chronic pain by attaching two or more electrical pads to a person's skin.

Objective: The study was conducted to evaluate the effectiveness of MET with TENS on Quadratus lumborum in acute unilateral lumbar strain.

Methods: The sample of 30 volunteers with no history of musculoskeletal disease was selected on the basis of unilateral back pain experiencing around or near lumbar and thoracolumbar segments and positive muscle length tests for Erector spinae and Quadratus lumborum. All the subjects were randomly assigned into three groups, subjects in Group- A undergone TENS, Group-B was treated with MET and Group-C was treated with MET and TENS in lumbar spine. The treatments were given for five consecutive days a week for a total of three weeks. Pain intensity and discomfort were evaluated before and after treatment programme. The outcome was measured after 3 weeks from each subjects. Pain and disability were assessed and analyzed by using Numerical Pain Rating Scale (NPRS) and Modified Oswestry Disability Questionnaire (MODI).

Results: The result of this study indicated that muscle energy technique with TENS on Quadratus lumborum will decrease acute unilateral Lumbar strain.

Conclusion: It can be concluded that MET and TENS can be used as an effective therapeutic maneuver to decrease pain and improve range of motion.

Keywords: *Muscle energy technique (MET); Transcutaneous electrical nerve stimulation (TENS); Numerical Pain Rating Scale (NPRS); Modified Oswestry Disability Questionnaire (MODI)*

STUDENTS' UNDERSTANDING AND PRACTICE TO GOOD NUTRITIONING: A CASE STUDY AT UniKL-RCMP

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Introduction: The physical aspect is one of the SPICES (Spiritual-Physical-Intellectual-Career-Emotional-Social) development domains implemented by UniKL to students. Physically fit and thriving students are active, strong, energetic and rarely to be unwell. To ensure good physical well-being, it is important for students to maintain their health. One of the way to maintain good health is to practice good nutrition. Islam is known as the religion of mercy to all creation (rahmatan lil alamaeen), and through its Messenger Prophet Muhammad SAW are teachings of good ethics and proper nutrition intake which is to be in moderation, clean and blessed. This study was conducted to determine the extent to which UniKL-RCMP students understand this concept and practice it in their lives.

Materials and Methods: Respondents to this pilot study and quantitative analysis are students who are still pursuing their studies at UniKL-RCMP at diploma and bachelor degree level in medicine, pharmacy, pharmaceutical technology, physiotherapy, medical imaging and nursing. The questionnaire is about their understanding and practice towards the concept of moderation, hygiene and blessing in terms of nutrition as taught by the Prophet.

Results: 1) Students' understanding on the concept of moderation, hygiene and blessing in their day-to-day dietary intake; 2) Students' practice of eating etiquette in their daily lives.

Conclusion: It is very important for UniKL-RCMP healthcare students to know and understand and apply good nutrition practices that contain elements of moderation, hygiene and blessings in their daily lives.

Keywords: *Physical; well-being; nutrition; UniKL-RCMP students*

MEDICAL EFFECTS OF RUQYAH HYSTERIA PATIENTS AT THE DARUSSYIFA' AND DARUSSALAM ISLAMIC TRADITIONAL MEDICAL CENTER

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Introduction: Differences in presumption regarding the causes of hysteria leads into different methods for its treatment. This study was aimed to identify and compare the causes and symptoms of hysteria due to *jinn* possession, with psychological origin. This study was also conducted to comparatively analyze the effects of the *ruqyah* treatment on hysteria due to *jinn* possession and its reaction towards a person with psychological disorder.

Materials and Methods: Qualitative research through methods of observation and interview of ten (10) patients, two (2) family members, and three (3) healers was carried out for this study. All participants were obtained from Pusat Perubatan Tradisional Islam Darussyifa' and Pusat Perubatan Tradisional Islam Darussalam.

Results: Analysis of the *Cohen Kappa* measurements revealed that the five (5) research themes validated by traditional Islamic therapist and psychologist was high with an average score of 0.76. The study showed that symptoms such as blinking of the eyes, speak in an incomprehensible language, and extra ordinary strength experienced by the hysterical patients of *jinn* possession were not experienced by patients suffering from psychological disorders. Hysteria from *jinn* possession is usually caused by *jinn* existence into a body by *al-Mass* (touch) and *al-Sar'* (smack) without identified cause either from black magic or '*saka*' or any psychological disorder. Psychological disorder patients are often due to traumatic life events, sadness, stress, anxiety, and anger. The hysterical symptoms observed during the *ruqyah* treatment thought to be due to *jinn* possession are not seen in patients with psychological origin. Hysteria from *jinn* possession is usually subconscious and patients do not have historical psychological problems. Conversely, psychological disorder patients are purely due to psychological origin and has no association with any possession. There is also a mixture between these two elements of hysteria due to *jinn* possession and psychological disorder in a certain case. Hysterical symptoms due to *jinn* possession usually reduce or disappear after *ruqyah* treatment and this would not happen in patients with psychological origin.

Conclusions: Reactions and outcomes of *ruqyah* treatment are important in differentiating the cause of hysteria that maybe due to *jinn* possession or psychological disorders as reflected by patient's response during the treatment.

Keywords*: The holy Quran; ruqyah; hysteria; traditional islamic theraphy; jinn*

CASE STUDY OF SIDDHA MEDICINAL PREPARATIONS'*THREE PALA CHOORNAM AND THAYIR CHUNTI CHOORNAM' ON NINNAKALICHAL* (ULCERATIVE COLITIS)

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Aim of the study is efficacy of the *Threepala choornam* and *Thairchunty chooranam* on ulcerative colitis. The incidence for ulcerative colitis in western populations is 5-10 per 100 000 persons. The ulcerative colitis is nonspecific inflammatory conditions of the alimentary tract and confined to the large intestine. The disease almost always involves the rectum (proctitis) and may also involve a variable part of the colon or entire colon. The principal symptom is diarrhea with loose bloody stools containing mucus and pus. Defecation is often accompanied by lower abdominal discomfort. These symptoms are correlated with *Ninnakalichal* in siddha aspect. The patient aged 37 yrs. was affected by this disease for six years. The disease was not cured by the allopathic medicine and also, He had advised to take medicine for lifelong. Then he came to siddha clinic with the colonoscopy report. 2.5 grams of *Threepala choornam* and *Thairchunty chooranam* in dose of 15-25 milli gram twice a day dispersed in hot water for 49 days were administrated. The disease was highly minimized by symptomatically and Histopathologic ally within 49 days. The histological features were not in favor of ulcerative colitis or Crohn's disease. Herbal ingredients of this medicine have high antioxidant activity and rejuvenating properties. This herbal Siddha Medicinal preparation proves to be effective, affordable and acceptable treatment on ulcerative colitis (*Ninnakalichal).*

Keywords: *Ninnakalichal Siddha medicine; Threepala choornam; Thairchunti chooranam; ulcerative colitis*

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