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ABSTRACTS

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Contents

Development and Validation of the Abdominal Bloating Social Support (SS-Bloat) scale

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Abstract

Introduction: Social support could help patients suffering from abdominal bloating (AB) symptoms. However, there is limited validated questionnaire to measure the social support of AB patients. The study aimed to validate the newly developed Social Support Scale for Bloating (SS-Bloat).

Methods: Based on literature review, experts' input and in-depth interviews, new items were generated for SS-Bloat. Content validity was assessed by experts and pre-tested with 30 individuals with AB. Cross-section study was conducted by inviting those with AB symptoms to complete the questionnaire. Construct validity and reliability were determined based on exploratory factor analysis (EFA) and Cronbach alpha.

Results: During the development stage, eight items were generated for SS-Bloat, and remained the same after content validity and pre-testing. A total of 152 participants (mean age 31.27 years old, females 68.3%) completed the questionnaire. Three problematic items were removed based on the EFA. The SS-Bloat consists of five items with one factor. Total variance explained by the EFA model was 35.6%. Cronbach alpha of the single factor was 0.66.

Conclusion: The newly developed SS-Bloat scale was considered valid and reliable in assessing the level of social support among AB patients. Further validation in different languages and populations are needed.

Keywords: Abdominal bloating, Questionnaire, Health promoting behavior, Social support, Quality of life

The Impact of Foreign Study Experiences on Occupational Therapists' Work Practices in Singapore

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Abstract

Introduction: Singapore has historically been a country that relies heavily on migrant health workers to fulfil the ageing population's demands on their healthcare system. While the COVID-19 pandemic has served to highlight the contributions and value of foreign-trained and foreign-born healthcare professionals to the resilience of healthcare systems, little is known about their integration into the Singaporean workforce. This qualitative pilot research aims to examine the impact of international study experiences on work practices of foreign-trained occupational therapists in Singapore.

Methods: The experiences of six (6) foreign-trained occupational therapists working in Singapore were collected through semi-structured interviews based on the Kawa Model and thematically analysed.

Results: Three key themes emerged were job culture, client-specific culture, and clinical skills. Each of these three categories encompasses both positive and negative consequences of the foreign study experience.

Conclusion: Though foreign-trained occupational therapists in Singapore encounter complexities adjusting to local practice, their experiences in other contexts allowed them to contribute in ways that local graduates could not. As cultural compatibility is key to facilitating integration, Singaporean hospitals recruiting staff from abroad should focus their efforts on countries with similar culture or healthcare systems to build resilience moving into the New Normal.

Keywords: Occupational therapy, cultural compatibility, foreign healthcare workers, work culture, healthcare systems.

An Enhanced Health Behaviour Model for Adoption of Digital Mental Health to prevent Mental Disorders among Young Adults in Malaysia

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Abstract

Introduction: The world is facing a global crisis in poor mental health due to the coronavirus pandemic. The Ministry of Health revealed that 1 in 3 Malaysians who are 16 years and above have mental health issues. Mental health is a critical issue due to cost and limited accessibility. Digital mental health care helped psychological distress citizens during Covid-19 and global health experts are urgently calling people to access the digital mental health care. This study aims to propose a framework based on an enhanced health behaviour model to understand the factors that influence the adoption of digital mental health.

Methods: Interview with open-ended questionnaire was used to collect data.

Results: Finding showed that awareness, dialogue support, social support and credibility of the digital platform are the most important factors that influence young adults to adopt digital mental health. Further finding revealed that self- efficacy is one of the adoption factors if there is financial support such as insurance to be covered.

Conclusion: The outcome of research is to introduce digital mental health at both public and private health care and inclusiveness of mental health in current insurance policy in ensuring to invigorate health care among the young adults in Malaysia.

Keywords: Digital mental health, Mental disorder, Insurance, Adoption, Young Adults

Antioxidant Activities of The Fraction Extracts of Cashew Shoots (*Anacardium occidentale*)

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Abstract

Introduction: *Anacardium occidentale* shoots, known as Pucuk Gajus in Malay is widely found in tropical countries to traditionally treat diseases associated with cardiovascular system, eye and kidney. It contains many phytochemical compositions such as polyphenols that scavenges free radicals, hence beneficial for diabetes mellitus (DM) treatment. The aims of study were to determine the antioxidant activities of cashew shoots fraction extracts by using DPPH free radical scavenging activity assay, and to profile the polyphenols by using HPLC.

Methods: The cashew shoots extract was fractionated into *n*-hexane (HF), ethyl acetate (EAF), *n*-butanol (BF) and water (WF) fractions, before characterised for their antioxidant activities.

Results: The result showed that EAF had the lowest EC_{50} value (0.011±0.001 mg/mL) which indicated the highest antioxidant activity compared to ascorbic acid (positive control), HF, BF and WF fractions (0.011±0.001, 0.032±0.007, 0.017±0.001 and 0.072±0.009 g/mL, respectively) ($p<0.05$). EAF contained several targeted polyphenols – gallic acid, ferulic acid and quercetin in the highest concentration (95.985±0.653, 8.737±0.104 and 16.251±1.109 ppm accordingly) as compared to that of other fractions ($p<0.05$).

Conclusion: EAF of *A. occidentale* shoots extract was suggested as the most active fraction with high antioxidant activity and can be further developed for the treatment of DM in the future.

Keywords: Cashew shoots, *Anacardium occidentale*, antioxidant, ethyl acetate fraction, polyphenols

Sanguinoderma rugosum: A potential neuroprotective and neurorescue agent on glutamate-induced hippocampal neuronal cells

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Abstract

Introduction: Neuroinflammation is a key factor underlying epileptogenesis and may further lead to epilepsy. *Sanguinoderma rugosum* is a wild medicinal mushroom traditionally used to prevent epileptic fits and unremitting crying by babies at night among the indigenous Temuan community in Malaysia. This study aims to examine the neuroprotective and neurorescue properties of *S. rugosum* on oxidative stress-mediated mouse hippocampal cells.

Methods: The mycelia of *S. rugosum* were subjected to submerged liquid fermentation and further solvent extractions. The neurotoxicity as well as the neuroprotective and neurorescue properties of *S. rugosum* extracts were determined *via* MTT viability assay on HT-22 cells at 24 and 48 hours. Glutamate was used to induce oxidative stress.

Results: The results revealed that all extracts do not exert cytotoxic effects on the cells. Pre-treatment with ethanol extract (12.5 µg/mL) and hexane extract (100 µg/mL) for 24 hours as well as hexane extract (100 µg/mL) for 48 hours exhibited remarkable neuroprotective activity, suggesting the ability to attenuate neuroinflammation. Whilst, post-treatment with ethyl acetate extract (400 µg/mL) for 24 and 48 hours demonstrated strong neuro-rescue activity.

Conclusion: The current findings indicate that *S. rugosum* extracts could serve as a potent neuroprotective and neurorescue agent in the management of neuroinflammation to treat epilepsy.

Keywords: Neuroinflammation, Medicinal mushrooms, Glutamate, Neuroprotective, Neurorescue

Evaluation of *in-vitro* Anti-Proliferative Activities of Hybrid Peptides against Hepatocellular Carcinoma (HepG2) cells

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Abstract

Introduction: Hepatocellular carcinoma (HCC) denotes the dominant histological subtype of primary liver cancer which is less amenable to most curative therapies due to increased drug resistance and adverse effects. We had previously designed two series of hybrid peptides (NDs and DNs) based on NDC1 and NDC2 via fragments hybridization approach. In search of alternative treatment for HCC, we aim to investigate the *in-vitro* proliferative activities of these hybrid peptides against HepG2 cells.

Methods: The cytotoxicity strength of NDs and DNs were tested on HepG2, Vero and THLE-3 cells using MTT assay. Upon selecting hybrid peptides with the best selective toxicity against HepG2 cells, their cytostatic activities were evaluated. Flow cytometric and calorimetric assays were employed to evaluate the mode of cell death and subsequent mechanisms were elucidated using qRT-PCR and western blotting analysis.

Results: Our results indicated that DN1 and DN4 exerted selective toxicity against HepG2 cells in a dose-dependent manner, although cell cycle inhibition was not observed. Both hybrid peptides induced apoptosis via inducing extrinsic and intrinsic pathways where up-regulation of pro-apoptotic genes and proteins were observed.

Conclusion: The current finding provides evidence of DN peptides as a potential candidate to be further developed as anti-cancer agents to treat HCC soon.

Keywords: Hepatocellular carcinoma, hybrid and linear peptide, HepG2, anti-proliferative, apoptosis

Ultrasensitive and Label-free Fluorescent Nanobiosensor for the Detection of miRNA in Cancer Progression

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Abstract

Introduction: MicroRNAs (miRNAs) are small non-coding RNAs that regulate gene expression on a post-transcriptional level and their levels are dysregulated in disease and metabolic conditions, thus highlighting their role as diagnostic and prognostic biomarkers. For example, miRNA-155 is commonly overexpressed in breast cancer patients. Herein, we present a nanobiosensor to detect miRNA-155, established on the basis of hybridization chain reaction (HCR) and DNA-stabilized silver nanoclusters (AgNCs), that serve as amplification strategy and fluorescent detection probes, respectively.

Methods: Under ambient conditions, DNA probes were mixed with miRNA-155 to initiate HCR, followed by the addition of reduced silver salt to form fluorescent AgNCs. Gel electrophoresis was performed to confirm the formation of HCR product. The emission of AgNCs was measured using a spectrofluorometer.

Results: The HCR-AgNCs nanobiosensor showed high selectivity towards the target miRNA-155, with capabilities to detect single-base mismatch. Furthermore, the HCR-AgNCs nanobiosensor displayed ultrasensitivity with a wide linear range between 100 fM and 10 nM, and LOD of 7 fM. In real sample analysis, the nanobiosensor exhibited exceptional reproducibility and stability with human serum samples.

Conclusion: The highly responsive HCR-AgNCs nanobiosensor can be applied clinically for the detection of miRNA-155 and point-of-care diagnosis of breast cancer.

Keywords: Biosensor, Breast Cancer, Hybridization Chain Reaction, MicroRNA, Silver Nanoclusters

Pharmacognostics study of *Strobilanthes crispus* and *Vernonia amygdalina* Delile as potential therapeutic agent: A comparative study

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Abstract

Introduction: Medicinal plants, such as *Strobilanthes crispus* and *Vernonia amygdalina Delile* (VAD), have been used traditionally to treat various diseases. However, knowledge of these plants' antimicrobial properties against human facial microorganisms is unknown. Hence, this study examined the antimicrobial activity of locally grown *S. crispus* and VAD on human facial microorganisms.

Methods: Different solvents (methanol, ethanol, and distilled water) were employed to extract bioactive compounds from both plants. Then, the extracts with the highest yields were tested for antimicrobial activity against human facial microorganisms.

Results: Our study showed that methanol gave the highest yields of extract from both plants (*S. crispus*, 13.6±0.01%; VAD, 14.1±0.03%). Both plants contained anthraquinones, flavonoids, glycosides, and terpenoids, although VAD showed higher antioxidant activity compared to *S. crispus* (DPPH inhibition IC_{50} of 96.2±0.77 and 89.9±0.95µg ml^{-1}, respectively). VAD also showed higher antimicrobial activity than *S. cripus* (1.15±0.07cm and 1.01±0.14cm zones of inhibition, respectively).

Conclusion: Our results indicate that the concentration of bioactive compounds in the plant extracts directly correlates with its potency in inhibiting microbial growth, hence, VAD has higher antimicrobial activity compared to *S. crispus*; however, both plants have the potential to be used as ingredients in nutra- and cosmeceuticals.

Keywords: Pharmacognostics, *Strobilanthes crispus*, *Vernonia amygdalina* Delile, Therapeutic agent, Antimicrobial property

Fig Powder as A Substitution of Maltodextrin and Fructose in Energy Gel

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Abstract

Introduction: Maltodextrin and fructose in conventional energy gel may cause gastrointestinal distress. Therefore, this study aimed to incorporate fig powder into energy gel to substitute maltodextrin and fructose. The effect of roasting time and temperature on the physicochemical properties of fig powder was also determined.

Methods: Physicochemical properties of fig powder roasted at different temperatures and time, 65°C (1 day), 65°C (2 days), 55°C (2 days) and 55°C (3 days) by using a convection oven were studied. Proximate compositions of two formulations of energy gel containing 0% and 18% fig powder roasted at 65°C (2 days) were studied.

Results: Fig powder roasted at 65°C (2 days) had the lowest anthocyanin content (0.84 ± 0.08 mg). Total phenolic content (30.73 ± 0.85 mg), total flavonoids (30.79 ± 0.32 mg), and antioxidant capacity (62.91 ± 0.30%) of fig powder roasted at 65°C (2 days) increased significantly. Fig powder roasted at 65°C (2 days) was chosen to prepare energy gel. The moisture, ash, protein, and fibre contents increased linearly with the fig powder content.

Conclusion: Fig powder in energy gel could be a good substitution of maltodextrin and fructose with additional nutritional benefits.

Keywords: Fig powder, energy gel, physicochemical properties, proximate composition

Antimalarial Activity, Cytotoxicity and Phytochemical Screening of *Quercus infectoria* Crude Extracts

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Abstract

Introduction: *Quercus infectoria* (QI) galls has been used traditionally as herbal remedy, however, there is no antimalarial activity of the galls has been reported. This study aimed to investigate the *in vitro* antimalarial activity as well as the cytotoxicity and phytochemical constituents of the QI gall acetone (ACE), methanol (MCE), ethanol (ECE) and aqueous (AQCE) crude extracts.

Methods: The antimalarial activity of the extracts against the chloroquine-sensitive strain of *Plasmodium falciparum* (3D7) was evaluated by using a malarial SYBR Green I fluorescence-based (MSF) assay. The cytotoxicity of the extracts on normal fibroblast (NIH/3T3), epithelial (Vero) and endothelial (HUVEC) cells was performed by using a 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay. The extracts were qualitatively screened for the presence of phytochemical constituents based on a characteristic of colour changes or precipitate formation. The effect of ACE on pH of the mid trophozoite stage parasite's digestive vacuole was examined by using a ratiometric fluorescein isothiocyanate (FITC)-dextran.

Results: Only ACE and MCE showed a promising antimalarial activity against the parasite with the IC_{50} of 5.85 ± 1.64 and 10.31 ± 1.90 µg/mL, respectively. ACE and MCE showed the CC_{50} ranged from moderate toxic to non-toxic against all tested normal cells. The phytochemical screening revealed the presence of tannins and flavonoids, and a high amount of total phenolic content (TPC) and total flavonoid content (TFC) in all extracts. The digestive vacuole pH of the parasites treated with ACE was significantly altered compared to the untreated parasites ($p < 0.001$).

Conclusion: Overall, this study provides valuable insights of the QI gall capability as a safer and promising antimalarial candidate.

Keywords: *Quercus infectoria* gall, *Plasmodium falciparum*, antimalarial activity, cytotoxicity, phytochemical

Identifying DNA Probe from Papillomavirus (HPV) 18 in E6 Region for Sensing Application

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Abstract

Introduction: The major determinant of cervical cancer on set is high risk types 18 Human *Papillomavirus* which reportedly led to HPV infection. Detailed biological expertise is extremely important to effective HPV detection systems. The aim of this research study is to design a DNA probe from HPV 18 in the E6 region for early cervical cancer detection using bioinformatics tools.

Methods: Sequence of amino acid conserved on E6 region applied as a fundamental to design DNA probe for detection of HPV 18 in cervix region**.** A highly technological and systematic search engine was performed by using Basic Local Alignment Searching Tools (BLAST) and CLUSTAL OMEGA. Extra statistical parameters have been given by basic local alignment search tools (BLAST), which include desired values.

Results: The DNA probe for HPV 18, 5' GAT CCA GAA GGT ACA GAC GGG GAG GGC ACG 3' was successfully constructed with GC content of 66.77%. This oligonucleotide probe is designed with a length of 30-mer, GC content in the probe is between 50%-70%. Between 24 and 35-mer, the probe authorised an acceptable length.

Conclusion: The region selection can be implemented as a synthetic DNA biomarker, with connotations for biosensor HPV detection techniques, extremely for early cervical cancer clinical determination.

Keywords: Bioinformatics tools, Human *Papillomavirus*, Multiple sequence alignment

Antioxidant Activities of Coelonin, a Bioactive Compound from *Dendrobium scabrilingue*

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Abstract

Introduction: Overproduction of free radicals in cells is the main cause of various chronic diseases including cancer, diabetes and heart disease. To prevent this incident, antioxidant agents are needed. Coelonin is a dihydrophenanthrene and one of the bioactive compounds in Dendrobium species. This study aimed to investigate antioxidant activity and protective effect of coelonin against reactive oxygen species (ROS) in macrophage RAW264.7 cells.

Methods: Antioxidant activity was measured using the 2,2-diphenyl-1-picryl-hydrazyl-hydrate (DPPH) assay. Cytotoxicity of coloenin was measured by using MTT assay. 2,7-Dichlorodihydrofluorescein diacetate (H_2DCFDA) assay was used to assess the effect of coelonin on hydrogen peroxide-induced oxidative stress in the macrophages.

Results: DPPH assay result showed that coelonin exhibited dose-dependent free radical scavenging ability. Evaluation on cytotoxicity of coelonin on the cells showed that the maximum concentration at 20 µM of coelonin has no significant difference in percent cell viability of the macrophage cells compared to the control. Pretreatment of the macrophage cells with coelonin at non-toxic concentrations prior to hydrogen peroxide exposure significantly reduced intracellular ROS production in a concentration dependent manner.

Conclusion: The results suggest that coelonin is a promising antioxidant agent. However, further studies are required to clarify the underlying mechanism of coelonin in reducing intracellular ROS.

Keywords: Coelonin, Reactive oxygen species, RAW 264.7 cells

Development Of Guided Imagery and Progressive Muscle Relaxation Therapy Audio for Patients with Functional Bloating

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Abstract

Introduction: Abdominal bloating symptoms were experienced by 65% of the general population. An effective treatment is still unavailable. Thus, posing a bothersome problem for patients and clinicians alike. Guided Imagery (GI) utilises mental images to invoke certain body reactions; whereas Progressive Muscle Relaxation (PMR) involves contracting and relaxing certain muscles to attain relaxation. The development and validation of the GI and PMR therapy are relatively novel approaches in treating patients with bloating.

Methodology: Descriptive research based on the Medical Research Council guidelines was conducted to develop the interventions. The study consists of three phases: 1) Identifying the evidence, 2) Developing theory, and 3) Modelling process and outcomes. Seven experts from related fields and 30 patients were invited to rate the audios based on four domains (scripts, narrative, experience, and adequacy) through the face validity index (FVI) and content validity index (CVI) questionnaire respectively.

Results: The CVI/Average and FVI/Average of the GI audio ranged from 0.98 to 1.00, while the PMR had a CVI/Average and FVI/Average of 0.96 to 1.00.

Conclusion: The GI and PMR audio proved to be suitable to the context and target population. The efficacy of the interventions will be tested in a randomised controlled trial study.

Keywords: Guided Imagery, Progressive Muscle Relaxation, Functional Abdominal Bloating, Functional Gastrointestinal Disorders (FGID), Psychological Interventions

The Impact of REM Sleep Deprivation on Vascular Function in REM Sleep Deprived Animal Model

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Abstract

Introduction: Good quality of sleep is crucial to human health and wellbeing. The pathogenesis of endothelial dysfunction following REM sleep deprivation remains unclear. We aimed to evaluate the endothelial changes following REM sleep deprivation using an inverted flowerpot technique.

Methods: There were three study groups, each with seven Sprague-Dawley male (n=7); free-moving (FMC), REM sleep deprivation for 72-hours (REMsd) and tank control (TC). Food intake, body weight gain (BWg), and blood pressure were recorded. Isolation of descending thoracic aorta was performed to measure oxidative stress biomarkers and evaluate i*n vitro* functional study. Femoral artery was isolated for measurement of endothelial-nitric oxide synthase protein expression.

Results: A significant decreased BWg despite a significant increased food intake was observed in REMsd group. When compared to other groups, the REMsd group demonstrated a significant increased systolic blood pressure. Malondialdehyde levels increased significantly while the activity of superoxide dismutase decreased significantly in REMsd as compared to the other two groups. Endothelium-dependent relaxation was significantly impaired while eNOS protein expression was significantly decreased in REMsd rats when compared to others.

Conclusion: This study provides convincing evidence that REMsd induces oxidative stress that leads to endothelial dysfunction.

Keywords: Sleep deprivation, animal model, endothelial dysfunction, oxidative stress, vitamin C

Effects of Tocotrienol-Rich Fraction in Medium-Chain Triglycerides (TRF-MCT) and Tocotrienol-Rich Fraction in Long-Chain Triglycerides (TRF-LCT) on Human Endometrial Stromal Fibroblast Cells Viability

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Abstract

Introduction: Endometrial stromal fibroblast (eSF) cells aid in maintaining the endometrium function and its cyclic changes. eSF cells regulate proliferation, remodelling, and degradation of endometrium tissues. Palm oil tocotrienol-rich fraction (TRF) is a substance with anti-inflammatory, antioxidant, and anti-proliferative properties. However, its effects on eSF cells are not well known. Thus, it is important to investigate the effect of TRF on the cell viability of primary human eSF cells. Hence, the aim of this study was to evaluate the cell viability of primary human eSF cells upon exposure to different concentrations of TRF-LCT and TRF-MCT.

Methods: eSF cells were isolated from patients with normal endometrium. eSF cells were cultured and incubated for 24 and 48 hours with serial dilutions of 25, 50, and 75 µg/ml of TRF-LCT and TRF-MCT. Cells were then subjected to MTS assay after each incubation period.

Results: Cell viability was significantly higher ($p \leq 0.05$) in TRF-LCT and TRF-MCT treated cells compared to control. When comparing between the two treatments, cell viability is higher ($p \leq 0.05$) in TRF-LCT compared to TRF-MCT (25 and 75 µg/ml concentration at 48 hours). The effect of TRF on cell viability was dose-dependent.

Conclusion: eSF cells response favourably to TRF-LCT treatment relative to TRF-MCT.

Keywords: tocotrienol-rich fraction, tocotrienols, palm oil, endometrial stromal fibroblast cells, endometrium

Tissue rigidity evaluation in dual-stage carcinogenesis of Lung Squamous Cell Carcinoma (SCC) *in vivo*

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Abstract

Introduction: Increased tissue rigidity (TR) was an emerging hallmark of cancer. However, TR evaluation in lung squamous cell carcinoma (SCC) remains elusive. Therefore, this study aimed to evaluate TR at dual-stage carcinogenesis of lung SCC in vivo.

Methods: BALB/c mice were allotted into four groups (n=6); (1) pre-malignant vehicle (PV) (70% acetone for 15 weeks), (2) pre-malignant cancer (PC) (0.04M NTCU for 15 weeks), (3) malignant vehicle (MV) (70% acetone for 30 weeks), and (4) malignant cancer group (MC) (0.04M NTCU for 30 weeks). Treatment was given topically on the dorsal area, twice a week. After termination of mice, immunohistochemistry for Ki67 protein and Sirius red staining were performed to confirm proliferation status and collagen content, respectively. P-value of < 0.05 was assigned as statistical significance.

Results: The PC and MC groups had significantly higher ($p<0.05$) proliferative activity and collagen content than the PV and MV groups. Meanwhile, these parameters were significantly higher ($p<0.05$) in the MC group as compared to the PC group, indicating a higher TR in the malignant stage versus the pre-malignant stage.

Conclusion: TR might be increased as cancer progresses, and targeting TR is a promising approach to treat lung SCC in the future.

Keywords: Lung cancer, squamous cell carcinoma (SCC), tissue rigidity (TR), proliferation, collagen

Physical workout/ Exercise as a treatment (prompt recovery factor) and protection against Covid-19

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Abstract

Introduction: Lack of exercise is among the top risk factors to increase the risk of death and various spreading morbidities.

Methods: A cross-sectional observational study was conducted at two gyms of Hyderabad Pakistan.

Results: The frequency of exercise per week increases the level protection against Covid-19. People doing exercise for more than 3 days had better outcomes in terms of recovery from Covid-19. Similarly, it was observed that the people with workout time more than 1 hour per day hardly encountered with Covid-19 as compared to those who were doing less than 1 hour per day. In addition, exercise more than 1 hour / day causes more prompt recovery. However, the recovery time was delayed up to 14 days among those doing exercise less than 1 hour/day.

Conclusion: Exercise decreases the chances of being affected by Covid-19 and can boost the process of recovery.

Keywords: Covid-19, Exercise, physical workout, recovery, protection.

RUNX1 Genomic Engineering Using a Double Nickase CRISPR-Cas9 Strategy

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Abstract

Introduction: Breast cancer is the most widely diagnosed cancer among women in the world, with 2.1 million new cases reported annually. In Malaysia, breast cancer contributes to 25% of female cancer deaths and the majority of the breast cancer-related death is due to metastatic tumour growth in distant organs. To date, no effective treatment is available for metastatic breast cancer. Therefore, it is imperative to find specific biomarkers that will allow an early detection and effective targeting of metastatic breast cancer cells.

Methods: A double nickase CRISPR-Cas9 strategy is used to knockout the expression of RUNX1 at the genomic level. With this approach, a stable RUNX1-negative cell line will be established in order to translate our *in vitro* data under *in vivo* condition.

Results: We have demonstrated that RUNX1 is required for the migration and invasion of MDA-MB-231 cells. Currently, the RUNX1-negative cell lines are being developed to validate our *in vitro* data. Four RUNX1-CRISPR plasmids have been established and confirmed by sequencing. These will be used to develop the RUNX1-CRISPR cell lines.

Conclusion: Our approach is anticipated to permanently knockout the expression of RUNX1 in MDA-MB-231 cells and they will remain silent whenever implanted in the mammary fat pad.

Keywords: RUNX1, CRISPR-Cas9, Breast cancer metastasis

Determination of pH Changes of The Digestive Vacuole of The Malaria Parasite, *Plasmodium falciparum* treated with Ellagic Acid

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Abstract

Introduction: Malaria is one of the leading causes of death worldwide caused by parasites of the genus *Plasmodium*. The effect of phenolic compounds such as ellagic acid against the malaria parasite has previously been reported. This present study was designed to evaluate the effect of ellagic acid on pH of the *Plasmodium falciparum* digestive vacuole.

Methods: SYBR Green I fluorescence-based method was employed to determine the antimalarial potential of ellagic acid against the malaria parasite, *P. falciparum* (3D7 strain). The flow cytometry-based technique using FITC-dextran was conducted to identify pH changes of the parasite's digestive vacuole treated with different concentrations of ellagic acid.

Results: Ellagic acid showed promising antimalarial activity with the 50% inhibitory concentration (IC_{50}) of 1.85 ± 4.57 nM. The pH of digestive vacuole of ellagic acid-treated parasites was significantly altered in a concentration-dependent manner as compared with untreated parasites ($p < 0.001$). The similar effect was shown by the parasites treated with a standard proton pump inhibitor, concanamycin A.

Conclusion: Ellagic acid might have altered the digestive vacuole's pH through the inhibition of proton pumps that regulate the acidification of the vacuole. Overall, this study provides significant evidence of ellagic acid capability as a promising antimalarial candidate.

Keywords: Ellagic acid, antimalarial activity, pH, digestive vacuole, *Plasmodium falciparum*, FITC-dextran

Effectiveness of Cardiopulmonary Resuscitation (CPR) using Self-directed Training Method on Level of Knowledge and Skills Among Hospitals Nurses in North-Western Nigeria-Protocol Paper

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Abstract

Introduction: The instructor led training method, otherwise referred to as traditional CPR training has been practiced for more than 40 years. However, this CPR training method has hardly achieved the desired result of maintaining the knowledge and skills of both lay people and health care providers. There is evidence to support alternative methods, such as self-directed training methods, which can provide high-quality resuscitation training through a more versatile method of delivery. The objective of this study is to compare the knowledge and skills of nurses between instructor-led and self-directed training methods from baseline to post-intervention, one month, three months and six months.

Methods: The design of the study is a clustered randomised controlled trial (RCT) in two referral hospitals in northwest Nigeria. This study uses the concept of Cognitive Load Theory (CLT) to understand how and why health professionals are struggling to master and develop expertise in complex concepts. Stratified random method was used and sample size is 146 calculated using two population mean formulas. Survival analysis will be used to test the hypothesis.

Results: The expected outcome is that there is a significant difference in knowledge and skills level between instructor-led and self-directed training methods.

Conclusion: Self-directed training method can be proposed on certification of CPR among nurses.

Keywords: Cardiopulmonary resuscitation, Nurses. Knowledge, skills and level.

Depression and Anxiety Disorders among Pharmacy Students in UITM Puncak Alam: Prevalence, Causes and Help-Seeking Behaviour during Covid-19 Pandemic

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Abstract

Introduction: Mental illness is one of the biggest health problems that affect Malaysians after heart disease and diabetes. The main focus of this study is to determine the prevalence, causes, and help-seeking behaviour among UiTM pharmacy students during Covid-19 pandemic.

Methods: Questionnaires were distributed among 240 students and were analysed using SPSS v27.0.

Results: Of all students, 46.3% were depressed, while 46.8% were anxious. A significant Pearson correlation between depression and anxiety was observed (r=0.7). “Easily annoyed and irritable” was the most typical depressive symptom, while “fear of worst happening” was the most typical anxiety manifestation. The scenario became augmented among these students because of the academic pressure (87.3%), irregular sleep patterns (65.4%), and financial problems (62.9%).

Conclusion: Identifying the causes and inculcating the help-seeking behavior among respondents may help them to overcome the issues wisely.

Keywords: Depression, Anxiety Disorders, Covid-19

Knowledge, Attitude and Practice (KAP) Study on Antibiotic Utilisation among General Practitioners (GPs) in Perak, Malaysia

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Abstract

Introduction: Antimicrobial resistance (AMR) is addressed as a global health threat by the WHO. In Malaysia, antibiotic prescribing rates are much higher in private clinics compared to public clinics. Therefore, this study was conducted to evaluate knowledge, attitude, and practice (KAP) of antibiotic utilisation among general practitioners (GPs) of private clinics.

Methods: This is a descriptive research conducted during the new norm of the Covid-19 pandemic. A self-administrated questionnaire which consisted of 30 questions was distributed among 67 GPs in the state of Perak.

Results: Test of reliability showed the value of Cronbach's alpha at 0.912. Overall, GPs were known to have good knowledge in handling antibiotics. However, respondents acknowledged a few factors which contradicted good prescribing practices (53.03% confirmed that they tended to prescribe antibiotics to satisfy patients' request, 60.61% agreed that sometimes profit influenced antibiotic prescription and 51.52% strongly agreed that maintaining good reputation could lead to antibiotics' overprescribing). Respondents also acknowledged the importance of educating the public as patients demanded for antibiotics during consultation.

Conclusion: Though GPs were well-educated about antibiotic utilisation, the public plays an equally important role in combating AMR. Therefore, KAP study on the public is undergoing to investigate their understanding of antibiotics.

Keywords: Antimicrobial Resistance (AMR), General Practitioner, Rational Utilisation of Antibiotics

In vitro Evaluation of *Hibiscus rosa-sinensis* on Wound Healing Activity

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Abstract

Introduction: Past study revealed the potential of *Hibiscus rosa-sinensis* (HRS) leaves ethanolic extract in modulating wound healing on rats. This study aimed to evaluate the wound healing properties of this extract at in vitro level.

Methods: A basic phytochemistry study was done to confirm the composition of the extract. Cell viability and cell proliferation of human epidermal keratinocytes (HaCaT) were assessed via MTT (3-[4,5-dimethylthiazol-2-yl]-2,5 diphenyl tetrazolium bromide) assay, while cell migration was determined by scratch assay.

Results: Results showed that HRS extract at concentration lower than 500 µg/ml does not reduce the viability of the cells. Higher concentrations (up to 1000 µg/ml) of the extract are neither cytotoxic nor improve the viability of the cells. The extract (15.63 - 62.5 µg/ml) influenced the proliferation of HaCaT significantly ($p<0.05$) and was comparable to positive control (30 µg/ml allantoin) at 24 and 48 hr. The same concentration of the HRS extract also showed rapid wound closure at 16 hr and close to full wound closure at 24 hr in scratch assay. This was significant as compared to the control group ($p<0.05$) and similar to the positive control.

Conclusion: Ethanolic extract of *Hibiscus rosa-sinensis* leaves is beneficial in accelerating wound healing *in vitro*. These results support the findings on wound healing of *Hibiscus rosa-sinensis* extract in animal study.

Keywords: *Hibiscus rosa-sinensis*, wound healing, cell proliferation, cell migration, *in vitro*

Bactericidal Potential of Dual-Ionic Honeycomb-like ZnO-CuO Nanocomposites from *Calotropis gigantea* against Prominent Pathogen Associated with Skin Infection: *Staphylococcus aureus*

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Abstract

Introduction: Skin infections caused by *Staphylococcus aureus* (*S. aureus*) colonisation, especially those associated with open wound and antibiotic resistance, are a significant healthcare problem. Presently, scientists are looking for efficient alternative nano-based bactericidal agents, particularly green synthesised nanomaterials. This study investigated the bactericidal potential of natural carbon and calcium decorated on ZnO–CuO nanocomposites from the *Calotropis gigantea* at different calcination temperatures.

Methods: Dual-Ionic Honeycomb-like ZnO–CuO nanocomposites were characterised by X-ray powder diffraction, scanning electron microscopy and energy-dispersive spectroscopy.

Results: The bactericidal efficiency of ZnO–CuO on *S. aureus* greatly improved with dual-ionic systems. The low temperature-calcined ZnO–CuO demonstrated better antimicrobial activity at a minimum inhibitory and bactericidal concentration.

Conclusion: These observations suggested that different calcination temperatures of ZnO–CuO may be initiated by the divergent ion distribution on 'honeycomb' porous structure, which was the underlying mechanism of toxicity towards *S. aureus*. Study results may contribute knowledge to the development of a synergistic bactericidal agent with binary nanocomposite combinations that could efficiently overcome bacterial colonisation on open wounds.

Keywords: *Calotropis gigantea*, Binary Nanocomposites, Bactericidal Agents, Open Wound Infection, Skin Infection

Developing of DNA Probe for Specific Spike Glycoprotein of SARS-CoV-2 as a Bio-detection Component for Biosensor Production

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Abstract

Introduction: Recently discovered coronavirus disease (COVID-19) caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) was a greatly infectious viral disease that affected global public health concern. Currently, the molecular diagnostic system was qRT-PCR as a gold standard for the detection of SARS-CoV-2. Extensive biological data is essential for generating effective preventive measures, diagnostic research, vaccines, and drug treatments targeting COVID-19. The study aimed to develop a DNA probe that complements the RNA target of the S region for SARS-CoV-2.

Methods: The conserved RNA sequence inside the S gene had been utilised as a framework for developing the oligonucleotide probe for the diagnosis of the virus. Cross-validation of distinct strains of coronavirus nucleotide sequences was complete using bioinformatic tools to validate the percentage of identical and consent regions that became the source of a distinct strain of viruses.

Results: The 30 mer with 50.0% GC content of DNA probe, 5' CAG TTT GCC CTG GAG CGA TTT GTC TGA CTT 3' was designed.

Conclusion: This complimentary DNA probe was developed based on an RNA target within the S gene option that could be utilised as a biomarker probe to develop a biosensor for the clinical and environmental diagnosis of COVID-19.

Keywords: DNA probe, spike glycoprotein, SARS-CoV-2, bioinformatics tools, biosensor

Analysis of Genetic Variants in Myeloproliferative Neoplasms using a Custom 22-gene Next-generation Sequencing Panel

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Abstract

Introduction: Myeloproliferative neoplasms (MPNs) encompass a heterogeneous group of chronic, clonal blood disorders with leukaemic potential. Although various MPN-associated genes have been discovered, Philadelphia-negative MPNs (essential thrombocythaemia (ET), polycythaemia vera (PV), and primary myelofibrosis (PMF)) lack subtype-specific disease markers. Next-generation sequencing (NGS) technology has potential utility in the clinical management of MPNs. Here, we examined the spectrum of genetic variants in a small cohort of clinical MPN samples using a custom, in-house designed 22-gene NGS panel.

Methods: The custom NGS panel was validated via two identical but independent sequencing runs before screening MPN samples (ET n=3, PV n=3, PMF n=4). Sequencing was performed on an Illumina Miseq (2x150 base pairs, paired-end) and data was analysed via a bioinformatics pipeline. Selected variants were confirmed via Sanger sequencing.

Results: The custom NGS panel had good performance and a detection limit of 1% variant allele frequency (VAF). Across the clinical MPN samples, 44 polymorphisms and 20 variants (including 4 putatively novel variants with potential biological significance) were identified. All identified variants were Sanger-confirmed, except for single nucleotide variants with VAFs of < 15%.

Conclusion: The fidelity of the analysis supports the clinical utility of the custom NGS panel. A larger study cohort combined with the greater profiling of genes will further clarify any subtype-specific genotype-phenotype associations.

Keywords: Myeloproliferative Neoplasm, Next-Generation Sequencing, Bioinformatics, Novel Variant, Disease Management

A Multi-omics Approach to Study The Evolution of Resistance During Low-level Antibiotics Exposure in *Shigella*

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Abstract

Introduction: The fluoroquinolone-resistant *Shigella* is listed by the World Health Organisation as a pathogen that urgently requires new antibiotics. Resistance to high concentration of antibiotics has been the focus of many studies. Interestingly, low concentration of antibiotics equally promotes the development of resistant pathogens. However, it is not known how *Shigella* spp. evolve under sub-lethal antibiotics, which is crucial to developing knowledge-based interventions in this emerging pathogen.

Methods: To elucidate the genetic pathways involved, we employ a multi-omics (genomics and transcriptomics) approach to monitor laboratory-controlled evolution of an antibiotic-susceptible *Shigella* into resistant strains. Genomics involves whole-genome sequencing of resistant strains to determine mutations while transcriptomics provides information on the gene expression to elucidate the genes/regulatory pathways that modulate antibiotics resistance.

Results: Known and novel mutations were identified in *S. sonnei* strain constant exposure to sub-lethal Norfloxacin. The strains developed up to 8-fold resistance after growing under antibiotics stress for 1000 generations. RNA-seq analysis on selected strains indicates that at least two unique pathways were involved in the response to low levels antibiotics.

Conclusion: These findings will fill the knowledge gap related to effects of sub-lethal antibiotics on the evolution of MDR pathogens by using *Shigella* as a model organism.

Keywords: *Shigella sonnei*, Antimicrobial resistance, Genomics and transcriptomics, In-vitro evolution, SNP

The Effects of Tualang Honey on Sperm Profile in Mixed Cholesterol Diet Administered Rats

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Abstract

Introduction: Hypercholesterolaemia is a recognised factor associated with male infertility. They have been shown to reduce the semen quality. The main recommendation for treatment is diet modifications. Tualang honey (TH) has proven to exert anti-inflammatory and anti-oxidative effects which may help to improve sperm parameters.

Methods: Thirty male Sprague Dawley rats were divided into two groups, mixed cholesterol diet (12%CD;n=24) and standard diet (SD;n=6) and were fed for 16 weeks. Then, the rats in the 12%CD group were divided into four groups and continued with SD. Group A was untreated while group B, C and D were given TH at different doses (1.2, 2.4, and 3.0g/kg/day) for 4 weeks. Then, sperm profile analysis from the caudal epididymis was performed.

Results: Group A showed significant decrease in sperm concentration, the percentage of total sperm motility, progressive motility, and viability compared to SD group ($p<0.001$). In contrast, all TH supplemented groups demonstrated significant improvement in the sperm parameters ($p<0.001$). The higher the dosage of TH given, the higher the improvements in sperm parameters ($p<0.001$).

Conclusion: TH supplementation with diet modifications improved sperm profile parameters. From our findings, there is a need to further explore TH in improving male infertility associated with hypercholesterolaemia.

Keywords: Mix cholesterol diet, Tualang honey, sperm profile

Emerging Mental Health Risks among Students at Technical Institution

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Abstract

Introduction: Mental health disorders like stress, anxiety and depression risk reported in increasing trend among university students. Emerging risk is a risk that may already exist but is hard to quantify. Previous research has investigated these issues but the related research involving risk level is still lacking especially in TVET University. Hence, this study was conducted to indicate the prevalence of mental health disorders with risk levels for each risk factor.

Methodology: About 386 Bachelor's students were involved. DASS-21 questionnaire was used to indicate the mental health disorders and qualitative risk matrix by WHO used to assess the risk levels. Data analyses used are descriptive analysis and binary logistic regression in SPSS.

Results: The results showed that the majority of students were having normal stress, extremely severe anxiety and normal depression. Majority were at high risk facing of mental health disorders for all risk factors except the discrimination factor. Academic performance was the highest frequency of risk factor of students suffering normal stress level, extremely severe for both anxiety and depression level and it was at a high of the risk level.

Conclusion: Early findings from this study shows that academic performance factors have contributed to emerging mental health risks.

Keywords: Emerging Risks, Mental Health Risk, Technical Institution, Depression, Stress.

Urinary microRNA Isolation using Modified Acid Guanidinium Thiocyanate-Phenol-Chloroform Method for Real-Time Polymerase Chain Reaction Assay

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Abstract

Introduction: Isolation of microRNA from urine sample is a challenge, particularly for use in subsequent sensitive downstream analysis such as real-time polymerase chain reaction (RT-PCR). Although there are commercial kits available, its high cost will burden small scale experimental studies. Due to this, several studies attempted in-house laboratory extraction method employing acid guanidinium thiocyanate-phenol-chloroform followed by salt precipitation. In this study, a slight modification was applied to previously described methods, and the RT-PCR profile was compared to a commercial kit.

Methods: Small RNA isolation was performed on random urine samples using two methods; 1) acid-guanidinium-thiocyanate-phenol-chloroform followed by salt precipitation (Trizol-Chloroform-KCH3COOH-LiCl-EtOH) and 2) Norgen's Urine microRNA Purification Kit.

Results: Higher yield (>1000ng/µl) of small RNA was recovered with good purity (UV-Vis spectrophotometer 260/280, >1.8) compared to the commercial kit. In the relative RT-PCR assay, a single peak dissociation curve was obtained, showing primer specificity in the amplification of target miRNA. Reliable miRNA expression level was indicated by Ct-values in the range of 30-35 in comparison to Ct-values obtained for endogenous control.

Conclusion: The described protocol in this study could serve as an alternative to the commercial kit for use in isolation and purification of miRNA, particularly from human urine samples.

Keywords: Urinary microRNA, Acid Guanidinium Thiocyanate-Phenol-Chloroform Method, Real-time Polymerase Chain Reaction, RNA Isolation, Salt Precipitation

Investigation of Small and Medium Enterprise Processes Susceptible of Generating Emerging Occupational Risks

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Abstract

Introduction: Small and Medium Enterprises (SMEs) in Malaysia faced high workplace accidents rate and prone to generate emerging risk. This study was conducted to identify the emerging risk at SMEs manufacturing.
Methods: Questionnaires adopted from expert forecast by EU-OSHA were distributed to manufacturing SMEs in Malaysia. The questionnaires were validated based on the relevancy and the clarity of questions by safety expert and enforcer followed by pilot test study and the value of Cronbach's Alpha is 0.9.

Results: Response from 53 manufacturers were received, there were 11 significant risk factors found directly contributing to emerging risk in SMEs manufacturing. Job insecurity ($MV > 4$), tight deadlines, long working hours and poor work life balance ($3.25 < MV \leq 4$) are agreed as emerging psychosocial risks. Epidemics and poor biological risk assessment ($3.25 < MV \leq 4$) as emerging biological risks. The nanoparticles and man-made mineral fibres as emerging chemical risk ($3.25 < MV \leq 4$). Three factors found as emerging ergonomic risk including prolonged sitting or standing, awkward posture and poor workspace design ($3.25 < MV \leq 4$).

Conclusion: The results show that physical, psychosocial, biological, and chemical risks in increasing trends at SMEs and in agreement with emerging concepts.

Keywords: Small and Medium Enterprise; SME; Emerging Risk; Occupational Risk

Therapeutic Potential of Natural Products Against Human Skin Pathogens

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Abstract

Introduction: Skin infection is a major public health problem which is the fourth leading cause of nonfatal burden. Excluding mortality, years lived with disability (YLDs) from skin disorder (36.4 million) are higher than diabetes mellitus (29.5 million) and migraines (28.9 million). Studies reported high incidence of resistance and relapse to common treatment (gentamicin, terbinafine, and clotrimazole) for skin infections have prompted us to investigate and compare the efficacy and safety of promising bioactive entities from nature with selected drugs.

Methods: Hexane, methanol, and aqueous extracts of *Piper betel*, *Allamanda cathartica*, *Allium sativum*, and ethyl acetate extracts of endophytes HAB11R3 and HAB10R12 were tested against selected common bacterial and dermatophytes infections according to Clinical and Laboratory Standards Institute (CLSI) M100-S22 (2012) and M38-A2 (2008) protocols, respectively. The safety profiles of testing extracts were identified against normal skin fibroblast BCL-2522.

Results: The aqueous extract of *A. cathartica* (ACAE, MIC values 62.5-125 µg/ml) and HAB11R3 (MIC values 250-500 µg/ml) exhibited strong antifungal and moderate antibacterial activities which comparable to fluconazole against *M. canis* and *E. floccosum*. HAB11R3, HAB10R12, ACAE, and ACME were fungicidal. The safety profile showed IC_{50} of ACAE was 290 µg/ml whilst HAB11R3 0.5 µg/ml.

Conclusion: ACAE possesses promising topical antifungal agents.

Keywords: Natural Products, Minimum Inhibitory Concentration, Antifungal, Endophytes, *Allamanda cathartica*

Therapeutic Potential of Baicalein-Enriched Fraction (BEF)-Preconditioned Neural Stem Cells for Ischemic Stroke Rat Model

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Abstract

Introduction: Ischemic stroke, triggered by the abrupt interruption of cerebrovascular blood flow, could lead to permanent neuronal cell death. Recently, multipotent neural stem cell (NSC) grafting has emerged as potential therapy to regenerate the damaged brain tissue. However, the hostile microenvironment in the ischemic brain region is challenging for the survival of transplanted cells. Therefore, in this study, NSC culture was optimised with a neuroprotective active compound (baicalein) extracted from Oroxylum indicum plant to enhance the NSC survival rate after transplantation into ischemic brain.

Methods: Baicalein-enriched fraction (BEF) was successfully extracted from the plant and quantified using TLC and HPLC. In vitro expandable NSCs were preconditioned with BEF at optimum dosage (3.125 µg/ml) determined through MTT assay for 48 hours before the cells were transplanted into endothelin-1 induced ischemic stroke animal group. Animal behaviours and stroke severity were observed and recorded for 14 days.

Results: Improvements in stroke behaviours occurred within 14 days after the preconditioned NSC transplantation.

Conclusion: In conclusion, BEF contributed to the survival of NSCs in ischemic conditions and significantly improved the damaged neuronal tissue caused by stroke.

Keywords: Ischemic stroke, rat ischemic stroke model, neural stem cells, baicalein-enriched fraction, *Oroxylum indicum*

Safety and Efficacy of Intravenous Iron Sucrose in Pregnancy: A Systematic Review and Meta-Analysis

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Abstract

Introduction: Iron deficiency anemia (IDA) in pregnancy is associated with a significant risk of maternal morbidity and mortality. Intravenous (IV) iron sucrose (IS) results in a faster improvement in iron storage and correction of hematological indices. The efficacy and safety of IV IS in the management of IDA in pregnancy was evaluated in this meta-analysis.

Methods: Eligible RCTs published from January 2010 to June 2020 on the management of maternal IDA using IV IS compared to oral iron were included. .

Results: 17 RCTs involving 3914 pregnant women were included. Significant increase in hemoglobin level [mean difference (MD) 0.75, 95% confidence interval (CI): 0.34 to 1.15; p = 0.0003] and ferritin levels (MD 44.64, 95% CI: 32.47 to 56.80; p <0.00001) was found after 4 weeks of maternal IV IS therapy compared to oral iron. Serious adverse effects were not reported in all studies and the risk of mild adverse effects were lower in the IV IS group compared to oral iron (RR 0.40, 95% CI 0.26 to 0.62; p <0.0001).

Conclusion: Intravenous IS can be considered as a promising alternative to oral iron as it is effective and safe in the treatment of IDA in pregnancy. However, future research is required to compare clinical outcomes between different parenteral iron preparations.

Keywords: Ron Deficiency Anemia, IV Iron Sucrose, Effectiveness, Safety

Knowledge, Attitude, and Practice Towards the Application of Point-of-Care Pharmacogenotyping Service Among Community Pharmacists in Malaysia

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Abstract

Introduction: Pharmacogenetic point-of-care testing (POCT) is a technology adopted by hospitals and community pharmacies for the identification of a patient's genetic profile that is associated with variability in drug response. Pharmacogenetic POCT has helped greatly in optimising personalised drug therapy among patients. Although this method is widely practiced in community pharmacies around developed countries, Malaysia has yet to utilise it. This study aimed to assess the knowledge, attitude, and practice (KAP) of community pharmacists towards the application of pharmacogenetic POCT in their practice.

Method: A cross-sectional study was conducted using 36 web-survey questions for community pharmacists, whereby 9.17% of them responded.

Results: The majority of the respondents were young female pharmacists who graduated with university degrees and have different years of pharmacy practice. The level of knowledge among respondents were poor but they demonstrated a positive attitude and interest in implementing pharmacogenetic POCT in a community-based setting. The association between KAP and the sociodemographic data showed a strong statistical association between knowledge and age.

Conclusion: Conclusively, educational programs and training on pharmacogenomic POCT and its clinical applications are required to ensure the ideal application of this service in the local setting.

Keywords: POCT, community pharmacist, knowledge, attitude, practice

Screening of Factors Affecting the Vitamin B12 Extraction From *Ulva lactuca* by 2-Level Factorial Design

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Abstract

Introduction: *Ulva lactuca* possess many biological properties due to the presence of bioactive compounds. It is believed to be an alternative source for vitamin B12 for strict vegetarians.

Methods: The extraction of vitamin B12 was performed using boiling extraction method from freeze-dried (FDB), air-dried (ADB), oven-dried (ODB), and sun-dried (SDB) sample. The effects of solvent:solvent, solute:solvent ratios, and pH on total vitamin B12 content extracted from the different dried samples were investigated and analysed using 2-Level Factorial design from RSM. The vitamin B12 (methylcobalamin, hydroxocobalamin, adenosylcobalamin, and cyanocobalamin) were analysed quantitatively and qualitatively using HPLC.

Results: The retention time (RT) of all samples corresponded to the RT of standard cyanocobalamin (CNCbl) at 1.9 min. ODB sample yielded the highest concentration of CNCbl (0.0210 mg/mL) when extracted at 25:75% methanol:water, 3 g:60 mL solute:solvent, and at pH 3, respectively. The overall model and interaction effects between solvent:solvent ratios and pH, as well as between solvent:solvent and solute:solvent ratios were significant for ODB sample at p-value less than 0.05, scrutinised by ANOVA analysis.

Conclusion: Different methods of drying, solvent:solvent, pH, and solute:solvent have different effects on the CNCbl content extracted from *U. lactuca*.

Keywords: *U. lactuca*, vitamin B12, 2-level factorial design

Pharmacological Activity of *Dioscorea* spp.: A Systematic Review

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Abstract

Introduction: Pharmacological research has become compulsory for the development of natural-based drugs to support the claimed therapeutic properties of medicinal plants. *Dioscorea* species are medicinal plants found to have impressive pharmacological profile. This review aimed to compile pharmacological properties of three *Dioscorea* species: *D. hispida, D. alata, and D. bulbifera,* along with their derived compounds through scientific findings, mainly focusing on their biological activities.

Methods: Relevant clinical and preclinical studies on pharmacological properties of these plants were identified, screened, and analysed. A systematic search using predetermined keywords on electronic databases (Scopus, Springer, and ScienceDirect) was conducted.

Results: This review found that these *Dioscorea* species possess various pharmacological activities such as anti-inflammatory, antimicrobial, anticancer, antioxidant, anti-diabetic, antihypertensive, and estrogenic effects. The plant tubers contain active compounds such as diosgenin that are responsible for anti-inflammatory and anti-diabetic activities in *D. alata* and *D. bulbifera*, respectively. Other compounds like dioscorine, phenolic, flavonoid, and terpenoid elucidated from the tuber of these yams were found to be involved with antimicrobial properties and showed prominent free radical scavenging effects.

Conclusion: Various pharmacological activities have been demonstrated by these plants though data on their mechanism of action is very limited. Therefore, further research needs to be performed to explore a full potential of these plants as future therapeutic medicines.

Keywords*: Dioscorea alata, Dioscorea bulbifera, Dioscorea hispida,* pharmacological activity, biological activity

Practice of Self-Medication with Antibiotics Among Students in a Public University

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Abstract

Introduction: Self-medication is a global phenomenon and potential cause of antimicrobial resistance. This study aimed to determine the prevalence, factors, conditions, and sources of supply of antibiotics, among students of Universiti Teknologi Mara, Selangor, Malaysia.

Methods: A cross-sectional study conducted using self-administered questionnaires.

Results: Response received was 350 out of 390 questionnaires distributed. Majority of respondents were female (63.7%) aged between 19-24 years (84.9%). Conditions of use were nasal congestion (56.1%), sore throat, runny nose, and fever. Prevalence was 11.7%. A total of 309 (88.3%) took antibiotics with prescriptions. Amoxycillin (70.6%) was the most common antibiotic used. 90.2% have good knowledge about antibiotics, but only 65.9% followed usage instructions. Convenience (75.6%) and cost-saving were cited as the most common reasons. Pharmacies (90.2%) were the main sources, while a minority had used leftovers. There were significant associations between age, gender, and faculties where students were attached to with knowledge, attitude, and self-practice (KAP) scores of self-medication ($p<0.05$). Older age groups and pharmacy students had higher scores of KAP. A few pharmacists reportedly dispensed antibiotics after patients agreed to bring a prescription from the doctor within 24 hours.

Conclusion: It is recommended for modules incorporating safe and effective practices of self-medication to be emphasised and strengthened in the pharmacy curriculum.

Keywords: self-medication, antibiotics self-medication, pharmacy prescription

A Systematic Review: Knowledge, Attitude, and Practice on Adverse Drug Reaction and Pharmacovigilance Among Healthcare Professionals

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Abstract

Introduction: Adverse drug reaction (ADR) reporting acts to detect, assess, and prevent adverse events or other drug related problems. ADR under-reporting is of major concern in the healthcare system.This systematic review aimed to assess on knowledge, attitude, and practice (KAP) on ADR and pharmacovigilance among healthcare professionals, focusing on identifying factors that influenced ADR reporting and strategies to improve ADR reporting.

Methods: The Cochrane, Google Scholar, Pubmed, Medline, and Springer-Link databases were searched between 2014 to 2019, on cross-sectional observational studies. Search terms were related to ADR, pharmacovigilance, healthcare professionals, and KAP.

Results: After screening the records and eliminating irrelevant studies that were not matched, 105 studies were assessed for eligibility. A final 30 studies were included in the qualitative synthesis. Based on the findings, healthcare professionals had good knowledge but lack in attitude and practice on ADR and pharmacovigilance. They believed ADR reporting is important, but obstructions such as ignorance, lethargy, and diffidence prevented them from reporting.

Conclusion: There is a need for more productive and dynamic actions in improving pharmacovigilance in the healthcare system, such as more educational interventions and awareness programs, to increase the number of ADR reporting among healthcare providers.

Keywords: adverse drug reaction (ADR), pharmacovigilance, healthcare professionals, KAP knowledge attitude practice

Effects of Drug-Free Pectin Hydrogel on Thermal Burn Wound in Diabetic Rats

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Abstract

Introduction: Patients with diabetes mellitus often exhibit delayed wound healing. This study investigated the effects of drug-free pectin hydrogels on partial-thickness thermal burn wound in streptozotocin-induced diabetic rats.

Methods: Thirty male Sprague Dawley rats were anesthetised and partial thickness burn wounds were introduced on the dorsum region of rats. Animals were randomly assigned into five groups of six rats each, namely untreated normal rats, untreated diabetic rats, diabetic rats treated with commercial ointment MEBO®, diabetic rats treated with 2.5% (w/w) pectin hydrogel (PH 2.5%), and diabetic rats treated with 5% (w/w) pectin hydrogel (PH 5%).

Results: Drug-free pectin hydrogel as a wound dressing had encouragingly accelerated the rate of wound healing. The diabetic rats treated with PH 5% showed a remarkably faster reduction in wound size and a higher rate of re-epithelialisation than untreated diabetic rats, as well as diabetic rats treated with PH 2.5%. In addition, the diabetic rats treated with PH 5% exhibited a comparable wound healing progress to diabetic rats treated with commercial ointment MEBO®.

Conclusion: The experiments suggested that cross-linked pectin, without the need to combine with other polymers is able to function as an excellent wound dressing material.

Keywords: pectin, hydrogel, wound healing, burn wound, diabetic rats

Ascorbic Acid Extraction Methods of *Hylocereus polyrhizus* and *Hylocereus undatus*: A Mini Review

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Abstract

Introduction: Ascorbic acid (AA), also known as vitamin C, is an essential dietary nutrient for a variety of biological activities and the understanding of its benefits has recently gained a lot of interest. A wide range of technologies with different methods of extraction have been applied in extracting AA from fruits. However, there are no data reported on the best extraction method in evaluating their suitability and economic feasibility for AA of *Hylocereus* fruits.

Methods: The review information was collected with keywords related to *Hylocereus polyrhizus and Hylocereus undatus* from scientific journals, books, and reports searched through available online database.

Results: Literature search showed that a few methods have been used to extract AA from the *Hylocereus* species. However, there is no observed variations in the methods of extraction.

Conclusion: A few methods have been used to extract AA from *Hylocereus* spp., but no universal extraction method was ideal due to the uniqueness of each extraction procedure of *Hylocereus* spp. Therefore, further research needs to be performed to investigate and explore suitable extraction methods of AA in *Hylocereus* fruits. However, it is suggested that the most common method was DPPH method because this method is widely used.

Keywords*:* ascorbic acid, vitamin C, extraction method, *Hylocereus undatus*, *Hylocereus polyrhizus*

Prevalence of Medication Discrepancies During Admission and Discharge in Armed Forces Hospital

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Abstract

Introduction: Medication reconciliation (MR) can identify medication discrepancies (MD) during transition of care of patients. This prospective study, conducted from June to July 2020, determined the prevalence of MD and its risk factors (RF) in the medical wards.

Methods: A ward pharmacist investigated differences in preadmission medications, medications in the ward, and upon discharge. MD was classified into: (i) intentional (changes in medication were made due to patient's conditions) and (ii) unintentional (changes in medication were made accidentally or no proper documentation available for the changes).

Results: Medication of 74 patients were reconciled and 611 medications were screened for MD. 162 (27%) discrepancies were detected, where 66% of the patients were found to have at least one MD. However, 155 discrepancies (96%) were intentional discrepancy, while 7 discrepancies (4%) were unintentional. RF that significantly influenced MD were patients' age (b=0.02, t=2.08,p=0.045), length of stay (b=0.15, t=2.75, p=0.008), number of medications on admission (b=0.42, t=3.93, p=0.000) and upon discharge (b=0.59, t=5.35, p=0.000).

Conclusion: MR could be a tool to prevent potential medication errors. The result of this study can be a milestone for the active involvement of pharmacists in Armed Forces Hospital to increase patient's medication safety.

Keywords: medication reconciliation, medication discrepancy, risk factor, medical wards

Association between Nutrition Knowledge, Attitudes, and Functional Food Recognizability and Consumption Among University Students in Klang Valley, Malaysia

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Abstract

Introduction: Despite the popularity of functional food has increased in Malaysia, consumers' awareness towards functional food still remains low. This research aimed to study the association between nutrition knowledge, attitudes, functional food recognizability, and consumption among university students.

Methods: A total of 284 university students in the Klang Valley completed an online, self-administered questionnaire on nutrition knowledge, attitude, functional food recognizability, and consumption.

Results: The study revealed that respondents generally have moderate level of nutrition knowledge (62.9 ± 17.3%) and functional food-related attitude (67.1 ± 8.9%) with an average of seven functional food types consumed. Nutrition knowledge was found significantly correlated with functional food-related attitude ($r = 0.205$, $p = 0.001$) and functional food recognizability and consumption ($r = -0.122$, $p = 0.040$). The use of functional food was significantly associated with nutrition knowledge ($\chi 2 = 15.669$, $p<0.001$). Students with moderate nutrition knowledge level (56.3%) were more likely to consume functional food. Interestingly, about 37.7% of non-functional food users were those with high nutrition knowledge level. Conversely, no significant association was found between the attitude and the use of functional food.

Conclusion: Significant relationship exists between nutrition knowledge with attitudes and functional food recognition and consumption. The findings can be used as a reference for future development and promotion of functional food via educational and marketing strategies that could enhance awareness of functional food and their corresponding health benefits.

Keywords: functional food, nutrition knowledge, attitudes

The Implementation of Health Protocol on Students during COVID-19 Pandemic in Indonesia

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Abstract

Introduction: COVID-19 infection does not recognise both old and young age. Young age groups gather more frequently and have activities outside the home so they are at high risk of infection. This study aimed to see the attitude of implementing health protocol on students in Indonesia.

Methods: This research was conducted from September to October 2020 using a cross-sectional design through an online survey. Non-random sampling was used with the criteria, namely university students in Indonesia, aged 18-24 years, willing to participate in this research and complete the questionnaire, with as many as 3,024 students participated. Chi Square Test statistical analysis was used to see the relationship between respondents characteristics and the implementation of the health protocol before and during the COVID-19 pandemic.

Results: The results showed that before COVID-19 pandemic, regional and field of science was significantly related to the use of masks and washing hands ($p<0.05$), while during COVID-19 pandemic, field of science was significantly related to physical distancing ($p<0.05$).

Conclusion: Students in Indonesia already understood and applied the health protocol recommended by the government in order to prevent transmission of the COVID-19 virus.

Keywords: health protocol, pandemic, COVID-19, students

Exploration of Characteristics and Predictors for 6-Month Abstinence among Quit Smoking Clinic Attendees in Malaysia

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Abstract

Introduction: Despite the availability of pharmacotherapy and counselling intervention, a poor abstinence rate is common in Malaysia's quit smoking clinics (QSCs).

Methods: Predictors for smoking cessation outcome were examined by evaluating factors pre- and during the cessation process. Retrospective study using a convenient sample of 285 smokers from four QSCs was conducted. Participants were categorised into quitters and non-quitters' groups and information collected from QSC's records were statistically analysed for comparison.

Results: Socio-demographic characteristics, smoking history, and ADR experience showed trivial roles on cessation outcome. However, frequency of QSC visits reported to be a significant independent predictor for smoking cessation outcome (OR=1.11 95% CI 1.01-1.23, p=0.034) with successful quitters in our study reported more frequent visit to QSCs when compared to the non-quitters.

Conclusion: These findings emphasised the need for effective and collaborative intervention to facilitate smoker's visit to QSCs, which subsequently will optimise cessation treatment adherence and enhance their quitting rates. In addition, this study highlighted the need for innovative solutions to conduct QSC during the Covid-19 period where many health services including QSCs have been suspended, as the healthcare system is focusing on fighting the pandemic.

Keywords: smoking cessation, abstinence, adherence, adverse drug reaction

Identification of Active Compounds from *Rosaveridiflora* species using LC-QTOF-MS

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Abstract

Introduction: *Rosa* species is a well-known ornamental plant. The petal of the flower has been used as an anti-inflammatory medicine. However, the details of compounds and functions from *Rosaveridiflora* species (green rose) extracted from Malaysian variety remain unclear. The objective of the study is to identify the compounds from green rose and their functions with the hypothesis that the extract contains various beneficial medicinal compounds.

Methods: In the present study, the green rose was extracted using aqueous-based extraction technique. The presence of secondary metabolites in the extract was tentatively assigned using LC-QTOF-MS analysis by comparing the MS fragmentation patterns with Waters VR UNIFY library. The presence of peaks detected in the bioassay chromatogram indicates the presence of bioactive substances. The data then were processed using Profile Analysis software version 2.1 to extract the mass spectral features from samples raw data.

Results: There were 306 compounds identified from the analysis. The compounds include procyanidin A2, chnidimol F, leucodelphinidin, genistin, menthoside, ononin, quercimeritrin juglanin, and others. These compounds are found to be responsible for many biological activities, including antimicrobial, anti-cancer, and anti-inflammatory activities.

Conclusion: Therefore, the results supported the hypothesis of the study that the extract contains various beneficial medicinal compounds.

Keywords: *Rosaveridiflora* sp., green rose, LC-MS, phenolic compounds, antimicrobial

Binding Strength and Structural Changes of Human Heat Shock Protein 47 His-to-Ala Mutants

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Abstract

Introduction: Heat shock protein 47 (HSP47) is a collagen-specific molecular chaperone essential for the correct folding of collagen triple helix. HSP47 assists in the biosynthesis of collagen molecules localised in the endoplasmic reticulum (ER) and in the transportation of collagen to the Golgi apparatus from the ER. HSP47 release from collagen in the transport vesicle is prompted by the lower pH in the cis-Golgi or the ER-Golgi intermediate compartment, before HSP47 is transferred back to the ER. Histidine residue has been reported to be triggering the release. Histidine-to-alanine (HA) mutants have been constructed to elucidate this release mechanism. Several HA mutants were unexpectedly found to have perturbed binding behaviour. This study probed the effects of the mutation on the binding strength and structural changes of the human HSP47 HA mutants.

Methods: Binding affinity was investigated using an ELISA-based binding assay, and structural perturbations were analysed using circular dichroism spectroscopy.

Results: Mutation at H220 completely abolished HSP47 binding to collagen *in vitro*, with significant structural changes observed. Mutation at H368 affected the pH-induced structural transition.

Conclusion: HA mutations affected the binding ability of human HSP47 and the pH-induced structural transition, depending on the locations relative to the binding interface.

Keywords: collagen, human HSP47, chaperone, binding affinity, secondary structure

Identification of Active Compounds from *Cervus timorensis* Velvet Antler using LC-QTOF-MS

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Abstract

Introduction: Velvet antlers are precious cranial appendages that emerge on top of the frontal protuberances in male deers. The deer velvet antler (DVA) has been used in Asian countries for a range of therapeutic uses including as antioxidants and antifatigue. The objective of the study is to identify the compounds from *Cervus timorensis* velvet antler and their functions, with the hypothesis that the extract contains various beneficial medicinal compounds.

Methods: In the present study, the DVA was extracted using a freeze-dried technique. The presence of secondary metabolites in the extract was tentatively assigned using LC-QTOF-MS analysis by comparing the MS fragmentation patterns with Waters VR UNIFY library. The presence of peaks detected in the bioassay chromatogram indicates the presence of bioactive substances. The data then were processed using Profile Analysis software version 2.1 to extract the mass spectral features from samples' raw data.

Results: There were 46 compounds identified from the analysis. The compounds include apocynin, moracin E, dendrocandin F, kurarinone, bavachinin, pinnatifinoside B, bavachalcone, and others.

Conclusion: These compounds were found to be responsible for many biological activities such as anti-cancer, antibacterial, and anti-inflammatory activities. Therefore, the results supported the hypothesis of the study that the extract contains various beneficial medicinal compounds.

Keywords: *Cervus timorensis*, deer velvet antler, LC-QTOF-MS, bioactive compounds, biological activities

Assessing the Usability of Portable Electroencephalogram (EEG) Device to Detect the Effects of Diffused Essential Oils through Brainwave Signal Analysis

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Abstract

Introduction: Portable electroencephalogram (EEG) represents a non-invasive neuroscientific technology to study real-time brain activity. Aromatherapy improves psychological well-being, and some effects can be measured through brainwave signal analysis. This study was aimed to determine the usability of a portable EEG device in measuring the effects of diffused essential oils with regards to the level of attention and meditation.

Methods: Thirty pharmacy students wore a portable EEG device headset and were exposed to the diffusion of lavender, orange, and peppermint essential oils in three separate days, respectively. The headset detected the brain impulses and wirelessly communicated the signals with an EEG reader application. The measurement for meditation levels and attention levels were taken prior to and during the diffusion.

Results: There were no significant differences in the average score of attention level before and during the diffusion for all essential oils used. However, a significant difference in the meditation level before and during the diffusion of orange oil $p= 0.017$ ($p<0.05$) was seen. Nevertheless, there was a trend towards increased level of meditation and decreased level of attention when essential oils were diffused.

Conclusion: Portable EEG devices can be a potential option to measure meditative and attentive effects of essential oils.

Keywords: aromatherapy, brainwave signal analysis, portable EEG

Complementary and Alternative Medicines in the Management of Diabetic Peripheral Neuropathy: A Systematic Review

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Abstract

Introduction: Diabetes mellitus could come with various life-burdening complications. One of them is diabetic peripheral neuropathy (DPN). There are several existing conventional medicines that are usually used to manage DPN. However, some patients prefer to use complementary and alternative medicines (CAMs) due to the complications and the side effects that could accompany the usage of conventional medicines. Apart from that, the reluctance of some patients from using conventional medicines were due to the cost of the conventional medicines.

Methods: This study was aimed to systematically review the effectiveness of complementary and alternative medicines involving randomized controlled trials (RCTs) that were used in the management of DPN. PubMed, Cochrane Library and Science Direct were searched for all relevant RCTs using the medical subject headings (MeSH) or keywords. Data were extracted and reviewed using PRISMA checklist.

Results: The search yielded 93 research articles and after the screening process, 11 RCTs that met the inclusion criteria were reviewed. CAMs identified include alpha-lipoic acid, vitamin B, acupuncture, spinal cord stimulation, yoga, and meditation had shown some statistically significant results in improving the symptoms of DPN.

Conclusion: Despite limited studies, evidences showed a trend of attenuation in symptomatic management of the pain in DPN.

Keywords: complementary and alternative medicine, diabetic peripheral neuropathy, systematic literature review

Lurking through Virtual Communities (Groups) on the Facebook Social Media Platform as a Form of Legitimate Professional Learning: Experiences of Occupational Therapy Practitioners in the United Kingdom

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Abstract

Introduction: 'Lurking' is a phenomenon where members of online communities engage only via observation, without discussion. While wider educational research regards this activity as a form of legitimate peripheral participation in situated learning, reviews on learning in healthcare revealed less favourable perceptions. This qualitative study seeks to examine the impact of lurking behaviours on professional learning in healthcare.

Methods: 27 occupational therapy practitioners across the United Kingdom documented their learning experiences in virtual communities known as Groups, on the Facebook social media platform via an online questionnaire. Data was deductively analysed through the Framework for Value Creation in Communities and Networks.

Results: The findings indicated that learning experiences corresponding with all five (5) levels of value creation were identified: immediate value, potential value, applied value, realised value, as well as reframing value.

Conclusion: The results confirm the legitimacy of lurking through virtual communities on social media platforms as a means of supporting professional learning. With the COVID-19 pandemic imposing significant restrictions to healthcare professionals' ability to access conventional Continuing Education in terms of time, energy and finances, this paper suggested that 'lurking' through virtual communities on social media is a viable alternative and calls for endorsement from regulatory organisations.

Keywords: social media learning, professional learning, online learning, virtual communities, occupational therapy

Risk Analysis for Bulk Separation of Fats, Oil, and Grease (FOG) from Food Processing Industry Effluent using Bow-Tie Technique

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Abstract

Introduction: Food processing industry is the main producer of wastewaters with high fat, oil, and grease (FOG). Despite these financial and environmentally detrimental effects, a homogenous FOG waste management method has not been established internationally. The lack of comprehensive, integrated technology, food processing facility, and community awareness has led to this study. Bulk separation is one of FOG management methods, but the risk profile of the process still has not been developed. The objective of this study is to recognise the risk posed from improper management of FOG and to develop a comprehensive understanding between the risks, controlling barriers, and the consequences of the method from food processing effluent.

Methods: Data were analysed based on extended literature and industry records of hazards using bow-tie technique.

Results: The results indicated a risk profile which include the relationship between the hazards, threats that exist, control barriers, top events, and the consequences.

Conclusion: The highlights that that the ways of the FOG disposal, the installation of adequate FOG interceptor in the food processing facility and other wastewater effluents in the sewer system can lead to pipe blockage, sanitary sewer overflow (SSO) and potentially cause the health and environmental issues.

Keywords: FOG, bulk separation, risk profile, bow-tie analysis, food processing industry

Pharmacists' Knowledge and Attitude towards the Application of Point-of-Care Pharmacogenotyping Services in Malaysia

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Abstract

Introduction: Pharmacogenomic tests are conducted every time a new medication is prescribed for the specific gene(s) highly influenced by a genetic mutation. As a start towards building capacity for point-of-care (POC) pharmacogenomic testing, this study is designed to investigate pharmacists' knowledge and attitude towards applying POC pharmacogenotyping services in Malaysia.

Methods: This is a descriptive, cross-sectional survey conducted among pharmacists working in hospitals from February until June 2020. A Likert scale was employed in the questionnaire, scored from 1 (strongly disagree) to 5 (strongly agree).

Results: The knowledge of POC pharmacogenotyping among 98 pharmacists in Malaysia is moderate (mean = 7.6), while age, years of practice, and education were the significant factors that influenced the score. The majority of the respondents agree that POC pharmacogenotyping will decrease the number of adverse drug reactions (83.7%) and increase medication safety (87.8%).

Conclusion: The application of POC pharmacogenomic testing is relatively new to the hospital setting. Strategies need to be planned by policymaker to increase pharmacists' knowledge of the POC test. Due to the small sample size reported in this study, more extensive research with a larger sample size should be conducted before introducing POC pharmacogenotyping services in Malaysia.

Keywords: pharmacogenotyping, point-of-care, pharmacists, knowledge, attitude

Preliminary Analysis of Structural Changes and Catalytic Activity of Class I Glucose-6-Phosphate Dehydrogenase Variants Using Molecular Dynamic Simulation

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Abstract

Introduction: Glucose-6-phosphate dehydrogenase (G6PD) deficiency in human is a common X-linked recessive genetic disorder. G6PD is a key enzyme in the pentose phosphate pathway responsible for protecting the red blood cells from oxidative stress by maintaining cellular NADPH level. Up to date, around 500 G6PD variants have been reported, but only 10% of G6PD variants have been structurally and functionally characterised. Moreover, most studies on G6PD variants are performed using biochemical analysis, but computational data on structural changes related to the mutation is still limited. In this study, molecular dynamic simulation (MDS) is used to determine structural and functional changes associated with mutations in four G6PD class I variants; $G6PD_{Plymouth}$, $G6PD_{Zacatecas}$, $G6PD_{Yucatan}$, and $G6PD_{Durham}$.

Methods: Mutation was introduced in the monomer G6PD enzyme in complex with G6P substrate and $NADP^+$ cofactors. Structural changes were evaluated against the wild-type enzyme structure based on the following parameters: protein backbones RMSD, RMSF, R_g, SASA, and hydrogen bond analysis plots generated from MDS.

Results: These studies discovered that severe effects of G6PD deficiency affect the binding sites of catalytic and structural NADP.

Conclusion: MD simulation tool can be used to understand the dynamic properties of the G6PD variants and serve as a tool to validate existing biochemical data.

Keywords: G6PD, molecular dynamic simulation, NADP

Association between Picky Eating Behaviour with Infant Feeding Practices and Weight Status of Pre-Schoolers in Klang Valley, Malaysia

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Abstract

Introduction: Picky eating during early childhood might lead to weight related issues. This study aimed to determine the association between picky eating behaviour with infant feeding practices and weight status of preschoolers aged 4-6 years.

Methods: A total of 163 pre-schoolers were recruited. Infant feeding practices and picky eating behaviour were assessed using Infant Feeding Practices Questionnaire and Child Eating Behaviours Questionnaire (CEBQ). Body height and weight were measured; body mass index (BMI) was calculated.

Results: The distribution of male and female pre-schoolers was 48% and 52% respectively, with mean age of 5.07±0.84 years. About half (49%) of the pre-schoolers were picky eaters. Pre-schoolers who were breastfed for less than 6 months (x^2=6.47, p=0.04), exclusively breastfed for less than 3 months (x^2=6.64, p=0.03), and introduced to complementary foods before 6 months (x^2=7.47, p=0.01) were more likely to be picky eaters. Picky eaters were more likely to be at risk of overweight (14%), overweight or obese (4%) (x^2=6.68, p=0.04), and stunted or severely stunted (32%) (x^2=6.22, p=0.045) as compared to non-picky eaters, respectively (4%; 1%; 17%).

Conclusion: Infant feeding practices were associated with picky eating behaviour. Future efforts should focus on parental education by promoting the breastfeeding practices to reduce picky eating prevalence among pre-schoolers.

Keywords: picky eating behaviour, infant feeding practices, early childhood

The Usage of Health-Related Mobile Applications among Community Pharmacists in Malaysia

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Abstract

Introduction: Health-related mobile applications are used in order to improve the outcomes of point-of-care. As community pharmacists are involved directly with the patients, the usage of health-related mobile apps may be helpful in their clinical decision making. However, little is known about the extent of its usage among community pharmacists in Malaysia. This study was conducted to explore the usage of health-related mobile apps among community pharmacists in Malaysia.

Methods: A 23 items questionnaire was emailed via Google form to the selected community pharmacies in Malaysia. The results were analysed by using Statistical Package for Social Sciences (SPSS) software version 25.0.

Results: Majority of the respondents preferred user-friendliness (97.6%) and the ability to access apps without internet connections (69.0%) when choosing a particular application as their clinical tool. MIMS (92.9%), Medscape (69%), and Micromedex (45%) were the most common health-related mobile apps used by the respondents. The drug information being accessed 'very frequently' were the safety of drugs in pregnancy and lactation (33.3%), paediatric dosage recommendation (31%), and dosage recommendations (28.6%).

Conclusion: Health-related mobile applications are mostly used by the respondents to reconfirm the safety of drug in pregnancy or lactation, prior to making decision at the point-of-care.

Keywords: health-related, mobile applications, community pharmacist

Characterisation of Reticulocytes Derived from Human Peripheral Blood CD34$^+$ Haematopoietic Stem Cells for *Plasmodium knowlesi In Vitro* Invasion Assay

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Abstract

Introduction: Reticulocytes are specialised host cells for *Plasmodium knowlesi*, the fifth identified human malaria parasite. Yet, the availability of reticulocytes for *P. knowlesi in vitro* culture is restricted by the limited number of circulating reticulocytes in human peripheral blood (PB). Therefore, human PB-derived CD34$^+$ haematopoietic stem cells (HSCs) with high proliferative potential were utilised in the present study as a source to generate sufficient supply of reticulocytes.

Methods: CD34$^+$ HSCs were cultured in expansion cytokines for 5 days followed by differentiation with erythroid-supporting cytokines for 14 days. The phenotype, morphology, and invasion of generated reticulocytes by both *P. knowlesi* and *P. falciparum* were studied.

Results: After 5 days of expansion, the total cell population increased approximately 2.10 ± 0.10-fold. Reticulocytes were successfully characterised by a high expression of CD71 and morphologically apparent by day 14. The CD34$^+$ HSC-derived reticulocytes were functionally active as determined by the ability of *P. falciparum* to proliferate within these cells, with an invasion index of 2.60 ± 0.11. Meanwhile, *P. knowlesi* was able to invade CD34$^+$ HSC-derived reticulocytes, however, with lower invasion index, 1.20 ± 0.12.

Conclusion: In conclusion, human PB-derived CD34$^+$ HSCs could be considered as a potential source to generate reticulocytes required for *P. knowlesi* continuous *in vitro* culture.

Keywords: *Plasmodium knowlesi*, peripheral blood, haematopoietic stem cells, reticulocytes

Minocycline Reduces Amyloid Deposit, Preserves Neuronal Cell Damage, and Improves Memory Impairment in LPS-Induced Alzheimer's Disease Rat Model

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Abstract

Introduction: Minocycline is a semi-synthetic tetracycline antibiotic, and its effects in lipopolysaccharide (LPS) Alzheimer's disease (AD) rat model have not been evaluated. The current study aimed to elucidate the memory-enhancing, anti-amyloid, and neuroprotective effects of minocycline.

Methods: Fifty male SD rats were grouped into: (i) control, (ii) LPS, (iii) LPS-treated with minocycline 25 mg/kg, (iv) LPS-treated with minocycline 50 mg/kg, and (v) LPS-treated with memantine 10 mg/kg. All treatments were given intraperitoneally once daily, for 2 weeks. Novel object recognition (NOR) test was performed to evaluate recognition memory function. Congo red and cresyl violet staining for hippocampus and cortex were done to estimate amyloid deposit and neural damage respectively.

Results: The current study showed that: LPS significantly induced amyloid deposition and neuronal damage, and impaired recognition memory and treatment with minocycline reduced amyloid deposit, preserved neuronal cells, and improved recognition memory in comparison to memantine.

Conclusion: Minocycline improved recognition memory, reduced amyloid deposit, and preserved neuronal damage of LPS rat model of AD comparable to memantine. So, minocycline has beneficial preventive therapeutic effects for neuroinflammatory and neurodegenerative diseases involving AD.

Keywords: Memory, novel object recognition, lipopolysaccharide, minocycline

Can Malaysian Bottom- and Middle-Income Households Be Happier with Mindfulness?

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Abstract

Introduction: With increasing cost of living and the absence of social security net, Malaysia is facing great challenges in providing sufficient retirement incomes, especially for bottom 40 (B40) and middle 40 (M40) households. These household groups are perceived as not having enough money, relatively much more worried, and unhappy. Their well-being is a great concern of policymakers. Well-being is the state of contentment with life, enabling people to successfully overcome difficulties. Mindfulness is the state when someone is aware and focused on the present moment. Spending too much time worrying over the financial state can make one experience stress.

Methods: This study explored the implementation of mindfulness intervention on B40 and M40 households to improve their well-being, and assessing well-being before and after mindfulness intervention.

Results: By practicing mindfulness, people will not think about things that are beyond their control, have an accepting mind, and be happier. Mindfulness might reduce consumer culture and desires for material goods and services.

Conclusion: Financial mindfulness helps one be better at making trade-off instead of just wanting everything. Review of past studies is very promising on how one can transform his or her life to a calmer and happier state with regular mindfulness practices.

Keywords: mindfulness, well-being, Malaysia, B40, M40

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Identification of Chrysotile in Brake Pads and Linings from Malaysian Vehicles and Heavy Vehicles by using Polarized Light Microscope (PLM)

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Abstract

Introduction: Exposure to asbestos can increase the risk of cancers, especially respiratory cancer. Nevertheless, the legislation pertaining to the banned usage of asbestos products in Malaysia is limited to crocidolite asbestos only, as per stated in the Occupational Safety and Health (Prohibition of Use of Substance) Order 1999. This study aims to detect the presence of chrysotile in the brake pads and linings used in vehicles and heavy vehicles in Malaysia.

Methods: The bulk samples (brake pads and linings) were collected from the market and field sampling. Seven different bulk samples were selected in total, consisting of three vehicle brake pads and four heavy vehicles brake pads/linings. A slow grinding method was employed to extract the fibre from the bulk samples. To identify the presence of chrysotile in the brake pads and linings, Polarised Light Microscope (PLM) was used. This method was adapted from the NIOSH Manual of Analytical Methods (NMAM) 9002. The fibre characteristics such as the colour, morphology, and pleochroism were identified.

Results: From the analysis, chrysotile fibres were detected in all the collected bulk samples.

Conclusion: The proper management of the bulk samples containing chrysotile is needed to reduce the risk of asbestos exposure to the workers.

Keywords: asbestos, brake pad, Polarised Light Microscope (PLM)

Formulation and Characterisation of PVA-Based Nanofiber Loaded with Gallic Acid as a Potential Chronic Wound Dressing

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Abstract

Background. Diabetic foot ulcer (DFUs) is one of the common delayed chronic wounds, with persistent wound inflammation among diabetic patients. DFU is becoming rampant with the rise of prevalence of diabetes. Thus, it is a demand to develop a potential effective wound dressing for chronic wound care management. Recent studies have shown that gallic acid (GA) exhibited a strong antioxidant property and holds great potential in accelerating wound healing. Thus, this research was aimed to incorporate GA into polyvinyl alcohol (PVA)-based nanofiber via electrospinning technique.

Methods. The GA-loaded nanofibers were characterised based on (1) morphology study, (2) viscosity study, (3) scanning electron microscopy (SEM), (4) moisture absorption rate, and (5) Franz diffusion drug release study.

Results. PVA (9%) that were incorporated with GA (0.6%) was found to be the most satisfactory formulation to be electrospun into a consistent, smooth, uniform nanofiber without beads, with an average solution viscosity (1683.33 ± 120.139cP) and an average diameter (174 ± 24.68nm). Moreover, the rapid release of GA through PVA nanofiber was achieved via *in vitro* drug release study.

Conclusion. A PVA-based nanofiber dressing loaded with GA was successfully formulated and optimised as a potential alternative for chronic wound dressing.

Keywords: nanofiber, gallic acid, poly(vinyl alcohol), wound healing, diabetic foot ulcer

Enhancement of Knowledge and Attitude Level on Depression via Knowledge, Depression, and Adolescents (KDA)-Puzzles

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Abstract

Introduction: In Malaysia, mental health issues among adults of age 16 years and above has an uptrend. Adults aging 16 to 19 years holds the highest percentage (34.7%). Their knowledge about its causes were inaccurate and lack of understanding about depression makes this mental health issue remains untreated. A better knowledge on mental health has a clear relationship with positive help-seeking attitude of a person. Therefore, knowledge on depression was introduced through puzzles to enhance knowledge and attitude level towards depression.

Methods: An interventional study and convenience sampling was used among 100 adolescents from age range 15 to 19 years old, from tuition centres in Kuala Selangor. Adolescents Depression Knowledge Questionnaire (ADKQ) was used to assess the knowledge and attitude towards depression at pre-intervention and post-intervention. There were four steps in this study beginning with ethical approval, pre-intervention, intervention, and post-intervention study. KDA-Puzzle consisting of 8 sets of modules was used in intervention to enhance the knowledge of depression and attitude.

Results: The data was normally distributed ($p > 0.05$). Mean age was 16.70. Level of knowledge at post-intervention (mean=0.99) was higher than pre-intervention (mean=0.45), and a good improvement on attitude level was found at post-intervention.

Conclusion: KDA-Puzzle intervention study showed greater improvement of knowledge and attitude level at post-intervention after the intervention study.

Keywords: intervention, knowledge, attitude, adolescents, puzzles

Correlation between Avoidant Coping Strategies and Depression, Anxiety, and Stress, among Malaysian during COVID-19 Pandemic

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Abstract

Introduction: Coronavirus disease or COVID-19 is a serious infectious disease that has affected the psychological well-being of many Malaysians. Maladaptive behaviours such as self-blame, denial, or substance abuse can cause depression, anxiety, and stress.

Methods: A cross-sectional study was conducted by inviting Malaysians to complete a set of questionnaires via an online survey. Convenience sampling was used to recruit participants. Brief Coping Orientation of Problem Experienced, and Depression, Anxiety, and Stress Scale were used.

Results: We included 842 participants aged 22 ± 6 years (media ± IQR). Mild to extremely severe scores of depression, anxiety, and stress were reported by 42.9%, 42.2%, and 37.3% of the respondents, respectively. All avoidant coping subscales were significantly correlated to depression, anxiety, and stress scales (all p-values <0.001). Behavioural disengagement of avoidant coping had the strongest correlation with depression and anxiety (both correlations, r = 0.97), while denial had the strongest correlation with stress subscale (r = 0.97).

Conclusion: The results showed that avoidant coping had strong positive correlation with depression, anxiety, and stress.

Keywords: avoidant coping strategies, mental health, Malaysian, pandemic, COVID-19

Academic Stress, Screen Time and Sleep Quality among University Students during COVID-19 Pandemic

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Abstract

Introduction: Sleep quality of university students is worsened during the COVID-19 pandemic. The study aimed to determine factors associated with sleep quality among university students during the COVID-19 pandemic.

Methods: A total of 361 respondents participated in a cross-sectional study through online self-administered questionnaire. Pittsburgh Sleep Quality Index (PSQI) and Epworth Sleepiness Scale (ESS) were used to assess sleep quality and daytime sleepiness.

Results: The mean age of students was 21.80 ± 1.37 years. More than half of the students (52.6%) were defined as poor quality sleepers while only 19.1% of them experienced excessive daytime sleepiness. Academic stress including exam frequency ($\chi 2 = 9.473$, $p = 0.002$) and performance in examinations ($\chi 2 = 6.178$, $p = 0.013$) were significantly associated with sleep quality while academic curriculum ($\chi 2 = 4.173$, $p = 0.041$) was significantly associated with daytime sleepiness. No significant association was found between screen time usage with sleep quality and daytime sleepiness ($p > 0.05$).

Conclusion: This study highlighted high prevalence of poor sleep quality among university students during COVID-19 pandemic that was due to academic stress. Intervention programmes to reduce academic stress should be carried out to improve awareness on the importance of maintaining good sleeping habits among university students.

Keywords: academic stress, screen time, sleep quality, university students, COVID-19

Cytotoxicity of Food Contaminant Free R-glycidol on Human Colon Cell Line, HCT 116 with Underlying Mechanisms and Metabolism

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Abstract

Introduction: R-glycidol is the one of the main food contaminants that has been classified as group 2A and probably carcinogenic to human, which is often developed during deodorization step in refined cooking oils. Our study aims to demonstrate the mechanisms of cytotoxicity effects of free R-glycidol in human colon cell line, HCT 116.

Methods: AlamarBlue® assay was used to measure cell viability of the treated cells. The reactive oxygen species (ROS) activity was measured using 2,7-dichlorofluorescin diacetate (DCFDA). It was further analysed by the protein expression of glutathione-S-transferase (GST) using Western blot technique. In order to confirm whether the oxidative stress might affect mitogen-activated protein kinases (MAPK) pathway, the protein expressions of ERK ½, p-ERK, Bcl-2 and Caspase-3 were examined.

Results: The exposure of free R-glycidol caused a decreased level of cell viability with the increase of treatment time. ROS activity was found significantly increased with the dose and time of exposure. The protein expression were found to be significantly decreased in treated HCT 116 cells after the exposure at 24 and 48 hours.

Conclusion: In conclusion, the cell death of treated HCT 116 cells was due to oxidative stress via MAPK pathway when ERK protein was phosphorylated and promoted cell death of the treated cells.

Keywords: R-glycidol, food contaminant, reactive oxygen species, MAPK pathway

Cognitive Determinants of Academic Performance of Pharmacy Students at University Technology MARA Selangor, Malaysia

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Abstract

Introduction: Cumulative Grade Point Average (CGPA) score has been a very well-established practice in university curricula that serves as an indicator of achieving academic competencies. Several determinants have been found to affect the students' academic performance. Those determinants are test anxiety, competency in tests and academics, students' management of time, and study strategies. The first objective of this study is to evaluate the cognitive determinants that affect pharmacy students' academic performance. Secondly, to identify the factors that have significant effects on their CGPA and year of study.

Methods: A self-administered, cross-sectional stratified random sampling study was conducted using validated questionnaires. The questionnaire was divided into six different domains. It was distributed to a total of 230 UiTM's pharmacy students from second until fourth academic year.

Results: A negative correlation was identified between the test anxiety and academic performance. Meanwhile, the academic and test competence, and time management were positively correlated with the academic performance of the students. Analysis of Spearman's correlation coefficient showed that there was a significant difference ($p<0.05$) between year of study with test anxiety ($p=0.021$), academic competence ($p=0.016$), test competence ($p=0.035$), and time management ($p=0.04$).

Conclusion: Faculty could develop an intervention to enhance the academic performance of the students.

Keywords: cognitive determinants

The Effect of Probiotic Lactobacillus rhamnosus on Candida albicans and Candida tropicalis Biofilm Formation

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Abstract

Introduction: *Candida albicans* and *Candida tropicalis* are opportunistic fungi that causes oral candidiasis. Meanwhile, *Lactobacillus rhamnosus* is a Gram-positive bacterium. The aim of this study is to investigate the influence of *L. rhamnosus* on *C. tropicalis* and *C. albicans* biofilm formation. The premise is *L. rhamnosus* impede biofilm formation of both fungi.

Methods: To foster mono-species biofilm, *C. albicans* ATCC MYA-4901 and *C. tropicalis* ATCC 13803 were standardised to $1x10^5$ cells. *L. rhamnosus* was standardised to $1x10^6$ cells. The microorganisms were cultivated in nutrient broth in 96-well plate and incubated at 37°C for 48 hours. Polymicrobial biofilm assay was done by cultivating both microorganisms in the same well and same cell number as mono-species. Crystal violet assay was employed to assess the biofilms with absorbance measured at OD_{620} wavelength.

Results: After 24 hours, polymicrobial biofilm of *C. albicans* with *L. rhamnosus* decreased by 37.1±9.2%. At 48 hours, it further decreased to 44.7±5.9%. For *C. tropicalis*, polymicrobial biofilm with *L. rhamnosus* exhibited a decrease by 16.3±5.9% and 35.7±7.6% after 24 hours and 48 hours incubation, respectively.

Conclusion: *L. rhamnosus* hinder the biofilm formation of *C. tropicalis* and *C. albicans*, signifying potential use of the bacterium for oral candidiasis prevention.

Keywords: *Candida albicans*, *Candida tropcalis*, *Lactobacillus rhamnosus*, probiotic, biofilm

The Prenatal Bisphenol A Exposure Effect on the Expression of NMDA Receptor Subunits in Male Foetal Rat Hippocampus

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Abstract

Introduction: Bisphenol A (BPA) is an inorganic compound used in the production of polycarbonate plastics and epoxy resins. Maternal BPA exposure is the most concerned issue as the developing foetus is more vulnerable towards any environmental perturbations. Prenatal BPA exposure has been shown to influence the development of the brain and behaviours. This study aims to investigate the effect of the prenatal BPA exposure on the expression of N-Methyl-D-Aspartate (NMDA) receptor subunits (GluN2A and GluN2B) in male foetus hippocampus.

Methods: The BPA dosage at 5 mg/kg/day and 50 mg/kg/day with 0.5% Tween 80 in reverse osmosis water were orally given to pregnant Sprague Dawley rats from gestational day 2 until day 21. The same treatments were given to control group except without BPA. The level of GluN2A and GluN2B in the male foetus rat hippocampus were quantified using ELISA analysis.

Results: The prenatal BPA exposure affected the level of NMDA receptor subunits by showing significantly reduced level of GluN2A ($p<0.05$) and GluN2B ($p<0.001$) in the male foetus rat hippocampus.

Conclusion: The finding suggested that the BPA compound might be transferred to the foetus via placenta and caused changes in the expression of NMDA receptor subunits, leading to learning and memory impairments when reaching adulthood.

Keywords: Bisphenol A, foetus, hippocampus, NMDA receptor subunits

Association between *CYP2E1* polymorphisms and colorectal cancer risk: a meta-analysis

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Abstract

Introduction: Cytochrome P450 2E1, encoded by the *CYP2E1* gene, is an enzyme that has been implicated in the metabolic activation of various carcinogens. Thus, polymorphisms in *CYP2E1* have been frequently investigated for their association with colorectal cancer (CRC) risk, although the results have been inconsistent.

Methods: To address these inconsistencies, we conducted a meta-analysis to assess the association between *CYP2E1* RsaI, PstI and DraI polymorphisms and CRC risk. A literature search was performed on PubMed, Web of Science, and Scopus databases, and the genetic risk association was quantitatively synthesised under five genetic models: homozygous, heterozygous, dominant, recessive, and allele.

Results: Overall, 18 studies involving 10,302 cases and 13,296 controls were included in the meta-analysis. The *CYP2E1* RsaI polymorphism was found to be significantly associated with CRC risk under homozygous (OR=1.496, 95% CI=1.177-1.901, P=0.001), recessive (OR=1.467, 95% CI=1.160-1.857, P=0.001) and allele (OR=1.162, 95% CI=1.001-1.349, P=0.048) models. Subgroup analyses revealed slight differences in the risk association between Asians and Caucasians, and between high and low-quality studies. No significant association was observed for the PstI and DraI polymorphisms (P>0.05).

Conclusion: The present meta-analysis suggested that *CYP2E1* RsaI polymorphism, but not the PstI and DraI polymorphisms, was associated with CRC risk.

Keywords: genetic association, meta-analysis

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Synthesis and Antibacterial Study of PMMA/Silver Nanoparticles

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Abstract

Introduction: A convenient process of simultaneous polymerisation and incorporation of Ag into polymer as a biocide material is still in demand. We reported herein a one-pot synthesis of poly(methyl methacrylate), PMMA/Ag nanoparticles via miniemulsion method and its antibacterial properties.

Methods: Ag nanoparticles were prepared with two reducing agents of aniline and $NaBH_4$, whereby the effects of different parameters such as the order of mixing the reactants, presence of a stabiliser, and time on the stability, size, and concentration of the Ag nanoparticles were studied. The resulting colloidal Ag was then incorporated into PMMA through miniemulsion. The products were characterised via UV-Vis, TEM, FTIR, and ^{1}HNMR, followed by the antibacterial study via Kirby-Bauer method against *E. coli* and *S. aureus*.

Results: UV-Vis results confirmed the surface plasmon excitation of Ag nanospheres whereby the ^{1}HNMR and FTIR proved successful polymerisation. The TEM results further showed the presence of Ag nanoparticles in the samples. The result of the antibacterial tests indicated that increasing the concentration of Ag nanoparticles in the samples enhance the inhibition of bacteria.

Conclusion: Results confirmed the successful synthesis of PMMA/Ag nanoparticles and the antibacterial activity was increased due to the significant concentration of Ag nanoparticles in the samples.

Keywords: silver nanoparticles, polymer nanoparticles, one-pot synthesis, miniemulsion, antibacterial

Effects of Self-Emulsifying Drug Delivery System-Formulated Annatto Tocotrienol in a Rat Model of Postmenopausal Osteoporosis: Evaluation using Bone Histomorphometry and Bone Remodeling Markers

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Abstract

Introduction: Annatto tocotrienol (AnTT) could prevent osteoporosis in rats, but it has low bioavailability. Self-emulsifying drug delivery system (SEDDS) might improve the oral absorption tocotrienol and hypothetically enhance its skeletal effects. This study aims to evaluate the effects of SEDDS-formulated AnTT on bone histomorphometry and remodelling markers in a rat model of postmenopausal osteoporosis.

Methods: Thirty-six female Sprague Dawley rats were ovariectomised and given the following treatments after two months, i.e. baseline (sacrificed immediately), sham (given base SEDDS), ovariectomised (OVX, given base SEDDS), AnTT (OVX rats given 60 mg/kg AnTT), AnTT-SEDDS (OVX rats given SEDDS-formulated 60 mg/kg AnTT), and raloxifene (OVX rats given 1 mg/kg raloxifene). The rats were euthanized after the two-month daily oral treatment. Femur and lumbar bones were harvested for histomorphometry and remodelling markers.

Results: Both AnTT and AnTT-SEDDS significantly prevented trabecular bone volume deterioration by improving osteoblast numbers and trabecular mineralisation rate ($p<0.05$ vs OVX). AnTT also significantly decreased skeletal sclerostin expression ($p<0.05$ vs OVX). Only AnTT-SEDDS significantly increased bone formation rate and reduced RANKL/OPG ratio ($p<0.05$ vs OVX).

Conclusion: In conclusion, SEDDS-formulated AnTT increased bone formation in rats with oestrogen-deficient bone loss. Therefore, it is a potential anti-osteoporosis agent for postmenopausal women.

Keywords: menopause, oestrogen deficiency, osteoporosis, sclerostin, tocotrienol

In Silico Molecular Modelling and Docking of Plant Compounds against Breast Cancer Cell Line Proteins

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Abstract

Introduction: Breast cancer is one of the well-known diseases analysed in women compared to men worldwide. There are few studies about plant compounds that have been identified to have anti-cancer properties. Consequently, phyto-compounds have the capability of evolving new drugs. In this research, three-dimensional (3D) structure of breast cancer cell line proteins, Caspase-3, Breast Cancer Susceptibility Type 1 (BRCA-1) and Retinoblastoma (Rb) were generated and docking with plant compounds (Stigmasterol, Ferulic acid and Quercetin respectively) was studied.

Methods: SWISS-MODEL was used to build the 3D structure of protein models. Next, the protein models were validated using ProCheck, ProQ, ERRAT and Verify 3D programs. Finally, each protein was docked successfully with Stigmasterol, Ferulic acid and Quercetin respectively using the SwissDock server and visualised with UCSF Chimera software.

Results: The binding energy of the protein-phyto-compound complexes (Caspase-3-Stigamasterol, BRCA-1-Ferulic acid and Rb-Quercetin) were -8.09, -6.38 and -7.48 kcal/mol respectively. These proteins had a stable bond with their phyto-compounds.

Conclusion: A better understanding of the protein-phytocompound-complex interaction will help in designing new clinical medications.

Keywords: Breast Cancer Susceptibility Type 1 (BRCA-1), Caspase-3, Docking, Modelling, Retinoblastoma (Rb)

Correlation between Body Mass Index and Blood Glucose Levels in Young Down Syndrome Individuals

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Abstract

Introduction: Down syndrome (DS) is a common chromosomal abnormality. DS is associated with diabetes and higher obesity rates and diabetes in DS generally present early in life. This study has been conducted to evaluate the relationship between body mass index (BMI) and fasting blood glucose levels in DS aged 4 to 19 years old.

Methods: Height and weight was measured and BMI was calculated. Blood was collected from DS individuals (n=50) and controls (n=50). The Reflotron® Plus System was used to measure the fasting blood glucose levels.

Results: The mean of BMI in DS was ranged from 11.1 to 37.2 kg/m2 with 12% (n=6) overweight and 6% (n=3) obese while in controls from 13.8 to 33.3 kg/m2 with 16% (n=8) overweight and 3.8% (n=2) obese with no significant difference ($p>0.05$) between DS and controls. There was also no significant difference ($p>0.05$) in the level of fasting blood glucose in DS (mean=5.221 mmol/l) compared to controls (mean=5.342 mmol/l). This study has failed to prove the relationship between BMI and blood glucose levels ($p>0.05$) in both groups.

Conclusion: In summary, there was no significant difference in the fasting blood glucose levels in DS individuals with no association with BMI.

Keywords: Down Syndrome, Body Mass Index, Anthropometry, Blood Glucose.

In Utero BPA Exposure Altered Heart Tissue Morphology and Expression of Cardiac Proteins

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Abstract

Introduction: Exposure to bisphenol A (BPA) during in utero life has been reported to increase the risk of cardiovascular disease (CVD) development. Therefore, this study aimed to elucidate the impact of in utero BPA exposure on the hearts of mothers and foetuses using pregnant rats.

Methods: For the pregnant rats, animals were divided into Tween-80 (vehicle control), 0.05 mg/ml and 0.2 mg/ml BPA via drinking water for 19 days; from pregnancy day 2 till 21. Foetuses were all euthanised and blood as well as heart tissues were collected. BPA blood plasma levels were measured by GC-MS in foetuses from all groups. Heart tissues were processed for H&E, Masson trichrome staining, immunohistology staining for cardiac markers (cardiac troponin I, alpha fetoprotein, Hypoxia induced factor-1 alpha).

Results: BPA was detected in blood plasma level of BPA-exposed foetuses. H&E staining of BPA-exposed foetal hearts showed a sign of fibrosis. The presence of fibrosis was further confirmed by Masson trichrome staining in BPA-exposed foetal heart. Remarkably, reduced expression of cardiac troponin I (cTnI) was also observed in foetus of the BPA-exposed mother in comparison with foetus of the control mother. In contrast, alpha fetoprotein (AFP) expression was well distributed in cytoplasm of control foetal heart while less distributed AFP expression was observed in heart of foetus from BPA-exposed mother. Hypoxia induced factor-1 alpha (HIF-1α) was increased in expression in BPA-exposed foetal hearts compared to the control.

Conclusion: Our findings indicated that BPA exposure altered heart tissue morphology, and muscle protein expression. In summary, the findings have suggested the risk of in utero BPA exposure on foetuses and may increase the risk of CVD in the later stages of life by altering the expression of protein crucial for heart function and development.

Keywords: Bisphenol A, Heart, In Utero, Cardiac Protein, Heart Development.

Virtual Reality (VR) and Music on Stroke Rehabilitation: A Systematic Review

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Abstract

Introduction: Stroke was the leading cause of death and disability in the world. Almost all the stroke patients have impaired cognitive function linked to reduced recovery and quality of life. Music therapy and virtual reality (VR) have been shown to improve physical and cognitive recovery in stroke patients.

Methods: Systematic literature search was conducted using PubMed and Scopus databases published between 2017 and 2020 documenting interventions to improve quality of life and recovery among stroke patients.

Results: Studies included randomised clinical trials, observational studies, guideline statements, and review articles. Twenty articles were selected for review upon checking the inclusion and exclusion criteria. The intervention study has demonstrated that music and virtual reality (VR) among stroke patients improve memory, concentration, attention, positive mood, and quality of life.

Conclusion: Promoting listening to music and virtual reality (VR) for stroke patients during neurorehabilitation enhances the quality of life and cognitive skills. Thus, stroke patients should be advised on the strategies of using music therapy and virtual reality during their rehabilitation process.

Keywords: Virtual reality, Music, Quality of life, Stroke, Rehabilitation

Cytotoxicity and Molecular Docking Studies of Benzimidazole Derivatives as Potential Anticancer Agents against Human Breast Cancer Cell Line (MDA-MB-231)

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Abstract

Introduction: Cancer accounts for approximately 10 million deaths in 2020. Among all malignancies, breast cancer is the most common cancer affecting women with a total of 684,996 death cases globally. Currently, benzimidazole derivatives have received great attention in research for their potential therapeutic activities in various disease models including cancer.

Methods: This study aims to assess the cytotoxicity of novel benzimidazole derivatives (1–4) on MDA-MB-231 cells using the MTT assay and to predict their possible interactions with the anti-apoptotic proteins; Bcl-2 and Bcl-xL, using a molecular docking approach.

Results: Among all derivatives, compound 4 showed remarkably lower IC_{50} values (24 h: 7.80±0.19 µM; 48 h: 8.83±0.64 µM) when compared to 5-fluorouracil. Compound 3 also presented stronger cytotoxicity when compared to 5-fluorouracil with the IC_{50} of 10.10±2.90 µM (48 h). As for molecular docking analysis, compound 4 demonstrated the strongest interaction with the anti-apoptotic proteins; Bcl-2 and Bcl-xL, with binding affinity scores of -9.2 and -9.1 kcal/mol, respectively.

Conclusion: Overall results revealed greater interactions between compounds 3 and 4 with the targeted proteins; Bcl-2 and Bcl-xL, in comparison to the positive control, 5-fluorouracil.

Keywords: Cytotoxicity, Molecular Docking, Benzimidazole, MDA-MB-231

Perfluorooctane Sulfonate Affects Cells Beating Rate and Induces Hypertrophy in Neonatal Rat Cardiomyocytes

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Abstract

Introduction: Perfluorooctane sulfonate (PFOS) is a non-biodegradable synthetic compound contaminating various environmental media and food sources. PFOS exposure may increase the risk of humans developing diseases such as cardiovascular diseases (CVD). This study aimed to investigate whether PFOS exposure affects cell beating rate and induces hypertrophy in cardiomyocytes.

Methods: Effective concentration (EC_{50}) was analyzed by measuring the cultured neonatal cardiomyocytes' percentage of response (beating rate/min) against PFOS concentrations from 10 to 125 µM at 24, 48, and 72-hour exposure. Also, cardiomyocytes were treated with endothelin-1 (hypertrophy inducer). Then, the expression of cardiac and hypertrophic marker protein (F-actin & BNP) were compared between PFOS-exposed cardiomyocytes with endothelin-1-treated cardiomyocytes.

Results: The EC_{50} of PFOS on cardiomyocytes was determined at 50 µM in 48 hr ($n=4$, $p<0.05$). Beating rates elicited at EC_{50} of PFOS and Endothelin-1 were 60 ± 2 and 65 ± 18 beats/min, respectively, compared to the unexposed group, 43 ± 3 beats/min. ($n=6$, $p<0.001$, and $p<0.0001$ respectively). BNP expression was observed in PFOS and Endothelin-1 groups.

Conclusion: Results indicated that PFOS might affect the normal function of cardiomyocytes and lead to the development of cardiac hypertrophy.

Keywords: Perfluorooctane sulfonate, Cardiomyocytes, Hypertrophy, Cardiovascular Disease

A Simple High-Performance Liquid Chromatographic Method for Quantification of Astaxanthin Nanoemulsion in Brain Tissue

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Abstract

Introduction: Astaxanthin (Ast) is a lipid-soluble pigment of the keto-carotenoid compounds with ten times more antioxidant properties than other carotenoids. However, Ast possesses low bioavailability characteristics that lower its efficacy and potency. Thus, we formulated Ast in nanoemulsion to cross the brain's blood-brain barrier (BBB) that we predict will protect against degenerative diseases. Considering the high lipid content of the brain, we developed and validated a normal-phase HPLC-UV to quantitate Ast in different regions of the rats' brain post-treated orally with Ast.

Methods: The brain samples were homogenised with acetone-hexane (1:3). The mobile phase consisted of hexane: acetone (75:25% (v/v)) with a run time of 10 min. The flow rate was set at 1.0 ml/min with the detector set at 470 nm. The method was validated with a calibration curve over the 24.4-6250 ng/ml concentration range.

Results: The absolute recovery, within-day and between-day results showed that the method is reproducible. The Ast recovered from 0.08 g of brain tissues yielded less than 50 ng/g of Ast.

Conclusion: The Ast nanoemulsion formulated can penetrate BBB to further study its antioxidant property against degenerative diseases.

Keywords: HPLC Method, Astaxanthin Quantification, Brain Tissue

Effect of BHMC, the Curcuminoid Analogue on Intracellular ROS Modulation in Human Liver Cancer, HepG2 Cells

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Abstract

Introduction: 2,6-bis-(4-hydroxy-3-methoxybenzylidene) cyclohexanone (BHMC) is an analogue to curcumin that has been synthesised to overcome the poor bioavailability of curcumin. Although not much research has been conducted on BHMC, it is proposed to have similar effects as curcumin. Thus, BHMC may possess anti-apoptotic and anti-inflammatory effects on the oxidative stress.

Methods: Cell viability assay was elucidated using MTT. Based on the IC_{50} obtained, reactive oxygen species (ROS) was determined using DCFDA assay. Further confirmation on ROS scavenging activity was measured using glutathione assay.

Results: BHMC was found to be cytotoxic selective towards normal Hs27 and thrice more toxic towards HepG2 compared to curcumin. Further intracellular ROS analysis demonstrated induction of ROS depending on the concentrations given. This was confirmed with the increase of reduced GSH compared to control after 24 hours treatment.

Conclusion: BHMC has greater cytotoxic effect towards HepG2 compared to curcumin. Although the exact mechanism is not fully elucidated, BHMC toxicity is suggested to be exerted via the ROS pathway that caused the cells to be sensitive towards the treatment.

Keywords: BHMC, Curcumin Analogue, Reactive Oxygen Species, Glutathione, HepG2

Identification of Homopurine Sites in miR17-92A Gene for Triple Helix DNA Application

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Abstract

Introduction: Despite all advantages of nucleic acid-based drugs (i.e. antisense), transcription of the target gene possibly remains active to produce the same mRNA. Therefore, the 'magic bullet' therapeutic oligonucleotides must interfere with the mRNA synthesis to give a permanent inhibition effect. On the other hand, triple helix (triplex) DNA provides sequence specific inhibition of the target gene through the reverse-Hoogsteen base pairing. This homopurine third strand DNA binds specifically to the identical homopurine sequence of double helix DNA and may block the assembly of transcription factors in transcription, thus permanently switching off gene expression. This preliminary study described the process of identifying the homopurine sites in the miR17-92a gene of HepG2 cancer cell line.

Methods: Appropriate PCR primers were designed to amplify both purine-rich sequences at the upstream and downstream of miRNA17-92a sequence. The expected sizes of PCR products were proceeded for sequencing.

Results: 91 bp and 101 bp of the expected PCR products were successfully amplified and were successfully verified by sequencing analysis.

Conclusion: Therefore, these potential triplex DNA binding sites might be useful as therapeutic target sites to suppress the synthesis of oncogenic miR17-92a and this finding can also be optimised for any genetic diseases.

Keywords: Triple-Helix Forming Oligonucleotide, microRNA, Polymerase Chain Reaction

Knowledge, Awareness, and Practice of Pet-Related Zoonotic Diseases among Students in Universiti Teknologi MARA Puncak Alam Campus, Selangor

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Abstract

Introduction: Animals are one of the essential human needs, whether as food or life companions. Despite being essential to humans, more than 50% of the infectious diseases reported in humans were transmitted through animals. Knowledge and awareness of these diseases are key factors to prevent infection. Therefore a study was carried out to compare current knowledge and awareness among undergraduate students in Universiti Teknologi MARA Puncak Alam Campus, Selangor. This study also aimed to know whether their knowledge and awareness influence their practice on pet care.

Methods: A self-developed questionnaire was constructed and validated. In two months, the questionnaires were distributed to 377 targeted respondents.

Results: Data showed that knowledge about zoonosis was significantly different between gender ($p<0.05$). A significant difference of knowledge and awareness was also found between the faculties ($p<0.05$). Female pet owners had a higher mean of practice score (20.8±3.3) compared to the males (19.9±3.7).

Conclusion: Overall, the knowledge and awareness of the respondents were adequate, but still need to be improved. These results suggested that it is essential to increase awareness and educational programs that provide information about zoonosis and pet ownership, especially among university students.

Keywords: Zoonosis, Knowledge, Awareness, Practice, Pet Zoonosis

Identification of Hub Genes and Key Pathways Involved in NDV-mediated Oncolysis of Bladder Cancer Stem Cells via Whole-transcriptomic Sequencing

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Abstract

Introduction: Newcastle disease virus (NDV) is an oncolytic virus that has been shown to exhibit strong oncolytic effect against a wide range of cancer types. However, the oncolytic effect of NDV against cancer stem cells (CSC) remains poorly understood. This study aimed at characterising the oncolytic effect of NDV against putative bladder CSC and elucidate the genes and signalling pathways associated with NDV-mediated oncolysis.

Methods and Results: The infection of putative bladder CSC (selectively grown in the form of 3D-spheroids) with NDV showed that the NDV was able to target bladder cancer spheroids, albeit there was a spectrum of response across different spheroids. Differentially expressed genes (DEG) were identified via whole-transcriptomic sequencing of the NDV resistant bladder cancer spheroids relative to the uninfected bladder cancer spheroids. Subsequently, functional enrichment analysis and protein-protein interaction (PPI) network analysis was performed. Module exploration of the PPI networks revealed hub genes such as *NFKB1* and *RELA* that potentially influence NDV-mediated oncolysis of bladder CSC through key pathways that related to viral pathogen detection, activation of immune and inflammatory responses.

Conclusion: These findings provide an insight into mechanisms for overcoming resistance towards NDV-mediated oncolysis and accelerating the clinical translation of NDV as an oncotherapeutic.

Keywords: Newcastle disease virus, Bladder cancer, Cancer stem cells, RNA sequencing, NDV persistent infection

Efficiency Profiles of Cisplatin Loading Strategies in the Titania Nanotube Arrays Nanosystem for the Targeted Chemodrug Delivery

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Abstract

Introduction: The titania nanotube arrays (TNA) nanosystem presented as a novel excipient for the targeted chemo drug delivery to overcome the limitations faced by conventional drug delivery. Understanding the interplay of the drug–material interaction is crucial to stimulate efficient drug delivery technology.

Methods: Cisplatin (CDDP) loading techniques in the TNA nanosystem was studied using immersion and top filling methods. Subsequently, the CDDP-TNA was wizened by vacuum and air-drying methods. The loading efficiency, distribution and binding interactions of CDDP with TNA (CDDP–TNA) were characterised.

Results: Functional structures of CDDP and amide I bond (N–H) were identified at 1635.6 cm−1 using FTIR and further quantified using spectrophotometry at 706 nm. Results indicated the successful interaction of CDDP and TNA by FTIR and wettability analysis. CDDP–TNA interaction showed favourable hydrophilic properties of 37.24±0.16º on bare TNA compared to 43.57±0.03º on CDDP-TNA, thus facilitating CDDP release from the TNA. Present findings showed promising loading capacity of CDDP through the top filling vacuum technique by 8.6-fold higher than immersion techniques.

Conclusion: Further comprehensive study on the TNA nanosystem with controlled drug release profile involving polymer coating is needed to achieve efficient localised chemo drug delivery.

Keywords: TNA nanosystem, Chemo drug, Loading efficiency

A Case Study on a Naval Ship: Indoor Air Quality (IAQ) Chemical Parameters on Different Ship Conditions and Engine Sequences

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Abstract

Introduction: During COVID-19 pandemic, the security of maritime border needs to be enhanced to avoid trespassing and illegal border activities. Hence, the Royal Malaysian Navy (RMN) has increased the patrolling routine, which requires additional duration of crew working onboard. Therefore, good indoor air quality (IAQ) is crucial to provide the optimum and safe working environment. This study aims to determine and compare IAQ chemical parameters; carbon dioxide (CO_2), carbon monoxide (CO) and total volatile organic compounds (TVOC) at different ship conditions: alongside and sailing.

Methods: Parameters were measured at six sampling points (common room, accommodation area 1, electrical room and accommodation area 2, including engine room and outdoor as references). All parameters were measured following the guidelines from Industrial Code of Practice on Indoor Air Quality 2010 (ICOP on IAQ 2010) at four time slots, resembling different engine sequences during sailing (warming up, increasing speed, full speed, slowing down).

Results: Results show that CO_2 concentrations in both conditions exceeded the standard guideline. CO concentrations were higher in all sampling points when the engine was fully running. TVOC concentrations were higher alongside.

Conclusion: This study found that ship conditions and engine sequences influenced the IAQ chemical parameters inside the ship.

Keywords: Indoor Air Quality (IAQ), Naval Ship, Chemical Parameter, Engine Sequence

A Probit Regression in Identifying the Risk Factors of Cervical Cancer in Private Hospital

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Abstract

Introduction: Cervical cancer is the second cancer listed as the major cause of death for women worldwide. A generalized linear model (GLMs) was conducted to identify the risk factor of cervical cancer and to build a suitable model. This research was conducted to identify the risk factors and investigate the relationship between cervical cancer and some risk factors based on the 854 samples from the private hospital.

Methods: Probit Regression was used to identify the risk factors. Out of 7 independent variables, 2 variables were given a significant relationship with cervical cancer. There was a significant relationship between cervical cancer with age and STDs which the p-value is less than 0.05.

Results: Age and STDs influenced the presence of cervical cancer in a private hospital. Women who are of older age are more likely to have cervical cancer. For a woman who had STDs, the probability of occurrence will be higher compared to individuals without STDs. Preliminary analysis with some cross-tabulation analysis was presented.

Conclusion: The Probit Regression model was built and the prediction was predicted with different cases of observation. The risk of getting cervical cancer can be reduced effectively if women have more knowledge on cervical cancer and the risk factors of cervical cancer can be identified.

Keywords: Cervical Cancer, Probit Regression

Decision Making Process on Planning a Balanced and Nutritious Diet for Autism Paralympic Athlete

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Abstract

Introduction: Athlete diet planning is conducted by choosing appropriate food items that fulfill the nutritional requirements of the diet formulation. This study aims to develop a mathematical model for diet planning the menus to meet certain nutritional requirements and cost constraints at the lowest level for autism Paralympic.

Methods: This research discussed the application of integer programming (IP) to build the mathematical model of diet planning for an autism Paralympic athlete for the pre-tournament period. By developing this mathematical model, it was used to solve the diet problem of autism disorder patients which was very specific to adolescent Paralympic athletes aged 20 until 35.

Results: The IP was a scientific approach to select suitable food items, which seeks to minimise the costs, under conditions of meeting desired nutrient quantities, avoiding food allergens, and getting certain foods into the diet that brings relief to the autism Paralympic. The data on this study were collected from dieticians, nutritionists, and also from the Malaysian Ministry of Youth and Sports.

Conclusion: Therefore, this study shows that the IP was approachable to produce an optimal and feasible solution and also at minimum cost for the diet problem of autism Paralympic athlete.

Keywords: Autism Paralympic, Diet Planning, Integer Programming, Menu Scheduling, Optimisation

Nutrient Planning for Heart Problem (Stroke) Patients by using Optimisation Technique

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Abstract

Introduction: The factor of most people that suffer from any disease is not taking nutrients and meals that are required in their body. This research identified the suitable range of nutrients which is lower bound and upper bound for heart problem (stroke) patients that can assist them to plan a balanced diet based on the guidelines of Recommended Nutrient Intake for Malaysia (RNI 2017).

Methods: Optimisation techniques such as linear programming (LP) and integer programming (IP) were discussed in this research to develop the mathematical model of meal planning for heart problem (stroke) patients in Malaysia. This research aims to determine nutritious menu planning as the objective function is to minimise the cost. For menu planning purposes, the software tool LPSolve IDE was used.

Results: The results showed that further analysis has been done by IP with applying the Delete-Reshuffle Algorithm in generating a 5-day structure of menu planning. The optimal cost of the meal planning structure was below RM20.00 per day for 5 days.

Conclusion: Hence, this research can give contributions to society especially for heart problem (stroke) patients to practice a healthy lifestyle. It also can assist people to plan their cost budget in meal planning.

Keywords: Nutrient Planning, Stroke, Optimisation Technique, Lpsolve IDE, Delete-Reshuffle Algorithm

Optimisation Approach on Nutritious Menu Planning for Sinusitis Patient among Malaysian

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Abstract

Introduction: Sinusitis or Sinus Inflammation is defined as the inflammation that occurs in the lining of the sinuses. Having surgery is the most recommended treatment. However, this will result in a high cost to bear. Furthermore, most people are likely to consume the antibiotic to relieve the Sinusitis. This will give side effects when continuously consumed for the long term. By taking an adequate amount of nutrient requirement also help an individual in preventing the Sinusitis itself.

Methods: Hence, menu planning was a design for Sinusitis patients that met the requirement of nutrient intake. This research applied Linear Programming and Integer Programming methods as the approach. Delete Reshuffle Algorithm has been implemented in designing the menu planning to obtain the menu for 5 days with a different menu every day and low cost.

Results: Integer Programming gave more practical results and the menu planning has been designed for 5 days that met the nutrient requirement at a lower cost.

Conclusion: In the future, the target group can be expanded to another disease that matches the characteristics with Sinusitis patients of all age levels and the list of food groups can be expanded to make more dishes that attract the patients to have a healthy lifestyle.

Keywords: Integer Programming, Linear Programming, Optimisation, Sinusitis, Sinus Inflammation.

Vegetarian Menu Planning and Scheduling for Breast Cancer Patients in Malaysia using Optimisation Approaches

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Abstract

Introduction: Breast cancer (BC) is a disease of tumor-forming on the breast, it is life-threatening among women, especially middle-aged females. This study aimed to develop a seven-day vegetarian menu for breast cancer patients.

Methods: The methods involved for food menu development in the study were Linear Programming (LP) and Integer Programming (IP) with the aid of AMPL.

Results: The results of the study showed that LP and IP could be adopted for menu planning for seven days.

Conclusion: In the future study, the researchers could consider designing other types of the vegetarian menu using a larger food data set.

Keywords: Breast Cancer, Vegetarian Menu, Linear Programming, Integer Programming.

Electrospinning of Emulsified Red Palm Oil in Producing Orodispersible Film as Pro-vitamin A Supplement

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Abstract

Introduction: In an attempt to develop a pediatric-friendly Pro vitamin A supplement, red palm oil was used as a local source of β-carotene and manufactured using electrospinning method to produce orodispersible film.

Methods: Gelatin-stabilized red palm oil emulsion at different gelatin to oil weight ratio (1:0.5, 1:0.75 and 1:1) were prepared. These emulsions were spun using a self-setup electrospinning machine at a horizontal configuration in a controlled ambient condition of 24-26ºC and 50-55% RH. Products obtained were peeled and kept over silica gel prior to further analysis.

Results: As the oil content increased from 1:0.5 to 1:1, the apparent viscosity and the average diameter of the electrospun fibers also increased. The morphology and thermal properties of the fibers were also investigated. Film disintegration occurred instantly when distilled water was added. At the same time gelatin swelled and gel formed upon contact with water. In the presence of acid (by using dilute acetic acid solution at pH 2 to mimic the condition of the stomach), the film was fully dissolved, and the solution turned cloudy which indicated it was self-emulsified under stirring condition.

Conclusion: An instant disintegrable gelatin film encapsulated with red palm oil was successfully prepared.

Keywords: Electrospinning, Orodispersible film, Red palm oil, Pro-vitamin A supplement

Functional Interrogation of CRISPR-Cas9 Mediated AGR2 Knockout in Metastatic Triple Negative Breast Cancer Cells

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Abstract

Introduction: The anterior gradient protein-2 (AGR2) which belongs to a family of protein disulfide isomerase (PDI) mediates the formation, breakage and isomerisation of disulphide bonds during protein maturation and maintain the homeostasis of the secretory pathway. AGR2 emerged as a clinically-relevant tumour target as it is highly expressed in several types of cancer and its expression enhances tumour development and metastasis.

Methods: We designed five individual sgRNAs targeting AGR2 (AGR2-KO) and one non-targeting control (NTC) and cloned them into lentiviral sgRNA expression vector systems. Upon lentiviral transduction into stable Cas9-expressing cells and subsequent selection using hygromycin, the cells were harvested as pooled knockout cells. By using T7E1 mismatch cleavage assay, DNA sequencing, Western blot and immunofluorescence, we confirmed the successful AGR2 knockout in 1833-BoM cells for all five individual sgRNAs. We then performed several phenotypic cell-based assays comparing the isogenic AGR2-KO cells with the NTC cells.

Results: Our results showed that the AGR2-KO cells have decreased proliferative, adhesive and migratory capacity compared to the NTC cells.

Conclusion: Our results corroborate the hypothesis that AGR2 may play a role in tumour progression and metastasis, hence, underscored AGR2 as an appealing anti-tumour target for cancer therapy.

Keywords: AGR2, PDI, Cancer, Oncology, Molecular Biology

Differential Genes Expression Profile of EMT6 Parental Cell Lines Irradiated with Gamma-Ray and its Surviving Cells

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Abstract

Introduction: Resistance to radiotherapy may cause cancer cells to escape the treatment and cause cancer relapse. This study aims to investigate the differential gene expression in EMT6 mouse mammary carcinoma cell lines to gamma-ray radiation and their surviving cells.

Methods: EMT6 cell lines were irradiated with gamma-ray of 2Gy/cycle for 8 cycles in the gamma cell chamber. RNA for control cells and the surviving cells in the treated group were collected. Differential gene expressions between both groups of cells and their pathways involved were analysed using Next-Generation Sequencing (NGS) utilising Gene Set Enrichments Analysis and Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway analysis.

Results: A total of 20,671 genes were expressed where 259 genes were expressed only in sham control group enriched mainly in apoptosis and Nf-κβ signaling pathway while 2896 genes were expressed only in treated group that enriched in general immunology pathway such as IL-17 and T-cell signaling pathway. Approximately 17,516 genes were expressed in both groups where 848 genes were significantly differentially regulated (418 genes up-regulated, 430 genes down-regulated) where the up-regulated genes were found enriched in general oncogenic pathways.

Conclusion: The differential gene expression in surviving cells may provide an important knowledge of the mechanism involved in radio-resistance.

Keywords: EMT6, Radioresistance, NGS, KEGG Pathway Analysis

Reduced Graphene Oxide Nanocomposite for the Treatment Methicillin-Resistant *Staphylococcus aureus* (MRSA) Infections

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Abstract

Introduction: Methicillin-resistant *Staphylococcus aureus* (MRSA) is one of the medically important pathogens among Gram-positive bacteria. Reduced graphene oxide (rGO) has garnered considerable attention for biomedical applications due to its antibacterial properties. Hence, we synthesised a series of reduced rGO nanocomposites and investigated their anti-MRSA properties using *in vitro* assays.

Methods: The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were determined against MRSA strains. The active composite was further investigated for its physicochemical properties, followed by cytotoxicity against the human embryonic kidney (HEK293) cell line.

Results: Out of five nanocomposites, rGO-copper (rGO-CU) showed the lowest MIC of 25 µg/mL and MBC of 100 µg/mL against the MRSA strains. The morphology analysis of rGO-CU using a scanning electron microscope showed uniform distribution of spherical copper nanoparticles on the rGO sheet. The X-ray powder diffraction analysis showed the presence of rGO peaks at $2\theta=26.4°$ alongside with characteristic peaks of copper at $2\theta=31.1°$, which confirms the attachment of copper nanoparticles on the rGO-sheet. rGO-CU showed a half-maximal inhibitory concentration (IC_{50}) of 8.35 µg/mL compared to the rGO, 330 ug/mL.

Conclusion: Further studies are being carried to formulate the rGO-CU into a topical cream for wound healing.

Keywords: Reduced graphene oxide-copper, MRSA, Nanocomposite, Wound healing

Trends in Output of Research in Clinical Prediction Models of Stroke Outcomes: A Bibliometric Analysis

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Abstract

Introduction: Clinical models of stroke outcomes have been studied extensively without quantitative synthesis and mapping the knowledge trends. This study aimed to describe the research activity trends of clinical prediction models of stroke outcomes.

Methods: A bibliometric analysis of publications on clinical prediction models of stroke outcomes indexed in the Scopus was conducted from 2010 to 2019. The data were analysed quantitatively and mapped using VOSviewer.

Results: A total of 6,364 publications exploring the prospects of clinical prediction models of stroke outcomes were identified. 'Stroke' was the highest profiled journal with publications 679 and 20,385 citations. Lip et al. (2010) article in "Chest" topped the most cited publications (3448). The USA, China and UK were the most productive countries. Furthermore, Massachusetts General Hospital, USA, led in the most prolific institution in the area (177 articles, 8843 citations).

Conclusion: This study showed a gradual rise in research activities on models of stroke outcomes since 2010. The bulk of the publications were from high-quality stroke-related journals and high-income countries. Stroke outcome models' investigators should follow studies from institutions with high-quality outputs in the field. There is a need to build wider collaborative research networks among relevant institutions.

Keywords: Bibliometrics, Collaborations, Predictions, Stroke

Determination of In Vitro Synergy of Ampicillin and Chloramphenicol against Multidrug-Resistant *Bacillus cereus* Species

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Abstract

Introduction: Nowadays, combination therapy has developed into one of the most efficient therapeutic efforts in treating infection caused by the emergence of multi-resistant microorganisms.

Methods: Six designated antibiotics, chloramphenicol, ciprofloxacin, ampicillin, rifampicin, gentamicin, and tetracycline, were tested for minimum inhibitory concentration (MIC) of *Bacillus cereus* (isolates KS2, E2, F2, F6, and K2W2) obtained from aquaculture localities and river in Kukup, Johor, Malaysia.

Results: All *B. cereus* isolates from the MIC determination showed resistant traits towards rifampicin and ampicillin but utmost sensitivity to chloramphenicol, ciprofloxacin, and gentamicin. Moreover, this finding showed a synergistic effect of ampicillin and chloramphenicol against the *B. cereus* isolates. Contrarily, the antagonism effect was observed in *B. cereus* isolate K2W2, whereas *B. cereus* isolate F6 had shown indifferent results.

Conclusion: Specifically, a synergistic approach or dual therapy of antibiotics can be a demand in treating multi-resistant microorganisms. Apart from that, the remarkable synergy of chloramphenicol and ampicillin opens novel possibilities for combining bacteriocins and antibiotics in combination infection treatment.

Keywords: Antibiotics, *Bacillus cereus*, Antibiotic Resistance Bacteria, Synergistic, Multidrug-Resistant

Prevalence and Factors Associated with Face Mask Usage During Covid-19 Pandemic Among Students and Staff of Malaysian Medical School

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Abstract

Introduction: Covid-19 is a highly infectious communicable disease. Based on previous experience with the severe acute respiratory syndrome (SARS) and H1N1, anxiety, misconceptions, and lack of knowledge negatively impact public health practice, including wearing a face mask in public spaces. We aimed to investigate the prevalence and associated factors of face mask usage during the Covid-19 pandemic among students and staff in the Faculty of Medicine and Health Sciences (FMHS), Universiti Putra Malaysia (UPM).

Methods: 220 respondents participated in our cross-sectional study via simple random sampling conducted in August 2020. An electronic version of a self-administered questionnaire was sent via WhatsApp and email. Data analyses were performed using the Chi-square test, IBM SPSS Statistics 25, with statistical significance, if $p<0.05$.

Results: 197/220 (89.5%) respondents wore face masks constantly, 89.6% chose the internet as a source of knowledge information, 90.3% had a high level of preventive measures against Covid-19, and 90.9% had a good level of hygienic practice attitude. Significant associations were noted between variables of associated factors and face mask usage, which include the source of knowledge information (internet) ($p=0.025$) and attitude towards Covid-19 ($p=0.001$) and hygienic practices ($p=0.001$).

Conclusion: High prevalence (89.5%) of face mask usage was demonstrated during the Covid-19 pandemic among respondents in FMHS, UPM.

Keywords: Face Mask, Covid-19 Pandemic, Lack of Knowledge, Hygienic Practice

Narrative Review 3Ps (Pharmacokinetic, Pharmacodynamic, Pharmacogenomic) of Sodium Valproate: What's New?

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Abstract

Introduction: Sodium valproate (VPA) is an old drug and currently one of the most commonly prescribed antiepileptics. With more studies, new information on the drug uncovered thus needs to compile all new knowledge. The objective is to understand the direction of research and new knowledge concerning VPA and provide compiled updated information on 3Ps (pharmacokinetics, pharmacodynamics and pharmacogenomics) of VPA for future application and studies.

Methods: Recent (2015-2020) studies on pharmacokinetics, pharmacodynamics and pharmacogenomics of VPA were searched using Pubmed, Google Scholar and Open Access search engines.

Results: Recent studies showed VPA has neuroprotection activity via histone deacetylase (HDAC) inhibition that benefits both brain disorders and ischemic stroke. VPA was also found to promote hair growth and lower the risk of acute respiratory failure in infection. New risk data associated with VPA use were hepatotoxicity, vitamin D deficiency, prolonged QT interval, and insulin resistance, among others. Various gene polymorphisms such as CYP2C9 and UGT1A6 are some polymorphisms that may cause dose alteration in the population.

Conclusion: Compilation on VPA's 3Ps demonstrated new drug information, hinting at the need for further evaluation. This includes its new uses and benefits, toxicity data including both acute and chronic use, and the involvement of genetic polymorphisms on the drug's pharmacokinetics and pharmacodynamics.

Keywords: Valproate Sodium, Pharmacokinetic, Pharmacodynamic, Pharmacogenomic

Life During the Pandemic of Coronavirus Disease in Malaysia: Are We Prepared Mentally and Physically?

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Abstract

Introduction: Novel Coronavirus Disease (COVID-19) originating from China has rapidly crossed borders, infecting people worldwide. This study aims to evaluate the impact of Coronavirus on mental health and physical among Malaysians.

Methods: A quantitative method using an online Google form was done between April and July 2020. A total of 269 responses were received, with the mean age of participants 24.5±0.5.

Results: The result showed the peoples' willingness to follow the government guidelines on quarantine and social distancing. Regarding physical, 61.71% agreed that washing hands could lower the risk, and 46.46% strongly disagreed that it was safe to travel across the country. In terms of mental health, 47.58% of people lost interest in several days. The majority of respondents (42.75%) did not feel down, depressed, and hopeless. Only 17.47% had a sleeping problem. Most of the respondents (33.09%) sometimes had problems concentrating on things. Besides, 42.38% did not feel anxious and nervous, but only some (10-11.5%) felt it. Additionally, 36.4% of respondents did not feel the difference between their mental health and physical. Somehow, 31.6% feel a little much worse, which is relatively high.

Conclusion: The COVID-19 does bring an impact on mental health and physical. So, this study has shown the relationship among Malaysians.

Keywords: COVID19, Mental, Physical, Pandemic, Social

Secondary Metabolites from Selected Fungal Endophytes Associated with *Uncaria sp*.

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Abstract

Introduction: As a rainforest country, Malaysia has the most extraordinary biodiversity and harbours novel endophytes with the most significant number. However, the isolation of promising endophytic microorganisms capable of producing bioactive metabolites from the considerable plant biodiversity is always challenging. The Rubiaceae family that grows in the great biodiversity areas also could be an excellent bioresource for plant-associated microorganisms.

Methods: Three samples of *Uncaria sp.* plant of Rubiaceae family collected from Taman Herba, UiTM Puncak Alam biological reserve for endophytic fungi isolation. Ethyl acetate extracts of all the isolates were analysed by HPLC and evaluated for preliminary screening of antimicrobial activity against S. aureus, E. faecium, *P. aeruginosa*, *E. coli*, and *C. albicans* MTT assay. The active crude extracts were fractionated, and their components purified by semi-preparative HPLC. Chemical structures were determined based on spectroscopic methods, including MS, NMR techniques.

Results: On comparison of the X-ray data, UV-vis, MS, X-ray diffraction and NMR spectrum with the literature, we can identify and characterised isolated compounds as Cytochalasin J&H.

Conclusion: This research on endophytic fungi demonstrated the necessity to explore the formidable resources of the fungal kingdom present in mega biodiversity centres like Malaysia. This research should be continued by extensive exploratory work and contribute to the discovery of new drugs.

Keywords: Endophytes, *Uncaria sp.*, Antimicrobial, Secondary metabolites, Cytochalasin J& H

Bringing in the Ching-Chong: Introducing 24 Season Drums as a Novel Approach to Physical Literacy and Resilience Development

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Abstract

Introduction: Resilience is often referred as the capacity to adjust oneself amid hardships. It helps to strengthen one's stress threshold and facilitates adjustment period. Physical literacy can be defined as having an individual's mind and body in a state of harmony. The present paper aimed to introduce possibilities for endorsing physical literacy and resilience, through the extensive use of 24 Season Drums, a musical performance originated from Malaysia.

Methods: Literature search was performed using PubMed, ResearchGate, ScienceDirect and Google Scholar databases. Keywords include physical literacy, resilience, stress, physical activity, drums, and 24 Season Drum. Published articles, review papers, and meta-analysis from May 2000 to September 2020 were included. The review was written based on the Scale for the Assessment of Narrative Review Articles (SANRA) statement.

Results: The literature search yielded in a search of 324 articles. 237 articles were removed after applying the exclusion criteria. After abstract and title reading, a total of 8 articles were retrieved and discussed further in the manuscript.

Conclusion: The evidence presented supports the implementation of 24 Season Drums to promote one's physical literacy and resilience development. The authors hope to attract more scope of collaborations between art-based performance in developing a resilient individual.

Keywords: Physical literacy, Resilience, Physical activity, Drums, 24 season drum

Resilience in the New Normal: Riddle-Based Game and Gamified Digital Case Studies as an Interactive Online Learning Tool in Pharmacology and Toxicology

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Abstract

Introduction: The COVID-19 pandemic has radically changed higher education landscape by adopting online teaching and learning. The abrupt changes fail to engage and improve students understanding, motivation and learning gains. Hence, innovative engaging learning tools are needed to provide rich learning experiences. The objective was to design and assess riddle-based game and digital case studies (RBGDCS) in enhancing student learning gains in Pharmacology and Toxicology (P&T).

Methods: Firstly, storyboards were conceptualised and constructed based on P&T topics. Thereafter, they were digitalised using Articulate studio 360 and PowToon by inserting digital images, videos, characters, and graded questions. Thereafter, the flow was validated according to the ASPIRE framework. Finally, questionnaires with open ended questions and Likert scale were prepared and handed-out to assess the respondents' view and attitude on RBGDCS and learning gains.

Results: A riddle-based game and seven digital case studies were successfully created and validated. The questionnaire aids in establishing the attainment of RBGDCS in making the learning process easier, fun and engaging.

Conclusion: RBGDCS were effective in boosting understanding and improving learning gains as they were engaging, motivating, challenging, and has the potential to help students develop essential skills.

Keywords: Covid-19, Digital Case Study, Digital Education, e-Learning, Riddle-based game

An Investigation into Adoption of E-commerce to Support Code Sharing the Case of Libyan Airlines

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Abstract

Introduction: The airline industry struggles to survive due to European Union restrictions and uncertainty in the Libyan economy. The only viable solution is to ride on code-sharing with other airlines to allow a greater flow of goods and passengers internationally. Therefore, it is critical to use e-commerce to increase demand for flights and gain a competitive advantage. Libyan Airlines faces economic obstacles such as war, lack of infrastructure and low internet penetration. Until recently, there has been a lack of studies on e-commerce success in the airline industry. Therefore, this study intends to explore various factors contributing to a successful e-commerce strategy in airlines.

Methods: This study employed the constructionism paradigm along with a qualitative (inductive) approach. Specifically, a case study method was used to explore the role of e-commerce using Resource-Based View (RBV) for this study. Thematic analysis was conducted using NVivo software.

Results: This study has contributed to the practical problem faced by the airline industry in Libya to enhance competitive advantage compared to other competitors in this time of economic crises in the world.

Conclusion: Strategy through code-sharing will be able to improve airline's performance. The Libyan Airlines scenario is presented to provide a background for this case study.

Keywords: E-commerce, Competitive advantage, Libyan airlines, Resource-Based View (RBV)

International SMEs in Facing the Challenges of the Iranian Market: A Recommendation

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Abstract

Introduction: Iran is potentially an attractive country for businesses, with a population of 85 million people, making it the 19th most significant market globally. Iran also has a young population and a high literacy rate. In addition, it is equipped with the technological expertise, natural resources and infrastructure to support business operations. Nonetheless, firms, especially foreign businesses, need to be equipped with competencies to face the unique challenges of operating in this market. The Iranian market is faced with a significant level of uncertainty and complexity. These complexities are exacerbated due to the international sanctions and a highly regulated and bureaucratic market structure.

Methods: The challenges of operating in the Iranian market are more pronounced for international small and medium enterprises (SMEs) due to their limited resources and bargaining power. This study provided suggestions to these SMEs to compete effectively in the Iranian market through literature review.

Results: International SMEs need to be more proactive in sensing the market changes and proactively adapting to them, which helps them survive while capitalising on the opportunities in the market.

Conclusion: The international SMEs operating in Iran, or are planning to, can refer to this study.

Keywords: International Small and Medium Enterprises (SMEs), Iran, Market Uncertainty, Sanction, Dynamic Capabilities

Using Cash during COVID-19? Impact of Perceived Risk and Security on E-wallet Adoption

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Abstract

Introduction: During the COVID-19 pandemic, transacting in physical cash is an unnecessary risk many would not take. Throughout the nationwide lockdown in Malaysia, cash usage declined by 64%. However, the mindset of Malaysians is not ready for e-wallet, citing security concerns. With expected prolonged pandemic, understanding digital payment usage is vital. This study extends the Technology Acceptance Model (TAM) to incorporate security and risk in understanding e-wallet adoption among Malaysians.

Methods: The quantitative study was conducted with purposive sampling, collecting usable surveys from 300 respondents. A research framework was developed with perceived ease of use (PEOU), perceived usefulness (PU), perceived risk (PR) and perceived security (PS) in affecting the intention to e-wallet adoption (INT).

Results: The findings found PEOU to be the strongest influencer followed by PS while PR showed a negative relationship to INT.

Conclusion: Malaysians are most concerned about PEOU as most may be low in "tech-savviness", needing assistance in performing transactions compared to Singaporeans. Malaysians are also carefree in attitude towards the risk compared to Singapore, Vietnam, and India. Emphasis is placed on the service providers' reputation in providing security while any untoward incidents are brushed off as a turn of bad luck.

Keywords: Digital wallet, Digital payment, Perceived security, Covid-19, Technology acceptance model.

The Role of Domestic Institutional Ownership in Influencing the Nexus Between Corporate Social Responsibility Performance and Auditor-Client Contracting: The Malaysian Evidence

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Abstract

Introduction: This study hypothesized that socially responsible firms tend to engage Big 4 auditors to verify the quality of their financial reporting standards. In turn, the auditors will charge lower audit fees due to lower engagement risks. As such, the positive connection between Corporate Social Responsibility (CSR) performance and auditor-client contracting can be perceived. This study hypothesized that domestic institutional ownership would enhance the nexus between CSR performance and auditors-client contracting in Malaysia.

Methods: The sample of the study covered all public listed firms in Bursa Malaysia from 2012 to 2020. Panel regression method has been employed in this study.

Results: There was a positive linkage between CSR performance and auditor-client contracting. The presence of domestic institutional ownership further strengthened the relationship.

Conclusion: In conclusion, being an excellent corporate citizen lowers the audit fees. This research has supplied a new avenue by blending in domestic institutional ownership to study the connection between CSR performance and auditor-client contracting**.**

Keywords: Corporate Social Responsibility Performance, Auditor-Client Contracting, Domestic Institutional Ownership.

Sustaining SMEs through Business Model Innovation

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Abstract

Introduction: Small and medium enterprises (SMEs) contribute significantly to the country's economic and social well-being. SMEs occupy 98.5 per cent of business establishments, create 38.9 per cent of gross domestic product (GDP) and employ 48.4 per cent of workers in Malaysia. Nonetheless, SMEs are also vulnerable to the external environment. Covid-19 pandemic and implementation of movement control in Malaysia have forced more than 30,000 SMEs to cease their operations. Thus, there is a need to relook into the survivability of SMEs.

Methods: An essential factor linking to the long-term survivability of SMEs is innovation. Nonetheless, innovation has to be viewed from a comprehensive perspective instead of one single dimension. This article suggests the SMEs adopt the comprehensive system of business model innovation. The operational definition developed by Clauss (2016) can be an excellent basis to guide SMEs to build the comprehensive innovation eco-system within the business, ranging from developing the right capabilities, value proposition and subsequently capturing the value created through innovation.

Conclusion: This comprehensive approach to innovation aims to allocate scarce resources to optimise value creation through the innovation value chain in SMEs. Through the adoption of business model innovation, SMEs should have higher survivability.

Keywords: Small and medium enterprises (SMEs), Business model innovation, SMEs survivability

Factors Affecting E-Commerce Adoption among Agricultural Micro Small Medium Enterprises (MSME)

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Abstract

Introduction: E-commerce has become a phenomenon in developing countries, including Malaysia. To keep up, Malaysia launched the National E-commerce Strategic Roadmap in 2016 to support companies to onboard e-commerce. The policy indicates its success when income through e-commerce increased to RM447.8 billion in 2017 compared to RM398.2 billion in 2015, contributed mainly by the manufacturing sector. However, in the agriculture sector, e-commerce adoption is still slow. E-commerce has become a new normal in the agricultural sector for business sustainability. This need to sustain businesses might contribute to an increase in e-commerce adoption by agricultural MSME. Thus, this paper aims to determine the factors affecting e-commerce adoption among agricultural MSME with the latest pandemic.

Methods: Based on Technology, Organisation, Environment (TOE) Framework and Technological Accepted Model (TAM).

Results: The outcome of interest included that e-commerce adoption within Malaysian SMEs was affected by perceived advantage, compatibility, top management support, employee knowledge, government policy and unprecedented event.

Conclusion: This research will enrich the existing knowledge on e-commerce adoption in Malaysia, focusing on MSMEs and agriculture sector that will be referenced by policymakers.

Keywords: E-commerce adoption, Agricultural Entrepreneurship, MSME

Corporate Governance and Shareholders' Confidence in Cooperative Corporations: A Case Study

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Abstract

Introduction: Malaysian cooperative investors suffered considerable losses in monetary and confidence because of poor corporate governance. This issue has posed severe consequences as it affects the confidence of the B40 shareholders to invest in such co-operations.

Methods: This case study presented preliminary interview results on the effect of poor corporate governance on the shareholders' confidence in Malaysian cooperatives among their B40 group. Transparency, trustworthiness, and integrity were crucial factors to recognise in cooperatives shareholders' confidence and good governance to ensure the organisations' long-term viability. Agency theory was adopted for this study.

Results: The findings are expected to support the national agenda of Shared Prosperity Vision 2030 enablers, Governance and Integrity, to enforce trust in citizens, in this case, shareholders of the B40 group. In addition, this study also will contribute to the agency theory in the context of shareholders' confidence within corporate governance. In contrast, in practical contribution, it will be a recommendation to the Shareholders for knowledge improvement on governance in investment portfolios and practical solutions to shareholders, especially the B40.

Conclusion: In future research**,** similar qualitative-oriented research can be helpful to validate the research model for different types of organisation's.

Keywords: Cooperative, Corporate Governance, Integrity, Confidence, B40

Social Media Influence on Digital Banking

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Abstract

Introduction: Advancements in the digital era have enabled customers to perform banking-related transactions through social media platforms. Thus, the value was a critical variable to gain a competitive advantage and cultivate customer loyalty.

Methods: However, the empirical studies from the social media perspective seem limited, and quantitative studies on local banks may provide a unique insight compared to the previous studies. Customers of seven local banks in Malaysia took part in this study.

Results: The results showed that customer experience and customer engagement directly affect customer loyalty, customer experience being the most prominent predictor. The study also clearly indicated that customer experience and customer engagement mediate between interaction value and customer loyalty.

Conclusion: The significant theoretical contribution of this study is the formation of a theoretical model that integrates the value in a social context, the attitudinal variables, to predict customer loyalty in the digital setting in a single study. Nevertheless, longitudinal study on a broader scope for future research is highly recommended. Finally, it is irrefutable that digital technologies have significantly supplemented the media landscape.

Keywords: Customer Experience, Customer Engagement, Interactive Value, Social Media, Loyalty

Guideline for B40 and M40 Buyers to Purchase a Residential Property in Kuala Lumpur

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Abstract

Introduction: Nowadays, the housing price in Kuala Lumpur is higher compared to other states in Malaysia. Thus, the citizens who live in Kuala Lumpur face a severe housing affordability issue where most citizens' income is not affordable to purchase a residential property, especially for Non-Bumiputera citizens.

Methods: Therefore, a survey was conducted for the B40 and M40 buyers to understand the purchasing power and the preference.

Results: The survey will determine the factors that contribute to the financial planning of the buyers towards the transaction of residential property in Kuala Lumpur.

Conclusion: There are several types of research been conducted to study this issue. However, the issue was not resolved until today.

Keywords: Computational Survey, Housing Affordability, Housing Price, Purchasing Power, Residential Property

Non-Classical Optimal Control Problem with Hyperbolic Tangent for Three Piecewise Function

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Abstract

Introduction: This study focuses on the non-classical Optimal Control problem (OCP) where the final state value is unknown. This produces a necessary boundary condition of the final costate value, which is not equal to zero. Moreover, the functional performance index is the royalty function of the unknown state value at the terminal time.

Methods: In this study, the royalty function that is in terms of the three-stage piecewise function was applied, and then, the function was approximated into the continuous approximation of the hyperbolic tangent (tanh) procedure. The modified shooting method, a combination of the Newton and Golden Section Search method, was applied to settle the Two-Point Boundary Value Problem (TPBVP).

Results: Finally, the results will be contrasted with the discretization techniques, the Euler, Runge-Kutta, Trapezoidal, and Hermite-Simpson approximations, as a validation procedure.

Conclusion: This will give a massive contribution towards the engineering field such as information engineering and financial engineering, where this research will provide proper knowledge in the mathematical form by relating to the OC theory. The knowledge can be applied in problem-solving and then reduce the time consumed during the process.

Keywords: Discretization Method, Minimization Technique, Optimal Control, Royalty Payment, Shooting Method.

A Study of Factor Influencing the Adoption of Cryptocurrency Among Investors in Malaysia

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Abstract

Introduction: Given the increase in the popularity of cryptocurrency investment over the years, this study will identify the factors that impact cryptocurrency adoption among investors in Malaysia and, following that, the development of a framework. In line with the Diffusion of the Innovation, the model will also allow more accurate market size forecasts to understand the current position in cryptocurrency Malaysia.

Methods: This research will be conducting a Quantitative approach. A survey questionnaire was developed and distributed to 178 target retail investors who invested in cryptocurrency across Malaysia. The collected data will be analysed using Structural Equation Modelling.

Results: The Diffusion Innovation factors were chosen as possible influencing factors where Compatibility, Relative Advantage, Trialability, Complexity, and Observability are analysed. Besides that, Consumer Behaviour Theory was chosen to study 'Perceived Risk' and 'Perceived Value' to understand investors' motivation to invest in cryptocurrency.

Conclusion: Malaysian investors and regulators must learn the use of this technology so that they will not miss out on this innovation and at the same time help regulators to develop policy. The digitisation of banking and payment channels, paving the way allowing Malaysia to become a 'cashless society.

Keywords: Adoption, Cryptocurrency, Bitcoin, Investors, Malaysia

Retirement Planning Intentions during COVID-19 Pandemic: Applying the Theory of Planned Behaviour

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Abstract

Introduction: Issues surrounding retirement planning have received the public's attention, especially with the recent COVID-19 pandemic. The Government of Malaysia has allowed the withdrawal of EPF funds to ease the financial burden due to the pandemic. This provision has evidenced the dependency of Malaysians on retirement benefits and how at-risk their retirement funds are when having financial difficulty. In the long run, poor retirement planning might lower the country's economic growth due to rising medical costs, affecting interest rates and investment returns.

Methods: Originally, the Theory of Planned Behaviour (TPB) model with the predictors of attitude, subjective norms and perceived behavioural control has been widely used in predicting an individual's behavioural intention in various aspects. However, aligned with prior studies, it is argued that the TPB model should be enhanced.

Results: Attitude measured in general knowledge is unlikely to predict an individual's action appropriately and should be replaced with a more specific measure of financial attitude. Secondly, subjective financial literacy should replace perceived behavioural control. It can serve as an intercession tactic that enhances awareness of a problem and influences adopting a new behaviour.

Conclusion: This conceptual paper provides valuable insights to future studies on adopting the TPB model in measuring retirement planning issues.

Keywords: Retirement Planning Intention, Financial Attitude, Subjective Financial Literacy, Theory of Planned Behaviour.

Technology Transfer to the Agropreneurs during the Movement Control Order (MCO) Period

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Abstract

Introduction: The implementation of MCO has caused more than thirty thousand micro, small and medium enterprises (MSMEs) to cease operations, with most of them being micro-businesses. Although agro-based businesses can operate, they need to adopt new knowledge and technology to face the new challenge and explore the opportunity in the market. They need to maintain food safety and quality over a more extended period to fulfil food delivery demand. The government agencies like Malaysia Agricultural Research and Development Institute (MARDI) are tasked to disseminate technologies to the public, including public goods technologies.

Methods: This article suggests improvements to the fifteen public goods technologies transfer channels in MARDI, especially to the targeted B40 agro-based businesses.

Results: This article suggests properly documenting the public goods technologies in the forms of manual and video. These documents can be channelled to the targeted agro-based businesses through national televisions, small group face-to-face workshops, mobile training trucks and postage of the materials.

Conclusion: The suggested new channels aim to improvise the effectiveness and reachability of delivering the public goods technology to the targeted agro-based businesses. The implementation of these channels are crucial for the survivability of micro agro-based businesses.

Keywords: Public goods technology transfer; Movement Control Order (MCO), Agro-based Industry Entrepreneurs, Bottom 40 entrepreneurs, Technology transfer channels

Divestiture Corporate-Venturing as The Alternative to Lay-Off

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Abstract

Introduction: The survey by Department of Statistics Malaysia (2020) during the first movement control order revealed that companies were severely affected financially. A main challenge faced by the companies was in paying for their employees, more so for larger companies. The impact is evidenced in the unsustainability of many businesses and the rise of unemployment among Malaysians. This article aims to explore the environmental context for divestiture-based corporate venturing while ensuring its sustainability.

Methods: This reviews the intrapreneurship related literature, especially Weithe-Korprich et al. (2017). This article suggests the companies to spin-off the non-core value creation activities within their value chain to reduce the salary payment while the new team in spin-off can explore new business opportunity. However, in ensuring the sustainability of the new spin-off, a comprehensive assessment needs to be conducted prior to the venturing decision.

Results: The assessment should focus on the feasibility to establish a new venture from the perspective of external environment and internal organisation structure, as well as the competencies and readiness of the management team of the new venture.

Conclusion: The articles provide the management team of the company a mechanism to conduct preliminary assessment on the potential spin-off.

Keywords: Covid-19 pandemic, Movement Control Order (MCO), Divestiture, Corporate venturing, Spin-off feasibility assessment

Proposing a Technology Adoption Journey Map for Agropreneurs

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Abstract

Introduction: The agriculture and food-based industry contributes to the economic development, citizens' health and alleviation from poverty. Government policies aim to modernise the industry targeting agro-based entrepreneurs (agropreneurs) through technology transfers. The Malaysia Agricultural Research and Development Institute (MARDI) classifies some of their intellectual property as public goods technology allowing B40 agropreneurs free access to those technology. To ensure the effectiveness of the technology transfer to the agropreneurs, MARDI's technology transfer and extension team needs to ensure the experience of the agropreneurs is taken care of.

Methods: This article adapted the customer journey map approach to develop a technology adoption journey map for the agropreneurs.

Results: Similar to customer journey map, the technology adoption journey map focuses on the experience of the agropreneurs, including the different touchpoints they experienced with the technology transfer team. This includes their emotion, experience and expectation in each touchpoint.

Conclusion: Findings from the technology adoption journey map can identify the challenges to improve the experience of the agropreneurs in technology adoption. It also guides MARDI's initiatives in moving forward improving revenue generation and food security for the nation.

Keywords: Technology adoption, Technology adoption journey map, Customer journey map, Public goods technology, Agropreneurs

Assessment of an Anti-Lift Channel for a Racing Motorcycle via Wind Tunnel Test

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Abstract

Introduction: This study aimed to design an anti-lift channel for a racing motorcycle to generate supplementary downforce to overcome involuntary lift at the front wheel. The channel will be integrated at the frontal section of the motorcycle (side fairing).

Methods: Two (2) channels with varying shapes were tested via wind tunnel. Channel A has a consistent design throughout, whilst Channel B is designed to be diverging in size as the airflow exits. The length and surface area for both channels were identical.

Results: Results indicated exponential growth of downforces for both channels; however, Channel A has a steeper growth in comparison. Channel A on average performed 60% better than Channel B with higher downforce recorded for the range of speeds being subjected. This is because the constant shape of Channel A allows for consistent and high airflow as opposed to Channel B.

Conclusion: Conclusively, the integration of Channel A anti-lift channel on the motorcycle provides the increment of downforce at the frontal section of the motorcycle, thus, improving safety, steering stability and high-speed braking performance which are vital on the track.

Keywords: Motorcycle, Aerodynamics, Anti-Lift, Safety

Solar Energy Cycle Modelling for Electricity Generation at Seri Iskandar City in the State of Perak, Malaysia

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Abstract

Introduction: Solar energy is the future green energy source that emits zero emissions of carbon. However, the solar radiation intensity largely depends on local geography and climate conditions for optimal system operation. A specific location of Seri Iskandar City in the State of Perak, Malaysia, has been chosen for study.

Methods: The study developed a MATLAB-based programming model for simulating the electrical power generated by monocrystalline silicon photovoltaic solar modules. The upgraded Malaysian Net Energy Metering programme over a 1-acre government office building throughout typical meteorological year data was used for feasibility analysis. Other technical considerations such as array spacing, and module temperature were also calculated for optimisation.

Results: The annual energy yield was generated at various tilt angles to determine the optimal angle at which it occurs at 3.9 degrees. Further, a rooftop system was proposed with an installed capacity of 429.1 kWp, of which the capacity has been verified by the local consultant as well. Moreover, through the government incentives towards green technology, the system would be returned as early as in 6 years of investment.

Conclusion: Times Finally, technical, and economic perspectives conclude that Seri Iskandar City is now proposed for future solar projects.

Keywords: Energy Modelling, Renewable Energy, Typical Meteorological Year, Net Energy Metering, Solar System

Synthesis and Characterisation of Biocellulose Hydrogel Derived from Oil Palm Empty Fruit Bunches

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Abstract

Introduction: Oil palm empty fruit bunches (OPEFB) biocellulose has attracted research interest in versatile applications, especially in hydrogel synthesis as an alternative material to substitute synthetic polymers for a greener approach. With this, the biocellulose needs to undergo dissolution before the hydrogel synthesis. However, researchers have not thoroughly studied OPEFB biocellulose solubility in sodium hydroxide (NaOH)/urea aqueous solution to synthesise biocellulose hydrogel. This study aims to synthesise and characterise biocellulose hydrogel derived from OPEFB in an optimum NaOH/urea aqueous solution ratio.

Methods: The dissolution method was employed to prepare biocellulose hydrogel by incorporating OPEFB biocellulose and polyvinyl alcohol (PVA) polymer. In comparison, the solubility of OPEFB cellulose in NaOH/urea aqueous solution was investigated by manipulating the NaOH/urea aqueous solution ratio and weight per cent of OPEFB cellulose.

Results: The results indicated that 7 w/w% NaOH/12 w/w% urea aqueous solution and 1 w/v% OPEFB cellulose exhibited the highest solubility of 70.89±1.85%. Fourier transform infrared spectroscopy of biocellulose hydrogel proves the successful interaction of PVA and OPEFB biocellulose in the synthesised hydrogel.

Conclusion: The synthesis of biocellulose hydrogel in an environmentally friendly solution (NaOH/urea aqueous solution) would ensure the production of more sustainable and cost-effective hydrogel to be used in various applications.

Keywords: Biocellulose Hydrogel, Oil Palm Empty Fruit Bunches, Solubility, Sodium Hydroxide/Urea Aqueous Solution, Functional Group

Numerical Experimentation on Argentina Nano Focus Machine

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Abstract

Introduction: Argentina Nano Focus Machine is a small transportable dense plasma focus used as a portable intense, fast neutron source.

Methods: The objective of this paper is to show that by using only one experimental current waveform together with the actual machine and operating parameters, the Argentina Nano Focus Machine could be numerically modelled to enable the study of its plasma dynamics and its yield of ion beams and fusion neutrons.

Results: The computed results agree reasonably with the measured in terms of the peak current (computed of 55 kA compared to the measured value of 62 kA), the radial phase start time and the duration of the pinch phase (computed 49 ns compared to experimentally estimated of 50 ns).

Conclusion: This demonstrates that the code is a valuable tool to complement the actual experiment by correctly computing the axial and radial trajectories' dynamics through the measured current waveform. Additionally, the code also produces the variation of ion beam energy and neutron yield as functions of pressure, for which there is no published experimental data.

Keywords: Numerical Experiment, Dense Plasma Focus, Lee Model Code, Neutron Yield, Ion Beam Energy

Improvement of Home Energy Management System by Using Intelligent Lifting Solar Panels

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Abstract

Introduction: Serious waste of resources and greenhouse gas emissions have led to a problematic energy situation. Thus, by upgrading the building design with energy efficiency, it may help in reducing energy loss. This wastage leads to the objective of this study which is to maximise the use of solar as an inexhaustible energy source by improving the home energy management system using intelligent raising and lowering solar panels at home.

Methods: If the solar panel rises and replaces the window, it will cause insufficient light intensity in the house and affect the daily life of the residents. Therefore, the Arduino system and light sensors were used in this study to develop the operation of a control system. When the light intensity is high, the solar panel will be expanded and vice versa.

Results: The experimental results showed that the performance was acceptable in maximising energy efficiency.

Conclusion: The findings show an improvement in-home energy efficiency by using solar panels on traditional windows.

Keywords: Home Energy Management, Solar Energy, Energy Saving

Systematic Literature Review on Multi-Criteria Analysis Methods for Ethanol Plant Sustainability Weighting

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Abstract

Introduction: The sustainability weighting is crucial as it is practically implemented into sustainability evaluation, especially in industrial development. Sustainability is about the interconnection between three aspects of sustainability impact: economic impact, environmental impact, and social impact. The models chosen from Multi-Criteria Analysis (MCA) play essential roles in measuring each impact's weighting according to the scenario and criteria selected.

Methods: MCA models will lead to methods based on scientific rules and robust statistical methods. However, there were insufficient studies on the existing literature sustainability weighting model from the MCA method for the ethanol plant. Hence, the present paper demonstrates a systematic literature review of MCA model methods on sustainability weighting for the ethanol plant. The review is based on leading databases; Scopus – ScienceDirect, Springer, Taylor, and Francis, and one supporting database – Google Scholar. There are two steps involved in systematic literature reviews: formulation of the research question and systematic searching strategies consisting of identification, screening, eligibility, quality appraisal, data abstraction and analysis.

Results: From the review, the preferable MCA weighting model for sustainability evaluation of ethanol plants is 'integrated AHP' rather than 'standalone AHP'.

Conclusion: The paper offered a significant contribution to the body of knowledge and sustainability evaluation purposes.

Keywords: Systematic Literature Review, Ethanol Plant, Multi-Criteria Analysis, Analytical Hierarchy Process (AHP), Weighting

Numerical Study of Crashworthiness on Honeycomb Filler Subjected to Impact Loading

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Abstract

Introduction: Crashworthiness is a variety of impact angles is a critical consideration when designing a secure vehicle. On the other hand, Honeycomb filler is well-known as a suitable filler for energy-absorbing devices in vehicles. The primary purpose of this research is to investigate the performance of honeycomb fillers with various cross-sectional designs versus thickness when subjected to various angles of impact loading.

Methods: The investigation is carried out by Finite Element Analysis (FEA) using ABAQUS software. The dynamic impact test carries out the investigations of FEA models. Numerical investigation studies the reaction of three types of honeycomb filler geometric designs: circular honeycomb filler, hexagon honeycomb filler, and multicell. The diameter of every single cell is fixed at 10.4 mm. The hexagon honeycomb filler is the best structural design, according to the simulation results. Hexagon honeycomb filler has a 120% higher EA, SEA, and CFE than circular honeycomb filler and 230% higher EA, SEA, and CFE than multicell filler.

Results: The results showed that as the angles increased, the output of EA and SEA decreased.

Conclusion: Finally, the hexagon honeycomb filler was the best model in terms of geometry, thickness, and loading angle.

Keywords: Crashworthiness, Circular Honeycomb, Dynamic Impact, Oblique Impact Loading

Effect of pH on The Dispersion Property of Sulphur Nanoparticles in Natural Rubber

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Abstract

Introduction: Sulphur nanoparticles (NPs) have attracted significant research and industry interests, especially in the rubber industry as a vulcanization agent. However, the main obstacle of direct incorporating sulphur NPs into natural rubber is agglomeration attributed to its high surface energy.

Methods: This study investigates the effect of different pH range on the dispersibility of natural rubber loaded with 1.5 wt% and 3.0 wt% sulphur NPs.

Results: The results revealed that 1.5 wt% of sulphur NPs has a better suspension in natural rubber compared to 3.0 wt% of sulphur NPs based on zeta potential value (+6.62 mV) and mean particle size distribution (366.2 nm). Moreover, the critical agglomeration occurs for both concentrations at lower pH, lower than pH 6.

Conclusion: The zeta potential value for both concentrations decreases as the pH increase. Meanwhile, the mean particle size distribution increase as the pH increase.

Keywords: Sulphur Nanoparticles, Natural Rubber, pH, Zeta Potential, Particle Size Distribution

The Prediction of Biochar Yield Produced from Banana Peels: A Support Vector Regression Evaluation

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Abstract

Introduction: Biochar can be produced from biomass through a thermal conversion process like pyrolysis. This study evaluates different Support Vector Machine Models, also known as Support Vector Regressors (SVR), in predicting the biochar yield.

Methods: Biochar was produced from banana peels at different operating conditions, such as temperature (200 to 700 °C), heating rate (5 to 15 °C/min) and residence time (60 to 180 min). The efficacy of different SVR kernels, namely, radial basis function (RBF), linear and quadratic, was investigated in predicting the biochar yield. The features employed were temperature, residence time and heating rate. The coefficient of determination (R^2) and the mean absolute error (MAE) was used as performance metrics.

Results: It was shown from a preliminary investigation that the linear SVR model could attain an R^2 of 0.8233 and an MAE of 6.11. This result is followed by the quadratic SVR model and RBF SVR model with an R^2 of 0.3940 and 0.1229, respectively.

Conclusion: Therefore, it can be concluded that the linear SVR model could provide a reasonably sound prediction of biochar yield. Future studies will be sought to vary different hyperparameters with the quality of the features towards predicting biochar yield obtained from the various operating conditions.

Keywords: Pyrolysis, Banana Peels, Support Vector Regressors, Biochar, Support Vector Machine

Correlation Analysis between Sub-Bituminous Coal Ash Fusion Temperature (AFT) to Ash Slagging Propensity

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Abstract

Introduction: Coal ash is incombustible, and it is the product of the combustion process and from the ash deposits residue as fly ash and bottom ash. Formation of ash deposit at the boiler tube at the large scale of utility boiler affecting the heat transfer process and consequently decreasing the boiler's performance when ash deposit drive to the occurrence of boiler slagging and fouling. Therefore, this research study the formation of coal temperature in predicting the formation of ash slagging in the boiler.

Methods: Ash Fusion Temperature (AFT) with a different stage of temperatures indicates the range of coal temperature absorbing the heat. Thus, this study intends to investigate the significant relationship between coal AFT and boiler ash slagging. The standard procedure ASTM (D3174–12) and ISO 1171:2010 were followed to measure AFT for this study. The coal sample at size 200um was heated up to 700–750°C, and an ash fusion determinator was applied in measuring coal AFT.

Results: Results found a slight correlation with a negative linear association between the four-phase of AFT and the slagging factor for sub-bituminous coal.

Conclusion: Thus, the R2 value less than 1.0 indicates a weak correlation between coal AFT temperature and the slagging factors.

Keywords: Sub Bituminous Coal, Ash Slagging, Ash Fusion Temperature, Slagging Factors

Development of The Extended Costa Loop Carrier Recovery System with SDR Technology

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Abstract

Introduction: Before the invention of digital signal processing technology, most radio systems were implemented using analogue circuitry, but analogue has some limitations. For example, if the component's size is too big or power consumption is high, it was a problem for a complex communication algorithm to develop in the analogue domain. Besides that, any modification on the analogue circuitry done through the physical intervention will affect the device's signalling. When processors and data converters' speed become faster, the analogue function may implement the digital domain. Costal Loop is used in the receiver end, i.e., demodulator.

Methods: This paper focuses on developing a carrier recovery technique by using the extended Costas Loop method in Software Define Radio to correctly realise the signal recovery and data demodulation from the affected devices.

Results: The results show that the extended Costas Loop well performance in eliminating the noise signal and the carrier has been recovered.

Conclusion: Most importantly, using software-defined radio offers many benefits for radio system designers and includes developers and researchers.

Keywords: Costas Loop, Demodulator, Carrier Recovery

COVID-19 Site Operating Procedures on the Construction Industry in Malaysia: A Value Management Approach

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Abstract

Introduction: The coronavirus (COVID-19) outbreak is a significant issue for the construction industry in Malaysia as they suffer RM18.5 billion losses during the first three phases of the country's Movement Control Order (MCO). This paper focused on identifying the effectiveness of COVID-19 site operating procedures in terms of time, cost and quality using a value management approach.

Methods: The outcomes of this research are achieved by applying a few value management techniques, including function analysis, Function Analysis System Technique (FAST) diagram and Analytical Hierarchy Process (AHP).

Results: All primary COVID-19 site operating procedures were identified with their functions in the FAST diagram. Based on the AHP analysis, the most effective COVID-19 site operating procedures in terms of time, cost and quality are wearing a 3-ply face mask (0.503), social distancing on site (0.269), and handwashing or sanitising (0.139).

Conclusion: The effectiveness of primary COVID-19 site operating procedures has been evaluated to strike a balance between time, cost and quality using a value management approach and can act as a helpful guideline for construction organisations as the construction industry has to operate under new norms in Malaysia and worldwide.

Keywords: COVID-19, Site Operating Procedures, Construction Industry, Value Management, FAST Diagram

The Emergence of Phase Change Material in Solar Thermal Energy: A Review

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Abstract

Introduction: Phase change material (PCM) features an attractive option due to its solar thermal storage capacity to assist the cooling/heating process, especially during a night operation, thus reducing energy cost and carbon footprint. This study aims to analyse the emergence of PCM in the application of solar thermal energy.

Methods: Subsequently, to envisage Technology Readiness Level (TRL) and commercialisation opportunity based on historical and contemporary research trends. This review encompasses peer-reviewed literature from the Scopus database for one decade between 2010 and 2019.

Results: Based on the review, moderate growth can be found in the research related to PCM-solar thermal at 23% of emergence rate from the past decade. In comparison, China has dominated this research development by concurring approximately 22% from the number of research articles published globally.

Conclusion: It can be concluded that the application of PCM in the solar thermal energy system is at TRL 5, which reflects research and development (R&D) progress is at prototypical intermediate development based on the trend of academic publication. Furthermore, based on the review, PCM features excellent potential in commercialisation opportunities due to its vital contribution as a frontier material/substance in overcoming the challenges of energy and environmental insecurity.

Keywords: Phase Change Material, Solar Thermal Energy, Renewable Energy, LHTES

Vibration Attenuation of Suspended Handle Model using Intelligent Tuning Method of AFC-PSO

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Abstract

Introduction: Prolonged exposure to high vibration from power tools can cause detrimental effects on worker health, such as the Hand-arm Vibration Syndrome (HAVS). In this study, an analytical model of the suspended handle using the intelligent tuning method of Active Force Control-Particle Swarm Optimization (AFC-PSO) is investigated to reduce the power tool's vibration effectively.

Methods: A single-degree-of-freedom (SDOF) suspended handle model consisting of mass-spring-damper and a piezoelectric actuator is constructed using MATLAB software. The model's parameters are experimentally determined. Two non-linear disturbances on the effects of hard-stop and imbalanced motor have been introduced to the system to evaluate the performance of the AFC-PSO controller, and the comparison has been carried out with the passive and PID controller systems.

Results: The optimum estimated mass for the AFC-PSO has been determined at 0.0495 kg. In terms of vibration attenuation, the AFC-PSO tuning method has shown robust performance (99 % of vibration attenuation) compared to passive and proportional–integral–derivative (PID) systems, even under the effect of non-linear disturbances.

Conclusion: In conclusion, AFC-PSO is an effective control scheme that can reduce the vibration of power tools and subsequently avoid the risk of HAVS.

Keywords: Vibration, Suspended Handle Model, Intelligent Tuning Method, Active Force Control (AFC), Particle Swarm Optimization (PSO)

Fabrication of Ankle Foot Orthotics Using 3D Scanner and 3D Printing Methods

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Abstract

Introduction: Orthotics are the body support device used for correction, immobilisation, fixation, and prevention of paralysis. The greatest number of orthotics utilised by the people who suffered from plantarflexion and dorsiflexion, or foot drop, especially in Indonesia, is ankle-foot orthotic (AFO) or lower-limb orthotic. However, the processing time and cost of producing AFO using the conventional method are long and expensive. The purpose of this paper is to fabricate innovative ankle-foot orthotics (AFO) using combinations of 3D scanning and 3D printing.

Methods: The method begins with 3D scanning the lower limb's patient using the photogrammetry method (3DF Zephyr). The design is generated and adjusted, and the orthotic prototype is produced using 3D printing with polypropylene (PP) material because it is lightweight, rigid, inflexible, and inexpensive.

Results: The 3D mesh model scanned using 3DF Zephyr shows good quality and more precise results. The prototype produced using 3D printing was tested by walking based on average gait analysis, and the angle of the foot and calf measurement shows a maximum error of 17.55%.

Conclusion: The proposed methods of fabricating orthotic prototypes can successfully reduce the cost by about 27.07% and processing time of 41.5% compared to the conventional method.

Keywords: Ankle Foot Orthotic, 3DF Zephyr, 3D Printing, 3D Scanning

Microwave CO_2 Pyrolysis - A New Approach for Valorization of Waste

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Abstract

Introduction: Microwave pyrolysis under the CO_2 atmosphere is investigated for feasibility as an alternative disposal method for wastes while efficiently converting them into value-added biochar and bio-oil. To this end, this study laid great emphasis on the exploitation of CO_2 in microwave pyrolysis of wastes. The motivation behind the use of CO_2 is to replace N_2 commonly used as purge gas in the current pyrolysis approach and to reduce its production as a potent greenhouse gas (GHG).

Methods: For in-depth study, pyrogenic products obtained from microwave pyrolysis of wastes in N_2 and CO_2 atmospheres are characterised. It is found that the utilisation of CO_2 affects the final char yield and properties, and bio-oil yield and composition.

Results: The presence of CO_2 reduced the tar decomposition and volatile release and in return produced biochar with a well-developed pore structure that contained high Brunauer-Emmett-Teller (BET) surface area (up to 150 m^2/g) and total pore volume (0.10 cm^3/g), which enhances the adsorption performance of char as active carbon.

Conclusion: As a whole, this study proposes a system illustrating the role of CO_2 in microwave pyrolysis of waste furniture board and reveals its potential as a new alternative to convert waste into value-added products for fuel utilisation.

Keywords: Biochar, Biofuel, Waste-to-Energy, Energy Recovery, Green Technology

Carbon Quantum Dots Incorporated onto N/N Type Graphitic Carbon Nitride Homojunction for Enhanced Visible Light-Driven Photoactivity

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Abstract

Introduction: With a surging concern over climate change, photocatalysis has garnered widespread attention globally. Hitherto, most existing photocatalytic semiconductors are only ultraviolet (UV) light-sensitive, a meagre proportion of the solar spectrum. This study addresses various challenges current photocatalytic nanomaterials face, including substandard light absorption and rapid recombination of electron-hole pairs.

Methods: Graphitic carbon nitride (g-C_3N_4) has been highly sought after ascribable to its suitable band gap, intrinsic photo-absorption, and facile synthesis. Furthermore, the synthesis of g-C_3N_4/g-C_3N_4 homojunction derived from different precursors (urea and thiourea) effectively suppressed the recombination of charge carriers and promoted the photo-efficiency. Concurrently, Carbon Quantum Dots (CQDs) have been a trending research nanomaterial due to their highly tunable optical and physicochemical features for versatile photocatalytic applications.

Results: For this research, a novel CQDs-based g-C_3N_4 homojunction nanocomposite was successfully fabricated via a hydrothermal approach. The hybridization between CQDs and g-C_3N_4/g-C_3N_4 homojunction produces synergistic effects of photocatalytic properties offered by both semiconductors and optimises the photoactivity toward degradation of Rhodamine B (RhB).

Conclusion: The feasibility of RhB photodegradation in the presence of CQD/g-C_3N_4 nanocomposites with a low-powered (18 W) LED light highlighted its benefits from the environmental and economic perspectives.

Keywords: Photocatalysis, Carbon Quantum Dots, Graphitic Carbon Nitride, Metal-Free Homojunction Photocatalyst, Wastewater Treatment

Effect of Temperature on Lightweight Concrete Containing Oil Palm Shell and Fly Ash

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Abstract

Introduction: Sustainability has become a significant concern of society's wellbeing. The problems associated with industrial by-products as wastes have added a burden to environmental sustainability. Among these wastes are Fly ash (FA) and oil palm shell (OPS), which are by-products of Malaysian coal and agriculture industries.

Methods: This study utilises earlier mentioned wastes as concrete mixing ingredients. This study was conducted to assess the temperature influence on OPS lightweight aggregate concrete (LWAC) comprising FA as cementitious materials. Several specimens were prepared according to standards in cubes form, cured in water for 28 days, then exposed to high temperature.

Results: The findings show that concrete containing fly ash exhibits better resistance to elevated temperature. Concrete containing a larger quantity of fly ash exhibits a lower value of strength deterioration.

Conclusion: Conclusively, utilising a suitable amount of waste materials as mixing ingredients could improve the performance of concrete when exposed to high-temperature words.

Keywords: Oil Palm Shell, Fly Ash, Cement Replacement, Elevated Temperature

Investigation on The Pressure and Velocity Contour for a Sliced Intake Manifold

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Abstract

Introduction: This study aimed to investigate the pressure and velocity contour of a sliced intake manifold.

Methods: The scope of the study is on the intake manifold only. The study of the air inlet in the single stroke engine motorcycle was based on the computational fluid dynamic (CFD) analysis via ANSYS software. A comparison was made between 0° and 45°angle sliced inlet.

Results: The result shows that the 45° angle sliced inlet plays a significant role in the pressure and velocity distribution pattern. The air tends to flow in a perpendicular direction to the inlet. The 45° sliced inlet resulted in a wider opening for air to flow. The stagnation points and relatively lower airflow region were observed just before the inlet and at the very end of the inlet due to the angled slice. The 45° sliced inlet was beneficial as the design allows for more feed air with coverage, accommodating the air demand at higher RPMs.

Conclusion: Conclusively, the 45° sliced inlet is proven to be beneficial. Hence, for future studies, other inlet angles and variables could be tested.

Keywords: Volumetric Efficiency, Intake System, Power Output, Motorcycles

Flexible Feedstock Analysis of Biomass Gasification Process towards Carbon-Negative Energy Technology: A Case Study in Malaysia

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Abstract

Introduction: The emission of greenhouse gases (GHG) from solid waste treatment and fossil fuel power plants has been a significant concern in Malaysia and globally. The discarded agriculture waste and organic municipal solid waste (MSW), abundant in this country, can replace fossil fuel to generate electricity and reduce GHG emissions.

Methods: Innovation in gasification with combined heat and power (CHP) (power pallet) system emerges as a potential technology to overcome those two challenges. However, the operational design of conventional gasification to generate electricity from various alternative fuels, for instance, agriculture waste (such as woodchip and coconut shell) and organic MSW, is still controversial. In contrast, a specific system can only accommodate a single type of fuel. Thus, this study simulates the capability and reliability of the power pallet to generate electricity from various mixed ratios of organic MSW to agriculture waste.

Results: The result obtained in this study can provide valuable insight into the flexibility of the gasification system as a reliable renewable energy system.

Conclusion: This preliminary work can provide insight on the capability of WtE technology, specifically the gasification process, to move towards carbon-negative technology based on the Malaysian context.

Keywords: Carbon-Negative Energy, Feedstock Flexibility, Gasification, Renewable Energy

The Use of Badminton Training Aids Set on Badminton Footwork Skill Performance

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Abstract

Introduction: Badminton is a racquet sport with open and swift actions. To be successful in badminton, players need excellent court speed and agility. Players need speed and quickness to react and get to the shuttlecock. This study investigates the sports innovation tool of Badminton Training Aids Set (BTAS) on badminton footwork skill performance among Sarawak badminton players.

Methods: The Badcamp Agility Test by Luiz and Paulo will be used on the pre and post-test sessions. Participants are among the Sarawak badminton players, randomly allocated into two groups, namely the BTAS Technique Group (n=20) and Footwork Pointing Technique Group (n=20). The intervention session will be implemented for 8 weeks (16 sessions). Upon completion of the 16 sessions of Badminton Training Aids Set (BTAS) and Footwork Pointing Technique, a post-test will be conducted on the participants.

Results: As a result, it was found that group training by using BTAS will perform better as compared to the pointing footwork group.

Conclusion: Based on the result, BTAS is an innovative tool that helps in increasing the badminton footwork skills performance of Sarawak badminton players.

Keywords: Speed, Agility, Intervention, Footwork, Techniques

Accuracy Measurement of Line Following Robot Tracking Using Motion Capture Systems

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Abstract

Introduction: Mobile robots are vastly used in industrial applications that need precise position and velocity estimation. Line following mobile robots is used for these applications, which have sensors for following the specific paths.

Methods: To study the accuracy of the line following mobile robots, a highly precise optical motion capture system was used containing 6 OptiTrack cameras in a capturing environment. OptiTrack motion capture systems were used to minimise the latency of the system in this work. Motion captured data were acquired in Matlab from Motive software to get a user-friendly visual representation of the ground-based robot's position. The ground-based mobile robot was operated with a raspberry-pi operating system that used infrared (IR) sensors for line following applications, which followed a black coloured line using five sensors to signal the motors attached with the robot's wheels.

Results: OptiTrack motion capture systems provide minimal marker mean error to track the ground robots with the most accurate position in the capturing area.

Conclusion: Line tracking robots can be used as automated equipment carriers, autonomous cars, domiciliary purposes, and path guidance in public places. This study will enable further research on motion capture of an indoor position of autonomous mobile ground robots.

Keywords: OptiTrack Motion Capture Systems, Motive Software, Line Following Robots, Raspberry-pi

Comparative Electrical Properties of Undoped and Sn Doped ZnO Thin Films for Gas Sensing Application

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Abstract

Introduction: In electronics, ZnO is a favourable semiconductor oxide to replace ITO as an electronics electrode employed in many applications such as electronic transmitters, piezoelectric devices, chemical and gas sensors. This study aimed to study the electrical properties of undoped and Sn doped ZnO thin films based gas sensors have been fabricated using the sol-gel spin coating technique.

Methods: The preparation of undoped and Sn doped ZnO thin films with different annealing temperatures from 400 to 550ºC. The molar ratio of zinc acetate to MEA was fixed at 1.0 M. The doping concentration was fixed at 1.0. %. The voltage of resistivity measurement was performed from -10 to 10 V using Advantest R6243/ Keithley 2400 source meter. All samples possessed approximately 200-250 nm range of thickness.

Results: The particle size of Sn doped ZnO thin films increases from 15.9 nm to 23.4 nm as the annealing temperature increases from 400 to 550°C. The conductivity of all samples was found to be in the range 10^{-5} S/cm, indicating a similar study with other research studies. The optimum conductivity value of Sn Doped ZnO thin film was 1.0 at. % at 550°C annealing temperature, which exhibited the highest conductivity of 8.39 x 10^{-5} S/cm.

Conclusion: In this study, it can be concluded that nanostructured Sn doped ZnO thin films prepared at 1.0 at. % doping concentration at 550°C exhibited extensively excellent for MSM based gas sensor applications. The doping process can improve the electrical conductivity of nanostructured ZnO thin film.

Keywords: ZnO, Gas Sensor, Electrical Properties, Thin Films

Ceria Nanotubes Photocatalyst for Degradation of Paraquat Dichloride

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Abstract

Introduction: This paper presents a study on the photocatalytic activity of cerium oxide nanotubes (CeNT) to degrade paraquat dichloride.

Methods: The CeNT was fabricated using a 2-step hydrothermal synthesis through the conversion of $Ce(NO_3)_3.9H_2O$ to CeO_2 by alkali thermal treatment of $Ce(OH)CO_3$. The CeNT photocatalyst was successfully characterised using XRD, FESEM, EDX, and FTIR to study its structural properties.

Results: The analysis confirmed that CeNT is single crystals nanostructured of hollow nanotubes with an average crystallite size of ~8.48 nm. The CeNT nanotubes from the hydrothermal process are used as photocatalysts to degrade paraquat dichloride under UV irradiation (at $\lambda = 257$ nm). Effects of calcination temperature, catalyst loading, and initial paraquat concentration were also evaluated, and optimum conditions were established. The degradation rate of the photocatalyst was 39% in 4 h, which is attributed to CeO_2 oxygen storage capacity and its reducibility.

Conclusion: The low crystallinity of the CeO_2 catalyst might lead to less production of OH• radicals that affect the overall photocatalyst performance. More importantly, the photocatalysts demonstrated high stability and reusability up to five cycles.

Keywords: Ceria Nanotubes, Photocatalyst, Paraquat dichloride, Degradation, Ultraviolet light

The Effect of Electrolyte pH On the Electrodeposition of Nickel Coating on Zincated Aluminium

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Abstract

Introduction: Nickel coating was successfully deposited on zincated aluminium using electrodeposition technique.

Methods: A detailed study was made about the effect of electrolyte pH containing 0.1 M nickel sulphate ($NiSO_4$) by cyclic voltammetry (CV). A constant potential of -0.8 V (pH 2), -1.1 V (pH 6) and -1.5V (pH 10) was chosen from CV for deposition of nickel using chronoamperometry (CA). All the nickel coatings produced were characterised by field emission scanning electron microscopy (FESEM), energy dispersive spectroscopy (EDAX), X-ray diffraction (XRD) and Scotch ® tape.

Results: It was found that the nucleation potential for nickel deposition on zincated aluminium increased with increasing electrolyte pH. The electrolyte pH 6 produced almost fully covered nickel coating with uniform nodular morphology. EDAX analysis showed that the nickel coating deposited using pH 6 has the highest nickel content with 73.63 wt.%. XRD analysis indicated that all nickel deposits consisted only cubic crystalline structure. Nickel deposited using pH 6 solution was the most well-adhered coating.

Conclusion: Ni coating on zincated Al surface at pH 6 was highly adherent and compact compared to coating prepared from pH 2 and pH 10 solutions since the film is strongly bound metallically with the zincated Al surface.

Keywords: Zincated Aluminium, Nickel Coating, Electrodeposition, Cyclic Voltammetry, Chronoamperometry

The Effect of Corporate Social Responsibility on Customer Satisfaction and Repurchase Intention in The Petroleum Industry in Malaysia

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Abstract

Introduction: Corporate Social Responsibility (CSR) can be turned into a powerful marketing tool. Consumers are inclined towards CSR activities, especially those that promote environmental conservation. The implementation of CSR is especially apparent in the oil and gas industry, where petroleum production generates large amounts of toxic and non-toxic wastes. Despite the increase in research on the topic over the years, there has not been much focus on CSR activities in the petroleum industry, especially from stakeholders' perspectives. This research studies the effects of CSR in the petroleum industry that impacts consumer repurchase intention in Malaysia through customer satisfaction.

Methods: The research method is quantitative in approach, while the data collected from questionnaires is random. Hypotheses are tested using the SmartPLS software data analysis.

Results: Enterprises require feedback from their CSR initiatives. Companies will be able to defer to these findings when deciding on their business strategies. They can demonstrate the role of CSR on consumer behaviour.

Conclusion: This research is mainly influenced by the Stakeholder Theory. It explores the influences of CSR activities in the petroleum industry on consumer repurchase intention. It learns about customers' expectations and improves their experience of them. It aims to identify and fill contextual, empirical and theoretical gaps in the CSR literature linked to consumer behaviour.

Keywords: CSR, Customer satisfaction, Repurchase intention

Problem Diagnosis on Knowledge Creation in Industry 4.0 among IT Project Managers

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Abstract

Introduction: Knowledge is becoming a point of distinction in Industry 4.0 competition is endemic, and the essence of globalisation leads to competitive advantages. An increase in IT proliferation fuels innovation. Conversely, IT project managers must overcome diverse knowledge creation challenges, as projects have no actual location, is entirely carried out through the internet, and undergo constant changes. According to the literature review, project managers primarily lack practical and theoretical knowledge in their projects. This study aims to present a practice review and insights to give light to the role of knowledge creation among IT project managers.

Methods: preliminary interviews were held with stakeholders to collect the practitioner's viewpoint. All ten of the IT-based project managers were present.

Results: Outcomes showed a lack of T-shaped skills in areas of estimating and risk management.

Conclusion: the lack of empirical investigation into this topic could imply a significant research gap and therefore require further analysis.

Keywords: Industry 4.0, Knowledge Creation, IT Project Managers

Adolescent Secondary School Students' Goal Orientations and Enjoyment Towards Sports

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Abstract

Introduction: This study examined the achievement goal orientations and enjoyment processes among 171 adolescent students with a mean age of 15.73 ± .76.

Methods: The Task and Ego Orientation in Sport Questionnaire (TEOSQ) and Physical Education Enjoyment Processes Questionnaire (PEEPQ) were used.

Results: Two-way ANOVA revealed the main effect of gender was significant for ego orientation, and the main effect of age group was significant for task orientation. There was a significant interaction between gender × ethnicity between subject's ANOVA and the main effect of ethnicity for ego orientation. In enjoyment processes, the main effect of gender was significant for self-referent competency and other-referent competency. The main effect of age group was significant for self-referent competency, peer interaction, and PE enjoyment. The main effect of gender was significant for self-referent competency, other-referent competency, parental encouragement, and PE enjoyment. There was a significant main effect of ethnicity for teacher-generated excitement, activity-generated excitement, peer interaction, parental encouragement, and PE enjoyment. A positive relationship was found between TEOSQ and PEEPQ.

Conclusion: Schools should cultivate a progressive learning environment to develop the students' growth in sports.

Keywords: Adolescent, Sports, Goal Orientations, Enjoyment

Participation Motivation and Attitudes Towards Physical Activity Among Trainee Teachers

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Abstract

Introduction: The study examined the attitudes and participation motivation towards physical activity (PA) among trainee teachers. The participants were 260 undergraduate trainee teachers with a mean age of 18.10 ± .45 years.

Methods: The Attitude towards Physical Activity Scale (APAS) and Physical Activity and Leisure Motivation Scale (PALMS) was utilised to measure the attitudes and participation motives.

Results: Two-way ANOVA was conducted to examine the effect of gender and race, and age groups in APAS and PALMS. In APAS, gender had a significant main effect on fun, fitness, and personal best. For PALMS, there was a significant interaction effect for competition-ego. Additionally, there was a significant main effect of race on the competition-ego and others' expectations. Age groups have a significant main effect on affiliation. The study revealed a positive significant correlation between variables of attitudes towards physical activity, and participation motivation demonstrating positivity towards PA.

Conclusion: The leverage of physical activity interventions should address a range of behavioural determinants which can engage health-related behaviour changes that favour active participation in PA

Keywords: Participation Motivation, Attitudes, Physical Activity

Online-to-Offline (O2O) Commerce: Factors that Influence Consumers' Offline Purchase Intention through eWOM

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Abstract

Introduction: The increase in retail supply has led to mall closure over the years (Savills, 2018, 2019). The research aims to explore the new trend of online-to-offline (O2O) commerce in bridging the occupancy rate issue that Malaysian's retail industry is facing (Savills, 2018) in the context of the fashion industry. Online-to-offline (O2O) commerce is a new trend aimed at bringing online store customers to offline store locations (Du & Tang, 2014). The conceptual framework was drawn from the extended Unified Theory of Acceptance and Use of Technology (UTAUT2) and Elaboration Likelihood Model (ELM), with eWOM as mediator.

Methods: Purposive sampling technique was applied, and respondents are millennials in the Klang Valley area. Data collected was examined using the Statistical Package for Social Sciences (SPSS) and SmartPLS.

Results: The results show that performance expectancy, effort expectancy, social influence, and hedonic motivation influence consumer offline purchase intention through eWOM. All the hypotheses are supported.

Conclusion: Studying the drivers of O2O consumers' behaviour is essential as it allows retailers to adopt different strategies in customer management, which aims to provide pleasure and increase customer satisfaction and bridge the issue of high occupancy rate.

Keywords: Online-to-offline (O2O) Commerce, Electronic Word-of-Mouth (eWOM), The extended Unified Theory of Acceptance and Use of Technology (UTAUT2), Elaboration Likelihood Model (ELM), Offline Purchase Intention

Rethinking Talent Management Strategies in Malaysia's Tourism sector post COVID-19

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Abstract

Introduction: COVID-19 triggered the downfall of global economies and heavily impacted the Malaysian tourism sector as the country's borders were closed. The decrease in tourists' arrival into the nation caused enormous losses for the tourism sector, and unemployment rates have surged. Although the government has provided numerous incentives and assistance to employers and employees from all sectors of the economy, the progress is relatively slow, and it may take time to recover fully. The paper aims to proposing strategic HRM in the tourism sector in order to have talent and sustainability within the sector.

Methods: Thus, this paper provides avenues to rethink tourism talent management strategies post COVID-19 via desk review of current literatures to understand COVID-19 impact on the tourism sector. Based on the gap found, suggestions on strategies to rethink talent management within Malaysia's tourism sector.

Results: The significant impact of post-COVID-19 global economic downfall on the Malaysian tourism sector resulting from decreased tourists' arrival into the country is highlighted. Accordingly, many employees have been laid off, leading to a surge in unemployment rates mainly attributable to tourism.

Conclusion: This paper provides an up-to-date viewpoint to COVID-19 and its spillover onto the Malaysian tourism sector while addressing the shift from 'Person-Job-Fit' towards a new norm, "Talent-Job-Fit" in managing tourism talent.

Keywords: COVID-19, Tourism, Talent Management, Malaysia, Unemployment

Critical Success Factors for Inclusive Talent Management in Malaysia

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Abstract

Introduction: There are two perspectives to talent management (TM) practices, exclusivity and inclusivity. The limelight, however, has been on the widely practised exclusive TM approach through the development of high potentials. As part of the 12th Malaysian Plan, the social reengineering goal seeks to attain an inclusive nation. Thus, this paper sets out to outline propositions and a framework on TM's critical success factors (CSFs), followed by potential research questions for future research.

Methods: This paper explores the under-researched area of inclusive TM by studying its critical success factors (CSFs) that would enable applicability in Malaysia utilising an inclusive talent development plan. In doing so, the stakeholder, resource-based view and ability, motivation and opportunity theories can be synchronously utilised.

Results: As a result, four CSFs to inclusive talent development were identified, inclusive TM as a priority, the presence of multiple contingent inclusive employee valuation propositions, the need for strategic recruitment passages, and the ability to generate and develop inclusive talents' knowledge, skills, and abilities.

Conclusion: For Malaysia's government and respective bodies to realise the goal of their inclusivity targets, they need to recognise CSFs of inclusive TM best practices primarily to talent development.

Keywords: Inclusive, Talent Management, Malaysia, Critical Success Factors

Board Game: Kembara Alam Hartawan Falak (AL-KAHF)

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Abstract

Introduction: Games are an effective method for educating society and students in understanding a particular field of knowledge. Astronomy, for example, is the branch of science that deals with celestial objects, space, phenomena, and the physical universe as a whole. This knowledge requires an understanding of theory as well as practical experience. Our product is a game-based learning product called Kembara Alam Hartawan Falak or AL-KAHF. It provides exposure, understanding and promotes science and technology, especially astronomy, among the general society and students. Students are exposed to the management of the institution's property, such as the Observatory, Baitul Hilal, National Space Agency, Planetarium, Science Centre, and the Mufti's Office. Inline technological development, AL-KAHF has an application in Google Play Store as it intends to use Augmented Reality (AR) technology to make this game more attractive.

Methods: In the methodology, we divided it into three parts, namely Game Development (subject content and game flow), secondly AR Enhancement (marker making and application development) and The Survey part (questionnaire, target group and user perception).

Results: 71% Positive effect to student awareness about astronomy, 98%. Most of them agree that astronomy board game is needed to develop to increase knowledge (education) in astronomy, and 98% of respondents agree this product is suitable to be developed nowadays to provide education in astronomy.

Conclusion: In conclusion, besides playing the game, students can indirectly learn more about science (education) in a relaxed manner and manage financial matters regarding the property related to astronomy. It is expected that the product will become very marketable.

Keywords: Board Games, Astronomy Education, Augmented Reality (AR) Technology

Smartphone Use among Undergraduate Students: A Preliminary Study

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Abstract

Introduction: The use of smartphones has increased drastically in recent years. Students tend to use smartphones for multipurpose, and the increasing usage might lead to overuse of smartphones. This study aims to report the findings on smartphone usage patterns and behaviour of undergraduate students.

Methods: 101 undergraduate students filled in the questionnaire, and data were analysed using descriptive statistics.

Results: The findings show that students mainly used their smartphones to communicate on social networking sites, search specific information, and check social media sites. Moreover, 34.7 per cent of students spend more than 12 hours on their smartphone, and 24.8 per cent spend 6 to 12 hours on their smartphone. The majority (86%) use a smartphone to feel better when having stressed; (85%) use smartphones longer than intended, more than half of the students not able to stand without a smartphone (63%), prefer searching information on a smartphone than asking others (61%), feel upset without a smartphone (53%) and constantly check smartphone to not miss any conversation (56%).

Conclusion: This preliminary study provides a brief finding on smartphone usage and behaviour among university students and shows that students tend to be dependent on their smartphones that might lead to problematic smartphone use.

Keywords: University Students, Smartphone Use, Usage Patterns

Regression Analysis for Stature Estimation from Foot Length Measurement in Multi-Ethnic Population of Sarawak

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Abstract

Introduction: Stature reconstruction is significant because it provides a forensic anthropological estimate of a person's stature. This research aims to investigate the relationship between stature and foot length and create population-specific regression equations for estimating stature in a multi-ethnic population in Sarawak.

Methods: This study was participated by 800 paramedic trainees (aged 19 to 23 years) from a multi-ethnic population of Sarawak. An adult foot device and stature measured left foot length was measured in standard position using Stadiometer. Statistical Package for Social Sciences was used to conduct Pearson's correlation test, linear regressions, and paired t-test statistical tests (SPSS Version 26).

Results: The correlation coefficient (R) value of the pooled sample (0.645–0.816) is higher and statistically significant (p 0.001). As for the Malay, Iban, Bidayuh, Melanau, and Kayan ethnic groups, with acceptably small standard errors of estimate (SEE) ranging from + 3.441 to + 4.636 cm. Thus, regression equations were derived for stature estimation from foot lengths even when sex remains unknown. The actual and approximate stature did not vary significantly in a paired t-test.

Conclusion: The population-specific regression equations provided by this research would be helpful to estimate the stature of the multi-ethnic population of Sarawak for anthropologists or forensic experts in anthropometric techniques.

Keywords: Forensic Anthropology, Stature, Foot Length, Correlation coefficient, Regression Equation

Integration of Science, Technology and Quran: The Implementation of Tadabbur, Ihya, and Ibrah Concept in Learning Activity Module

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Abstract

Introduction: The integration between the Quran and science has long been debated, and it has been extensively covered in the syllabus of many education institutions. Many efforts have been proposed to integrate the knowledge that aimed to clarify the idea into a proper plan. However, the absence of a clear-cut concept and blueprint has become a challenging task to practice integrating both pieces of knowledge. Therefore, the Ulul Albab Model was introduced in Program Saintis Islam Terengganu to integrate the Quranic and scientific knowledge. Hence, this paper is written to study the effect of the Ulul Albab Model on students' knowledge of the integration of Quranic and scientific knowledge.

Methods: Data collected using a questionnaire with 37 respondents and chi-square analysis with a significance level of 5% (α= 0.05) was used in this study.

Results: The result of the p-value is 0.08 shows that there is a significant correlation between the model used and students' knowledge of the integration of Quranic and scientific knowledge.

Conclusion: *Tadabbur, ihya and ibrah* sessions proved to be the most potent and essential sessions for them to consolidate their knowledge in the Quran and science, which also challenged their analytical thinking skills.

Keywords: Ulul Albab Model, Quranic-Scientific Knowledge, Holistic Education, Program Saintis Islam Terengganu

Middle Managers as Authentic Leaders for the Public Sector Management: Systematic Review

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Abstract

Introduction: Authentic leadership emerges as the new forms of moral leadership increase the leadership of the 21st century. This emergence is caused by authentic leaders who drive subordinates' intrinsic motivation, which leads to positive emotional engagement, and this theory posits human potential can be enhanced in organisations.

Methods: It employs a systematic review of relevant positive leadership theories and, in comparison, existing public sector leadership theories using selected high impact articles from management and leadership journals.

Results: Authentic leader nurtures leadership development in the public sector. It serves as a foundation for a motivational-based framework in developing middle managers for effective leadership development in future research directions.

Conclusion: Authentic leader increases followers' organisational behaviour and their intrinsic motivation in the public sector context. It can shape a new understanding of how intrinsic motivation predicts a leader's behaviour and drive followers' outcomes within the public sector leadership domain.

Keywords: Authentic Leadership, Public Sector Leadership, Middle Managers

Experiential Education Versus Traditional Education Impact on Student's Engagement and Skills Growth: PharmaShout Newspaper as a Developed Tool for Pharmacy Undergraduates

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Abstract

Introduction: Experiential education has been used to empower the slogan "experience leads to knowledge" since more than 40 years ago; however, conventional teaching is the most used standard academic method and degree-based career building. Our study hypothesis is that developing experiential education tools such as the PharmaShout newspaper for undergraduate pharmacy students can enhance their writing and studying skills at Al-Kitab University (Kirkuk, Iraq).

Methods: The survey was only administered to participating students in PharmaShout newspaper after it was successfully published, questions were adapted from a validated source.

Results: Data showed that around 88% of pharmacy students were willing to engage and ask questions while writing an article in PharmaShout compared to 23.5% in the course-based education scheme. Furthermore, 71% were ready to prepare multiple drafts, yet only 17.6% did so in traditional education. Importantly, PharmaShout spurred 41% of the students to do additional studies independently, while only 11.8% were interested in making such an effort during a standard educational course.

Conclusion: To prepare students for the evolving societal and workforce needs, universities should consider experiential education as an inspiring and evaluating tool, particularly in the resilience of E-Learning as the new normal.

Keywords: Experiential education, Undergraduate pharmacy, Engagement per cent, Absorption capacity, Skills

Accident Risk Analysis in Food Manufacturing Industry

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Abstract

Introduction: The food manufacturing industry is one of the largest manufacturing industries available in Malaysia. Increasing demand for food manufacturing nowadays, especially in the new normal period, has eventually uplifted the high possibilities of occupational accidents. Thus, the accident risks among the workers can be reduced by identifying the risks and causes of accidents in the first place. This study aims to conduct the virtual identification of the risks and causes of accidents in the food manufacturing industry.

Methods: A comprehensive analysis was conducted by using the Bowtie Analysis. All related information, including the root cause and the contributing factors of food manufacturing industry accidents, was collected through observation and virtual interviews. Bowtie diagrams were constructed using BowtieXP software to display all the information and findings. Due to these advantages, the analysis could lead towards a comprehensive risk assessment in ensuring smooth operations and achieving an inherently safer without requiring the physical appearance of the assessor at the site. Thus, to test the applicability of the analysis, the actual case studies at Kilang Keropok A, Pahang and Kilang Keropok B, Kelantan are performed, respectively.

Results: Outcomes of the study included threats, consequences, proactive barriers, and reactive barriers were identified in the food industry. Amid all the conclusions, the identified accident risks have moderate and low impacts on people and reputation, respectively, meanwhile no impact on assets and the environment.

Conclusion: An adequate risk analysis tool, namely Bowtie Analysis, may be very helpful in identifying and analysing the root cause of the accident. Consequently, the threats that existed in the organisation could be prevented by adapting the safe work practices, and preventive measures were displayed in the Bowtie diagram.

Keywords: Accident risks, Food industry, Bowtie Analysis

"A Real-Vocab": Augmented Reality English Vocabulary Module for Children with Autism

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Abstract

Introduction: To date, an increasing number of children across the globe are being diagnosed with autism in which Autism Spectrum Disorder (ASD) causes a child to experience persistent problems in social communication also in the journey of learning the English language. Specifically, there have been waves of technology inventions created to tailor to mainstream learners in the education field. Yet, not many technology-related tools were invented that could cater to learners with special needs.

Methods: This study involves an instructional design approach where design and developmental approach is used with the involvement of the ADDIE model. This developmental research approach is based on Richey & Klein, whereby three phases are applied in the study; needs analysis, design, and development.

Results: The findings have gathered that the development of an augmented reality English vocabulary module could potentially assist children with autism in their English language learning, specifically vocabulary development.

Conclusion: Augmented reality technologies can further extend these possibilities regarding mobility, seamlessness, and contextual learning to help bridge the gap between average learners and learners with autism.

Keywords: Augmented Reality Technology, Autism, ESL Learning; Module, Vocabulary Learning

Does Awareness on IoT Cybersecurity help Malaysia to Create Bright Society?

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Abstract

Introduction: The proliferation of IoT (Internet of Things) has accelerated cyberattacks and likely to affect the vision to be a bright society, a nation without the dark side of ICT proliferation. Malaysia is seemingly a hotspot for global major blocked suspicious cyberattacks.

Methods: This paper sits on a positivistic research paradigm and presents the current scenario of IoT proliferation and cybersecurity implementation in Malaysia. A total of 329 working youth was surveyed through a cross-sectional quantitative survey method.

Results: The result shows, 71% of the respondents indicated negative sentiment that Malaysia is not safe from privacy and cybersecurity danger. Majority of the respondents (83%) agree that the attacks on IoT are more serious now than in the past. This is because the use of smart devices has increased tremendously. This study revealed that the initiative of the Association of Information Systems on creating a Bright Society, a society with reduced dark side of ICT proliferation requires extremely active participation from all stakeholders.

Conclusion: We conclude that the importance of cybersecurity awareness on IoT cannot be undermined. Hence, we call the scientific community to conduct more research on this topic and make the idea of Bright Society creation, a reality.

Keywords: Cybersecurity, Bright Society, IoT, Malaysia

Perception of E-tailing Ethics among Malaysians

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Abstract

Introduction: The use of e-tailing is perceived to encounter numerous e-tailing ethical problems and issues like dishonest behaviour, deceptive practices, unsafe e-transactions, misuse of data and information. Security and privacy of consumers are of concern as the consumers' usage rate on online shopping platforms multiplied. The credibility and reliability of some of the e-tailing retailers are being challenged. The CPEOR model, including security, privacy, non-deception, and reliability, can contribute solutions for e-consumers while also improving the business ethics of e-retailers. This study aimed to evaluate consumers' perceptions about e-tailing ethics towards repurchase intention in Malaysia using the CPEOR model.

Methods: 298 sets of Malaysian e-shoppers 18 years old and above were collected through an online survey.

Results: It was found that security, privacy, and reliability have a relationship with consumer repurchase intention towards e-tailing in Malaysia. However, non-deception has no relationship with consumers repurchase intention towards e-tailing in Malaysia.

Conclusion: This study contributed ethical values to parties, especially e-tailers, in handling businesses professionally and ethically. This study may serve as a guideline for e-shoppers on a few ethical precautions such as security and privacy and the non-deceptions and reliability of e-retailers.

Keywords: E-tailing Ethics, CPEOR, Repurchase Intention

Examining The Relationship Between Coaching Behaviours, Anxiety and Performance Satisfaction of Volleyball Players

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Abstract

Introduction: It is crucial to understand the relationship between coaching behaviour, anxiety, and performance satisfaction to comprehend athletes' development and growth. This study aimed to determine the coaching behaviours, anxiety and performance satisfaction of the elite volleyball players.

Materials & Methodology: The study recruited 352 elite volleyball players (Males = 161; females = 191; age: 24.42 ± 8.62 years). They responded to three questionnaires: Coaching Behaviour Questionnaire (CBQ), Revised-Competitive State Anxiety Inventory-2 (CSAI-2R), and the Athlete Satisfaction Questionnaire (ASQ).

Results & Discussion: There was a strong correlation between coaching behaviours and anxiety (r = 0.30), coaching behaviours and athlete satisfaction (r = 0.26), and anxiety and athlete satisfaction (r = 0.24). In comparison to negative coaching (2.43 ± 0.45), behavioural coaching support was important (2.97 ± 0.40). The most significant factor influencing satisfaction was team integration (5.33 ± 1.00), followed by self-confidence (2.93 ± 0.49) and cognitive state anxiety (2.60 ± 0.58).

Conclusions: Coaches' behaviour is essential in improving athletes' success and athlete satisfaction. Coaches should assess athletes' preferred coaching behaviours to help them manage their anxiety and self-confidence.

Keywords: Coaching behaviours, Anxiety, Performance satisfaction, Volleyball players.

The Causes of Fuelling the Growth of Social Commerce Among Home-Based Digital Entrepreneurs Due to Pandemic

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Abstract

Introduction: Social commerce has grown beyond its limits despite having many negative ripple effects on global business due to pandemics. The pandemic has created tremendous business opportunities by forcing many people to venture into home-based digital businesses using social media platforms, especially Facebook and Instagram. The purpose of the study is to gain insight knowledge of home-based digital entrepreneurs' domain by reconnoitring the causes of marketing their products on social media platforms.

Method: The study adopted a quantitative method, and the data was collected from 82 home-based digital entrepreneurs using social media platforms to market their products.

Result: The study revealed that social capital, human capital, and environmental factors significantly inspired people to market their products through social media network platforms.

Conclusion: The study acknowledged the theory of entrepreneurial opportunity and contributed significant insights for the literature review and the implications for home-based entrepreneurs who are targeting a social media platform for their business. Thus, Social media networks created a new wave, and it has played an essential role in job creation and self-development during the pandemic.

Keywords: Social capital, Human capital, Environmental factors, Social commerce and Home-based digital entrepreneurs.

Factors Associated with Drug Use During Pregnancy and Breastfeeding among Female Drug Users (FDUs) who Used Amphetamine-Type Stimulant (ATS) in Malaysia

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Abstract

Introduction: Illicit drug use during pregnancy and breastfeeding has been recognised as a global public health problem in recent years among female drug users (FDUs), posing medical and social demands on maternal and child health. Though using an amphetamine-type stimulant (ATS) is associated with adverse health problems, its use during pregnancy and breastfeeding remains poorly studied. Our study aims to determine factors contributing to drug use during pregnancy and breastfeeding among FDUs who use ATS in Malaysia.

Methods: A total of 200 FDUs with current ATS use history participated in this cross-sectional study. The majority were Malay, 86% (n=171/200), married (69%, n=138/200), and 51% had 9 years of education. Respondents mean age in this study was 32.2 years (SD=8.61).

Results: Our results showed the prevalence of drug use among FDUs during pregnancy was 38% (n=75/200), and breastfeeding was 15% (n=30/200), respectively. Findings from the multivariate analysis indicated that drug use during pregnancy and breastfeeding was associated with being unmarried, having shorter (≤6 years) duration of ATS use history, younger age, and having a regular intimate male partner who uses drugs.

Conclusion: Given the prenatal exposure risk of ATS use, properly targeted interventions are needed to facilitate child-bearing FDUs participation in treatment programs in Malaysia.

Keywords: Pregnancy, Breastfeeding, Illicit drug use, Amphetamine-type Stimulant, Female drug users

Cybersecurity Challenges and Impact for Malaysians During the Coronavirus (COVID-19) Pandemic

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Abstract

Introduction: Coronavirus 2019 (COVID-19) has forced countries to be resilient and balance their economies while preventing the disease's spread. Most of the world is working remotely, including Malaysia. While this prevents the spread of COVID-19, the risk of a cybersecurity breach to their personal information is introduced. Furthermore, due to the pandemic, Malaysians heavily rely on mobile payments, online transactions and contact tracing apps such as 'MySejahtera' to help curb the spread of COVID-19. However, apps similar to MySejahtera contain personal data, which is also vulnerable to cybersecurity and privacy threats. This paper discusses the cybersecurity challenges that Malaysians face during the COVID-19 pandemic.

Methods: Doctrinal research methodology and secondary data from agencies were used for this study.

Results: Fraud has continued to make up over 70% of total cybersecurity-related incidents since 2019. Advisories related to security threats on software used frequently during the pandemic have increased in Malaysia. Government accountability, transparency, privacy and security are critical concerns of the public regarding the tracing app.

Conclusion: Malaysia's policymakers need to address government accountability during pandemic situations, specifically in the Personal Data Protection Act 2010, to protect consumers' data.

Keywords: COVID-19, Cybersecurity, Privacy

The Role of International Donors in Policymaking: Case Study of the Palestinian Water Sector

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Abstract

Introduction: In fragile states, international donors play an essential role in the development process. Consistently, the Palestinian Authority relies mainly on international funding. Therefore, this study investigates the driving factors behind the international funds and explores the impacts of the international funds on the water sector policymaking in the Palestinian context.

Methods: A qualitative research approach was adopted to collect data to achieve the study's objectives. Ten Interviews were conducted to gather the primary data.

Results: The results showed that international donors support Palestinians financially, mainly for political reasons, to promote the two-state solution. The results also indicate that despite the seemingly positive role those international donors play in developing the water sector, their support is not sustainable, making water governance fragile. The role of the water sector actors is to be passive as they depend heavily on international supports.

Conclusion: The impacts of international donors on the water sector have eventually led to widening the gap between the policy formulation and implementation stages. Thus, the status-quo of the water sector has been strengthened, and the water reform process has not been translated into actions.

Keywords: International Donors, Palestine, Policy, Water, Reform Process

Accountants Role in Achieving Sustainable Production: The Moderating Role of Integrated Reporting

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Abstract

Introduction: The Sustainable Development Goals (SDGs) are projected to impact Malaysian businesses significantly. Businesses that concentrate on sustainable production by improving the environment and empowering the organisation at all phases will maximise their firm performance over time and create sustainable value. There are limited studies on the role of accountants in achieving SDGs through integrated reporting, a way forward of corporate reporting.

Methods: This research will adopt a quantitative approach using chartered accountants who are the corporate report preparers registered under the Malaysian Institute of Accountants (MIA) as the sample.

Results: Through the eight elements of integrated reporting, accountants can help the organisation achieve SDG Goal 12 on sustainable production.

Conclusion: Accountants can act according to their role in sustainable production, considering the business's motives and intentions, providing and advising accordingly to achieve the firm's performance.

Keywords: Integrated Reporting, Accountants, Sustainable Production, Firm Performance, Corporate Reporting.

Terminologies-based Teaching: A Student's Perception on Analytical Separation Methods

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Abstract

Introduction: Analytical Separation Method (CHM510) course is a subject offered to Bachelor of Science (Hons.) Chemistry, AS222 and Bachelor of Science (Hons.) Chemistry with Management, AS222 at Universiti Teknologi MARA (UiTM), Malaysia. During the learning of this course, students must be proficient in the fundamental terminology involved to understand separation methods.

Methods: The collected samples involved students from Shah Alam, Kuala Pilah, Arau, and Jengka campuses in UiTM. An analytical cross-sectional study had been conducted between October-November 2020 using a well-designed questionnaire.

Results: About 80% of the total 128 respondents assumed they understood the definition of terminology used. Moreover, a slight decline to 77.3% was noted when students were asked to distinguish the meaning of various terminology. Apart from that, 61.7% chose to agree to re-explain the terminology available, with 36% of them observed to have a lack of skill to relate the terminology with the theory that was further considered difficult for them.

Conclusion: Most of the students demonstrated good agreement in terms of terminology and were able to distinguish from each other, which clearly showed that students understood the definition and correctly re-explained terminologies.

Keywords: Analytical separation course, terminology, descriptive statistics

The Sustenance of Cultural Heritage Through Social Entrepreneurship

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Abstract

Introduction: George Town was inscribed with UNESCO World Heritage Site (WHS) on July 7, 2008. This listing has elevated Penang to the international status of multiculturalism. However, there is a problem with the changes in the social fabric and the availability of resources to curb gentrification.

Methods: This article is based on a literature review alongside with qualitative research method.

Results: This article suggests that social entrepreneurship (SE) in sustaining the cultural heritage of George Town UNESCO WHS by filling the gaps of social needs left unmet by the government and private sectors. Integration of Theory of Change and Stakeholder Theory suggests the possible contributions of social enterprises in gathering resources needed to accomplish the activities of the SE solution that transform those resources into outputs of the SE activities. In consequence of the outputs, outcomes with external stakeholders' contributions are expected to impact the efforts of sustaining the cultural heritage positively.

Conclusion: This article suggests that the government should enhance policy structure to encourage SE activities as SE is a unique sector that can solve contemporary social and environmental issues.

Keywords: Social Entrepreneurship, Cultural Heritage, Theory of Change, Stakeholder Theory, UNESCO World Heritage Site.

A Critical Evaluation of Telemedicine Cybersecurity in Malaysia

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Abstract

Introduction: Digitizing healthcare or telemedicine in Malaysia has increased in practice due to the Coronavirus (COVID-19) pandemic. Telemedicine lowers costs, ensures physical distancing, and convenient for real-time remote consultations and treatment. While telemedicine appears promising for Malaysia's current digital landscape, the Telemedicine Act 1997 of Malaysia has not come into force. Hence, the Act lacks the regulation and control of telemedicine. Moreover, personal and private information shared in telemedicine websites or apps are vulnerable to cybersecurity threats. This study discusses the legislative and cybersecurity challenges of telemedicine as it applies during the COVID-19 pandemic.

Methods: Doctrinal and qualitative research methodology was mainly used for this study. Thirteen respondents with working experience and with graduate or postgraduate degrees were interviewed.

Results: The results showed that seven of the respondents heard of telemedicine, but have never used it and reluctant to use it due to cybersecurity and privacy concerns. Six of the respondents have never heard of telemedicine at all.

Conclusion: The Telemedicine Act 1997 needs to be reviewed. A more specialised definition needs to be included to ensure consumer rights are protected. Furthermore, data protection must be a primary concern and confidentiality of data must be preserved.

Keywords: COVID-19, Cybersecurity, Personal Data Protection, Telemedicine

Does Regulatory Enforcement Effective in Malaysia? An Analysis of the Occupational Accident in Malaysia

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Abstract

Introduction: Occupational accidents always happen at the workplace, especially in the construction and manufacturing industries. In 2019, the Department of Occupational Safety and Health (DOSH) had reported that the total number of occupational accidents was 40811 cases compared to 2018, which was 35460 cases. This study aims to examine the factors of occupational accident at the workplace in Malaysia and discuss whether the regulatory enforcement conducted by DOSH effectively reduces the number of accidents in our country.

Methods: By adopting the qualitative method of content analysis, this study analyses the statistics of accidents reported by the DOSH. Semi-structured interviews also were conducted with the legal enforcement officers from DOSH.

Results: The study found that the causes of occupational accidents are mainly because the employers failed to ensure the employees' safety and failed to provide a safe working environment. The unsafe act of the employees also contributes to occupational accident in Malaysia.

Conclusion: Although regulatory enforcement cannot decrease the number of accidents tremendously, it increased employers' compliance with law and regulations. The employers, employees and, DOSH must work together to prevent occupational accidents at the workplace.

Keywords: occupational accident, workplace, employee, enforcement

Security Risk Analysis for Information Asset (Intellectual Property (IP)

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Abstract

Introduction: Information in its multitude of forms has been recognised as 'Information Asset'. As such, securities to avoid the damage and leakage of information assets are vital. The best method is by applying a security risk model. This research aims to choose a security risk analysis model to optimise the MMU IP unit and IP inventors in MMU information asset development.

Methods: The research design was based on a qualitative method, where information asset and security risk analysis were utilised as experts' fields. It is imperative to have an in-depth discussion with experts in these fields.

Results: The ultimate output of this research is that a security risk analysis model was chosen that can optimise the MMU IP unit and IP inventors in MMU IP development which is the CORAS security risk analysis model.

Conclusion: CORAS can be used by the IP inventors and IP intermediaries in MMU to assess and control the risks that affect the information asset (IP) before and in case of risk actualisation. However, more research is warranted to get the views of other parties involved in IP, such as IP Lawyers, to get their perspectives and inputs.

Keywords: Intellectual Property, Risk Management, Security Risk Analysis, Information Asset

Achieving Better Quality of Life: Challenges Faced and Coping Strategies used by Primary Caregivers of Children with Cerebral Palsy in Malaysia

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Abstract

Introduction: Children with cerebral palsy (CP) require long-term assistance from their primary caregivers due to restrictions on their daily functioning. This has negatively affected the quality of life (QOL) of the caregivers. This study aimed to investigate the challenges and coping strategies used by the Malaysian primary caregivers of children with CP to achieve better QOL.

Methods: Semi-structured interviews were conducted from June to September 2020 with 18 primary caregivers of children with CP. Then, data were thematically analysed.

Results: Respondents aged between 31 to 57 years old with the majority are female (77.8%). The top challenges faced by respondents were emotional distress, physical strain, cognitive disarray, financial constraints and restricted personal time. Respondents mostly applied emotion-focused coping strategies such as taking up hobbies and doing exercise, accepting the disability as fate, turning into religion, seeking emotional social support and positive reframing, to coping with their lives. Respondents also believe that good QOL includes physical and mental well-being of the family and themselves, financial stability, social support from family and friends, and always be thankful.

Conclusion: There is a need to tailor a programme based on effective coping strategies to alleviating the hardship of primary caregivers in caring for their children with CP.

Keywords: Disability, Parents, Cerebral Palsy, Well-Being, Qol

Malay Version of the Emotional Intelligence Scale for Youth Football Players: Translation and Validation

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Abstract

Introduction: Players and coaches recognise the importance of emotional intelligence to manage mental readiness during the training to ensure improved sports performance. Numerous studies have consistently shown a positive correlation between mental readiness and success in sports.

Methods: This study was aimed to develop and verify the Emotional Intelligence Scale (EIS: Lane et al., 2009) in Malay language version, which consisted of translation, verification, and constructing reliability phases. The instrument experienced forward and backward translation from English to Malay version. Five experts reviewed the 33-item EIS content, specifically the six-factor model (social skills, regulation, appraisal of other emotions, appraisal of own emotions, utilisation of emotions and optimism) for consistency, clarification, complexity, and suitability for inclusion. Expert opinion was used to ascertain perceived usefulness and utilisation. The questionnaire was distributed to 300 undergraduate trainee teachers through a convenience sampling process. The content validity and reliability were determined by using Cronbach's alpha.

Results: The 33-items Malay-EIS demonstrated good item properties, adequate content coverage, and favourable, expert review scores. Cronbach's alpha values for six factors ranged from 0.70 - 0.85 for Malay EIS.

Conclusions: The Malay versioned EIS is a valid and reliable tool and can evaluate football skills performance among youth football players in Sarawak.

Keywords: Emotional Intelligence Scale, Malay Version, Validation, Reliability

The Use Of Badminton Training Aids Set On Badminton Footwork Skill Performance

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Abstract

Introduction: Badminton is a racquet sport with open and swift actions. To be successful in badminton, players need excellent court speed and agility. Players need speed and quickness to react and get to the shuttlecock. This study investigates the sports innovation tool of Badminton Training Aids Set (BTAS) on badminton footwork skill performance among Sarawak badminton players.

Methods: The Badcamp Agility Test (Luiz and Paulo, 2015) will be used on the pre and post-test sessions. Participants are among the Sarawak badminton players, randomly allocated into two groups, namely the BTAS Technique Group (n=20) and Footwork Pointing Technique Group (n=20). At the same time, the intervention session was implemented for 8 weeks (16 sessions). Upon completion of the 16 sessions of Badminton Training Aids Set (BTAS) and Footwork Pointing Technique, a post-test will be conducted on the participants.

Results: BTAS Technique group will perform better as compared to the Footwork Pointing Technique Group.

Conclusions: Based on the result, BTAS is an innovative tool that helps in increasing the badminton footwork skills performance of the Sarawak badminton players.

Keywords: Speed, Agility, Intervention, Footwork, Techniques

Examining the Antecedents and Consequences of E-wallet Adoption: An Empirical Analysis

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Abstract

Introduction: E-wallet is acknowledged as a growing trend and it is altering the global electronic payment landscape by providing a relatively modern and promising way of managing a physical wallet. With the seamless services offered by this new payment tool, whether the use of it is one of the dimensions to improve one's positive perception of their lives is still in doubt. Hence, this study aims to examine the key antecedents influencing the e-wallet adoption in Malaysia and also the influence of e-wallet adoption on Malaysian's well-being.

Methods: This study extended Unified Theory of Acceptance and Use of Technology (UTAUT2) with a psychological construct, subjective well-being supported by the capability approach to explain Malaysians' behaviour toward e-wallet with the use of partial least squares structural equation modelling (PLS-SEM) and data of 324 e-wallet users.

Results: The results revealed that performance expectancy, price value, facilitating conditions, followed closely by social influence are the strongest antecedents of behavioural intention to adopt e-wallet. Most importantly, e-wallet adoption exhibits a large effect on subjective well-being.

Conclusion: Helpfulness, value gained and availability of facilitative assistance are the decisive factors of adoption intention among e-wallet users. The use of e-wallet would lead to the result of subjective well-being.

Keywords: E-wallet, UTAUT2, Subjective well-being, Adoption

Understanding Students' Online Service Experience: An exploratory study in Malaysia context

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Abstract

Introduction: This study aims to explore and identify students' online service experience to contribute to improving students' learning. Most higher learning institutions (HLI) face challenges for survival due to competing at national-level HLIs and facing the Covid-19 pandemic. HLIs need to revise and reintroduce online service delivery methods to enhance students' service experience. However, identifying students' online service experience has become a challenge because of the limited studies available in Malaysia.

Methods: The study explored and measured relevant factors from the students' point of view via Exploratory-Factor-Analysis (200 responses) and Confirmatory-Factor-Analysis (375 responses).

Results: The results suggested six factors representing the students' online service experience – 1) ease of use; 2) joyous; 3) convenience; 4) immersion; 5) reliability; and 6) perceived risk. The findings suggest students are those who have high affective and cognitive intensity with the institution.

Conclusion: Individuals are often aware of their affective and cognitive intensity and more likely to respond positively to an institution. By considering the basic idea of high affective and cognitive intensity, the study assumes that students who consider service experience as their core behavioural pattern will be more likely to have a favourable attitude toward the institution.

Keywords: Online Service Experience, Exploratory, Higher Learning Institutions, Students' attitude, Students' learning

Change Management in Public Organisations: The Effect of Political Change

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Abstract

Introduction: The change of government in May 2018 was the first since Malaysia's Independence. As the government's core machinery, the Malaysian Civil Service (MCS) was expected to adapt efficiently to the political changes, ensuring a smooth transition and continuity in service delivery to the people. However, the MSC's ability to adapt to the political change came into question with calls for reformation. This research investigates the relationship and impact of political change on MCS preliminarily.

Methods: A literature review on organisational change in public organisations were carried out before studying the reported inadequacies of the civil service in responding to political change. The relationship between MCS and the process of political change was observed in the context of change management in its operative environment.

Results: The adaptability of the MC to political change and the new government's administrative and policy outlook is vital as a change of government could theoretically occur every five years, and the MCS needs to be change-ready.

Conclusion: The findings identify the need for further research on the impact of political change on MCS and the fundamentals of change readiness within MCS.

Keywords: Change Management, Political Change, Public Organisations, Change Readiness

Students' Preference on Integrating Pedagogical Agent in Hybrid Learning

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Abstract

Introduction: Implementation of hybrid learning in higher education serves a great advantage. Practical subjects need more attention than theoretical subjects. Mathematics is perceived as a complex subject. A good learning environment is vital for students' learning. The pedagogical agent is an artificial or human life-like character used in an educational environment to teach the subject matter. It motivates students to improve their learning process. This study aims to examine students' perceptions of pedagogical agents teaching mathematics in a hybrid learning environment.

Methods: The instrument used in this study is an online questionnaire. It is a self-designed questionnaire and has been validated by a panel of experts. A random sample of 206 participants participated in this study.

Results: The findings show that 77 of students found that learning mathematics was complicated. The majority of them preferred to study mathematics through hybrid learning compared to traditional and online learning approaches. Only minority students (53) found that they dislike learning mathematics in a hybrid learning environment with the assistance of a pedagogical agent. Notably, the majority of students preferred a hybrid learning approach with the implementation of a pedagogical agent.

Conclusion: Thus, implementing a hybrid learning approach that integrates with a pedagogical agent in higher education provides better insight into mathematics learning.

Keywords: Pedagogical Agent, Hybrid Learning, Mathematics

The Antecedents of Green Consumerism of Malaysian Urban Youth

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Abstract

Introduction: The current study investigates the factors influencing green consumerism among the Urban Youth in Malaysia.

Methods: The study adopted a quantitative method. Four hundred three respondents aged between 16 – 30 years participated in the survey. The data was analysed using SPSS version 8 and smart-PLS version 3.3.2 software.

Results: The study suggests that attitude towards green consumerism and environmental concern have a significant positive effect on the intention for green consumerism. Intention for green consumerism has a significant positive effect on green consumerism behaviour. Intention for green consumerism mediates the effect of attitude towards green consumerism and environmental concern on green consumerism behaviour.

Conclusion: The study found that Subjective norm, PBC and Self Image has no significant effect on the intention for green consumerism. An effective way for Malaysian urban youth to alter their attitude towards green consumerism is to increase their knowledge on environmental sustainability and its implications.

Keywords: Green Consumerism, Urban Youth, Theory Of Planned Behaviour, Environmental Concern, Self-Image.

Electrical Technology Students' Learning Styles at the Malaysian Vocational College

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Abstract

Introduction: Learning styles are how individuals acquire, control and store information that is different. An adaptation of learning styles and teaching approaches could help teachers to use appropriate teaching approach and to make the learning more meaningful.

Methods: This paper presents the Index of Learning Styles (ILS) to investigate students' learning style preferences at Vocational Colleague in Malaysia culture. The ILS was administered to a group of 280 students at Vocational College in Malaysia. Descriptive statistics were provided by explaining the main preferences of respondents and the findings of this analysis.

Results: The results indicate that the majority of Electrical Technology students at Vocational College were active, sensing, visual, and sequential learners, whereas the minority favoured the reflective, intuitive, verbal, and global aspects of learning style.

Conclusion: By using ILS in the classroom, a student's learning style awareness could be created. It is also used to improve the understanding of the student's learning style and adapt to teaching methods to increase the student's mastery of knowledge.

Keywords: Learning Style, Index of Learning Style, Vocational College

Analysing Board Characteristics with Firm Performance among Malaysian and Singaporean Shariah Public Listed Companies

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Abstract

Introduction: This research seeks to determine if corporate governance mechanisms are more significant in Shariah public listed companies (PLCs), Malaysia or Singapore. Corporate governance mechanisms (independent variables) that were adopted in this research are the number of independent directors (NOID), independent chairman (IC), CEO tenure (CEOT), board size (BS), number of women directors (NWD) and number of foreign directors (FD). Firm performance (dependent variables) was measured by the Return on Assets (ROA), Return on Equity (ROE) and Tobin's Q.

Methods: Panel Data Analysis was applied to determine an overall result over 5 years (2013 – 2017). 25 Shariah PLCs were selected from Malaysia and Singapore for this research.

Results: This research revealed that Singaporean Shariah PLC's NOID had a significant impact and negative on the company's ROA and ROE. Singaporean Shariah PLC's NOW had a significant impact, and negative relationship on the company's ROE and Tobin's Q. Singaporean Shariah PLC's BS had significant impact and positive relationship on the company's ROA, ROE and Tobin's Q.

Conclusion: Singaporean Shariah PLCs' NOW had a negative and significant impact on the company's ROE and Tobin's Q. Foreign directors had no impact on Singaporean Shariah PLCs' firm performance.

Keywords: Corporate governance, Shariah PLCs, Independent Directors, CEO tenure, Board Size

Readiness In New Normal Teaching and Learning Through Teachers Views

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Abstract

Introduction: The COVID-19 pandemic has forced schools and teachers to execute different teaching methods such as online learning as a new normal approach. Online learning is not new, and this was an educational method that first emerged in the mid-90s as the Internet spread worldwide.

Methods: This phenomenology study was carried out from teachers' perspectives about their readiness in teaching and learning in the new normal, resulting from the impact of the COVID-19 pandemic and the enforcement of the Movement Control Order (MCO) by the government. Data were collected from November to December of 2020 from primary school teachers. Thematic analysis was applied to analyse the data obtained from semi-structured interviews.

Results: From the findings, two themes emerged in this study, namely, i) the perspectives on knowledge, skills, and attitude, and ii) the challenges in technical know-how, pupils, and other support.

Conclusion: The research concluded that an instructor needs to be equipped with diverse expertise. Apart from that, the teacher needs support from administrators, colleagues, and the community, to assist in teacher readiness and motivation.

Keywords: New normal, perceptions, challenging, online learning.

Bringing in the Ching-Chong: Introducing 24 Season Drums as A Novel Approach to Physical Literacy and Resilience Development

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Abstract

Introduction: Resilience is often referred to as the capacity to adjust oneself amid hardships. It helps to strengthen one's stress threshold and facilitates adjustment period. Physical literacy can be defined as having an individual's mind and body in a state of harmony. The present paper aimed to introduce possibilities for endorsing physical literacy and resilience through the extensive use of 24 Season Drums, a musical performance originating from Malaysia.

Methodology: A literature search was performed using PubMed, ResearchGate, ScienceDirect and Google Scholar databases. Keywords include physical literacy, resilience, stress, physical activity, drums, and 24 Season Drum. Published articles, review papers, and meta-analyses from May 2000 to September 2020 were included. The review was written based on the Assessment of Narrative Review Articles (SANRA) Statement Scale.

Results: The keyword "24 Season Drums" produces 15 results; the combination of "drums" and "physical literacy" produces 58 results; the combination of "drums" and "musical literacy" produces 251 results. 237 articles were removed after applying the exclusion criteria (108 related to engineering, 9 conference papers, 12 abstracts, 6 thesis, 17 were unretrievable, 39 were published in Mandarin, 46 involves physical activities only). After abstract and title reading, eight articles were retrieved and discussed in the manuscript.

C**onclusion:** The evidence presented supports the implementation of 24 Season Drums to promote physical literacy and resilience development. The authors hope to attract more scope of collaborations between art-based performance in developing a resilient individual.

Keywords: physical literacy, resilience, stress, physical activity and 24 Season Drum.

The Effect of Goal Contents Towards Physical Activity

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Abstract

Introduction: This study investigated the effect of goal content on physical activity among 383 primary and 278 secondary school students with a mean age of 1.42 ± .49.

Methods: The Goal Contents for Exercise Questionnaire by Sebire and colleagues (2008) was used to assess the goals.

Results: Two-way analysis of variance (ANOVA) showed an interaction between the effect of gender × age groups between subjects ANOVA and the main effect of gender for social affiliation, image, health management, social recognition and skill development. Age groups have a prominent effect on health management and skill development. There was an interaction between gender and race, between subjects' ANOVA for social affiliation, social recognition, health management, and skill development. Gender had a prominent effect on health management, image, social affiliation, social recognition and skill development. Races had a prominent effect on health management, social affiliation, social recognition and skill development. There is a positive relationship between the goal contents variables.

Conclusion: The findings suggest that PE stakeholders should provide an autonomy-supportive learning environment to maximise students' ability to maintain PA.

Keywords: Goal Contents, Physical Activity, School Students

Infusing Tabayyun Concept in Media Dakwah (Preaching) in Malaysia

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Abstract

Introduction: Encouragement to carry out da'wah is enshrined in the Qur'an and Sunnah; this is also consistent with the order to implement the concept of Amar Makruf and Nahi Munkar. However, when engaged in the passion of carrying out da'wah, people often forget to apply the Tabayyun concept to the news, issues or facts that they are trying to highlight until it creates various stigmata and negative perceptions of Muslims and Islam in particular.

Methods: This article aims to examine the document analysis methods for information collection.

Result: We found that the community must review, identify the source of news information from an authoritative source and refer to an expert before publishing the info on social media. The study found that the Tabayyun concept plays an essential role in applying contemporary preaching media, especially when considering the rapid development of information technology. Therefore, the role and use of media as a medium of da'wah is essential and should be mastered by every preacher to produce a generation of media preachers or techno dai who are skilled and knowledgeable.

Conclusion: Moreover, the awareness and implementation of the Tabayyun concept should be adopted by media culture so as not to get involved in the spread of fake news or information sources.

Keywords: Tabayyun, da'wah, media. Dai, the spread of fake news

A Systematic Literature Review on Safety Culture in Malaysian Industry

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Abstract

Introduction: Safety culture is getting more attention as a mechanism to prevent industrial accidents. Manufacturing, construction, and oil and gas are high-risk industries with high accidents rates in Malaysia. However, a lack of systematic review highlights safety culture issues for various industries in Malaysia. Therefore, the objective of this study is to investigate the recent study on safety culture issues in Malaysian industries.

Methods: The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) consists of identification, screening, eligibility, and data abstractions steps were used to establish a systematic literature review (SLR) from ScienceDirect and Scopus databases.

Results and Discussion: Twenty-five articles were obtained on safety culture for the year 2016 to 2020. The results generated two main themes: the responsibility of organisation issues and individual behaviour issues with fourteen subthemes. Management commitment is crucial in constructing a safety culture in nuclear, construction, oil and gas, chemical plant, and manufacturing industry in Malaysia.

Conclusion: In conclusion, top management has a great responsibility to build a good safety culture at the workplace in minimising industrial accidents in future.

Keywords: Safety Culture, Malaysian Industries, PRISMA, Systematic Literature Review and Industrial Accidents.

The Effect of Leadership Styles on Employee Engagement in The Public Service- A Systematic Review

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Abstract

Introduction: Employee engagement is an emerging concept which enhances positive organisational outcomes. In most human resource development literature, leadership is found as a critical factor in driving employee engagement. Leaders with the right attitude and leadership skills can lead public sector organisations in times of turbulence to support their vision and mission. Hence, this paper explores the importance of leadership styles and their effect on employee engagement in the public sector.

Methods: Secondary data was collected based on published articles and systematically analysed to identify the literature gaps and propose future research agendas.

Results: Transformational leadership emerged as a critical style that positively influences employee engagement given the attributes of transformational leaders that emphasise the relationship between leaders and their followers.

Conclusion: Due to limited research published in this context, this study proposes that more research needs to be done to examine current leadership styles in public organisations. An appropriate framework to incorporate transformational attributes in supporting employee engagement needs to be developed. Public sector agencies need to train more middle managers with transformational attributes to become more people-centric, supported by various theories such as social exchange theory and the new public sector model.

Keywords: Transformational leadership, employee engagement and public sector.

Business Model for Malaysian Local Councils' Sustainable Smart City Initiatives

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Abstract

Introduction: Malaysian cities embrace the smart city aspiration through their respective local councils ("PBT"). However, PBTs are facing funding challenges. Most PBTs receive funding from the federal government. In 2018 only 45% of PBTs managed to record revenue exceeding RM1 million.

Methods: The study will be conducted via a case study on one PBT that has a track record of successfully delivering city services and can sustain itself financially. For this purpose, the proposed study subject is Majlis Bandaraya Subang Jaya ("MBSJ").

Results: Based on current trends, it is unlikely for PBTs to sustain any smart city initiatives. A more viable business model is thus required.

Conclusion: This paper presents a practice review concerning PBT's financial and non-financial challenges in implementing smart cities and the possible business model that can generate new funds to sustain the city services. It will impact the national agenda under the Fiscal Sustainability enabler of the Shared Prosperity Vision 2030 and Smart Cities and Transportation of the Socio-economic drivers of the 10-10 MySTIE Framework. It can also serve as a reference for PBTs and businesses to provide public services within a city.

Keywords: Smart city, PBT and business model.

Adoption of Self-Service Technologies (SSTs) among Retail Consumers in Malaysia: Moving Towards a Resilient Retail Sector Post Covid-19

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Abstract

Introduction: Like many businesses that fail to cope with the changing retail landscape amid the COVID-19 pandemic, the impact of the global health crisis is calling for attention and debate on how virus transmission can be minimised in retail stores by using self-service technologies (SSTs) to produce services independent of involvement of direct service employee so that face-to-face contact can be reduced during buying and selling activities. This study adopts the Unified Theory of Acceptance and Use of Technology to investigate the determinants of SSTs adoption among retail consumers in Malaysia.

Methods: Quantitative analysis is used based on an online survey involving 200 retail businesses.

Results: The research model explains a high percentage of variance (R^2 = 70%) in adoption. Performance expectancy, social influence, perceived convenience, and perceived behavioural control exert a significant ($p < 0.05$) positive effect on adopting SSTs among retail consumers, while effort expectancy and facilitating conditions have no significant relationship with adoption.

Conclusion: As the well-being of retail consumers takes centre stage, this study provides critical managerial implications to the retailers who incorporate SSTs as part of the in-store post-Covid 19 strategies for a more contactless transaction.

Keywords: Adoption, Self-Service Technologies, Retail Sector, Covid-19, Malaysia.

Frugal Innovation: Pandemic first-aid for Private Higher Learning Institutions

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Abstract

Introduction: The rapidly evolving COVID-19 pandemic has led to national lockdowns that threaten the survival of many private higher learning institutions (HLIs) that face poor profitability and insufficient funding. This disruption has accelerated the urgency for universities to leverage their intellectual capital and adopt a new business model. Online learning has become the new normality and shifting HLIs towards digital transformation. Frugal innovation (FI) could help the ailing HLIs continue innovation efforts without substantial financial investment and extreme scarcity of resources.

Methods: The objective of this paper is to shed light on the ability of private HLIs to turn crisis into opportunity through Frugal innovation using a knowledge-based view (KBV). Data collection will be carried out using survey (quantitative approach) with questionnaires distributed to private university academic staffs and management. The survey will be utilised to collect relevant information needed to test the hypothesized relationships between the intellectual capital and frugal innovation identified in this study.

Results: FI can support HLIs to develop their academic programme and services at an affordable price and enable the utilisation of their internal and external knowledge and technologies to reduce the cost of innovation and operation for business continuity.

Conclusion: While it is rational that steadying the ship is the utmost important task, FI can build strategic resilience by minimising resources and focusing on core functionalities to meet the economic needs and societal preferences in building a holistic education system towards leaping into IR 4.0.

Keywords: Higher Learning Institutions, Frugal innovation, Intellectual capital

A Review of Educators' Experiences in Conducting Emergency Remote Teaching During Pandemic Covid-19

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Abstract

Introduction: The Pandemic of Covid-19 which struck the world in 2019 has dreadfully forced a global shut down of educational activities. This has caused a frightful crisis-response where all educational institutions prompted online learning to serve as the alternative educational platform.

Methods: The articles are drawn from the Scopus online library within university access. The key terms which were used for the literature search were '*emergency remote teaching*' and '*education during Covid-19*'. These journal articles were published from May 2020 to December 2020. The criteria for selection were the studies that gave open-access to full articles and were published in English as journal articles only.

Results: The findings have been reviewed based on 3 categories; (a) Study methodology (b) Study setting and population (c) Scope of study. The authors then summarised the findings and coded them in five main themes; (i) Challenges in infrastructure (ii) Teachers' technology readiness (iii) Teacher's satisfaction and motivation (iv) Stress and burnout (v) Opportunity for development.

Conclusion: This study unveils the educators' experiences and perceptions in conducting emergency remote teaching. Educators from all over the world faced various challenges to make sure that learning and teaching process happened within the pandemic.

Keywords: Education, Experience, Covid-19, Emergency Remote Teaching.

Effect of Game Based Learning via UniteAR Towards Students' Perception in Learning Geography

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Abstract

Introduction: The development of education has changed with current technological developments and these developments have brought many innovations in teaching and learning methods. There are many game-based technologies introduced in the market, but not all games are suitable for student learning. This is because most of the existing game features are less effective for education, so it is important to choose a game-based application on appropriate criteria for education. Therefore, this study was conducted to examine the students' perception towards the integration of game-based learning applications embedded with augmented reality technology via UniteAR.

Methods: The developed learning materials were known as Kit Pengembara and the questionnaire was used to measure the students' perceptions towards the goal, interaction and feedback features of the application. These three criteria were listed by Alaswad & Nadolny (2015). A total of 21 students were involved in the learning process using the Kit Pengembara.

Results: Results of the study also show that students give a positive perception on Kit Pengembara after using it in the learning process.

Conclusion: This study is expected to provide ideas and help teachers to design game-based learning materials that integrate with Augmented Reality technology in teaching and learning activities.

Keywords: Game based learning, Geography, UniteAR, Perception

Exploring Problem Representation Using the Think Aloud Protocol: A Research Guideline

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Abstract

Introduction: Previous studies showed that developing physics students' problem representations improve their understanding of the content of physics. To develop the problem representation ability, we need to understand the thinking process that took place while solving problems.

Methods: To collect the data of the thinking process, Think Aloud Protocol (TAP) and semi-structured interviews were used. The data was collected using video recording and field notes, and later, transcribed and analysed using the constant comparative method.

Results: The finding shows that students have their own problems solving patterns which include the format and function of each representation they have made during the problem-solving process, which are, sketches, numerical values, formula, symbols, and text. These patterns indicated that the students had unique ways of representing physics problems for them to solve systematically through multiple representations used.

Conclusion: TAP is an efficient way of exploring and understanding the thinking process of the representations created by secondary school students. Consequently, in physics, the effect of being able to interpret and use various representations and to transform multiple representations is highly valued as a tool to facilitate problem-solving.

Keywords: Think Aloud Protocol (TAP), Thinking Process, Problem Solving, Verbal Data, Cognitive Process

Attitude Change in Learning Physics Using PhET

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Abstract

Introduction: Science is one of the components that contribute to the Industrial Revolution 4.0's achievement, yet students' attitude towards learning science especially in physics remains low. This study is about students' attitudes towards physics learning using PhET Interactive Simulation.

Methods: This quantitative study employed the Survey Research Design by administering the Attitude Towards Physics Lesson Scale with a group of 40 Form 4 students from central Selangor. By applying descriptive statistics, the data from the attitude domain are presented and summarised.

Results: The findings have shown that there is a positive change in students' attitude towards learning physics after undergoing the simulation with an overall mean of 4.43 (between slightly agree and agree). More than 60% of them liked physics theory lessons, included laboratory work, recognised the importance of physics, and practiced a positive behaviour tendency to learn physics after the treatment.

Conclusion: The PhET Interactive Simulation can be one of the possible alternative methods applied in the physics classroom to enhance the learning experiences.

Keywords: Physics Learning, Attitude Change, PhET Interactive Simulation

Analysis Of Facebook Comments to Examine Society Opinion on Herbal Medicine for Covid-19 Treatment

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Abstract

Introduction: Posts about treatment of COVID-19 using herbal medicines have gone viral on social media platforms. Facebook pages such as the Public Health Malaysia (PHM) Facebook have been publicly responding to viral posts related to health issues in Malaysia.

Methods: A post in the PHM Facebook (Date: 26 March 2020) on the use of neem leaves for COVID-19 treatment as fake news was selected. Content analysis of the netizen's comments under the post was carried out to examine society's opinion on herbal medicine as COVID-19 treatment.

Results: The finding reveals opinions such as concern over toxicity and efficacy of herbal medicine, concur to try herbal medicine for COVID-19 treatment and request of further studies on herbal medicine.

Conclusion: From the information obtained, further research will be dedicated to educate and empower the society on the efficacy and toxicity of herbal medicine for COVID-19.

Keywords: Facebook, Comment, User-Generated, Information Diffusion, Herbal Medicine

Epidemiological Study of The Influence of Socio-Demographic Factors on The Occurrence of Down Syndrome in Malaysia

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Abstract

Introduction: Down Syndrome (DS) is a known chromosomal abnormality resulting in congenital malformation and mental retardation. Maternal age is a significant risk factor for DS in Malaysia. Effects of some selected socio-demographic factors were studied in this case-control study of 308 Malaysians.

Methods: Statistical study was carried out using Logistic regression analysis.

Results: This logistic regression of the case-control study of DS revealed that parents who live in rural areas have a higher risk of having a DS child. Parents with higher education were less at risk of having a DS child than less-educated parents, while Indian and Chinese parents have a lesser risk of having DS children than Malay parents.

Conclusion: There was no significant association between parental smoking habit, prenatal scan, and risk of having babies with DS in Malaysia.

Keywords: Socio-Demographic, Epidemiology, Down Syndrome, Logistic Regression Analysis

Bridging Culture and Science Education: Implications for Research and Practice

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Abstract

Introduction: Two decades ago, many studies claimed the importance of integrating culture in science education, grasping everyone's experience and background. The growing body of literature defines culture differently but agrees that culture should be prominent as it makes science learning meaningful and advances social justice.

Methods: In this research synthesis, we sought current inquiries that connect cultures with science education reform discourse to identify and understand the integration phenomena' current trends from 2015 until 2021. Combined five keywords of Funds of Knowledge, Culturally Responsive Teaching, Culturally Relevant Pedagogy, ethnoscience and local-based teaching-learning in Scopus, Web of Science, Science Direct, and Wiley engine database, finally only 21 articles were selected that met our specification criteria.

Results: The analysis shows that scholars tend to implement culture-based research towards marginalized students and teachers, but less about parents' perspectives on science, especially in rural areas. These studies agree that students' performance improves when culture is integrated into science learning. However, some questions and research gaps arising from studies are discussed. We hope this research synthesis could help reshape the public discourse about social justice issues in education, especially in science education.

Conclusion: We hope this research synthesis could help reshape the public discourse about social justice issues in education, especially in science education.

Keywords: Funds Of Knowledge, Culturally Responsive Teaching, Culturally Relevant Pedagogy, Ethnoscience, Local-Based Teaching And Learning

Portraying the Impact of Social Media to Cosmetics Industry from the Perspective of Social Media Influencers

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Abstract

Introduction: There are growing numbers of uprising cosmetic companies building their business empire through social media. Social media could really "influence" our choices. Social media influencers play a significant role in portraying the image and carrying the 'branding' of businesses and their products. However, there is a limited understanding of the utilisation of social media influencers by enterprises' entrepreneurs in Malaysia. This research examines the requirements of makeup artists to become social media influencers and to study how social media influencers utilise the social media platform as marketing tools to reach targeted audiences. Finally, to investigate the effectiveness of the traits of social media influencers to the audiences.

Methods: Qualitative research method and interview are applied in this study.

Results: High number of followers, actively using social media, and conducting self-branding on social media determine a cosmetic industry worker to become a social media influencer. Besides, relentless participation in social media activity, standing as an opinion leader, willingness to share beauty information and familiarity with social media marketing effectively reach the targeted audiences.

Conclusion: Social media sites have significantly impacted business on social media. Understanding emotional branding through story-telling and sincerity is essential to succeed as social media influencers.

Keywords: Social Media Influencers, Cosmetics Industry

Assessment Of Knowledge Creation Enablers In The Malaysian Civil Service

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Abstract

Introduction: Knowledge creation as part of the knowledge management domain has received significant attention in the past few decades due to its contribution to the effectiveness of organisation management. Both private and public sector organisations have invested considerable resources in knowledge creation initiatives to achieve competitive advantage as part of their return on investment.

Methods: Using Nonaka's SECI knowledge creation model, this study explores indexed journals as well as published theses, conference proceedings, and government reports vis-à-vis knowledge management processes, public sector performance and Malaysian public sector. The papers are combined and categorised to enlighten future studies in the field.

Results: The literature identifies the five most significant enablers supporting knowledge creation, namely technology, leadership, people, organisation structure and organisational culture.

Conclusion: By identifying and supporting knowledge creation, dissemination, and application at the organisational level, we can reap its benefits. More needs to be done in understanding the contribution of knowledge creation in improving both the effectiveness and efficiency of public service delivery to realise the vision and mission to serve the rakyat, such as Shared Prosperity Vision 2030 and the 12th Malaysia Plan.

Keywords: Knowledge Management, Knowledge Creation, Organisational Performance, Malaysian Public Sector, Competitive Advantage

The Importance of Physical Activity Participation among Persons with Disabilities

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Abstract

Introduction: This article deliberates the importance of participation in physical activity among persons with disabilities.

Methods: 100 persons with disabilities (men = 59, women = 41) aged between 10 to 40 years old participated in the study where the Benefits of Exercise towards Persons with Disabilities and Social Support to Exercise for Persons with Disabilities questionnaires developed by Rauzon (2002) were used to investigate the importance of physical activity for persons with disabilities.

Results: Both men and women agreed that exercise could improve blood pressure and cholesterol levels, help prevent diseases, give more energy, relieve tension and gain a positive outlook on life. Findings show no significant relationship between family support and physical activity participation ($p>0.05$). For social support, there is a significant relationship between friend support and physical activity participation ($p<0.05$), such as exercising with them, complaining about the time they spend for exercise, fun exercise, rewards and helping to plan activities around their exercise.

Conclusion: Physical activity participation for persons with disabilities offers many benefits. This knowledge should be shared with the able-bodied persons as it will help them become better caregivers in encouraging and supporting those disabled in physical activities.

Keywords: Disabilities, Physical Activity, Participation, Exercise, Social Support

Reliability and Construct Validity Evidence of Standing Long Jump (SLJ) among Students with Visual Impairment

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Abstract

Introduction: This study aims to determine the objectivity, reliability, construct validity evidence on leg power among visually impaired students. Standing Long Jump (SLJ) is a reliable field test to assess leg power.

Methods: Thirty-five (35) male subjects and two (2) raters participated in this study on reliability and validity. The ICC, test-retest, and Pearson Correlation were used to determine the objectivity and reliability of the SLJ. A dependent t-test was used to determine the construct validity evidence.

Results: Findings showed that ICC was high among males (.97). The consistency of the instrument among subjects (r = .81). Paired sample t-test showed the t-value (M= 1.76, SD= 0.293) (t (34) = 13.32, p = .000 was significant. Findings showed a significant difference in leg power between the final (M= 1.76, SD = 0.293) and the initial test mean (M=1.68, SD= 0.298). This finding showed that the SLJ has the construct validity evidence in this population.

Conclusion: Valid and reliable testing instruments are needed to provide helpful feedback and interpretation to the trainers on current population evaluation.

Keywords*:* Jumping Performance, Test-Retest, Leg Power, Physical Fitness, Testing

Industry 4.0 -A Driver for Triple Bottom Line Sustainable Development

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Abstract

Introduction: The study attempts to establish a framework by defining the determinants of Industry 4.0, which will support the government and policymakers in implementing Industry 4.0 to attain economic, environmental, and social (triple bottom line) development in Malaysia. The paper identifies the core determinants that will influence the accomplishment of Industry 4.0 technologies among the MSC status companies in Malaysia.

Methods: The paper will conduct a survey using a structured questionnaire to collect data from the managers. Simple random sampling will be used to collect responses, and Structural Equation Modeling (SEM) will be used for data analysis.

Results: The study will test whether the determinants of Industry 4.0 are positively associated with the Industry 4.0 implementation and whether Industry 4.0 implementation mediates the relationship between the determinants and triple bottom line sustainable development. This study will also test the direct relationship between Industry 4.0 implementation and triple bottom line sustainable development.

Conclusion: This study will integrate the "Technology, Organization and Environment (TOE)" theory, the "Diffusion of Innovation (DOI)" model, and the "Dynamic Capability (DC)" view as the theoretical basis for understanding the relationships. Furthermore, inspired by the current research gaps, this study will measure the mediating impact of the implementation of Industry 4.0 between the determinants of Industry 4.0 and sustainability, which will be another avenue of the contribution of this study.

Keywords: Industry 4.0, Determinants of Industry 4.0, Triple Bottom Line Sustainability

Community and Climate Change Among the Bagang Community in Pitas, Sabah

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Abstract

Introduction: Climate change is an extraordinary phenomenon that can occur in the natural environment, which influences the condition of weather, temperature and humidity that will cause extreme weather, drought, floods, tsunamis and the rising of temperatures. This phenomenon occurs due to the disruption of the natural process of the earth's system. This article aims to identify the coastal community's perception of climate change in Mempakad Laut, Pitas. This research (GLK0023) is funded by Coral Triangle Initiative (CTI).

Methods: The information was collected through in-depth interviews with the Bagang community, and then the information was analyzed descriptively.

Results: The study found that although the community did not know the meaning of the terms climate change, they were aware of the phenomenon in their area, including floods, tornadoes, droughts, large waves and unpredictable wet season changes as well as drought. They consider the incident stressful, threatening security and disrupting their fishing activities, so-called the Bagang. However, they have strategies to adapt to the phenomenon, including being prepared for disaster, modifying the house's structure, and trying to understand the nature of environmental change in predicting the disaster.

Conclusion: These results will provide some information on how humans adapt to their changing environment and can guide other coastal communities in dealing with climate change phenomena.

Keywords: Community, Climate Change, Perception, Changing Environment

The Effectiveness of Nanoscience Activity in Promoting Positive Attitude Towards Chemistry Lessons

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Abstract

Introduction: Attitude towards learning chemistry constructs students' academic achievement and reflects students' interest and motivation in learning chemistry. Effective chemistry teaching methods become essential for educators when designing the lessons. Nanoscience is an alternative teaching approach that has been widely discussed when delivering chemistry concepts. Integration of nanoscience in chemistry teaching has shown a positive impact on learning chemistry. Hence, this research aims to investigate the effectiveness of nanoscience as an alternative teaching approach in chemistry lessons.

Methods: A Quasi-experimental study involving 153 Form Four students from Kedah were conducted. Students from the experimental group undergo a series of nanoscience hands-on activities. Attitude Towards Chemistry Lessons Scale was administered to determine the effectiveness of nanoscience activity in promoting a positive attitude towards chemistry lessons.

Results: MANCOVA results show a significant difference in students' attitude towards chemistry lessons (Wilk's Lambda = 0.29, $F(4, 157) = 94.76$, $p < 0.05$), which is more favourable towards the experimental group~~s~~. Interview data further support the quantitative finding.

Conclusion: Research suggested that nanoscience activities had the feasibility to enhance students' attitudes towards chemistry lessons. Besides, nanoscience activity can be integrated into the teaching and learning of chemistry to promote a more convenient, exciting and relevant learning experience.

Keywords: Nanoscience, Chemistry, Secondary School, Attitude towards Chemistry Lessons

Effects Of Synchronous and Asynchronous Music on Running Performance, Mood and Heart Rate

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Abstract

Introduction: In recent years, there has been an increasing number of studies examining the effect of synchronous music and asynchronous music on sports performance. The study examines the ergogenic effects of synchronous and asynchronous music on runner performance, mood, and heart rate.

Methods: Fifteen active undergraduate male students (Age = 22.4 ± .91 years old) participated in this study. All participants completed three research conditions: a) Synchronous music, b) Asynchronous music, and c) Control (no music) while running in the control shuttle run protocol, with one week of rest in-between trials. The music was standardised at 75dB, which is a safe hearing level.

Results: Two-way repeated measures ANOVA found a significant difference in three conditions on running performance, F = 6.27, df = 2, p = .006, with synchronous music (8.28±1.47), asynchronous music (7.53 ±1.87) and no music (7.59±1.31), but no significant difference was found in heart rate. In mood, significantly higher vigour and lower fatigue were observed in synchronous music compared to other research conditions with p = 0.042; p = 0.028, respectively.

Conclusion: Music has a beneficial effect on running performance and mood but less impact on the heart rate.

Keywords: Synchronous Music, Asynchronous Music, Running, Mood, Heart Rate.

Effects of Service Quality, Product Quality and Customer Satisfaction on Customer Loyalty in Retail Industry

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Abstract

Introduction: Customer loyalty should be the very reason that businesses exist. Loyal customers are more committed in terms of purchasing the services and products and will be more likely to repeat their purchase. Despite knowing this, many businesses are still unable to successfully retain their customers. Therefore, this study aimed at investigating the relationship between product quality and service quality on customer satisfaction and customer loyalty in the context of the Malaysian retail industry. The conceptual foundation of this study is based on the European Performance Satisfaction Index model.

Methods: Data were gathered randomly from a total of 329 Malaysian retail customers using an online survey. Later, the data were analysed using SPSS and AMOS software.

Results: The result demonstrated that service quality, product quality, as well as customer satisfaction, are three distinct constructs that are integrated for assessing customer loyalty whereby, service and product quality were found to carry a relatively stronger impact on the variable customer loyalty.

Conclusion: Therefore, all frontline staff should display the best of their behaviour when dealing with customers and deliver flawless service at all service counters. In the future efforts should be directed for determining the influence of customer relationship, customer expectations and commitment on customer loyalty.

Keywords: Customer Retention, Relationship Marketing, Consumer Sentiment, Brand Loyalty, Brand Preference

Student Emotional Achievement in Physical Education at Primary Schools: Teaching and Learning Approach

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Abstract

Introduction: Emotional achievement is a new field of research that combines the emotions experienced by students. This study aims to determine students' emotional achievement based on a control value approach through two different teaching environments.

Methods: Different teaching approaches (teacher-oriented) and (student-centred) are used by two different students to test their achievement emotions. Students were required to complete the Achievement Emotion Questionnaire (AEQ-PE). Internal consistency of the questionnaire was assessed using Cronbach alpha. Two components of the AEQ-PE (i.e., enjoyment and pride) were selected for the hypothesis testing. The relationship between pride and enjoyment was assessed by using Pearson correlation and independent t-test.

Results: The AEQ-PE questionnaire showed acceptable internal consistency reliability with Cronbach alpha value ranging from .76 to .92. The correlation result indicated a significant positive relationship between enjoyment and pride ($p < .001$). Independent t-test result revealed significant mean differences between both groups on enjoyment ($p = .004$) and pride ($p = .021$). The student-centred group showed a higher level of enjoyment (3.47 vs 2.86) and pride (3.38 vs 2.88) than the teacher-oriented group.

Conclusion: The findings help researchers understand the role of emotions in learning and subject motivation towards Physical Education.

Keywords: Achievement emotions, teaching approaches, self-determination, primary school.

Determinants of Environmental Management System (EMS) and Its Impact on Organisational Performance – A scenario of Malaysian Manufacturing Industries

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Abstract

Introduction: Malaysia has been undergoing various threats and environmental issues due to rapid industrialisation over the past few decades. Corrective and preventive actions need to be taken to overcome pertinent issues and promote sustainability. One such solution is for the industries to adopt and implement Environmental Management System.

Methods: This research employs the positivism research paradigm. This study will investigate the linkages amongst determinants of the Environmental Management System (EMS) and organisational performance based on theoretical aspects. Quantitative survey methods will collect data drawn from Malaysian Manufacturing industries, which is certified under ISO14000 EMS. Collected data will be analysed using Structural Equation Modelling (SEM).

Results: This study aims to further enhance the literature review on EMS growth. A holistic model will be tested about its adoption in the Malaysian Manufacturing Industry based on sustainable development initiatives of the 12th Malaysia Plan.

Conclusion: This study aims to highlight the research gap found on EMS growth in the Malaysian Manufacturing Industry to warrant a detailed empirical test and establish a model that industries can adopt with ISO14000 certification.

Keywords: EMS, Organisational performance, Malaysian manufacturing industry, ISO14000

Online Learning During Covid-19 Pandemic: A Practice Review

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Abstract

Introduction: This case study research on synchronous online learning (SOL) is triggered by the COVID-19 pandemic that had caused the order of movement control. The sudden transition from physical learning to online learning SOL has created confusion and challenges for students. SOL in a Movement Control Order (MCO) environment may not be the same quality as the well-designed online learning.

Methods: Practice reviews were conducted in Malaysia's public and private universities. Thematic analysis was carried out using new NVivo computer software to identify emerging themes and patterns through a rigorous method.

Results: Students were less engaged, had lower learning motivation and had weaker self-discipline on SOL in the MCO environment. Engagement is found to be essential to provide solutions.

Conclusion: The need to investigate students' learning behaviours based on self-directed learning theory (self-management, self-monitoring, motivation dimensions), engagement theory and interest theory.

Keywords: Synchronous online learning, Self-directed learning, Movement Control Order, Higher Learning
Institution.

Additive Programming for Modelling Malaysian Primary School Diet Problem: Autism Children

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Abstract

Introduction: Children diagnosed with autism or autism spectrum disorder (ASD) often deal with many kinds of food-related challenges. These can include many things, like allergies or maybe the child has a hard time swallowing. The children may be picky eaters or hate certain foods and refuse to eat any of them. There is no evidence that special diets help children with ASD. Autism is a complex brain disorder. While it may seem that cutting out certain foods could relieve an autistic child's symptoms, it might cause more harm.

Methods: In Malaysia, mathematical modelling in creating a healthy menu for autistic children is limited. Moreover, manual planning a menu is complicated, inefficient, and inaccurate, lacks variety, no consumer preferences and flexibility, no local recipes, insufficient number of nutrient and food groups, does not meet the nutrient's boundaries, and is time-consuming.

Results: This study proposed a new mathematical model for solving menu planning issues using the optimisation method that increases the necessary nutrient intake and determines the balanced nutrient required by the autism children.

Conclusion: Minimising the budget will also help to overcome all the problems mentioned. Two optimization methods will be used, namely Linear Programming and Integer Programming.

Keywords: Additive Programming, Integer Programming, Linear Programming, Menu Scheduling, Optimisation

A Conceptual Perspective into the Application of Digital Video on Mobile in Arabic Learning

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Abstract

Introduction: The use of technology has become a key tool to assist and supplement the education sector at the Covid-19 pandemic. The current Covid-19 crisis has struck most countries worldwide at the speed of light, including Malaysia.

Methods: The researchers analyse the previous articles on video-based learning perspectives in the education system and implement them in Arabic learning. The articles considered in this research are limited to seven years of published research based on the author's search in Scopus and the Google scholar database. Each article was reviewed by extracting the data from the abstract and literature, including author, year, journal database, and the effectiveness of video-based learning.

Results: Findings found that video-based learning brings benefits and advantages to the education system. It proved that the learning becomes more exciting and meaningful. Students are satisfied by using the video and feel also involved in the atmosphere in the video.

Conclusion: The review found that digital video has proved its significance to be implemented in Arabic learning. The implementation of digital video in Arabic education can be taught student's interest in learning Arabic. It can help students save time, become more efficient, and improve their mastery of Arabic learning.

Keywords: Video-Based Learning, Digital Video, Arabic Learning, Mobile Application

Nutritious Planning and Scheduling for Breast Cancer Patient With Optimisation Methods

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Abstract

Introduction: Breast cancer is cancer that developed from the breast tissue due to the erratic growth of cells. According to the 2017 Malaysian statistics, one out of 20 individuals have breast cancer in their life.

Methods: To help the breast cancer patient in choosing the best food with their meal the whole day, we aimed to find a way on how to use different mathematical programming methods to prepare a proper and healthy planning diet menu that fulfils all the nutrients constraints with the minimum cost for the breast cancer patient. Based on the literature review, previous research for the menu planning and approaches used for the optimisation have been reviewed in detail. There were two mathematical programming methods applied: i) integer programming and ii) binary integer programming methods in formal study and linear integer programming method in the pilot study.

Results: There are two sets of data where 100 food items for small data models and 426 food items for big data models were used.

Conclusion: At the end of this research, we should be able to provide a minimum cost on a one-day menu and weekly menu for breast cancer patients with sufficient nutritional value.

Keywords: Breast cancer, Binary programming, Nutritious planning, Menu scheduling, Optimisation

Technology Acceptance Model for Social Media Use to Communicate Science

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Abstract

Introduction: This paper proposes an extended Technology Acceptance Model (TAM) to highlight motivators for social media adoption by scientists. With fake news being pervasive on social media, scientists need the right motivators (predictors) to use suitable media to promote genuine science with maximum reach.

Methods: This study reviewed TAM literature from ELSEVIER, SAGE and SCOPUS, which investigates social media use for technical communication, e-learning, and amusement purposes. Scientists would use social media as a tool to promote, educate and entertain the public about science. Hence, the proposed model adapted common predictors identified from journal articles about promotional, educational and entertainment activities using social media as inclusion criteria.

Results: New predictors introduced to Davis et al. (1989) TAM include self-efficacy and personal motivation as user-centric motivators and perceived risk as barrier influencing behavioural intention (BI). Subjective norm and enabling conditions are possible external predictors which influence perceived ease of use (PEU), perceived usefulness (PU), and attitude towards use (ATU). Age, gender, experience and academic seniority are predictors of interest, suggestive from Venkatesh et al. (2003) Unified Theory of Acceptance and Use of Technology.

Conclusion: Future studies can test this extended TAM's explanatory power to predict social media adoption by
scientists for science communication.

Keywords: Science communication, Social media, Computer-mediated communication, Fake news, Scientists in social media

Nutritious Menu System for Malaysian Religious (Tahfiz) Primary School Children: Improving Good Memories

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Abstract

Introduction: Religious (Tahfiz) school student aged 7-12 need to eat nutritious meals which contains proper calories and nutrients for appropriate development with a specific end goal to repair and upkeep the body tissues. It averts undesired diseases and contamination.

Methods: Serving healthier food is a noteworthy stride towards accomplishing that goal. However, arranging a nutritious and balanced menu manually is convoluted and tedious. This study aims to develop a mathematical model with an optimisation technique for menu scheduling that fulfils the whole supplement prerequisite for Tahfiz school student, reduce processing time, minimise the budget and serve assortment type of food each day.

Results: It additionally gives the flexibility for the cook to choose any food to be considered in the early process and change any favoured menu even after the ideal arrangement and optimal solution have been obtained. This is called sensitivity analysis. A recalculation procedure will be performed considering the ideal arrangement and seven days menu. The data was gathered from the Malaysian Ministry and school authorities. Menu arranging is a known optimisation problem.

Conclusion: Therefore, Binary Programming alongside optimisation technique and "Sufahani-Ismail Algorithm" utilised to take care of this issue while improving good memories for the children.

Keywords: Tahfiz Primary School, Good Memory, Binary Programming, Menu Scheduling, Optimisation

Mutual Information Method in Combination Model Selection for Forecasting Tourist Arrival

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Abstract

Introduction: Recently, combining forecasts of individual models can improve forecast performance. In practice, selecting individual forecasts for model combination based on forecast accuracy evaluation shall extract all the significant information for the actual output forecast values. Hence, it is advocated to select the optimal individual model from theoretical and experimental aspects that can perhaps offer more information to a better combination forecast model prediction.

Methods: This study proposed the mutual information algorithm scaling proposed (MI-S-P) approach to select the optimal individual model as an input for a combination forecast model. Seven individual models and three linear combination methods were applied to evaluate the MI-S-P approach effectivity. The short-term 12 months ahead forecast includes the monthly data on the top five international tourists' arrival entering Malaysia from the year 2000 to 2013.

Results: The result is divided into two main parts, namely in-sample data (fitted model) and out-sample data (forecast model). The analyses show that the in-sample and out-sample values using the MI-S-P model have successfully improved forecast accuracy on average by 2% compared to using all of the individual forecast combination models.

Conclusion: MI-S-P approach can be an alternative way in identifying the right optimal individual model for modelling a combination forecast model.

Keywords: Combination Model, Information Theory, Mutual Information, Tourism Forecasting

Computational Survey and Coefficient on Understanding the Homebuyers' Preference and Housing Affordability

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Abstract

Introduction: The housing affordability issue has seriously occurred in Kuala Lumpur recently as the property price increased significantly from time to time.

Methods: The research was focus on the B40 and M40 non-Bumiputera homebuyers where the interested respondents have not obtained any benefit from the government. To understand the preference of the homebuyers, the survey was conducted to gather information about the B40 and M40 on buying a house. The Cronbach's alpha was useful reliability to determine the relationship between items in item-scale. Cronbach's alpha is an internal reliability coefficient that measures between two different concept questionnaires.

Results: The sample size of the pilot study was 59 and the Cronbach's alpha for both questionnaires was greater than 0.8. Moreover, the value of Cronbach's alpha for the second questionnaire was greater than the first questionnaire.

Conclusion: The second questionnaire was selected for the formal study.

Keywords: Computational survey, Housing affordability, Analytical hierarchical structure, Property price

Malaysian Secondary Boarding School Menu Planning System

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Abstract

Introduction: Boarding school student needs to eat well-balanced nutritious food which includes proper calories,
vitality, and supplements for legitimate development, keeping in mind the end goal is to repair and support the body tissues and averting undesired disease.

Methods: Serving a healthier menu is a noteworthy stride towards accomplishing that goal. This study intends to build up a scientific mathematical model and decision support system for menu planning that improves and meets the vital supplement consumption for boarding school students aged 13-18 while saving the financial cost. It gives the flexibility for the cook to change any favoured menu even after the ideal arrangement has been produced. A recalculation procedure was performed because of the ideal arrangement. The data were gathered from the Ministry of Education and boarding schools' authorities.

Results: A well-balanced menu scheduling is produced which meets all the constraints. The model was fathomed by utilising Binary Programming and the "Sufahani-Ismail Algorithm" and a system was developed to comply with the problem.

Conclusion: The Malaysian Secondary Boarding School Menu Planning System is the first system in Malaysia and the world. It can also be used for other problems such as military, hospitals, and others.

Keywords: Binary programming, Menu scheduling, Nutritious meals, Optimisation

Maximise the Utilisation of Operation Theatre in Johor's Hospital Using Optimisation Method

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Abstract

Introduction: Operation theatre is one of the largest revenues centres of hospitals but also required high costs, therefore the schedule should be effective and maximise the usage to improve their performance and meet patients' satisfaction level.

Methods: This study aims to construct a one-month schedule of an operation theatre at the strategic level by using the Integer Linear Programming method, maximise the usage of operation theatres and compare the existing schedule with the constructed schedule to validate the effectiveness of the proposed model. The coding is constructed in AMPL software and the schedule is solved weekly since the demand of operating hours of each department is updated each week by adding the unfulfilled demand in the previous week to the original demand of the same department in the current week.

Results: The one-month constructed schedule has allocated a total of 54 rooms and it has achieved about 96.52% of the overall allocated operating hours in the existing schedule when compared to the existing schedule. **Conclusion:** The usage of operation theatre is maximised, and the effectiveness of the proposed model and results are validated, however, this study can further improve by using various optimisation methods as well as take more variables into account.

Keywords: Integer Programming, Linear Programming, Operation Theatre Scheduling, Optimisation

Developing a Digital Workplace Framework to Increase Research Productivity at Universities: The Role of Mobile Messaging Apps During the Covid-19 Pandemic

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Abstract

Introduction: Safety concerns arising out of the COVID-19 pandemic have resulted in human mobility restriction and the subsequent rollout of work from home protocol. Along with teaching and learning activities, research at universities has been inevitably interrupted. Taking advantage of technological advancement and convergence, while being physically distanced, the use of mobile messaging apps by staff acts in turn to maintain work continuity. Nonetheless, there is a paucity of studies on the role of messaging apps in research activities.

Methods: To bridge the knowledge gap, empirical research focusing on research productivity was critically reviewed and analysed. Given the relevance of messaging apps to various stakeholders in the digital era, this study integrates and synthesises the findings of the literature on information and communication systems.

Results: This study proposes a conceptual framework grounded on conventional staff productivity models, encompassing personal, organisational and environmental factors. The use of mobile messaging apps is recognised as the moderator for its crucial role in facilitating better communication and effective collaboration in research.

Conclusion: The integrated view of this study can help design a digital workplace framework for research productivity.

Keywords: Mobile Messaging Apps, Research Productivity, Work From Home, Universities

An Interactive Virtual Reality Tourism For UMS Visitor Using Gamification

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Abstract

Introduction: As technological advancement brings new ways for tourism using virtual reality (VR) technology, Universiti Malaysia Sabah (UMS) has introduced its EcoCampus Visitor Information Centre (EVIC) in August 2016. EVIC is a one-stop centre that provides information and promotes tourism packages in UMS. Currently, the information provided is manually and uses non-interactive media that causes loss of visitors' attraction. This study intended to develop an interactive VR Tourism mobile application using gamification to attract more visitors to explore the places of interest around UMS.

Methods: The Waterfall methodology is used for developing this application. In this study, the Hexad model is used to identify suitable gamification elements. It suggests a list of suitable gamification elements based on the motivation of a particular type of user.

Results: The gamification elements implemented in the project are rewards and points. Database design, gamification, and User Interface are designed and created. Five modules have been completed. Developed applications are in a good category.

Conclusion: From the results of the User Experience Questionnaire, the developed application is attractive, easy to use or understand, which encourages users to use it further, indicating that the developed application can be used to solve the problem statement stated.

Keywords: Tourism, Games, User experience, Mobile application

Instructors' Self-Efficacy towards the integration of Information and Communication Technology in Teaching in Nigerian Defence Academy

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Abstract

Introduction: Information and communication technology is an important device for educational transformation in 21st century. ICT play a significant role in allowing students to learn and develop their knowledge online, which many academic institutions have incorporated. The integration of ICT in teaching and learning in some parts of Nigeria academic institutions has not been practised by instructors due to poor electricity power supply, lack of access to computers and internet connectivity which resulted to instructor's low level of ICT self-efficacy as well as motivation towards its integration in teaching. Self-efficacy level influences instructor's choice on how or when to teach students using ICT. The integration of ICT in teaching have not been previously analysed in NDA as at the time of this report. In attempt to fill the gap, this study examined instructors' level of self-efficacy towards the integration of ICT in the Nigerian Defence Academy.

Methods: This study adopted descriptive research of the survey type of non-experimental quantitative research. This investigation was conducted using a questionnaire to sample 154 instructors. Cronbach Alpha formular was used to determine its reliability coefficient which yielded 0.71. Mean scores were used to answer the research questions.

Results: The findings revealed that there was a high level of self-efficacy among instructors in computer related with a grand mean score of 3.2 using a benchmark of 2.5.

Conclusion: The article suggests approaches that can help academic institutions create an effective ICT integration in teaching and learning. Knowledge of ICT should be considered as a prerequisite for recruitment.

Keywords: ICT, Self-efficacy

Analysis of ULF Emission with Solar Wind for Earthquake Precursor

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Abstract

Introduction: The study of electromagnetic waves (EM) in Ultra Frequency Frequency (ULF) ranges is a promising tool to investigate the seismomagnetic effect for earthquake precursors.

Methods: This paper analysed the reliable ULF frequency ranges for moderate and strong earthquake prediction (Magnitude= 5.0-6.9) using a ground magnetometer installed at Cebu (10.36^{o}N, 123.91^{o}E) Philippine. This research also determines the emission of magnetic pulsation, Pc4 and Pc5, with solar wind changes and geomagnetic storms before earthquake events at low latitude regions.

Results: It was found the most affected ULF is arising at frequency range (1.7-6.7 mHz) as Pc5 compared to Pc4 (6.7-22 mHz) for potential earthquake precursory. The result also indicates solar wind changes and geomagnetic storm responses to the emission of ULF magnetic pulsation (Pc4, Pc5) before an earthquake event.

Conclusion: From this study, it is concluded the magnetic pulsation has probability short-term earthquake signature manifestation.

Keywords: ULF magnetic pulsation, solar wind, geomagnetic storm, earthquake precursor

Synthesis and Characterisation of TiO_2/g-C_3N_4 as Photocatalyst for Photodegradation of Dyes, Phenol And Caffeine

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Abstract

Introduction: Water contamination occurs when pollutants, toxins, and other hazardous products are released into bodies of water such as lakes, rivers, and the ocean, either knowingly or unintentionally, lowering the water quality for other users. Photocatalysis using semiconductor attract many researchers interest because it can decompose pollutant and cause hydrogen evolution by the generation of •OH radicals and other oxidative species.

Methods: The calcination and hydrolysis method were applied for the fabrication of TiO_2/g-C_3N_4. The samples then being characterised by using FTIR, XRD, SEM, BET and TGA. The adsorption and photodegradation efficiency for methylene blue, phenol and caffeine were calculated and recorded.

Results: The TiO_2/g-C_3N_4 shows better photocatalytic activity than g-C3N4 and TiO_2 due to heterojunction formation. For removal of methylene blue and caffeine, both showed promising results as both got almost 100 % within 240 min under UV light irradiation and phenol got 74.66 % after 300 min under UV light irradiation. The mechanism for photodegradation was discussed.

Conclusion: This study demonstrates the effects of TiO_2 on TiO_2/g-C_3N_4 and the application for photodegradation of dyes, organic compounds and drugs which benefit for environmental remediation purposes

Keywords: Nanocomposites, g-C_3N_4, TiO_2, Photocatalytic degradation, Remediation

Study On Photocatalytic Efficiency ff Hybrid Titanium Dioxide Nanowires/Reduced Graphene Oxide (Tio_2nws/Rgo) For Degradation of Methyl Orange Dye

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Abstract

Introduction: Wastewater pollution is the biggest issue facing many countries due to the dye loss from industries and causes severe health and environmental problems. Therefore, hybrid TiO_2NWs/RGO has been studied to increase photocatalytic efficiency on dye degradation.

Methods: TiO_2NWs/RGO was synthesised by the fabrication method. Characterisations on samples have been carried out by using FTIR, XRD, SEM and BET. A UV spectrophotometer is then used to determine the concentration of dye.

Results: FTIR shows the presence of a functional group of TiO_2NWs/RGO. XRD and SEM confirm the presence of agglomerated TiO_2NWs and a layered structure of RGO. The hybrid also has a large surface area. Almost 100% methyl orange dye degraded by TiO_2NWs/RGO.

Conclusion: TiO_2NWs/RGO shows the highest photocatalytic efficiency compared to the single TiO_2NWs and RGO

Keywords: Nanocomposites, photocatalyst, Graphene, degradation, dye

Ionic liquids-Surfactin Binary Mixture for Crude Oil Dispersion

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Abstract

Introduction: Conventionally, remediation methods such as booms and skimmers are costly and their functions limited by weather conditions. Although chemical dispersants are effective and relatively cheaper, they possess undesirable qualities, such as fouling on shorelines, contaminating drinking water and non-biodegradability. Biosurfactants, such as surfactin, are an eco-friendly alternative to chemical surfactants. Synthetic surfactants are often applied as mixtures because they perform better than the individual components. The ideal synthetic surfactants are ionic liquids with high chemical and thermal stability, non-volatility and high solvation capacities.

Methods: Surfactin would be cultivated using *Bacillus subtilis* under favourable conditions. The purified surfactin would then be combined with ionic liquids to form an IL-surfactin binary mixture. The dispersion effectiveness against crude oil would be optimised via Response Surface Methodology. Parameters to be tested include pH, temperature and agitation.

Expected results: The dispersion effectiveness of the ILs-surfactin binary mixture will be optimised in terms of pH, temperature and agitation.

Conclusion: The IL-surfactin binary mixture would be successfully optimised with excellent performance to dispersed crude oil. This system can be employed for oil spill clean-ups and aligns with the United Nations Sustainable Development Goal "Clean Water and Sanitation" and "Life below water".

Keywords: Ionic liquids, oil spill, Binary mixture, Respond Surface Methodology

Influence of Sand Size in Mechanical and Technical Properties of Plastic Sand Bricks

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Abstract

Introduction: This study reports on an approach to the development of bricks by incorporating plastic wastes as an alternative raw material to reduce plastic waste with various sand sizes in the production of plastic sand bricks.

Methods: Four types of recyclable plastic waste were utilised in this study, such as polyethylene terephthalate (PET), high-density polyethylene (HDPE), low-density polyethylene (LDPE), and polypropylene (PP), along with five sand sizes from 0.85-5.0 mm range. The brick samples were made by incorporating melted plastic sand, poured into the pre-heated mould, and setting two plastics to sand (1:1 and 1:3) proportions. Tests such as compressive strength, water absorption, efflorescence, fungal resistance and freezing and thawing were carried out.

Results: Results indicate water absorption rate directly proportional to the sand size, while density and compressive strength of the plastic sand bricks is inversely proportional to the sand size. The bricks showed resistance towards fungal growth, and there were no changes in the weight observed after 50 cycles of freeze and thaw.

Conclusion: The ideal sand size was 0.85-1 mm with the highest compressive strength, 34.6 N/mm^{2,} which complies with ASTM standard for first-class bricks and a further increase in sand size decrease the strength due to lower surface area and adhesion force.

Keywords: Plastic waste, plastic sand bricks, sand aggregate, sand size, reuse plastic waste

The Optimisation of Chitosan Dissolution in Ionic Liquid

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Abstract

Introduction: Chitosan is formed from the deacetylation of chitin. It is only soluble in acidic conditions, but the dissolution would release a strong and unpleasant smell. Therefore, ionic liquids (ILs) had been employed as an alternative green solvent to dissolve chitosan. However, there were no studies on optimisation of chitosan dissolution in IL and ecotoxicity studies of chitosan-IL mixture reported. Thus, this research aims to study the optimum conditions of chitosan-IL dissolution using RSM and evaluate the chitosan-IL mixture's toxicity.

Methods: Optimisation studies using Response Surface Methodology (RSM) using Central Composite Design (CCD) will be carried out. Three parameters will be selected for the dissolution such as temperature, initial chitosan loading and dissolution time. The ecotoxicity of chitosan-IL will be assessed to determine the value of MIC and EC_{50} of chitosan-IL.

Results: From these optimisation studies, the optimum condition of dissolution of chitosan in IL will be known. The optimised chitosan-IL will be subjected to ecotoxicity studies to generate a toxicity profile.

Conclusion: Optimisation of chitosan dissolution in IL and evaluation of ecotoxicity of chitosan-IL enable a wide range of applications. This study also helps realise sustainable development goals such as Good Health and Well-Being and Life Below Water.

Keywords: Chitosan, Ionic Liquids, Ecotoxicity, Response Surface Methodology

Integrated Process Knowledge Management System (PKMS) based on Risk-Based Process Safety

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Abstract

Introduction: Major accidents in Chemical Process Industries (CPI) continuously occurred due to the long chain of Process Safety Management (PSM) system failure. Process Knowledge Management (PKM) element requirement from Risk-Based Process Safety (RBPS) guideline has boosted a process safety improvement in the CPI. However, lacking systematic technique for easy implementation of RBPS guidelines has delayed its efficiency in terms of time-consuming, outdated data, workforce, and delayed process knowledge application throughout the decision-making process.

Methods: The PKM framework and system were developed by applying the PDCA concept and using a web-based system. Validation of the system was conducted at a chemical plant via case studies and System Usability Scale (SUS) study involving expert group discussion.

Results: Integrated Process Knowledge Management System (PKMS) was designed to link PKM and other RBPS elements. The PKMS helps companies comply with PSM standards, capture real-time data of process knowledge, and ensure consistency and reliability in knowledge sharing within the organisation. It also supports the self-audit of process knowledge completeness, speeds up tasks' delegation, reduces human error and accelerates data distribution across the organisation.

Conclusion: Overall, the expert group agreed that an integrated PKM system would ease the major hazards management program and minimise the process of safety accidents.

Keywords: Process Knowledge Management System (PKMS), Risk-Based Process Safety (RBPS), Process Safety Management, Integrated Systems.

Preparation and Evaluation of Anionic Flocculants for Lead Ions Removal in Water

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Abstract

Introduction: The flocculation technique has been implemented in primary wastewater treatment where inorganic and organic flocculants are used. Organic polymeric flocculants are preferable due to their capability to promote flocculation at a low dosage and modified for different purposes. Anionic flocculants are polymers that have negative charges on their backbones.

Methods: Three anionic flocculant polymers (P1, P2, and P3) were prepared by polymerizing acrylamide together poly(vinyl alcohol) (PVA) and starch. Total suspended solids (TSS) and lead ions removal were calculated to evaluate the efficiency of the flocculants.

Results: P3 had the highest amount of PVA and recorded the highest TSS removal, while P1, which had the highest acrylamide, recorded the highest lead ions removal. Thus, P2 (the same ratio of acrylamide to PVA) was selected for the dosage studies because P2 produced optimum results for both TSS and lead ions removal. From the dosage studies, the higher the dosage of P2, the higher the removal of TSS and lead ions.

Conclusion: Polyacrylamide-PVA-starch anionic flocculants were prepared, and the efficiency of the flocculants was evaluated. P2 polymer was found to produce optimum results - increasing the dosage caused more TSS and led ions removal.

Keywords: Flocculation, Anionic Polymeric Flocculant, Total Suspended Solids, Lead Ions Removal, Wastewater Treatment

Cloud-Based Water Quality Monitoring System for Marine Hatchery Using IoT

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Abstract

Introduction: For marine hatcheries, water quality is essential, so that marine creatures grow in a suitable environment. Water pollution is when deadly substances such as chemicals or microorganisms contaminate water bodies. The toxic substances get dissolved in the water, which degrades the water quality and harms humans, the environment, and aquatic ecosystems. Chemical, radioactive, and industrial wastes are thrown in the ocean, which makes the water contaminated. This paper presents a real-time water quality monitoring system to help marine creatures survive in a good environment.

Methods: The method for this project is by using Rapid Application Development. The main hardware is temperature, pH, turbidity sensors, and a micro-controller Arduino Wemos D1 mini. The data is retrieved by real-time monitoring and stored in Firebase Real-time database and ThingSpeak. In this paper, a comparison between Firebase and ThingSpeak has been made.

Results: The Arduino system is the central part of this system. Three sensors, temperature, pH and turbidity, are connected to the Arduino WEMOS D1 Mini with few resistors and capacitors. All the data from the sensors are sent to the Firebase and ThingSpeak for storage. The second part is the comparison between Firebase and ThingSpeak. After the experiment, the results based on latency Firebase are faster, and that based on functionality, ThingSpeak is better. A mobile application is also developed to make it easier for the users to check the water quality from remote places.

Conclusion: The developed prototype stores the information in Firebase and ThingSpeak through a mobile application developed to serve end-users. The system was tested several times at the Universiti Malaysia Sabah Marine Hatchery to check its efficiency. The experimental results prove that the system has a great prospect and can be practically used for water quality monitoring in marine hatcheries.

Keywords: Water Quality, IoT, Firebase, ThingSpeak

Synthesis, Characterisation and Weight Loss Study of Cu(II) *N*-Methylcyclohexyl and Cu(II) *N*-Ethylcyclohexyl Dithiocarbamates Complexes: Corrosion Study

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Abstract

Introduction: The industrial sector is faced with a corrosion issue that causes material destruction. Several techniques have been developed to prevent corrosion problems, but inhibitors are more inclined to prevent this problem.

Methods: Cu(II) *N*-methyl cyclohexyl dithiocarbamate [Cu(*N*-MchDTC)$_2$] and Cu(II) *N*-ethyl cyclohexyl dithiocarbamate [Cu(*N*-EchDTC)$_2$] complexes were successfully synthesised by the direct method. The complexes have been characterised through FTIR-ATR, UV-Vis, gravimetric analysis, and molar conductivity. Subsequently, the complexes were used for a corrosion study employing weight loss quantification.

Results: From the data of the FTIR-ATR spectra, it was shown that a bidentate bonding of dithiocarbamates formed the complexes to Cu(II) ion. The UV-Vis analysis shows three primary absorption peaks: the LMCT, $\pi \rightarrow \pi^*$ and *d-d* transitions. The molar conductivity revealed that the complexes existed in a non-electrolyte role. The gravimetric analysis revealed that the percentage of Cu(II) in the Cu(N-MchDTC)$_2$ Cu(N-EchDTC)$_2$ complexes were 12.48% and 9.23%, respectively. Cu(*N*-MchDTC)$_2$ is an excellent corrosion inhibitor compared to Cu(*N*-EchDTC)$_2$ in the corrosion inhibition screening.

Conclusion: It has been shown that when the inhibitor's concentration increases, the inhibitor's efficacy also increases.

Keywords: Corrosion, Corrosion Inhibitor, Dithiocarbamate, Sulphuric Acid, Hydrochloric Acid

Mechano-antibacterial Nanostructure Mechanism on the Wings of Two Species of Tropical Cicada

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Abstract

Introduction: Microbial surface contamination of biomedical implants warrants sustainable solutions to control microorganisms' attachment. Our study shows that nature-designed nanostructures on insect wings demonstrate bactericidal effects with biomimetic functional surfaces.

Methods: Two cicadas, *Orientopsaltria sp.* and *Tacua speciosa*, were collected from Danau Girang Field Centre, Sabah. Nanostructures on cicada wings were characterised via Scanning Electron Microscope (SEM) and ATR-Fourier Transform InfraRed Spectrometry (FTIR), while hydrophobicity measurements were based on water contact angle. Bactericidal properties were studied using wings treated with bacteria cultures, and bacteria-nanopillars interactions on wings were observed through SEM.

Results: Nanostructure of *Orientopsaltria sp.* were spherically capped nanopillars, while *T. speciosa* contained nanocone-type structures. Nanostructures' height to diameter ratios were 1.03 nm and 2.26 nm, respectively. An antibacterial assay using these wings revealed that *T. speciosa* was much more effective in reducing the bacterial population than *Orientopsaltria sp.* Nanostructures of *T. speciosa* were 400% taller and 180% thicker than *Orientopsaltria sp*. The interpillar spacing of nanostructures in *T. speciosa* was 460%, with a 50% lower hydrophobicity strength than *Orientopsaltria sp.* SEM micrographs revealed their bacterial cell intrusion mechanism was more effective in *T. speciosa*.

Conclusion: Nanostructures are involved in bacteria immobilisation and exhibits species-specificity.

Keywords: Biofilm Formation, Cicada, Wings Nanostructure, Mechano-Bactericidal, Hydrophobicity

Removal of Tetracycline Antibiotics residues from Environmental Water using Magnetic-Deep Eutectic Solvents Adsorbents

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Abstract

Introduction: Tetracycline (TC) antibiotics have been used extensively to treat various infections. Due to its low cost of production and ease of administration, its beneficial effects are widely exploited in human therapy, veterinary and agricultural purposes which contributes to the occurrences of TC in the environment that leads to adverse health effects towards organisms and ecological risk associated with increased bacterial resistance. The conventional approach to using the present absorbent for the solid phase extraction is complicated and less favourable in cost and efficiency. Hence, a new absorbent is proposed – a magnetic nanoparticle coated with deep eutectic solvents (Fe_3O_4-DES). This study investigates the adsorption efficiency of Fe_3O_4-DES to enhance its performance as an adsorbent for TC removal from an aqueous solution.

Methods: The methodology can be divided into 4 parts: synthesis of material, characterisation, optimisation and adsorption studies, and application to wastewater sample. The Fe_3O_4-DES was synthesised in situ in a round-bottomed flask under nitrogen gas.

Results: The structural properties of the adsorbent were analysed via Fourier Transform Infrared Spectrometer (FTIR). The removal efficiency of TC was assessed using a UV-vis spectrophotometer at wavelength 357.3 nm. Only 20 mg of adsorbent was needed to remove 10 mg/L of TC for 10 mL of solution at only 40 minutes. pH 5 is chosen as TC exists in the neutral form at this pH. The kinetics follows pseudo-second-order. The reaction is endothermic, spontaneous and favourable across all studied temperatures and best fit Freundlich and Halsey isotherm.

Conclusion: Fe_3O_4-DES was successfully synthesised. The results showed more than 69.2% satisfactory removal for 1, 10, & 40 ppm of a spiked sample with less than 4.6% RSD. The proposed material exhibits satisfactory performance under complex matrices.

Keywords: Tetracycline, magnetic deep eutectic solvent, UV-vis spectrophotometry, adsorption.

Colour Palette Descriptors for Ethnicity Classification of Pedestrians in CCTV Footage

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Abstract

Introduction: Nowadays, with the rise of Big Data, there is growing motivation to analyse them and comprehend them. In this field, we are tackling the problem of pedestrian attribute recognition from CCTV footage, particularly in ethnicity. The difficulty of ethnicity classification in this situation is due to the lack of features required. The current techniques require facial landmarks as features.

Methods: Therefore, we suggest utilising the colour tones of the individuals as features instead. The skin region of individual faces is segmented, and several dominant colours are then added into the colour palette, which later is used as features during classification. To prove the viability of our technique, we are using the P-Destre dataset, which contains pedestrian dataset and their attributes, including their ethnicities.

Results: Using the P-Destre dataset, we achieved an accuracy rate of 71% of differentiating between Caucasian and Indian pedestrians using only colour descriptors.

Conclusion: The result shows that ethnicity classification is feasible using a colour palette as a feature. On this basis, even with the lack of facial landmarks, it is still possible to identify a pedestrian ethnicity from CCTV Footage.

Keywords: Pedestrian Attribute, Content-Based Video Retrieval, Ethnicity Classification

Nano-modification of LMwPF with Montmorillonite Nanoclay for Bamboo Treatment

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Abstract

Introduction: The present study explores the uses of nanoclay to improve the functionality of low molecular weight phenol-formaldehyde resin (LMwPF). The physical properties of LMwPF and modified LMwPF with 0.5%, 1.0%, 1.5% and 2.0 wt% nanoclay were characterised. The result shows a significant change in the physical properties of LMwPF resin after being introduced with nanoclay.

Methods: The LMwPF was mixed with nanoclay using a high-speed homogeniser at 10,000 rpm for 20 minutes. Five types of samples were prepared at different clay loading.

Results: The physical properties of LMwPF with nanoclay were changed from clear resin to foam. It is believed that the nanoclay acted as a crosslinking agent in the mixture and affected the chemical and physical properties of LMwPF.

Conclusion: The inclusion of nanoclay has altered the chemical and physical properties of LMwPF.

Keywords: phenol-formaldehyde, nanoclay, physical properties.

Synthesis and Recovery Techniques of Surfactin from *Bacillus subtilis* W13 for Crude Oil Dispersion

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Abstract

Introduction: Biosurfactants are surface-active compounds synthesised by bacteria or yeast from various substrates. Their unique properties allow for the replacement of chemical surfactants in dispersion oil. This study aims to synthesise the biosurfactant, surfactin, from *Bacillus subtilis* W13 under favourable conditions using waste cooking oil as its hydrocarbon substrate and compare surfactin's yield utilising a one-step recovery method.

Methods: *Bacillus subtilis* W13 was grown with several types of waste cooking oil to produce surfactin. The surfactin was then extracted using ionic and non-ionic precipitation methods. Analysis of its purity, yield, and effectiveness was through Fourier transform infrared (FTIR), High-Performance Liquid Chromatography (HPLC), emulsification index (E24 and E48), and oil spreading technique.

Results: The highest yield of surfactin was produced utilising palm oil as substrate (0.76%), followed by peanut oil (0.62%). Organic solvent precipitation was the best ionic recovery method to recover surfactin via a single-step approach. Both HPLC and FTIR spectrum shows the presence of purified surfactin obtained from the medium.

Conclusion: Limited studies on the downstream processing of surfactin production had increased the overall cost of production. Hence, it is essential to develop a single-step recovery strategy that aims to maximise the yield while minimising the cost of production.

Keywords: Biosurfactant, Bacillus subtilis, Downstream processing

Survivability Of Plastic Eating Mealworm (Coleoptera: *Tenebrio molitor*) Ingesting Marine Source Expanded Polystyrene

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Abstract

Introduction: Plastic pollution is one of the severe anthropogenic issues on marine and coastal ecosystems worldwide. Thus, the decomposition using a biological agent to treat and dispose of plastic waste in the marine environment is crucially urgent. Recent studies have revealed that the larvae of mealworms, *Tenebrio molitor* can eat polystyrene, one of the most challenging plastic materials for biodegradation.

Methods: The survival and development rate of mealworms fed on marine source expanded polystyrene (EPS) were investigated under laboratory conditions for two months. A total of 360 mealworms were acclimatised for four days and tested with three treatments (bread, EPS, and starved). We measured the length and weight of the mealworms every three-day interval together with the number of survived mealworms. The presence of polystyrene in their frass was observed under dissecting microscope and Fourier Transform Infrared Spectrometer (FTIR).

Results: More than 40% of the EPS-fed mealworms survived with increment in length and weight and have almost the same growth rate with starved treatment. Even though a lower rate of EPS consumption was observed, findings from this study showed evidence of the mealworm's plastic-eating capabilities.

Conclusion: This could be the potential for industries to explore using mealworms to treat plastic wastes as a new approach for waste management.

Keywords: Plastic-Eating, Polystyrene, Mealworm, *Tenebrio molitor*, Marine Environment.

Graphene Oxide-Poly Lactic Acid Nanocomposite for the Removal of Hazardous Dyes from Contaminated Water

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Abstract

Introduction: Dyes such as methylene blue (MB) are a group of hazardous pollutants that could persist in wastewater and pose serious health problems to living organisms. In recent years, various nanomaterials with adsorption properties have been developed to address these pollutants.

Methods: In this study, the feasibility of poly lactic acid (PLA) grafted from graphene oxide (GO) nanocomposite as adsorbents in the uptake of MB was investigated. The adsorbents were characterised through analysis such as FTIR, XPS, zeta potential, TEM, and SEM. For the adsorption testing, the parameters of the study included the initial concentration of MB solution (10-100 mg/L), pH (2-12), and contact time (5-180 min).

Results: TEM results showed that the uniform dispersion of nanosized PLA on the surface of GO. The shift of zeta potential toward the negative side after modification with PLA indicated a stronger electrostatic attraction for MB cationic dyes than GO. The fabricated GO-PLA demonstrated near-complete uptake of the contaminants, with adsorption capacity as high as 390 mg/g, because of the stronger electrostatic interaction compared to pristine GO (removal rate at 90%).

Conclusion: The findings indicated the successful synthesis of novel GO-PLA nanocomposites to remove dyes from textile industrial effluent.

Keywords: Graphene Oxide, Poly Lactic Acid, Adsorption, Methylene Blue, Wastewater Treatment

Singapore SMEs Approach towards adopting Industry 4.0 (IR4.0): A Digital Leadership Perspective

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Abstract

Introduction: Industry 4.0 has been discussed as the emerging digital revolution across the economic climate based on industry experts. Small Medium Enterprises (SMEs) had displayed hesitancy in adoption due to unfamiliarity and fear of failure in investment return. Singapore Government has been actively promoting digitalisation among local SMEs through various grants and initiatives. Given this background, this study aims to examine the influence of the digital leadership approach in preparing Singapore SMEs for Industry 4.0 to stay competitive

Methods: A mixed research approach was adopted. The quantitative data was collected from SME employees currently engaging or considering embarking on the digital transformation journey through an internet survey instrument. The qualitative data was collected from SME employers currently involved in the digital transformation process through a semi-interview instrument.

Results: The overall results have indicated a positive correlation between the awareness of digital transformation and motivation towards digital leadership among SME employees and employers. However, there are significant challenges to implementing IR4.0 initiatives, as found in the study.

Conclusion: SME employers need to adopt effective digital leadership practices to adopt suitable government grants and redefine their current organisational mindset towards digital transformation.

Keywords: IR4.0, Digital Transformation, Digital Leadership, Singapore SMEs

Novel Hydrogel Immobilized Magnetophoretic Microbial Biosorbent for Dye Removal from Aqueous Solutions

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Abstract

Introduction: Methylene blue (MB) is among the most commonly used dye in textile industries. Conventional dye removal methods such as low-cost adsorptions, filtration, coagulation and flocculation are not effective in removing trace concentration of dye from effluents which is a significant concern.

Methods: This study focused on the MB removal efficiency at low concentrations by a novel formulated magnetophoretic microbial biosorbent (BS).

Results: Inactivated *Bacillus cereus* cells isolated from copper-containing nutrient agar (NA) plates had proved to enhance the MB removal efficiency. Indeed, BS recorded a high MB removal efficiency above 90% at trace concentration of dye solution. The adsorption process of MB onto BS behaves as a Freundlich and pseudo-second-order kinetics model. The novel BS had also demonstrated excellent reusability up to 8 cycles with an average of 89 % removal efficiency.

Conclusion: Thus, this novel formulated biosorbent has vast potential for commercialisation due to its high removal efficiency of MB at trace concentrations with low budget recovery methods.

Keywords: Magnetophoretic, Biosorbent, Reusability, Inactivated *Bacillus cereus*, Dye removal

An Assessment of The Effectiveness of Coordination Processes in Global Software Development Projects: Model Formulation

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Abstract

Introduction: Following the strategic thrusts of the eleventh Malaysia plan on accelerating human capital for an advanced nation, A3 was to improve labour market productivity by 3.7% per annum. This improvement was to ensure the 40% compensation of employees to Gross Domestic Product (GDP) in Malaysia by 2020. Software industries in Malaysia could directly impact the labour market productivity by shifting their development work towards Global Software Development (GSD) to yield strategic and economic advantages. Extant studies on GSD shows that despite having some benefits, software industries are still suffering, and ineffective coordination remains a challenge.

Methods: This research has adapted qualitative design, including an interview for data collecting, Delphi Technique for model validation and case study for model evaluation.

Results: Final model consists of 10 coordination processes, 35 coordination strategies with 138 indicators. Results showed that the more indicators selected, the more likely the model helps accomplish the effectiveness towards GSD projects success.

Conclusion: This research has provided the "Evaluation Model for assessing the effectiveness of coordination processes in GSD projects". The model could help facilitate coordination processes involved in GSD projects, in line with GSD Handbook under Facilitate Coordination.

Keywords: Global Software Development, Coordination, Evaluation Model, Effectiveness.

Performance Evaluation of Various Plastic Waste as Aggregate Replacement in Cement Brick

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Abstract

Introduction: Waste utilisation in civil applications is a sustainable solution regarded as an excellent method to reduce the abundant amount of plastic waste and minimise environmental impacts. This study was aimed to investigate and evaluate various types of plastic waste as a partial replacement for fine aggregates in cement bricks production.

Methods: 3% and 6% of plastic replacement were applied in this study, with the mix design of 1:6 (cement: sand). Four different types of plastics include polyethylene terephthalate (PET), high-density polyethylene (HDPE), low-density polyethylene (LDPE) and polypropylene (PP), were tested in this study. All cement brick specimens were tested for compressive strength and water absorption at 28 days.

Results: It was observed that brick with 3% of polypropylene (PP) showed the highest compressive strength, 12.4 N/mm2, than other types of plastic. The finding has also indicated the feasibility of various types of plastic waste, PET, HDPE and PP, as aggregate replacement in construction materials. The achieved compressive strengths for all plastic replacement percentages were satisfied with the standard requirement.

Conclusion: The experimental study establishes the potential of the sustainable use of various types of plastic waste as aggregate replacement in cement brick to reduce adverse environmental impacts.

Keywords: Plastic waste, Aggregate, Cement Bricks, Waste Management, Compressive Strength

Study on the Efficiency of Hetero-Fenton Catalyst Based on Fe_3O_4-Zeolite Composite For Ofloxacin Degradation in Aqueous Solution

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Abstract

Introduction: This study synthesised an environmentally friendly zeolite-based heterogeneous fenton catalyst (FeZ).

Methods: A simple co-precipitation method was used to load Fe_3O_4 onto zeolite, which was then used to degrade ofloxacin (OFL), an antibiotic.

Results: The effects of several variables influencing the degradation of OFL have been evaluated and optimised in depth. The results showed that at pH 9, analyte concentration of 20 mg L^{-1}, 1.0 g L^{-1} catalyst dosage and 5 mg L^{-1} H_2O_2 concentration and the optimum removal time was 120 min. According to the findings, the FeZ catalyst composite degraded 88% OFL and 51 % total organic carbon under the optimised catalyst conditions. Furthermore, after five consecutive runs, the fenton catalyst composite degradation of OFL showed that the material exhibited excellent stability.

Conclusion: The synthesised catalyst is revealed to be suitable for use in wastewater remediation without raising environmental or health concerns.

Keywords: Antibiotics, Catalyst, Fenton, Fe_3O_4, Nanoparticles

Reinforcement of Cybercrime Legislation to Face the Challenges of Cyber Pandemic in the New Normal

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Abstract

Introduction: There is a surge of sophisticated fifth generation of cyber-attacks which are exceedingly difficult to detect and like the health pandemic, it mutates with every attacks. Citizens of cyberspace are not prepared to face these challenges of cyber pandemic. Thus, it is vital not only to reinforce the current legislation relating to cybercrime but also to enhance the awareness of cybercrime among the general public. The purpose of this paper is to discuss the efficiency of current cybercrime legislation in Malaysia in an evolving environment of new normal.

Methods: A comparative analysis is used by examining the practice of cyber laws in selected jurisdictions.

Results: The analysis revealed that the current legislation in Malaysia needs to be reinforced to comprehend the challenges in the new normal. Most of the legislation have not been amended to resolve the new issues in cyber space. The study found that the current level of cybercrime awareness in Malaysia is not adequate.

Conclusion: Thus, it is time to enhance the awareness of cybercrime among the general public and create the culture of cyber resilience; capable of defending and withstanding the cyber pandemic in the new normal.

Keywords: Cybercrime, Cyber pandemic, New normal

Micropropagation of Bentong Ginger (Zingiber officinale Rosc.)

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Abstract

Introduction: Bentong ginger (Zingiber officinale Rosc.), cultivated in Bukit Tinggi, Bentong, is renowned for its aroma and numerous medicinal qualities. The practice of cultivating Bentong ginger on newly-opened forestlands necessitates the acquisition of new fertile lands every few years as crop yields from recycled lands are lower than those obtained from new lands. Breeding is hampered by poor flowering and seed set, slow propagation rates, genotypic and phenotypic variations when compared to the mother plant, and risks of disease transmittance through infected rhizomes. As such, plant tissue culture, capitalising on the use of plant growth regulators (PGRs), presents great potential in circumventing all the issues presented above.

Methods: Combinations of PGRs - 6-benzylaminopurine (BAP), naphthaleneacetic acid (NAA), and kinetin (Kin) - supplemented in semi-solid full-strength Murashige and Skoog medium added with 3% sucrose, were tested on surface-sterilised buds obtained from purchased ginger rhizomes.

Results: The tested PGRs, used singly or in combinations ranging from 0.05 – 2.5 mg L^{-1}, were found to improve shoot number, shoot height and root production in the surface-sterilised ginger buds.

Conclusion: There is great potential in improving Bentong ginger cultivation prospects via micropropagation.

Keywords: Bentong ginger, micropropagation, plant growth regulators, Zingiber officinale

Characterisation of a Live Attenuated Pasteurella multocida B:2 GDH7

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Abstract

Introduction: A significant veterinary pathogen, Pasteurella multocida serotype B:2, causes an economically challenging Haemorrhagic septicaemia (HS) disease in bovine. Annual vaccination regime is commonly practised in the affected countries including Malaysia. A live attenuated vaccine known as P. multocida B:2 GDH7 was constructed to overcome the drawbacks of the established vaccines.

Methods: A simple but precise PCR method was developed with specific primers to identify and differentiate between the parent and mutant strains. Genomic and proteomic characterisation between the strains were achieved with REP-PCR and SDS-PAGE analyses. The application of bioinformatics analysis has facilitated protein profiling.

Results: Apparent profiles were observed from the genomic contents between the strains. More than 5% of the predicted 105 outer membrane proteins (OMPs) were expressed in respective protein profiles. Moreover, notable major OMPs such as OmpA and OmpH were found to be distinctive.

Conclusion: In conclusion, this study has indicated profile differences likely reflecting the attenuation of the mutant as the live attenuated vaccine for HS.

Keywords: Pasteurella multocida, Haemorrhagic septicaemia, live vaccine, characterisation.

Microbial Community, Fungal Suppression and Chemical Properties of Vermicompost Using Spent Mushroom Substrate and Chicken Dung

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Abstract

Introduction: Vermicomposting is an environmentally friendly technology that treats agriculture wastes, food production wastes and sewage sludge. The produced vermicompost is an exceptional organic fertiliser that benefits plants' growth and health.

Methods: The microbial community of vermicompost was studied through bacteria isolation, CFU counting and biochemical tests. Inhibitory properties of vermicompost were tested using the dual culture methods. Chemical properties of vermicompost include phosphorus content, moisture content, pH, electric conductivity (EC) and C/N ratio were investigated. Vermicomposting was conducted using Eudrilus eugeniae earthworm in three treatment ratios of spent mushroom substrate: chicken dung (100:0, 90:10, 80:20).

Results: The microbial community of the 90:10 ratio vermicompost increased the population of beneficial microbes (Azotobacter sp., Bacillus sp., and Rhizobium sp.) and reduced the population of harmful microbes (Escherichia coli, Enterococcus faecalis and Pseudomonas sp.). Harmful Salmonella sp. was not detected. All tested vermicompost ratios suppress mycelium growth of Fusarium sp disease, ranged from 59-69%. Chemical analysis revealed 90:10 ratio vermicompost contained the highest phosphorus content (13.35 kg ha-1), the ideal range of moisture content (63%), pH (8.62), EC (280 µS/cm) and C/N ratio (16.35).

Conclusion: Vermicompost could benefit the crops planting in the agriculture industry.

Keywords: Vermicomposting, Eudrilus Eugeniae, Beneficial Microbes, Fusarium Sp., Phosphorus

Production of Spray-Dried Sea Cucumber (*Cucumaria frondosa*) By-Products Hydrolysate Powder

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Abstract

Introduction: Sea cucumber is one of the valuable marine animals as an important nutritious food source. However, approximately 50% biomass in the form of visceral are discarded as waste during the processing, causing an environmental threat.

Methods: This study was aimed to transform these sea cucumbers (*Cucumaria frondosa*) by-products (SC byp) into a value-added product. Two enzymes (alkaline protease and exopeptidase) were used to hydrolyse the SC byp and spray-dried into hydrolysate powder.

Results: The production of SC byp hydrolysate powder (SCh byp) was feasible, in which the powder that was treated with maltodextrin (SCh byp MD) exhibited better stability, with significantly ($p \leq 0.05$) lower moisture content (5.50±0.60%dw) and water activity (0.25±0.02) than SCh byp. The SCh byp MD demonstrated significantly ($p \leq 0.05$) lower pH (5.33±0.06), higher total soluble solids (5.1±0.1°Brix), water absorption index (82.33±2.20%dw) and brighter (L*=47.51±1.86). Interestingly, the hydrolysates contained all the 9 essential amino acids, corresponding to 39.81% and 36.66% of total amino acids in SCh byp and SCh byp MD, respectively. Thermal profiles indicated that the melting point of SCh byp MD was higher (115°C) than that of SCh byp (94°C).

Conclusion: Converting waste into a product not only preserve the environment but also could potentially be profitable to the industry as it can be applied as functional ingredients, animal feed, or in nutraceutical products.

Keywords: Enzyme, Hydrolysate, Marine, Powder, Protease

Novel Use of Jicama Skin as Antioxidant

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Abstract

Introduction: Jicama is a tropical root vegetable belonging to the legume Fabaceae family. Jicama tuber contains several bioactive components which are reported to exert therapeutic effects in vivo and in vitro. However, limited research is conducted to explore the antioxidant activity of Jicama skin, therefore it is often being wasted. This study aims to investigate the anti-oxidative potential of Jicama flesh (JF) and skin (JS).

Methods: JF and JS was vacuum dried and subsequently ground into fine powder. The JF and JS extracts were produced through ultra-sonication at 60°C for 27 minutes. Then, antioxidant assays like ferric reducing ability power (FRAP), DPPH and ABTS along with total phenolic content (TPC) of extracts were determined.

Results: Results showed that TPC and FRAP of JS were ~10 times higher than JF. The DPPH and ABTS scavenging potency of JS were approximately 8 times stronger than JF. However, the TPC of both JS and JF extracts was found to be no correlation with its antioxidant activity. These results unveiled that the antioxidant activity of JS and JF is not contributed by TPC.

Conclusion: JS is potentially used as a prominent antioxidant additive in functional foods.

Keywords: Jicama skin, Jicama flesh, Total phenolic content, Antioxidant activity

Effect of Extraction Time on the Antioxidant and Anti-diabetic Activities of Mulberry Leaves Extract

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Abstract

Introduction: The NHMS 2019 survey proposed that the prevalence of diabetes in Malaysia is increasing. Mulberry is a well-known traditional Chinese medicinal plant. Mulberry leaves (ML) have been proven to contain high flavonoids and prominent bioactivities. This is a preliminary study to investigate the effect of extraction time on the chemical, antioxidant and anti-diabetic properties of ML.

Methods: Ultrasonic extraction was conducted for 1, 1.5, 2, 2.5 and 3 hours to produce ML extract. Total phenolic (TPC) and flavonoid content (TFC) of ML extract were determined via Folin–Ciocalteu and aluminium chloride method, respectively. The antioxidant property was tested using DPPH and FRAP assay. Alpha-amylase inhibitory assay was employed to assess the anti-diabetic property of ML extract.

Results: The extract produced from 2.5 hrs extraction contains the highest TFC (4.87±0.12 mgQE/g) and antioxidant activity (52.07±0.70% DPPH inhibition and 41.98±0.26 mM Fe Equivalent of FRAP). TPC of extracts produced from 2, 2.5, 3 hours extraction was higher than 1 and 1.5 hours. Extraction time had no impact on the alpha-amylase inhibition activity (80.90-87.13%) of ML extract.

Conclusion: ML extract with the best antioxidant and anti-diabetic activity was produced via 2.5-hrs extraction. Future research should be conducted to explore the potential application of ML extract as a functional ingredient for hyperglycaemia control.

Keywords: Mulberry leaves, Anti-diabetic, Antioxidant, Functional ingredient

Synthesis And Characterisation Of 4-Chlorophexyacetic Acid Herbicide Intercalated With Calcium-Aluminium Layered Double Hydroxide Through Co-Precipitation Method

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Abstract

Introduction: In agriculture, the increasing number of herbicides can lead to the increasing number of weed species and reduce the crop's quality. A good herbicide should be effective at low doses and eco-friendly. Calcium-aluminium layered double hydroxide (Ca-Al LDH) can be used as a host to contain these herbicides between its interlayer due to its high anion-exchange capability. The herbicide used is 4-chlorophenoxyacetic acid (4-CPA). This study aims to intercalate the 4-CPA herbicide into the interlayer of Ca-Al LDH providing a safer alternative for herbicide.

Methods: The host-guest was prepared via the co-precipitation method for the concentration of 0.025 M and 0.10 M. After the Ca and Al were mixed, sodium hydroxide (NaOH) was added to obtain pH 12 and left for 18 hours. The sample was centrifuged and let dry in the oven for 72 hours. The 4-CPA anion was added for the intercalation process.

Results: PXRD pattern shows the basal spacing increase for 0.025 M nanocomposite from 8.54 Å to 9.98 Å. For FTIR spectra, nitrate peak is absent for 0.025 M nanocomposite and shows COO- peak at 1634 cm-1.

Conclusion: The intercalation of 4-CPA into the Ca-Al-LDH interlayer was a success for 0.025 M $Al(NO)^3$ at pH 12 using the co-precipitation method.

Keywords: 4-Chlorophenoxyacetic Acid (4-CPA), Intercalation, Co-Precipitation, LDH, Nanoparticle

A review on *Pycnarrhena cauliflora* and its Synonyms

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Abstract

Introduction: The leaves of *Pycnarrhena cauliflora* (Menispermaceae) are consumed as a flavour enhancer by the local communities of Borneo. A literature search on the species showed that besides taxonomic description, very little scientific work has been done on the plant. Nevertheless, the plant is a synonym to *Antitaxis cauliflora* Miers., *Pycnarrhena longifolia*, (Decne. ex Miq.), *Antitaxis longifolius* (Decne. ex Miq.) Mier., and *Gabila longifolia* (Decne. ex Miq, B). Among these synonyms, *P. cauliflora* was closely related and frequently interchanged with the species *P. longifolia*. Thus, a complete review of *P. cauliflora* and its synonyms are in need to organise and revise the plant's systematic classification.

Methods: The information on the species was collected from scientific journals, books, and reports searched through available databases such as Google Scholar, PubMed, Directory of Open Access Journals, Science Direct, Bioline International, and Reaxys.

Results: A total of 50 references reported from 1981 to 2021 were obtained to overview the morphology, nutritional value, traditional uses, phytochemistry, and biological activities of *P. cauliflora* and its synonyms.

Conclusion: The paper reveals that *P. cauliflora* is unalike to its synonyms, so do *P. longifolia*. This warrants further scientific investigation on *P. cauliflora* particularly to exploit its commercial value.

Keywords: Morphology, Nutritional Value, Traditional Uses, Phytochemistry, Biological Activities

Assessing the Potential of Biochar as Plant Growth Promoter

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Abstract

Introduction: The utilisation of biochar as fertiliser on the growth of water spinach (*Ipomoea aquatica* Forsk) is not fully researched at present time.

Methods: This study focused on producing biochar from Banana (*Musa spp*.) peels through slow pyrolysis which can improve the growth of water spinach plants. Properties of biochar were determined by comparing the biochar yields, elemental compositions and morphologies to obtain the optimum operating conditions during pyrolysis. Then, the efficacy of biochar as a soil conditioner to improve plant growth was studied. Response surface methodology was used to analyse the pyrolysis operating conditions like temperature, residence time and heating rate.

Results: Optimal conditions for biochar yield of 48.4 % were temperature of 400 °C, the residence time of 120 min and heating rate of 18.4 °C/min. Biochar had an O/C ratio of 0.276 resulting in higher stability with a half-life of more than 100 years. Biochar addition of 1 wt% to the soil improved the growth of water spinach plant with the mean plant length achieving 42 cm after 6 weeks.

Conclusion: It can be concluded that banana peel derived biochar can be a promising conditioner for plant growth with the right quantity applied in the soil.

Keywords: Banana peel, Biochar, Fertiliser, Soil conditioner, Plant growth

Bacterial Wilt by *Ralstonia solanacearum*: A Destructive Disease in Many Crops

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Abstract

Introduction: Bacterial wilt disease is caused by the pathogen *Ralstonia solanacearum*. It is among the most devastating diseases affecting many economically important crops all around the world such as tomato, pepper, ginger and potato. The disease has caused significant loss particularly to small-scale farmers whose sources of income primarily come from cultivating these crops.

Methods: Here, we begin the review by introducing the classification of *R. solanacearum*, its disease symptoms and variation of its host range. This review also focuses on few examples of important crops that are severely affected by the disease as well as its distribution, particularly in Asian regions. In the rest of this review, we discuss several effective management strategies which have been practised regularly to combat the disease.

Results: The findings from this review could lead towards developing knowledge on certain major challenges in agricultural productivity such as crop reduction as well as the economic impact of the disease due to pathogen infections.

Conclusion: The knowledge gap is also discussed to identify fruitful and promising areas of future research to sustain agricultural production, provide quick disease detection and prevent further infection in crops.

Keywords: Bacterial wilt, Disease incidence, Management strategies, *Ralstonia solanacearum*

Organoleptic Evaluation and Determination of Watermelon (*Citrullus lanatus*) Quality Based on Flesh Samples between Post-Harvest Day 4 and Post-Harvest Day 8

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Abstract

Introduction: Consumer demands for fresh fruit with enhanced health-promoting properties. Fresh fruit qualities usually evaluated by fruit organoleptic; fruit sensations including colour, odour, taste, touch and texture by the basic sense of touch, sight, hear, smell and taste. The initial sight of fruit is the first evaluation made by consumers. However, evaluation of fruit's appearance does not represent its odour and taste. Fruit organoleptic evaluation differs daily due to the chemical changes that happen during the ripening process which may alter fruits' physiology. Thus, this study aims to evaluate and determine the organoleptic properties of watermelon (*Citrullus lanatus*) between post-harvest day 4 and post-harvest day 8.

Methods: Watermelon fleshes were cut into small portions of 15 g each and served fresh to 38 respondents from the Centre of Medical Laboratory Technology, Universiti Teknologi MARA (UiTM) Puncak Alam Campus, Selangor, on post-harvest day 4 and day 8. The flesh quality was then evaluated based on the fruit's aroma, colour and taste. The evaluation data were analysed by using Wilcoxon signed-rank using Statistical Package for the Social Sciences (SPSS) version 25.0.

Results: The study results showed organoleptic evaluations of watermelon were significantly different in taste (post-harvest day 4; p=0.000) and colour (post-harvest day 8; p=0.002) by comparing the two consecutive days. However, no significant differences were observed on the aroma with p=0.109 between post-harvest day 4 and day 8. Watermelon has a sweeter taste on post-harvest day 4 compared to post-harvest day 8. Fructose showed optimum level in the first week of post-harvesting period and start to decline after day 8. Watermelon flesh in post-harvest day 8 showed higher colour intensity compared to post-harvest day 4 in which may probably due to lycopene synthesis during storage.

Conclusion: From the organoleptic outcomes, the study concludes that watermelon in post-harvest day 4 has the best taste quality and more appealing compared to post-harvest day 8.

Keywords: Watermelon, Post-harvest, Organoleptic evaluation

Screening of Lignin-Degradation Activity and Amplification of Dyp Gene in Local Strain *Rhodococcus*: Upcycling the Agrowaste

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Abstract

Introduction: Lignin, the abundant compound in lignocellulose, remains as untapped potential as sustainable feedstocks in biorefinery due to its recalcitrant nature. *Rhodococcus* has been reported to be one of the lignin-degrader due to its versatile metabolic activity. This bacterium has been utilised in industries for the production of valuable materials including ethanol and vanillin. This study aims to screen the ability of 12 local strains of *Rhodococcus* in degrading lignin.

Methods: These strains were grown on lignin-based agar to screen for the lignin degradation capability. The selected strain was then cultured in MSM broth containing lignin at 30ºC, followed by the polymerase chain reaction (PCR) with the annealing temperature of 61ºC for 35 cycles.

Results: The study revealed UCC0021 strain resulted in the highest cell density on the agar with optimum cell growth on broth observed at 72 hours. PCR detected the presence of dye-decolorising peroxidase (DyP) gene band possessing the approximate size of 400 bp.

Conclusion: This study demonstrated the ability of locally isolated *Rhodococcus* as lignin degrader with PCR suggested DyP as the responsible enzyme. The efficient degradation of lignin could offer greater value to the agro waste, which can be refined into valuable chemicals.

Keywords: *Rhodococcus*, Lignin degradation, Agro waste, DyP gene, Lignocellulose biomass

Antioxidant Activity of Banana Leaves (*Musa acuminata*) Extract

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Abstract

Introduction: *Musa acuminata* is also known as a banana plant which has been classified as one of the oxidative foods. However, the study about the antioxidant potentials from the leaves is in limited numbers. Therefore, this work is aimed to study the antioxidant potential of *Musa acuminata* leaf which can lead to as an alternative source for natural-based antioxidant agent.

Methods: 100 g of dried powdered *Musa acuminata* leaf sample were soaked for three days at room temperature with methanol. The methanolic extract was further isolated and both methanolic extract (M) and its isolated fraction (M1) were subjected to (DPPH) radical scavenging activity, total phenolic content (TPC) assay and total flavonoids content (TFC) assay.

Results: The antioxidant activity of M and M1 were observed to show low antioxidant activity toward the DPPH assay with the IC 50 value of M and M1, 1687.2669 and 13194.075, respectively. However, both M and M1 showed high antioxidant activity in total phenolic (M:30.83 GAE/g, M1: 16.08 GAE/g) and total flavonoids content (M:662.10 CE/g, M1:553.17 CE/g,).

Conclusion: *Musa acuminata* leaf extracts exhibits antioxidant activities. Thus, give the experimental basis to understand the use of *Musa acuminata* in traditional medicine as an antioxidant agent.

Keywords: *Musa acuminata*, Antioxidant, Phytochemicals

Fractionation of Enzymatically Hydrolyzed Edible Bird's Nest Glycopeptides and its Properties

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Abstract

Introduction: Our patented work on edible bird's nest (EBN) has shown that enzymatic hydrolysis unravelled the complex EBN glycoproteins into simpler glycopeptides, which enhanced the bioactivities by improving its solubility and exposing more bioactive peptides sequences. However, EBN glycopeptides is still a macromolecule, with fractions of different molecular weights, which would have different properties and bioactivities.

Methods: This research was aimed to determine the chemical properties and antioxidant activities of freeze-dried (EBN FD) and spray-dried (EBN SD) EBN hydrolysates fractionated using gel permeation chromatography (GPC).

Results: Two well-separated fractions were identified (EBNf FD1, EBNf FD2, EBNf SD1 and EBNf SD2). EBN FD demonstrated significantly higher ($p \leq 0.05$) peptide (3.6%), total carbohydrate (27.7%) and sialic acid (18.2%) contents than that of EBN SD. A similar trend was observed in low molecular weight fractionates (EBNf FD2 and EBNf SD2). Meanwhile, the first fractionate (EBNf FD1 and EBNf SD1) exhibited significantly higher ($p \leq 0.05$) hydroxyl radical (•OH) scavenging activity. Fourier transform infrared spectroscopy demonstrated that all EBN fractionates have a similar spectrum, except in the region of N–H (amide II) and C–H alkyl group.

Conclusion: EBN fractionates with different molecular weights showed different chemical properties and antioxidant activities. Further studies on the fractionation using anion exchange chromatography (AEC) methods are ongoing to separate the charged glycopeptides.

Keywords: Edible Bird's Nest, Fractionation, Fourier Transform Infrared, Gel Permeation Chromatography, Sialic Acid

Determination of Pesticide Residues in Food Matrix using Surfactant

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Abstract

Introduction: A new sample pre-treatment methodology namely vortex assisted surfactant enhanced emulsification liquid-liquid microextraction (VSLLME) using green silicone surfactant has been developed and applied for the monitoring of carcinogenic organophosphorus insecticides in food matrices with the aid of gas chromatography-mass spectrometry (GC-MS) detection.

Methods: The parameters influencing the extraction performance were successfully optimised. 80 µL of Hexane and 0.5% (v/v) of silicone surfactant were used as extraction solvent and emulsifier, respectively, the solution was vortexed for 1 min after adding 4% (w/v) of Na_2SO_4.

Results: Under optimum conditions, the detection limit of the proposed method was ranged between 0.008 − 0.1 μgL^{-1} while good determination coefficients (R^2) varying from 0.9989 to 0.9994 were obtained for all calibration curves. Application of the developed method on food samples gave satisfactory recovery values (80 − 118%) for the target analytes.

Conclusion: The suggested approach has also proven to be simple, cost-effective, timesaving, and environmentally friendly.

Keywords: Green silicone surfactant, Organophosphorus pesticides, Gas chromatography, Food samples

Comparative Callogenesis Assessment in Leaf and Endosperm Explants of *Barringtonia racemosa L.*

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Abstract

Introduction: *Barringtonia racemosa L.* is one of the underutilised plant species natively found in Malaysia with various pharmacological activities and has been identified to be endangered in certain regions of the world. This study was conducted to assess callogenesis potential in *B. racemosa* from leaf and endosperm explants on MS media.

Methods: The callogenesis in *B. racemosa* from leaf and endosperm explants was assessed by culturing the explants on MS media treated with 2,4-D (1.0–2.5 mg/l) and kinetin (0.5–2.5 mg/l) incubated at 25 ± 2ºC under dark condition and subcultured after four weeks of culture.

Results: The greatest callus induction percentage in leaf explant (98.33 ± 1.67%) was found in the culture treated with 2.0 mg/l 2,4-D and 1.5 mg/l kinetin with the greatest biomass (1.69 ± 0.67 g FW and 0.86 ± 0.05 g DW). Meanwhile, the treatment of 1.0 mg/l 2,4-D and 1.5 mg/l kinetin scored the highest callus formation (56.70 ± 3.35%) in endosperm explant with the greatest FW (1.68 ± 0.44 g) and DW (0.24 ± 0.14 g) records.

Conclusion: Callogenesis protocol was established, and it is essential to identify optimum explant-treatment combinations for producing a substantial amount of callus useful in plant biotechnology and phytochemical studies.

Keywords: *Barringtonia racemosa L.*, Callus, Explants, Kinetin (Kin), 2,4-Dichlorophenoxyacetic Acid (2,4-D).

The Promotion of Food Security through the Minangkabau Land

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Abstract

Introduction: Malaysia's rising population of 32.58 mil with an annual increase of 1.1% ponders on a burning thought whether Malaysia can sustain food security in years to come. The recent pandemic saw shortages of vegetables as the country had difficulty bringing in products from neighbouring countries. Such a state that needs to review the demand and supply of the production of vegetables so that Malaysia can sustain itself in these trying times. There needs to be a concern about whether unused Minangkabau land can be turned into vegetable plots to meet the growing needs of Malaysians. The heritage land being passed down through the womenfolk is the Minangkabau tradition which is still practised in Negeri Sembilan. While families might be holding small plots to larger portions, something should be done to further commit to higher food security.

Methods: Interviews with Policy Makers, Farmers and Minangkabau Landowners.

Results: The research is in an exploratory stage.

Conclusion: The research hopes to find a conclusive agreement between Minangkabau landowners and farmers with the help of the policymakers of Negeri Sembilan towards increasing food security to meet the demand of the growing population.

Keywords: Food security, Minangkabau land, Negeri Sembilan, Vegetable production

Understanding The Readiness Factors of Palm Oil Smallholders' Inclination Towards Malaysia Sustainability Palm Oil (MSPO) Implementation

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Abstract

Introduction: Malaysia's largest commodity, palm oil, is expected to contribute RM70 billion with an export volume of 17.7 million tonnes of Malaysia Gross Product (GDP). However, trade barriers and global demand for sustainable oil palm products impede growth. The palm oil plantations account for 40 percent of Malaysia's total output. Approximately 98.5 per cent of the organised smallholders are MSPO-certified. However, 68.39 per cent of the independent smallholders have yet to be certified. Malaysia's government has pledged to have all smallholders certified by the middle of 2021. Uncertified smallholders will be fined and risk being unable to sell their fruits if they fail to meet that goal. Therefore, understanding of readiness factors to implement MSPO among palm oil smallholders has become critical.

Methods: Respondents were independent smallholders from all states in Malaysia. A survey is used where respondents complete a self-administered questionnaire.

Results: Initial analysis indicates that the readiness of Malaysian palm oil smallholders to adopt MSPO is influenced by sustainability awareness, perceived advantage, government support, and the cost of MSPO implementation.

Conclusion: The study would contribute to the area of sustainability, readiness to implement, and the palm oil
industry.

Keywords: Smallholders, Readiness, Implementation, Palm Oil, Malaysia Sustainability Palm Oil (MSPO)

Interaction Between Zinc Oxide Nanoparticles and *Centella Asiatica* Plant

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Abstract

Introduction: Zinc oxide nanoparticles (ZnONPs) offer tremendous potential in the agricultural sector due to their impressive physicochemical characteristics. Studies showed that ZnONPs interactions lead to various physiological, morphological, and genotoxic changes in plants. However, scientific evidence on its impact on edible plants is still scarce.

Methods: Thus, in this study, the uptake, accumulation and effect of six different concentrations (50mg/L, 100mg/L, 150mg/L, 200mg/L, 250mg/L and 300mg/L) of ZnONPs in hydroponically grown *Centella asiatica* were assessed and recorded for 28 days. The uptake and translocation of ZnONPs in *C.asiatica* were observed by using Field Emission Scanning Electron Microscope (FESEM).

Results: Our findings showed that the highest fresh weight and most maximum roots elongation was shown for plants treated with 250mg/L ZnONPs. Observation of cellular uptake through FESEM image showed that ZnONPs were localised at the leaves part. No accumulation of ZnONPs were found at the stem and root parts. All plants treated with ZnONPs demonstrated reduction in fresh weight after 21 days.

Conclusion: The study showing that prolonged exposure of ZnONPs gave phytotoxic effect to *C.asiatica* plant.

Keywords: *Centella asiatic*, Field Emission Scanning Electron Microscope (FESEM), Zinc oxide nanoparticles (ZnONPs)

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