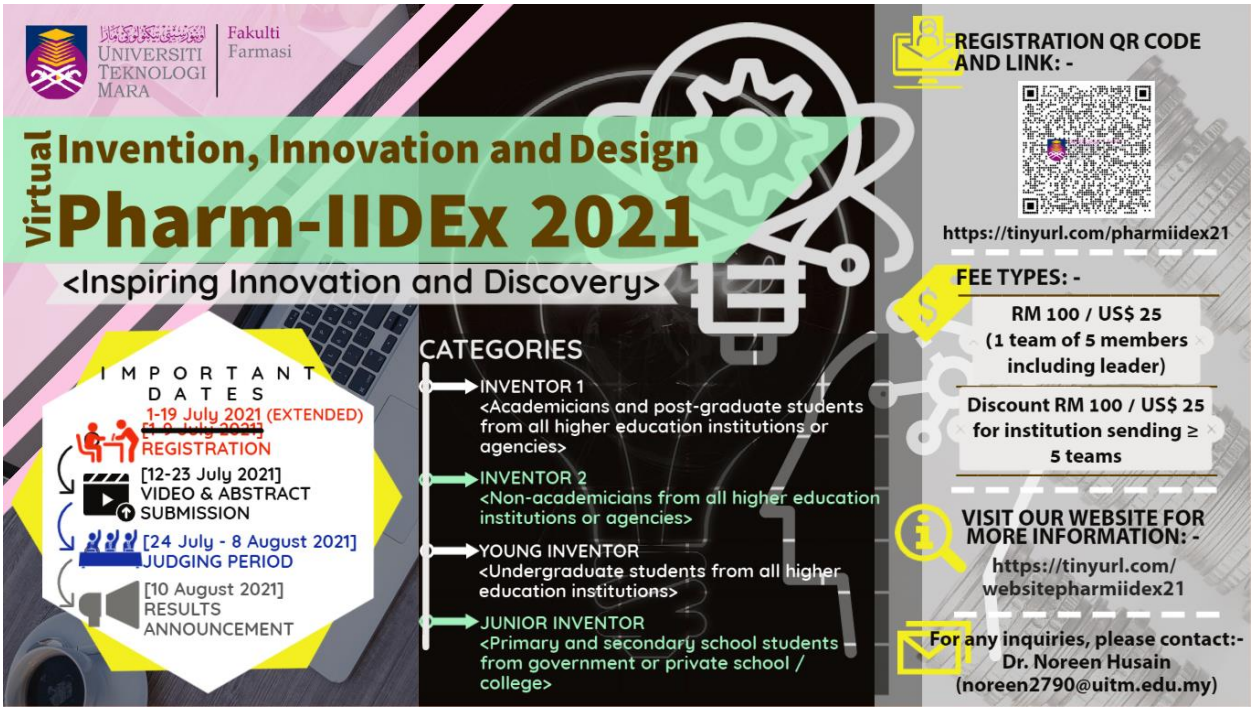
VIRTUAL PHARM-IIDEx 2021

"Inspiring Innovation and Discovery"



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Academician and Postgraduate students from Higher Education Institutions or Agencies

Virtual Clinical Pharmacy Clerkship (vCPC): A concept to bring clinical teaching & learning from bedside to off-site

Norkasihan Ibrahim*, Izzati Abdul Halim Zaki, Hanis Hanum Zulkifly, Mahmathi Karuppannan, Mohd Shahezwan Abdul Wahab

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Abstract

Clinical Pharmacy Clerkship (CPC) on-site clinical environment is an essential requirement in training the final year Bachelor of Pharmacy students to apply knowledge in rationalizing pharmacotherapy options. Problem-based learning commonly used to replace CPC lacks in the experience component. The virtual CPC (vCPC) concept enables experiential clinical teaching and learning (T&L) when access into the clinical environment is restricted. This concept is applied four components: (1) four virtual medical wards with total of twelve bed-head tickets representing actual case notes, (2) comprehensive timetables, (3) standardized T&L materials adapted from the established '5-Step Patient Care Process (5PCP)' and (4) standardized rubric for performance assessment. Students undergo a one-week attachment in each ward and participated in scheduled clinical pharmacy activities using the Google Meet and Google Classroom platforms. All activities were supervised by the lecturers and hospital preceptors. Students' performance was assessed on weekly basis. The vCPC concept was implemented in the current semester hospital clerkship for 182 final year pharmacy students involving 20 lecturers and 3 hospital preceptors. Students were divided into 20 groups and completed their ward rotations over four weeks. The vCPC is a concept that has successfully brought clinical teaching and learning from the bedside to off-site during the COVID-19 pandemic.

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AROMA-GUIDE to Maximise the Beneficial Effects of Aromatherapy in Persons with Dementia

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Abstract

Aromatherapy is a non-pharmacological approach to reduce behavioural and psychological symptoms of dementia (BPSD). In early 2021, we conducted a survey on the willingness of caregivers to use aromatherapy in managing persons with dementia (PwD). 71 caregivers of PwD responded to the survey, of which 35% have used aromatherapy in PwD, while 83% were willing to use aromatherapy. Several studies have examined the effectiveness of aromatherapy in PwD, but inconsistencies in the administration methods were among the drawbacks affecting outcome measures. A proper guideline on aromatherapy administration method is essential to allow caregivers to provide aromatherapy in a safe and effective manner. Thus, we have developed AROMA-GUIDE flipbook. This flipbook contains aromatherapy administration guide to assist caregivers to manage BPSD. AROMA-GUIDE was developed based on evidence gained from a review of 26 research articles on aromatherapy in PwD which were published between 1997 and 2021. AROMA-GUIDE includes methods and procedures in using aromatherapy, evidence on aromatherapy that are beneficial in PwD, tools to monitor BPSD and safety measures. Hence, AROMA-GUIDE should be a must have tool to any formal and informal caregivers who are attempting aromatherapy for PwD to maximise the benefit and to reduce the hazards.

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Novel Topical Analgesic from Malaysian Local Plant Incorporated Micellar Nanotechnology for Musculoskeletal Pain Reliever

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Abstract

Musculoskeletal conditions are consisting of the comprise more than 150 conditions that affect human locomotor, to lifelong conditions associated with ongoing functioning limitations and disabilities. These conditions are frequently characterized as persistent pain that enable to reduce people's ability to work. Initially, oral analgesic drugs including nonsteroidal anti-inflammatory drugs (NSAIDs) are used for the treatment of acute and chronic musculoskeletal pain, however associated with adverse effects such as gastrointestinal bleeding, kidney failure and stroke. Then, the topical have been introduced as alternative for oral NSAIDs to promote safer approach for consumers. Unfortunately, some investigations proved the adverse events occurred after topical administration of NSAIDs that lead to erythema, dry skin, irritation, pruritis and paresthesisas. Therefore, the research investigations on medicinal plant implementations as safer alternative approach in relieving musculoskeletal pain increases as scientific committees' interests are based on consumers' awareness on plant used promote lesser adverse events. *Eucalyptus globulus* or known as 'kayu putih' can be extracted for its leaves' essential oil. Scientifically, 1,8-cineole has been found in extracted *Eucalyptus globulus* leaves essential oil that highly potential to promote natural analgesic activity. However, Malaysian are only implemented the *Eucalyptus* oil in traditional way and further scientific research on the aromatic oil is still limited and the plant becoming undervalued. Besides, the lipophilic and highly volatility characteristics of most essential oil limit their therapeutic potential and to be further used in real industries. Hence, this research project introduces an analgesic substance from Malaysian *Eucalyptus globulus* leaves essential oil extract and efficacy advanced by incorporated with micellar nanoparticle technology. Through this project, the essential oil of *Eucalyptus globulus* leaves was extracted via hydrodistillation process and the oil's gas chromatography mass-spectrophotometer analysis found 78.96% of 1,8-cineole, the natural analgesic constituent. Then, the incorporation of extracted *Eucalyptus* essential oil with micellar nanoparticle has been formulated through spontaneous emulsification method and transformed the oil in nanoparticle size ($d = 17.13 \pm 0.035$ nm). Analgesic potential of the *Eucalyptus*-micellar formulation has been assessed using hot plate test in rats assay where the topical administration of the formulation on fore and hind limb of rats, possessed the central and peripheral analgesic effects by prolonged the rats pain responses towards the heat stimulus after being put on top of hot plate (55 °C).The successfulness of this assay demonstrated highly potential of *Eucalyptus globulus* essential oil to be as safer and effective analgesic potential after being incorporated with micellar nanoparticle technology. Hence, this project is empowering back the value of *Eucalyptus globulus* as medicinal plant with potential to treat persistent pain associated with musculoskeletal disorders. Additionally, a pre-clinical anti-inflammatory analysis such as carrageenan induction assay is recommended to specifically investigate potential of the *Eucalyptus*-micellar formulation in relieving musculoskeletal pain.

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Development of a novel natural 6- gingerol based nanoformulation for the treatment of cerebral ischemia and evaluation of their pharmacokinetic and pharmacodynamic effects

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Abstract

6-Gingerol (GL) is a nonvolatile phenolic constituent used in the treatment of ischemia-brain. GL showed a very low solubility and poor-absorption. A novel gingerol-mucoadhesive-nanoemulsion (GL-MNE) was developed to enhance GL-bioavailability in the brain. Gingerol nanoemulsion (GL-NE) was prepared by aqueous-microtitration-method in which lauroglycol 90 (oil phase), tween 80 (surfactant), and PEG-400 (co-surfactant) were used. A conversion of GL-NE into a mucoadhesive-GL-MNE was carried out by using chitosan and GL-MNE and subsequently characterized their morphology, thermodynamic stability, *in vitro* release, mucoadhesive-potency, and *ex-vivo* nasal-permeation, to enhance their brain-bioavailability and PK & PD-parameters. Results showed that GL-MNE exhibited 94.89nm bubble-size, 0.129 PDI, 1.892mV zeta-potential. GL-MNE exhibited excellent mucoadhesive activity as compared to GL-NE & GL-S. GL and Nonivamide (IS) showed a retention time 1.27 & 1.12 min and m/z:295.37/137.07 & 294.31/137.18, respectively. The developed GL-method was also successfully validated with the range of 1.0-1000.0 $ngmL^{-1}$, 94.12–98.97% inter-and-intraday accuracy, and 2.06–4.04% precision. Based on the PK-parameters results, it was found that GL-MNE showed significant effect ($p<0.001$) via i.n. route of administration. Conclusively, GRL-MNE showed a significance ($p < 0.001$) impact for the improvement of brain-bioavailability in the treatment of cerebral ischemia with enhancing their neuroprotection at extremely low-dose of GRL.

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HRS Mucilage as Natural Transdermal Permeation Enhancer

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Abstract

Stratum corneum is the most significant barrier in transdermal drug delivery system, particularly for hydrophilic drugs. Several strategies have been developed by other researchers to increase the permeability of stratum corneum including physical and chemical approaches. While the first approach is fast, it may result in skin erythema, pain, and irritation. The latter approach is also associated with skin irritation especially when synthetic materials like ethanol, glycerine, and azone were employed as a component in transdermal drug delivery system. In order to mitigate these problems, the present work aims to investigate the skin barrier modification by a novel polysaccharide, *Hibiscus rosa-sinensis* (HRS) mucilage in a gel dosage form for transdermal drug delivery. Polysaccharide is used globally and described as generally-recognized-as-safe (GRAS) by the U.S Food and Drug Administration. Dried-powdered mucilage was extracted from the fresh leaves of HRS. Three concentrations of HRS mucilage were formulated into HRS gels, namely 1 (CL1), 1.5 (CL1.5), and 2 (CL2) % (w/w) using caffeine as a model drug. The in-vitro drug permeation profile of caffeine was examined using vertical diffusion cells. The ability of HRS mucilage to regulate skin permeation in transdermal drug delivery system was investigated using scanning electron microscopy and attenuated total reflectance Fourier transform infrared spectroscopy. HRS mucilage in the form of a gel altered the barrier and permeability of skin by perturbing the lipid and protein structures, acting on the helical keratin filaments as well as through the O–H and/or N–H interactions. These were then reduced the diffusional resistance for drug transport and increased the drug permeation. The optimal concentration of HRS mucilage at 2 %(w/w) (CL2) was deemed useful in facilitating the transdermal delivery of caffeine.

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ViNSAID: A Step Closer Towards Safer Anti-inflammatories

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Abstract

ViNSAID Capsule is a formulation of *Vitex trifolia* leaves hydroalcoholic extract (VT) with non-steroidal anti-inflammatory drugs (NSAIDs) such as diclofenac, ibuprofen, and indomethacin. *V. trifolia* belongs to the family Verbenaceae is traditionally used to treat inflammation, allergy, pain, and fever. Inflammation is the human body's immune system response to different types of invading agents and stimuli. It is associated with several life-threatening chronic diseases. The World Health Organization (WHO) ranks chronic diseases as the greatest threat to human health. Anti-inflammatory drugs such as NSAIDs are used widely however, long-term use of the drugs causes life-threatening side effects such as gastrointestinal, cardiovascular, and renal complications that lead to hospitalization. *V. trifolia* leaves have a potent anti-inflammatory effect that is attributed to the presence of several secondary metabolites. With scientific evidence, the plant extract with NSAIDs possesses potential synergistic anti-inflammatory effects with reduced side effects. Thus, the development of a formulation of the extract and NSAIDs capsule is a good alternative to the current conventional anti-inflammatories. ViNSAID, a combined richness of *Vitex trifolia* and NSAID; an evidence-based approach for developing safer anti-inflammatories.

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Aqualess Bath

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Abstract

A water crisis, also known as water stress, occurs when people in certain places that do not have enough access to clean water. Water stress is most common in locations with little precipitation, high population density, or as a result of natural disasters. Each year, approximately one million people die due to water-related diseases, sanitation and hygiene. To address the challenges posed by the hygiene-related issues, we introduced Aqualess Bath, a gel-based bathing alternative. Aqualess Bath is specially formulated with an antibacterial agent, moisturiser and propolis, leaving the skin clean, smooth, and moisturised. Aqualess Bath only requires 5 – 10 mL of water to clean the whole body, and thus, reduces the need for water. Aqualess Bath is suitable to be used in water-stress locations, for travelers or bed-bound patients and many more. The product is relatively cheap, ready to be used and convenient for transport.

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Synthesis of new N^2-N^9-Dibenzyl β-Carboline Bromate Derivatives as Potential Anticancer Agents

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Abstract

β-Carboline alkaloids, which are widely distributed in nature, originate from a remarkable family of natural and synthetic indole-containing heterocyclic compounds. Current conventional chemotherapeutics have several drawbacks that limit their effectiveness, such as multidrug resistance and severe side effects. Recently, much interest on β-carboline have been focused on anticancer due its reported immense potential. The present study reports new N^2,N^9-dibenzyl-β-carbolineum bromate derivatives synthesized from L-tryptophan by the Pictet-Spengler reaction using three steps with excellent yields (>80%). The structures of synthesized compounds were confirmed by nuclear magnetic resonance (NMR) and X-ray single-crystal diffraction (XRD). Preliminary structure-activity relationships (SARs) indicated that substituents in positions-2 and -9 of the β-carboline ring could enhance anticancer properties. Evaluation of *in vitro* anticancer activity against K562 (chronic myelogenous leukemia) cancer cell line showed that the compounds exerted excellent cytotoxicity effects (IC_{50} values 0.36-1.08 µM). In addition, the compounds were less toxic toward non-cancer cell lines BALB/3T3 and Hs27, in comparison to commercial chemotherapeutics, cisplatin and doxorubicin, which are employed as positive controls. In short, the synthesized new N^2,N^9-dibenzyl-β-carbolineum bromate derivatives are expected to elicit good anticancer activity with less toxicity and also provides important insight for design of future therapeutic intervention for cancer.

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Anti-Müllerian Hormone (AMH) Rapid Self-Test Kit

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Abstract

Anti-Müllerian hormone (AMH) regulates folliculogenesis in females. It is one of the important biomarkers used in the diagnosis of reproductive health conditions such as Primary Ovarian Insufficiency (POI) and polycystic ovary syndrome (PCOS). Normal AMH level is crucial to help predicting the chances of getting pregnant and timing of menopause, especially when a patient is planning to go for *in vitro* fertilization (IVF) treatment. In the current practice, AMH level is often measured using the enzyme-linked immunosorbent assay (ELISA) assay. In general, there are a few difficulties for the patients to perform an AMH test because the existing AMH Test Kit is not widely available and some are very expensive for Malaysian users. Besides, it requires patients to either physically present at medical facilities or purchase an available AMH kit that required them to collect finger blood drops and resend the samples to the address given as instructed in the kit. These may be ineffective because it is time- and cost-consuming besides having the potential risks of samples contaminations or delayed in the delivery time to the labs. Hence, the Anti-Müllerian Hormone (AMH) Rapid Self-Test Kit was designed to provide patients (and women in general) with a preliminary at-home self-screening test kit which is convenient, ready-to-use, time-saving (fast results within a few minutes) and cost-effective. This kit is anticipated to help patients to self-assess their blood AMH level, which may associate with their menstrual irregularities, pregnancy failures and other reproductive health conditions, and eventually visit their physicians for further examination.

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MYFloral Soap™

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Abstract

Handwashing is the first line of defense against transmission of bacteria and virus. Since the beginning of the Covid-19 pandemic, hand soaps have become a hot commodity. Hand soaps can be in various forms such as liquid, gel, and bar, but current products are prone to leak, not travel friendly, and might not favourable to a person with sensitive skin. Thus, there has been a surge in demand for hand soaps that are easy to us, convenient and effective. MYFloral Soap™ is the first soap flakes in Malaysia that contains *Hibiscus rosa sinensis*, *Centella asiatica*, *Baeckea frutescens* and *Rhodomyrtus tomentosa* extracts. The soap possesses antibacterial and antifungal properties. The extracts used in the soap are proven to have antioxidant, anti-inflammation and wound healing properties. Our product MYFloral Soap™ is a great alternative for a quick, on-the-go hand wash and it fits in your purse or even your pocket. Target market for this product are teenagers and adults, travelers and people who has sensitive skin and are aware of naturals product benefits.

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Baeckea Patch-Natural Mosquitoes Repellent

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Abstract

Mosquitoes are the vectors for diseases, for example dengue fever, malaria, chukungunya, Zika, yellow fever, and filariasis. In Malaysia, dengue fever is a serious mosquito borne virus disease with cases and death every year. To date, no vaccine is available for dengue, hence, the use of mosquito repellents has been recommended to prevent mosquito bites. However, most marketed repellents in Malaysia contain chemicals like N,N-di-ethyl-m-tolnamide (DEET) as an active ingredient. This chemical repellent cause side effects like head ache, cough, eye irritation, and breathing problem to the sensitive population. Moreover, they are not effective outdoors and can be toxic and harmful to environment. Thus, natural repellent is the alternative to synthetic repellents. Baeckea patch is a natural mosquito repellent made with *Beakea frutescence* essential oil and extract as the active ingredients. The essential oil and extract of *Beakea frutescence* are scientifically proven effective against mosquitoes. This nature based product is convenience, provide mosquitoes protection up to 12 hours and can be used in all age groups with affordable price. Besides that, the use of this natural repellent for dengue control would protect environment, decreased dependence on DEET-based repellents and generate local employment.

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Molecular Distinction of Lung Cancer Type by Microfluidics Analyses of Novel Lung Cancer Genes Identified by Arbitrarily-Primed Polymerase Chain Reaction

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Abstract

Despite the advances and availability of new drugs for lung cancer treatment, there is an urgent need to find more sensitive and faster diagnostic tools for early detection, as early discovery will increase patient's survivability. Our goal is discovery of new lung cancer genes by a modified Arbitrarily Primed – Polymerase Chain Reaction (AP-PCR) and examining them on microfluidics platform. A single 18mer PCR primer was employed to randomly amplify oligo-dT primed first-strand cDNA prepared from lung adenocarcinoma total RNA and the corresponding biopsy normal tissue from 6 patients, from lung cancer cell line A549 and HTB-182. Several pairs of adjacent and pooled normal and tumour total RNA from liver and were also included. The PCR products were analysed by agarose gel electrophoresis and Agilent 2100 Bioanalyzer. PCR products were visible only in lanes from lung tumour and but none in the rest. Bioanalyzer detected more than a dozen differentially expressed genes whereas conventional agarose gel managed to display only five. Initial sequence analysis of all clones revealed a common primer binding site with prominent presence of *Alu* repeats. One clone match perfectly to a full-length expressed sequence tag (EST) with unknown function. The rest of the transcripts gave no match to any known genes in the database and mapped to various loci on the chromosomes. 3' and 5' Rapid Amplification of cDNA Ends (RACE) was performed to two of the clones, namely C2 and C7. The expression was validated by quantitative RT-PCR.

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Kappa Vita

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Abstract

Maintaining a healthy lifestyle is a concern for many people nowadays. Following the current trend, the demand for herbal products for traditional and alternative medicine has increased. Seeing the growing interest globally, Kappa Vita is innovated for the new trend of keeping good health and exclusively innovated for those who are always on the go. This product is formulated from *Kappaphycus alvarezii* (*K.alvarezii*) extract, Psyllium husk, and orange extract to enhance the flavour. *K. alvarezii,* a local seaweed from Sabah, is one of the main ingredients in this product, has been reported scientifically for its health benefits, notably decreasing hypercholesterolemia and hypertension. Besides that, the gel-forming fibres in psyllium husk can slow down the digestion of food, maintain a healthy balance of insulin and helps in regulating the blood sugar levels, which could benefit diabetic patients. It also could give a feeling of being full, thus can help for weight management. These two main ingredients are also identified as prebiotic to promote a healthy colon, thus enhanced and strengthened the immune system. The orange extract enhances the excellent taste, but high content of vitamin C and antioxidants also could aid in reverse the ageing process and being healthy. It's designed in a single packaging to ensure each pack's benefits can be well-preserved, thus avert the quality of the product from degradation by the surrounding environment. A small and single packet can be conveniently fit in your pocket or purse to make it suitable to carry around. This innovation can also be used as one of the preferred functional food, thus utilizing and promoting our local resources aligned with the government vision of 'Translating Innovation to Wealth' through 'high return on research and development investment' between research institutions and universities and industries.

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Skyfruit: The nature gifted bio-essence for skin rejuvenation

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Abstract
The project showcased the traditional medicinal, *Swietenia macrophylla* King seed (a.k.a Skyfruit) which was being developed into cosmeceutical product. The extensive study conducted demonstrated the essence of Skyfruit possesses great capability in absorbing the entire UVB and some portions of UVA wavelength, wound healing potential and antioxidant activity. In depth molecular biology analysis on intracellular level demonstrated Skyfruit was able to suppress the dysregulation of UVB on a cellular level by promoting an increase in protein expression in the redox system, antiinflammation, DNA repair, RNA transcription, protein maintenance and synthesis, cell growth, migration and proliferation, cell glycolysis processes and on the same time suppressing collagen degradation itself. Promising bioactive that derived from Skyfruit was then analyzed in silico-ly using molecular docking, displayed that the bioactive compounds extracted from the seed were able to bind to human tyrosinase, potentially inhibiting the formation of pigmentation it was then validated using zebrafish embryos studies. Moving forward the formulated cosmetic prototype product demonstrated great effect on skin condition of participants and managed to foster the business collaborations with several companies for commercialisation. In the journey of developmental stage, we have managed to come out with various techniques innovation for testing and received worldwide application use. The project would be also benefiting the ASEAN countries as the traditional plant used would be enabling us to make full use of our renewable biological resources to general high tech product and economical reward to our country. On the same time, improving the human capital development and fostering our tradition cultural use with new fresh breath of design and applications. In summary, our research progress has assisted to the growth of the new techniques for cosmeceutical testing and on the same time preserves the use of traditional medicine in our culture. The cosmetic product generated is deemed much more “natural” and economical, which is befitting towards current consumer demands.

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AERO-G: Patch and Heal

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Abstract

There is growing interest in discovering plants and their bioactive compounds as alternative therapeutic agents to synthetic drugs in wound healing. *Chromolaena odorata (C. odorata*) or locally known as "Pokok Kapal Terbang" has been used traditionally to cure wounds. Besides, numerous studies have reported that the extracts of *C. odorata* leaves have been shown to exhibit antibacterial, anti-inflammatory, anti-oxidant and wound healing properties.Considering these essential qualities, AERO-G is invented in hydrogel patch form, which is upgraded from our previous *C. odorata* gel formulation (AERO-Heal). Our preliminary study of the gel shown it is stable, reflecting the combination of materials used in the formulation, which did not degrade throughout the study. This invented hydrogel dressing consist of 80 percent *C. odorata* aqueous extract in a gel base which promotes efficient healing by keeping the wound moist while delivering actives ingredients that help achieve its therapeutic effects. AERO-G hydrogel patch is suitable for various minor injuries, including cuts and abrasions and skin graft. This product is handy and travel-ready that functions as a wound healing aid that promotes fast healing of all kinds of minor wounds. It seals and protects the wounds from bacteria, viruses and foreign debris. Overall, AERO-G has the potential to deliver the active ingredients of *C. odorata* to the skin that could aid antimicrobial wound care management. Equally important, it can also boost Malaysia's brand of natural products.

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KindyPharm

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Abstract

Pre-schoolers are in need of early exposure to information on safe medicines use and avoidance of harm from misuse of medicines to prepare them for making medical decisions as they grow and become adult. Delivery of age-appropriate information is feasible through the conduct of health program which takes into account their socio-demographic accounts. KindyPharm is devised to educate children at preschool age about medicines through fun learning activities. Unlike the National Quality Use of Medicine Campaign (QUMC) which focuses on public academic institution, our program promotes health equity by targeting on preschool students in private facilities instead. The program strategies include storytelling, colouring activities, hidden picture game, word search puzzles, and interactive game of measuring liquids. Three educational materials published by none other than our team member of Syafi'ah Bakaruddin are used with titles of '*Di Mana Ubat Olah', 'Sukat Ubat Tepat-tepat',* and *'Misi Melawan Raksasa Kuman'.* The 2-hour long program has been successfully organized in two Pusat Asuhan Tunas Islam (PASTI) in Putrajaya, receiving positive feedbacks from the students and the preschool administration. KindyPharm offers a promising platform for innovative collaboration between UiTM and the Ministry of Health to be replicated in other public and private preschool centres.

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The First Virtual Clinical Pharmacokinetic In-House Training (V-CPK-IT) For UiTM Undergraduate Pharmacy Students

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Abstract

Creating content for virtual clinical pharmacokinetic in-house training (V-CPK-IT) to emulate the real hospital environment posed a challenge to lecturers. We conducted the first V-CPK-IT for a duration of 5 days in December 2020. The objectives were to provide experiential training to final year pharmacy students in applying CPK drug monitoring for various disease conditions and populations. Five simulated cases in the form of video using *SimMan* patient simulator were assigned according to students' groupings. Students clerked the assigned cases' daily progress and thus were firstly exposed in using the Ministry of Health clinical pharmacy clerking forms (CP1, CP2, CP3 and CP4). Five lecturers whom each was assigned to a student grouping acted as hospital preceptors and thus conducted daily guided teaching through daily case discussions with students, covering aspects of pharmaceutical care issues and plan using the Subjective, Objective, Assessment and Plan (SOAP) format. Assessment were based on group discussions, video presentation and report writing and individual participation. V-CPK-IT has provided successful learning outcomes in enhancing students' understanding on the practical aspects of CPK towards optimizing drug therapy. The V-CPK-IT has also led to the opportunity to tackling the psychomotor, affective and cognitive domains' limitations due to the pandemic.

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Clinical Medication Review Type III E-Booklet for Malaysian Healthcare Professionals

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Clinical medication review (CMR) Type III is a review that discusses concerns related to the use of medications by the patients in relation to their clinical condition. Low quality of medication review may lead to adverse drug reactions (ADRs), comorbidities, polypharmacy, inappropriate medications, and unplanned hospitalization or re-hospitalization. Awareness of CMR type III in the Malaysian healthcare settings is still lacking. Uncentralised and scattered referencing materials from various literatures concerning CMR Type III such as its algorithm and toolkits also contributes to the low awareness. We conduct a literature search and reviewed 50 literatures to determine the effect of CMR Type III and its algorithm, steps and tools. CMR Type III leads to fewer inappropriate medications use and drug related problems which causes decrease in length of hospital stay. The algorithm can improve the accuracy of detecting potentially inappropriate medications (PIMS) and the STOP-START tools leads to fewer medication errors especially among the elderly. Hence we adapted and incorporated those tools and algorithm in a standardized CMR Type III E-Booklet which forms as a manual for easy referencing and use by our healthcare professionals. Our e-booklet already received support by the geriatricians from Hospital Tengku Ampuan Rahimah, Klang, Selangor, Malaysia.

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A Virtual Video Simulation of the Modified ODL Clinical Pharmacy Clerkship – A First Experience

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Abstract

Clinical Clerkships (CC) encompass a period of medical education in which students practice medicine in the supervision of preceptors. Online Distance Learning (ODL) is the provision of flexible education opportunities in terms of access and multiple modes of knowledge acquisition. The combination of CC and ODL in clinical pharmacy clerkship challenges preceptors since it is to emulate real face-to face hospital setting. The preceptor task is to provide a virtual simulation of predetermined clinical cases to mimic the clinical environment. The main objective is to provide experiential training to 4th year pharmacy student to document patient's information, rationalize and to communicate effectively and develop pharmaceutical care plan. The students were assigned three neurological, cardiovascular and haematological cases over a week. Daily discussion and presentation was conducted with supervision provided by the preceptors. The mode of teaching was ODL discussion, presentation and a final video presentation of the cases. Method of experiential training first exposes students to tools in clerking such as the Ministry of Health Clinical Pharmacy form (CP1, CP2, CP3, CP4). Second, day-to-day discussion of cases applies the Subjective, Objective, Assessment and Plan (SOAP) Format. This hands-on experience will ultimately bring students to understanding their role in ward pharmacy activities such as clerking, rationalizing patient reasons for admission and to provide pharmaceutical care. The output is a written report and a short virtual simulation video presentation. It is hope that the experiential exposure helps students to undergo their provisional registered pharmacy attachment before being a registered pharmacist.

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Glucofix: Brown Seaweed Effects on Glucose Liberation

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Abstract

A study was conducted to examine *Undaria pinnatifida* (UP) and its bioactive compounds to inhibit carbohydrate digestive enzymes. The effects of the seaweed in a human study were also examined. A 5 mg/mL of water extracts of UP was used for α-amylase and α-glucosidase inhibition assay hyphenated with high performance liquid chromatography–mass spectrometry (HPLC–HRMS). Twenty healthy subjects were enrolled in a randomized, 3-way, blinded cross-over trial. The study was registered under ClinicalTrials.gov (no. NCT00123456). The subjects received 30 g of starch with 5 g of UP, daily. Fasting and postprandial blood glucose and insulin concentrations were measured. UP shows the strongest inhibitory effect against α-amylase and α-glucosidase activity with IC_{50} 0.81 ± 0.03 mg/mL and 0.08 ± 0.02 mg/mL, respectively. Alginates found in UP appeared to be potent inhibitors of α-amylase activity with an IC_{50} of 0.075 ± 0.010 mg/mL while fucoxanthin significantly inhibited α-glucosidase with IC_{50} value 0.047 ± 0.001 mg/mL. Linear mixed model (LMM) analysis showed a lower blood glucose and insulin response following the intake of UP. Overall, UP, alginates and fucoxanthin are potent α-amylase and α-glucosidase inhibitors and concomitant ingestion of UP thereby potentially retarding glucose liberation from starches and alleviation of postprandial hyperglycaemia.

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Mythbuster: Remdesivir, a Blockbuster Cure for COVID-19?

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Abstract

When investigating or studying a certain topic of interest, say treatment choices for the current COVID-19 pandemic, one may want to know which medication is more effective, either drug A or drug B? Similarly, in light of recent debates, Remdesivir has equally been proposed as a promising drug of choice for Sars-Cov-2 despite conflicting evidences. Evaluating a myriad of published evidence and papers can be difficult, more so when these papers analysed the same treatment and come to different conclusions. Their different statistics either demonstrates in favour or against an association. We adopted the Forest Plot method to synthesise and consolidate relevant studies probing the same question. In a threefold step-by-step method, we firstly identified common outcomes (e.g., clinical improvement, occurrence of an adverse effect) and then combined statistical analyses of the papers to then proceed to display multiple data on a single set of axis. Doing this allows a healthcare practitioner, in particular clinicians and pharmacists to quickly and effectively make comparison. The method offers a one-stop infographic displaying what the studies show and the quality of those results.

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vOSCE 21

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Abstract

Many face-to-face assessment methods required transformation to a virtual medium including Objective Structured Clinical Examination (OSCE); a competency based examination. The virtual OSCE (vOSCE) was offered to two Clinical Pharmacy Courses: i) PHC 550: Applied Therapeutics in Cardiovascular and Respiratory Disorder and ii) PHC 551: Applied Therapeutics in Infectious Disease and Neoplastic Disorders. During vOSCE, students were assessed on their cognitive, psychomotor and affective skills for a prespecified time. Students rotate to multiple 'stations' virtually via Google Meet to demonstrate competence tasks representing a range of clinical areas within a 'set time' ranging from 3-5 minutes. Competencies tested were the ability to i) read and understand the clinical scenario (station 1) ii) perform history taking from the patients (station 2), ii) solve medication related problem (station 3) and lastly perform discharge counselling (station 4). Simulated patients (SP) were recruited and acted as patients in stations 2 and 4 to assimilate the "real world" scenario of pharmacist-patient interaction. Twenty lecturers were involved as examiners and each lecturer examined 9 students. The vOSCE was performed to the final year undergraduate pharmacy students (n=185) for both subjects in two separate days.

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Smart Conductive Polyaniline (PANI) Fabrics for Anti-Bacterial Properties

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Abstract

The science surrounding the use of face masks by the public to prevent COVID-19 transmission is rapidly progressing. However, not all face masks are created equal. Cloth mask filtration is generally lower than that of surgical masks and respirators. The face mask made from anti-bacterial fabrics, such as Polyaniline (PANI), is ideal for protecting the human respiratory system since it inhibits the growth of bacteria and pathogens. PANI fabrics were previously reported to be unstable when exposed to water, promoting the leaching of conductivity and anti-bacterial properties. The addition of thermal treatment to PANI fabric improves surface durability. As a result, the surface of PANI fabrics was bracing for better adhesion of PANI as anti-bacterial agents and bacterial repellence. The thermal condition was performed on fabrics with PANI solution at various temperatures, ranging from 20 °C to 130 °C. We discovered the best temperature is 40 °C to treat PANI fabrics so that they last after a few washes and are stable in use. The presence of p-toluene sulfonic acid (p-TSA) in PANI fabrics would cause conductivity and anti-bacterial properties to be compromised. During the development of conductive PANI fabrics to bacterial and pathogens, it was found that the acid leaches out from the fabric structure and inhibits colonization. We conclude that improving the surface durability of PANI fabrics is critical for controlling acid discharge from the PANI fabric structure by using proper thermal treatment. This is the first fabric with enhanced durability properties that can act as anti-bacterial agents to the best of our knowledge. Overall, the thermal treatment method used in this project has improved the durability properties of the fabrics by up to 10% of their performance.

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NMR Metabolomics-Future Technology for Diagnostic

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Abstract

Metabolomics is a very useful, fast and easy tool that has the unique feature of connecting all “omics” techniques and best represents the phenotype. Metabolomics, a high-throughput global metabolite analysis, is arguably more of an essential platform than genomics, transcriptomics, and proteomics, precisely because it can be used to characterize the small molecules (molecular weight <1500 Da) fingerprints. The total metabolites within a living organism (e.g., plants or animals) contain approximately 2000–20000 elements, which, when analyzed using Nuclear magnetic resonance (NMR), can reveal significant disease risk factors. NMR-based metabolomics approach is extremely time efficient and cost-effective compared to clinical trial examining *in vivo* and *in vitro* metabolic profiles, which promises to provide data on disease metabolic alterations and mechanism of action associated with various antimicrobial agents. Metabolomics profiling also allows for the activity of small molecules and metabolic alterations to be measured, that provides high-spectral resolution, which has linked to potential metabolic relationships. NMR-based metabolomics is a powerful diagnostic tool to monitor drug toxicity, identify disease markers and highly significant discriminator of different metabolomics profile of various viral infections by following changes in metabolite concentrations in biofluids. Metabolomics studies applied to biomedical research generally employ biofluids (urine and blood plasma), tissues and cells of human or animal origin.

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Oral Synbiotic (OroSYN©) Mouthwash

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Abstract

Oral diseases such as dental caries, halitosis and oral candidiasis are caused by the imbalance microbiome, which leads to the colonisation of pathogenic microorganisms. Currently, mouthwash is used to remove microorganisms in the oral cavity using various active compounds such as chlorhexidine, cetylpyridinium chloride and alcohol. However, these chemicals also kill beneficial oral bacteria, including *Streptococcus salivarius* causing dysbiosis. Dysbiosis is a condition where the microbial composition is imbalanced, which can cause many other diseases, including oral cancer. Therefore, there is a need to improve the current mouthwash, inducing a balanced microbiome to improve oral health. Furthermore, a balanced oral microbiome has also been reported to reduce the severity of COVID-19 lung co-infection. Our product, oral synbiotic (OroSYN©), is formulated from probiotic *Streptococcus salivarius* K12 and prebiotic banana skin. The product has been filed for patents (PI2019006842 and PI 2017704458) and copyright (LY2019004312). The product was supported by IIUM grant (RIGS17-083-0658) and the Prototype Research Grant Scheme (PRGS/1/2020/SKK/08/UIAM/02/1). The project can give an impact, including to the local Bumiputra industry, NFA Technologies Sdn. Bhd. This aligns with the strategic thrust I (Business and Industry Ecosystem) of the Shared Prosperity Vision 2030 that is to empower Bumiputra SMEs. It will also significantly impact the community by increasing the awareness of the importance of oral health, which is in line with SDG no 3: Good health and well-being, and improve the economy of banana farmers, which is in line with SDG no. 1: Zero poverty.

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Multipurpose Portal for Sterilization

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Abstract

The COVID-19 outbreak, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), undeniably has led to significant impact towards various anthropogenic activities. As of lately, sporadic cases have become a major concern. The exact cause remains unknown. The fact that SARS-CoV-2 able to survive on surfaces up until 9 days, depends on the type of surface should not be neglected. Despite low possibility of people getting infected from touching contaminated surfaces, nonetheless, the risk still exists. Indeed, fomite transmission has been reported. With the increase demand of delivery services, due to the restriction movement order imposed by the government, it is wise to consider that fomite transmission can be a possible underlying cause of these sporadic cases. The negligence of proper hygiene management among the vendor, the courier or the user can trigger a chain of infection. Therefore, our group believes that sanitizing any foreign items by the user is appropriate and in fact will provide enhanced protection against fomite transmission. Thus, this project proposed a Multipurpose Sterilization Portal that utilizes ultraviolet type C (UVC) as a method of sterilization. Here, we present our prototype of Multipurpose Portal Sterilization that was designed to be safe, practical and suitable for public use. The portal will be equipped with two doors for inlet and outlet, making the chamber as a pass-through portal for easy sterilization in aseptic environment. The UVC will be connected to a timer, that will expose the items in the chamber for at most 15 minutes of UVC irradiation. In addition, the system will be equipped with cut-off switch as to ensure that the operators will not being exposed to the UVC irradiation. In addition, our product is portable making it to be versatile and convenient to use. Ultimately, this product is expected to reduce the risk of fomite transmission.

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Enhancing Teaching and Learning of Pharmacovigilance Through Adobe Spark

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Abstract

The current pandemic has forced many educational institutions to postpone physical classes. However, to ensure that education continues, many institutions have opted for online teaching and learning. Teaching online comes with many challenges especially in keeping students attentive and focused. Thus, educators are compelled to find creative solutions. Adobe® Spark is an application that can create social graphics, short videos and webpages which can be assessed using various devices. This application allows embedment of videos, quizzes, and links to other websites. A webpage was created using this application for the topic pharmacovigilance which is one of the important subjects for undergraduate pharmacy students. The link to the webpage was shared with the students. A study was conducted to compare students' knowledge before and after the link was given. Additionally, another group of students of the same batch was given an audio-recorded PowerPoint™ slides of the same topic. Their knowledge was also compared before and afterthe PowerPoint™ slides. It was found that the average scores of students in the Adobe® Spark group was slightly better than the PowerPoint™ group, although both groups had better knowledge after the intervention. Students felt that learning through Adobe® Spark is interesting, unique, and enjoyable. The addition of quizzes and interaction with the lecturer was an added value. Educators should consider using Adobe® Spark extensively.

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NOTA-Pamidronate Kit: Novel Fluorine-18 (^{18}F)-based Bone Scanning Agent

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Abstract

Bone metastasis is a common feature in cancer patients and remains the primary cause of death in cancers including lung, prostate, and breast cancers. In diagnosing the condition, several imaging agents used in nuclear medicine, including positron emission tomography (PET) agents such as ^{18}F-sodium fluoride (Na^{18}F), although showed to have potential, suffered from specificity issues due to non-specific fluoride uptake that resulted in false-positive images. To ensure higher sensitivity and specificity, bisphosphonate, a bone-seeking agent, namely pamidronate, has been utilized as a targeting moiety complexed with 1,4,7-Triazacyclononane 1,4,7-triacetic acid (NOTA) chelator, a commonly used chelator for complexing with radiometals. Fluoride-18 has been chosen for its wide availability in nuclear medicine setups. Initially, due to harsh conditions required for radiolabelling, it was deemed unsuitable for complexing with bioactive molecules. Recent development in radiochemistry especially the introduction of aluminium-fluoride (Al ^{18}F) allows for shorter reaction times, more efficient radiochemistry, higher yield, and a better economic approach. Therefore, an innovation of kit based formulation of [^{18}F]AlF-NOTA-pamidronate would allow imaging at centers. The preliminary works are in the pipeline and showed promising results. Using our method, we achieved optimal ^{18}F-fluorination for [^{18}F]AlF and [^{18}]AlF-NOTA complexes, with radiochemical yield and purity of greater than 95%.

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TacDrop: Enhancing Medication Safety for the Visually Impaired

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Abstract

Visually impaired people are at high risk of non-adherence to the medication prescribed and pose safety and efficacy issues in the treatment regime. Although visual impairment tends to affect people aged 50 years and above, there are visually impaired younger generations who experienced issues with their medication. They had difficulties with medicine-taking, including opening and differentiating the medication containers and spillage of the liquid medicine while measuring the medication by themselves. TacDrop is a dropper designed to assist the visually impaired with their liquid medication and is part of the adaptive technology in ensuring medication safety for the visually impaired. A conventional liquid dropper is labelled with a tactile sticker to ease the identification of the correct dropper for the prescribed dose. Different dots on the bulb of the dropper indicates the different amount of liquid designed for the dropper. For example, one dot on the bulb indicates 1.25ml of liquid, while patients should use the dropper with three dots on the bulb when they were prescribed 5 ml of liquid medication. Visually impaired patient will have more confidence when taking their liquid medication or when administering medication for their children with the introduction of TacDrop.

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SAINS-2U

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Before April 2020 all students happily went to school as their regular routine and their interests and performances were strongly influenced by the school activities which were conducted face to face. However, due to the pandemic, students and teachers have to cope with the new norm where teaching and learning are carried out through online platform. The difficulty of continuing education online for some during the pandemic-triggered lockdown was highlighted by many newspapers and online media. Many parents also expressed concern that their children have lost interest in school. Dropping out of school has severe consequences, maybe even affecting crime rates. It became critical in this long-term movement control. This showed COVID-19 outbreak's disruption of school. The best solution would be for us to stop students falling in the first place. Small steps in this direction are important. Therefore, we created this product for our standard 2 kids – Sains-2U. It's an online teaching game, easy to use, can be used anywhere, interactive and it is definitely suitable for this new norm. Sains-2U innovation is one of the options that may avoid drop out among our children, especially to keep their interest in science. It consists of 17 multiple choice questions which follow the standard 2 science subject. Students may play in their own time but interestingly, the game race results are according to their correct answers. The correct answers and important statements can be viewed back at the end of the game and this provides a good revision session. Besides, students' knowledge on the topics will also increase through the interactive discussions with the teachers. Hopefully, this innovation product will help our kids to keep their interest in science and avoid drop out.

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The Right Use of Nicotine Patch as A Strategy for Smoking Cessation Amidst the Pandemic COVID-19

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Abstract

Smoking cessation program was found to be more successful during the pandemic due to fear of COVID-19 threat and economic burden. Nicotine replacement therapy is an effective strategy to motivate the smoker to stop smoking especially during this stressful situation. A seven-minute educational video was created as part of the syllabus "Know Your Medicine" with the aim of spreading awareness on the danger of smoking as a risk factor of COVID-19 infection and its associated complications as well as promotion of personal and public advantages of smoking cessation during the COVID-19 pandemic. This educational video targeted the smoker and advocated the availability of an effective, safe and affordable alternative to cigarette. 'Five Right Use of Nicotine Patch' concept was the main focus of the video whereby right patient, right medicine, right dose, right route of administration and right time was emphasized. Apart from empowering the students in an awareness campaign of safe and effective medicine, this initiative is in line with Malaysia MOH strategic plan 2021; delivery of dynamic, effective and relevant strategies in healthcare delivery during the COVID-19 pandemic. In future, this video will be utilized in smoking cessation clinics around Selangor with hope that the objectives can be fulfilled.

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SimplySanny Sanitizer Sheet: Compact + Big Impact

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Abstract

The COVID-19 pandemic has resulted in various interventions to prevent and control the spread of the virus in the community. For the general population, one of the Standard Operational Procedure (SOP) to reduce the risk of exposure is good personal hygiene. Regular hand washing with soap or disinfection with hand sanitizer containing at least 60% alcohol are recommended by WHO as preventive measure of COVID-19. Various type of hand sanitizers has been available, from bulk to home made. However, existing hand sanitizers are facing several challenges including size, cost, cross contamination and toxicity. SimplySanny, a hand sanitizer dissolving sheet is invented as a compact and portable hand sanitizer. SimplySanny is made from biodegradable Sodium Carboxyl Methyl Cellulose formulation that will dissolve upon rubbing to minimize waste. The sanitizing formula consists of *Chromolaena odorata* extract, benzalkonium chloride (preservative, antimicrobial agent, surfactant) and mint essence to moisturise and refresh the skin. The formulation is synergized to act by denaturing protein cell wall and inhibition of enzyme in the microorganism's metabolic pathway. One sheet of SimplySanny will completely coats the hands and dries under 30 seconds to leave skin germ-free and moisturized. Preliminary study using disc diffusion method shows that SimplySanny has the antibacterial activity comparable with similar alcohol-based hand sanitizer. However, the compact size, travel friendly and carry-on compliant is the utmost advantage of SimplySanny compared to other products. With the price of RM2.99, SimplySanny has a potential to be the first hand sanitizer sheet on the market and able to compete with currently available hand sanitizers. SimplySanny is a quick, easy and effective hand sanitizer that is designed to fit the new normal.

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Coronavirus Educational Kit 3D Components of Coronavirus Molecules for an Engaging Teaching & Learning Experience.

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Abstract

In this work, we developed a functional prototype of a coronavirus educational kit that contains 3D components of four important molecules of coronavirus: the virion, spike protein, main protease and RNA polymerase. The kit serves as an assisted teaching and learning tool for educators and students at various educational levels. It can be used while teaching virus related subjects such as science/biology for high school students, and biochemistry, microbiology and virology for higher education students. Using this kit, students learn by doing hands-on assembly of the virus molecules. The 3D components can accelerate their understanding while referring to diagrams in the textbook. This tool can benefit the most scientists working in the field of structure-based drug design and structural bioinformatics, especially in coronavirus research. Other than teaching and learning applications, the educational kit is also suitable for the public awareness program about coronavirus. The 3D models of the virus structures can be utilized for exhibition or as additional materials for any presentation. It may improve public understanding of the science about viruses, particularly on the spike protein that is being utilized as the main component in the COVID19 vaccines. In this package, the components of the coronavirus structures are highly curated as they were digitally processed from the cryoelectron microscopy and X-ray crystallography data. The physical components were produced using 3D printing technology, the current most sustainable manufacturing method. The materials for the products are made from polylactic acid (PLA), a thermoplastic polyester produced from plant-starch. Thus, the production and materials are compliant with the United Nation (UN) Sustainable Development Goals (SDGs) agenda.

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PharmGy: An Innovative Strategy to Engage Students in Pharmacology

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Abstract

Pharmacology is an integral component of the undergraduate pharmacy curriculum, providing core knowledge on the mechanisms of drug action and toxicity. Pharmacology courses are instrumental in laying the foundational concepts required for understanding of patient specific drug therapy and rational drug therapeutic decisions. It is thus important for pharmacy graduates to appreciate pharmacology principles, able to relate and apply them in their practice. It is a known fact that the pharmacology courses in undergraduate pharmacy entail the delivery of large amount of information in a relatively short period of time. Mobile technologies are playing an increasingly important role in students of tertiary education. The use of smartphone and tablet devices is gradually becoming a compelling learning tool used to enhance teaching and learning in distance education. Furthermore, the trend in education is changing, with digitalisation of content and e-learning development and utilisation on the rise, especially in this current pandemic. This new development necessitates the need to consider a shift from the general norm, whether it be curriculum delivery or students' learning processes. This project focuses on the development and utilisation of mobile application for pharmacology revision, with the objective of engaging student in quality studying while on the move. PharmGy, is a mobile app that features multiple choice revision questions on pharmacology of drugs. Topics are sorted by body system and instant feedback are provided for correct and incorrect answer choices. The utilisation of this app helps students to analyse what they have been thought in an interactive and systematic way and thus understand pharmacological concepts better. The inclusion of interactive elements, and the added-on concept of gaming would provide a fun and satisfactory experience in learning. We believe that this application would play a major role in improving students' understanding and performance of pharmacology related courses.

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Visual-based Digital Flipbook on Undergraduate Research Poster Guidelines: An Innovative e-Learning Approach

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Abstract

Following the COVID-19 pandemic crisis, the needs for technology and e-learning tools came into demand to ensure the effective teaching and learning activities with much more innovative and interactive online learning approaches. This has greatly challenged educators and learners to be tech-savvy and equip themselves with the variety of e-learning tools to help them in online and distance learning. Digital flipbook is one of the most recent freely available online e-learning tools that provide a high impact and engaging approach in delivering lessons, as well as enhances the interests of the learners. Hence, taking advantage of this approach, present project was executed involving the compilation of previously presented scientific posters of the final year projects from undergraduates of Faculty of Pharmacy, Universiti Teknologi MARA (UiTM) (from the year 2015 – 2019), whom were under the supervisions of the authors. The aim of this project was to provide guidelines – through the given examples – on the tips of preparing research posters, especially for the presentation of their research projects. This was executed as one of the initiatives to help students who were mostly first-timers working on a research poster. Besides, this digital flipbook is also a useful way to exhibit, share and promote research activities as it allows affordable, accessible and flexible display of information to the public. In conclusion, the digital flipbook used to catalogue the previous research posters of undergraduate final year projects is foreseen as a beneficial innovation of e-learning approach that can be used to our students and students from other universities.

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Design, Implementation and Outcomes of Virtual OSCE for Undergraduate Pharmacy Students

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Abstract

The transformation process of the face-to-face clinical assessment modality known as Objective Structured Clinical Examination (OSCE) into virtual platform holds a significant challenge in terms of designing the competencies to be assessed, logistics and technology to be employed. A 3-station virtual OSCE was designed and implemented for the third-year pharmacy students in January 2020. Multiple discussion sessions were conducted among the key stakeholders in the designing stage to ensure efficient conduct of the vOSCE. Competencies to be assessed, case and rubrics are prepared by the vOSCE committees and vetted by expert panel following the standard criteria, format, and protocol for vOSCE. Google meet was utilised upon assessing stakeholders' familiarity, internet connectivity as well as availability of recording function. Rubrics were transformed into virtual format using Google Form. All necessary efforts to uphold the vOSCE's integrity were taken including using password protected documents, randomising cases, and blinding of examiners. Overall, students were satisfied with the organization and operation of the vOSCE. Majority of the students cited that instruction provided was clear and tasks given at both stations reflected the teaching content. The vOSCE provided educators and students with unique experience of tele-pharmacy which is commonly practiced in pharmacy service today.

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Oral Mucosa 3D Model Utilisation for Drug Assessment

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Abstract

The construction of the 3D model has become an option available in pre-clinical studies to address the drawbacks of current model systems such as monolayer(2D), animal and *ex vivo* model. Many investigators have moved to 3D model systems because of the high resemblance to the native tissue and clinical relevance because these complex 3D models provide better, more relevant information when compared to other model systems. Fundamentally, 3D model involves combining cells, growth medium and scaffold in order to fabricate biological substitutes. Current oral mucosa models are constructed using primary oral keratinocytes and fibroblasts that display donor-to-donor variability and whose widespread use is restricted by availability and ethic limitations. To address these issues, an attractive approach is the development of oral mucosa models using immortalised cells as these cells have longer lifespans, accessibility, reproducibility, ease of culture and can be propagated almost indefinitely whilst retaining the morphology of normal cells. The aim of this study was to fabricate the 3D of normal oral mucosa model (3D-NOM) based on immortalised oral keratinocytes (FNB6 TERT-2) for drug evaluation in Research and development (R&D). This study has produced the full-thickness of 3D-NOM that are histologically and structurally equivalent to the native oral mucosa.

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Category: Inventor 2

Non-Academician from Higher Education Institutions or Agencies

RoXxy Heels Blister Patch Gel: A natural remedy for heels blister prevention and recovery by using Rosemary Essential Oil.

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Abstract

A blister is a small fluid-filled bubbles that forms on area of the skin that may develop after a skin burn, infection with fungus or bacteria, or trauma. A blister can interfere with everyday tasks commonly develop on the feet that may cause difficulty for walking or standing. Strong evidence about Rosemary Extract Oil; *Rosmarinus officinalis L.* in experimental blister or wounds have begun carried out an antimicrobial activity, anti-inflammatory properties and antioxidant agent is thoroughly described in literature. We designed a RoXxy heels blister patch gel with dosage of natural product-based active ingredients mainly from Rosemary extract oil that accelerates the wound healing process, effective in reducing inflammatory and absorb fluid-filled bubbles inside the blister to enhance skin's discomfort. It instantly forms a soft protective antimicrobial barrier to protect blister from rubbing and touching which can lead to risk of infection and scarring. The patches also create a moist environment for faster and better healing. It is designed in adhesive semi solid gel form to effectively deliver active ingredients to prevent heals blister. This product is made of natural product; thus, it can be commercialized as a cheap, safe and effective alternative to available wound care product.

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LoCal: Alternative to Sweetened Condensed Milk

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Abstract

Monk fruit or luo han guo fruit (*Siraitia grosvenorii*) is a member of the Cucurbitaceae family. This fruit is commonly used in traditional Chinese medicine for the treatment of several diseases. Recently, monk fruit has become important area in research because of its noncaloric, extremely sweet components called mogrosides. The consumption of sweeteners, natural as well as synthetic sugar lead to many health problems in Malaysia. Due to the growing concern of increased calorie intake from added sugar in sweetened condensed milk, LoCal is produced to act as alternative. LoCal made from a combination of monk fruit sugar, skimmed milk and unsalted butter by using a simple cooking method. It is lower in calorie, sugar and fat than the available normal sweetened condensed milk in the market. Monk fruit sugar will not give impact on blood glucose level or insulin. LoCal's taste is 90% similar to the sweetened condensed milk. Therefore, it is hope to achieve its objective to serve the public with healthier choice sweetener for food and drinks. In future, it is planned to expand this research by adding additive or using better technic to longer the shelf life of this product.

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Potential of Roselle as High Value Beauty Supplement

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Abstract

As the global demand of natural beauty supplement increases, Malaysia is among countries that follow this trend. This is attributable to consumers' awareness related to their inner beauty, eating habits and resources towards the health performance. However, Malaysian beauty industries is still lacking with the supply of local natural products and still depending on imported ones. Consequently, Malaysians have limited choice in choosing high quality natural food segment since the imported products are extremely expensive. Moreover, Malaysians are also exposed with many synthetic-based beauty supplement that enriched with synthetic ingredients, including colorant to produce attractive features of the product, with low quality value and high chances of side effects. Roselle plant segments extracts have been successfully revealed to contain anthocyanin, fatty acids and tocopherol, which make it possible to be exploited as high value beauty supplement as these constituents possesses antioxidant activity and good nutritional value for food sources. This project aims to empower Roselle as sustainable local source for high quality and nutritious food supply, especially in beauty industry, in Malaysia.

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Bunny Playtime: Exercise Tools for Rabbits

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Abstract

Rabbits are gregarious animals that live in a small breeding group where they crawl, hop, jump, run, mate and nest for social interactions. This social interaction is essential for mentally and physically healthy rabbits. However, rabbits that kept in an enclosure will have lack social interactions and physical activities. This is due to cage housed rabbits are kept for some time with insufficient space to express their normal behaviours. Bunny playtime is one of the ways to give freedom for them to exercise and socialize with designated exercise tools within an area. It comprises exercise tools that can be created from recycled items such as cardboard boxes, newspaper, ropes ball or PVC pipes. These are safe, effective and eco-friendly exercise tools to improve the good welfare of these animals. This new structured exercise and socialisation programmes for cage-housed rabbits can decrease the incidence of stereotypical behaviours, increase the quality of life, prevention of diseases and improve human-rabbit interactions during clinical research procedures. Hence, a positive state of animal's wellbeing will result in research excellence that will benefit society.

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E-MAM; Manual Amali Makmal

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Abstract

Smartphone, a gadget that is highly preferred and commonly used in line with the advanced technology such as Quick Response Code application. In this digital era, the Quick Response Code also known as QR Code is a medium to store a lot of information by generating a code in type of matrix or two-dimensional barcode and recently used in various fields of application which can be use via smartphones. In laboratory, staff are using the conventional way to document copy of practical manuals such as by filing and sometimes it can be unorganized. Therefore, this project aimed to develop a QR code system to facilitate as well as an easy access to a practical manual document, named E-MAM; *Manual Amali Makmal*. The information in this system includes all the apparatus, method and procedures as well as calculation or formulation that are used in the practical. This will help laboratory staff to save time and their work will be more systematic and productive. On the other hand, the QR code reduces the use of paper because no hardcopy needed and at the same time we can protect the environment.

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I-LOG Track & Trace

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Abstract

Monitoring the instruments usage and booking system are important task for the laboratory in order to keep both parties, users and staff updated about the lab's activities. In conventional way, the hard copy booking form and log book is essential to get the users details and trace the instrument activities. These can cause a lot of papers usage, weakness in document control and not user friendly between the laboratory staff and user. Therefore, we introduce a new innovative way called "**I-LOG**" in helping laboratory to replace the conventional booking and monitoring system. The user just needs to scan the QR code and fill up the online booking form as well as for the log usage on the instrument. The booking information and the details of users can be securely kept and automatically transfer to the booking schedule which can easily be monitored in one drive. The idea of using I-LOG is in line with modern era that demand easy, convenient and quick communication between users and laboratory's staff. I-LOG works like wonder where, users can easily scan the QR code from the lab's website for the instrument's booking and next, scan the QR code on each instrument for the log usage. With this, I-LOG will be captured and recorded the information of users according to the instrument and can be easily trace anytime and anywhere by the lab's staff for monitoring purposes. Apart from that, I-LOG can help to protect users from Covid infections by using QR code scanner from user phone. In conclusion, this new innovation could be economical, paperless, time saving and easy for both staff and users for the record keeping and monitoring the lab activities.

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E-IOI: Instruction of the Instrument

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Abstract

Smartphones are becoming an essential device to everyone due to the connectivity and convenience they provide. The device can be used to decode QR codes (Quick response codes) at high speed. QR code is widely used in the automatic identification fields. The emergence of the COVID-19 pandemic accelerates the usage of smartphones and QR codes globally. Everyone is advised to practice social distancing and reduce contact with high-touch surfaces and objects to curb the spread of Covid-19. By now, all commercial/public premises require QR code scanning upon entry, and most merchants offer smart payment options using QR codes. Additionally, QR codes are used in marketing such as directing clients to resume, websites, business cards, discount codes and events. Therefore, we would like to introduce the concept to our laboratory management by generating QR codes for instruments available in the teaching and research laboratories (the system is known as E-IOI). The QR codes carry detailed information on the procedures/instructions to operate the instruments. By scanning the QR code using smartphones, users may conveniently and rapidly obtain the information. Furthermore, the E-IOI implementation is economical (QR code in a sticker form to replace the conventional A4 size printed paper instruction) and allows efficient procedure management (e.g. easy to update information). In conclusion, this project not just supports contactless but also paperless instrument management.

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hydraEye

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The dark circle around the eye that is referred to as a panda eye is mainly caused by chronic eye tiredness, age, eye strain, allergies, dehydration, overexposure to the sun, and in some cases, genetics. Dark eye circles are treated based on the aetiology of the condition. But, in rare cases, certain home treatments can be of use. Some of the most commonly used ways include soaking the tea bags in a cold compress and administering a cold compress. However, with current and innovative technology, there is a way to circumvent this issue using an eye cream or an eye patch. In addition to solving these difficulties, the hydraEye with Kelulut honey was formulated. hydraEye has hyaluronic acid, argan oil, glycerin, and Kelulut honey, which aids in the rejuvenation and revitalization of tired eyes. hydraEye is paraben-free and skin-friendly; thus it is ideal for people with sensitive skin.

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PUREBELLE: Coconut Oil with Tomato Extracts Hand Cream

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Abstract

In this era of COVID-19 pandemic, hand washing and sanitizing are considered as a staple routine every single day. Lots have suffered from extreme hand dryness as well as redness and itchiness. This is because of the high concentration of alcohol in the sanitizer, plus soap and detergents can also cause skin dryness. Therefore, an effective yet fast absorbing hand cream is a must. The two main active ingredients of this hand cream are coconut oil and tomato extract. Coconut oil is considered as one of the superfoods for many. Coconut oil has been shown to be as effective and safe as mineral oil when applied as moisturizers for mild to moderate xerosis. Clinical studies have revealed that coconut oil improves the symptoms of skin disorders by moisturizing and soothing the skin. While, the tomato is rich in flavonoids with intense antioxidants activities which is the key properties to fight free radicals and slow down skin aging. Formulated with all natural, non-toxic ingredients and infused with lavender oils, this natural hand cream aims to moisturise and revitalize tough, dried out hands while giving a subtle scent and calming feeling. With the pH of 5.67, this non-greasy formulation will absorb quickly and locks moisture in the skin, while maintaining the natural skin barrier.

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e-ATRApps: Asset Tracking Applications

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Abstract

e-ATRApps is an asset tracking application inspired by AppSheet. It is a systematic electronic medium used for tracking the asset in the laboratory. By using the application, the laboratory staff can easily find the asset faster, auto-update, real-time, paperless and can be done anytime and anywhere. This application shows that the built system can work faster compared to existing manual ways (*softcopy*) on asset management. With this application, laboratory staff can easily view all the assets in the laboratory, quantity and knowing the condition status and picture of assets without having to present physically into the laboratory by browsing using a phone or a computer. Moreover, the use of an asset tracking application is to find the asset locality, condition and maintenance status.

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RoBo Cleaner

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Abstract

Organic synthesis is about transforming a readily available reagent into a more valuable product. Having clean glassware is crucial for the efficiency of this process. Dirty glassware can potentially affect the reaction and make isolation of the final product more challenging. Thus, a synthetic chemist must keep the glassware spotless. Glassware must be physically and chemically clean. Round bottom flask is used in heating or boiling of liquid, distillation. The most common procedure for cleaning glassware that will be effective against dirtiest glassware will be to first rinse with an organic solvent, and then second, to brush and scrub with warm, soapy water. Then the glassware needs to be rinsed with tap water, deionized water, and finally with acetone before placing on a rack to air dry. As it is important to have clean glassware, we have created a motor driven revolving brush which is operated by batteries and bristles made from nylon strings which can elevate up to about 10 degrees for easier cleaning of the round parts of the glass bottom. The nylons string is not abrasive but powerful enough to thoroughly cleanse the round bottle. This motorized brush is valuable especially when a large number of tubes or bottles are processed. It will reduce the cleaning time with a minimal effort of brushing. Furthermore, brushes are more hygienic than sponges and that their use should be encouraged.

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Anti-Aging Nano Formulation BeuT-Complex for Skin Care and Cosmetic Products

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Abstract

Nanotechnology incorporation in cosmetic formulation is considered as the hottest and emerging technology available. Cosmetic manufacturers use nanoscale versions of ingredients to achieve better efficacy in function of UV protection, deeper skin penetration, long-lasting effects and increased colour intensity. In this invention, BeuT-Complex™is developed as a novel micellar nanotechnology-based ingredient for anti-ageing cosmetic formulation. The nano-formulation comprises plant derived natural surfactant, emulsifier, the oily phase comprising plant oil which molecular weight greater than 300 and aqueous phase comprising biological active extracted from Roselle Calyces, Bee Venom, and Camellia Japonica Flower. It provides nano formulation with a number average size of less than 100nm, preferably ranging from 40nm to 70nm. The micellar globules entrap oil components inside the micelles core which oils interacted with surfactant hydrophobic segment, to enhance the components' efficacy. The micelle globules functioned as vehicle to efficiently deliver the nano sized globules that comprising high percentage of biological actives in both oil and aqueous extracts into skin surface layers. This Nano formulation possesses safe and effective anti-aging activity with promoted 50% increase in Human Pro Collagen type 1 production, wrinkle reduced 7.4% in 4 weeks and skin whitening by 80% tyrosinase inhibition activity.

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Foliage and Plant Parts Enrichment for Laboratory Rabbits: The Reference

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Abstract

Rabbits in the wild spend most of their time digging, jumping, socializing and running. This is not the same in captivity or laboratory situations. For rabbits to be natural, they need to be given plenty to do. This is what we call enrichment. In the wild, they spend 80% of their time foraging. In pet rabbits, enrichment is provided with hay and grass apart from tunnels and hideouts. Enrichment in rabbits can be divided into 4 categories, namely: olfactory, auditory, tactile and visual. This experiment/video highlights the foliage and edible plant enrichment for rabbits. This enrichment behaviour fulfils one aspect of rabbit welfare. Rabbits love to have their food scattered rather than having their food in a bowl since they like to forage. At LAFAM UiTM, the 5 New Zealand rabbits were subjected to various foliage and plant parts enrichments. Enrichment encourages positive natural behaviour and decreases abnormal behaviour. They like to have the freedom to exercise and explore and forage. A rabbit's digestive system needs fibre to function, these fibres are supplemented by various leafy vegetables. In this study leaves from the local plants were used such as the mulberry, cassava, agathi, sapodilla, insulin, hibiscus, gooseberry, moringa, jackfruit and blume. Besides that, others such as the hibiscus flowers, banana pseudo flowers, its stem and unripe fruits were also applied. Taiwan napier grass and sugarcane stems were also included. This foliage and the plant parts have good nutritional benefits to the hindgut animals and serve as an enrichment for the rabbits in captivity.

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Category: Young Inventor

Undergraduate Students from Higher Education Institutions

Moraleaf Sheet: Daily Immunomodulator Supplement of *Moringa oleifera* Leaves Extract as COVID-19 Preventive

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Abstract

COVID-19 pandemic's still being a challenge for several countries, even though vaccines have been developed, but we have not completely separated before the occurrence of herd immunity. One of the main steps in preventing the infection is taking vitamin C supplements which would increase stamina and immunity. Most people consume vitamin C in various form such as capsules, tablets, lozenges, syrups, jelly, or pulveres. However, that kind of vitamin C are still less practical, especially for individuals with heavy activities due to the needs of water to consume them. On the other hand, vitamin C supplement's packaging has a large size so it is less practical to carry around. Moraleaf Sheet is an innovative product of vitamin C made from Moringa leaf extract which contains vitamin C, vitamin E, beta-carotene, and phytochemical antioxidants from phenolic group as immune booster. Moraleaf Sheet is made from a combination of Moringa leaf extract, starch and another additive formed in colored paper with a unique shape and motivational qoutes and packaged in a jar. The form of a sheet makes Moraleaf practical to be consumed and carried around. The motivational words could add the enthusiasm of communities to consume them without ignoring the main advantages.

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Manufacture of Eucalyptus Oil Aromatherapy Products for COVID-19

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Abstract

SARS-Cov-2 virus or known as Coronavirus Disease (COVID-19) originated in Wuhan, China, and was discovered in late 2019 and has spread to 65 countries. Efforts are made by the community to reduce and prevent the infection of COVID-19 by washing hands with soap, maintaining distance, not traveling unless necessary, always using masks and hand sanitizer, consuming foods that can increase immunity and balanced with supporting supplements. "Eucalyptus oil is one of the traditional medicines used for airway diseases such as asthma, sinusitis, and lungs. Eucalyptol (another name 1,8 cineole), which includes flavonoid compounds is the active ingredient isolated from eucalyptus plants by distillation". According to SNI (Indonesian National Standard) number 06-3954-2006, eucalyptus oil contains 50- 65% 1,8 cineole. Purification of 1,8 cineole compounds up to 85% levels obtained through twice fractionation.

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Interprofessional Students Emergency Response Team (InSERT)

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Abstract

Interprofessional education is an educational approach for preparing students in the health professions to provide patient care in a collaborative team setting. We conducted a scoping review of 47 qualitative studies that reported healthcare professionals'(HCPs) experiences in dealing with COVID-19 pandemic. Lack of workforce and increase workload were one of the issues faced by HCPs. Furthermore, in Spain, nursing students had to join hands despite the lack of experiences and training to respond to increasing healthcare demand. However, this caused a lot of anxiety as they were not mentally prepared to handle situations that arises. Based on the evidences gathered, it is critical to maintain adequate number of HCPs in healthcare facilities to provide safe working environment for both HCPs and patient care. We propose the development of InSERT which consist of undergraduate and postgraduate students from medicine, nursing and pharmacy department to support HCPs during a pandemic. InSERT members will be specifically trained for pandemic response and upon completion, the member should be ready for deployment in healthcare facilities during any outbreak or emergency. A specific training module that caters for pandemic response is necessary for accreditation of this programme that can prepare students to standby or back-up our HCPs in overwhelming situations.

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Development of Straw Mushroom (*Volvariella Volvacea*) Flour and Its Application in Baking Product

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Abstract

This project focused on the nutrition analysis of flour ingredient in making gluten-free bread. The added ingredient is the straw of *Volvariella volvacea* mushroom which was added to supplement gluten-free and wheat bread (control). The findings showed that gluten-free bread supplemented with mushroom flour powder has increased its protein, fibre, ash, and carbohydrate content while lowering its moisture, and fat content. The texture of gluten-free bread is able to mimic the texture of wheat bread after the addition of mushroom ingredient flour. This innovation is applicable in the product development sector to explore a new market of gluten-free products. The new ingredient flour is beneficial for those with gluten intolerance, whereby they can consume this gluten-free bread supplemented with mushroom flour to gain the same level of nutrition as wheat bread. Lastly, this innovation has commercialization potential on its key point: product, people, price and place. Mushroom flour has an economic value to replenish the deficiency of protein and fiber in gluten-free bread. This product targets people who seek healthy food and gives a great option of gluten-free food. The price key point of this product consists of the price composition strategies and place key point involves market, channel, and distribution to ensure this product is available to consumers.

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DeCare: An Application to Care for People with Dementia and their Caregivers during a Pandemic

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Abstract

We conducted a scoping review of 27 articles pertaining to the challenges faced by people with dementia (PwD) and their caregivers during COVID-19 pandemic. The implementation of lockdown disrupted PwD's clinic visits which is important to maintain their wellbeing. Total death among PwD due to non-COVID-19 reasons were high during the pandemic. As for the caregivers, the burden in managing PwD increased. Lack of family support due to restricted movements and closure of geriatric settings to cater to pandemic management overwhelmed them. Based on issues identified from the review, we are currently developing DeCare, an application that will be beneficial to PwD and their caregivers. This application will provide a platform for online consultation with their physicians. It will also be linked to the community pharmacy whereby their medicines can be delivered to their homes. Additionally, the application will also include games that can stimulate PwD's cognitive function. As for the caregivers, this application will provide information on non-pharmacological management in managing PwD. There will also be a feature that provide caregivers with stress management resources and online consultation with psychologists. Thus, application DeCare will be useful to connect with PwD and their caregivers and to support them during the pandemic.

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Massage Bar Added with Watermelon Skin Extract and Mints

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Abstract

Massage bar is like a lotion but in a solid form that has dual functionality. It could be used as a lotion for skin moisturization, while the oily ingredients in the massage bar could be applied for massaging purposes. Agroindustry waste like watermelon rind is precious to incorporate in the massage bar as it composes antioxidant, antifungal, antibacterial, and many more. The use of this watermelon rind in this cosmetic product might reduce the landfill dumping of the waste. Therefore, this research aims to formulate massage bar using a watermelon skin extract incorporated with peppermint essential oil to give the cooling effect. This study tested the DDPH radical scavenging ability, viscosity, pH and hardness of the product and compare the values with the commercial massage bar. The tested properties showed promising results where the developed massage bar in this study can be commercialised.

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Flipchart for Visual Perceptual Skill

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Abstract

The term Visual Perceptual is the process that refer to the capacity of brain to understand and interpret the raw material of vision what the eyes can see (images of surrounding) that can be used for decision making. In addition to basic visual functions and motor skills, visual perceptual skills allow us to carry out many daily activities and to guide our actions. There were known as 7 components in Visual Perceptual Skills (Visual Discrimination, Visual closure, Visual Memory, Visual spatial Relationship, Visual Form Constancy, Visual Sequential Memory & Figure Ground Discrimination). Visual perceptual skills often problems in school based children as they came from various unmatured skills especially in children that been diagnosed with dyslexia, down syndrome, autism, mentally challenged or developmental delay children. This may cause them to lack in academic settings when it come to school syllabus that required them to fulfill the school based task, especially it affect writing and reading session. This "Flipchart" is to help parents, teachers and therapist to train and monitor performance for visual perceptual skills for their children/patient to improve in visual perceptual skills area, in order for the children to improve in motor skills, self-care, social participation, recreational activity, and education This Flipchart visual perceptual skill is a training activity from printed picture that had been laminated. It makes as flipbook so it can be easy to be use for parents and therapist.

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Category: Junior Inventor

Primary and Secondary School Students

KIDS EXPRESS: A Tool for Parents and Teachers to Help Children Cope with The Pandemic by Voicing Through Art

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Abstract

Young children are having difficulties in coping with the lifestyle changes due to COVID-19 and its implication on their education. Not all children are able to cope with on-line learning and it may affect their mental health. Parents and teachers play an important role to assist young children to express themselves through art. Children may not have the ability to verbally express themselves about the difficulties faced by themselves or their family members. Besides, art can also be used as an educational tool for children to explain the way they understood the lessons taught by their teachers through art. Hence, we have created KIDS EXPRESS which is a unique box that contains a guide for parents and teachers to assist children with their learning as well as tips to help kids cope with their emotions during the pandemic. It also comes with an art kit that will be a great gift for children to express themselves.

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FRIENDLY EDU: Pioneering On-Line Learning

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Abstract

Covid-19 pandemic forced student and teachers to convert to online education and it has not been an easy situation for many. We conducted an on-line survey to explore students' experiences with regards to online learning and the potential solutions to improve the current system. A total of 65 primary and secondary students participated in this study. Analysis of this study revealed that students were happy that they have the flexibility in learning schedule and able to experience game-based education through online learning. Internet connection issues (69.2%), homework overload (53.8%) and boredom during lessons (53.8%) were the main problems faced by students. Shorter lesson time, more student engagement activities and project-based learning were the potential solutions reported by the students to improve current online education. The findings of this survey inspired us to develop Friendly Edu, an application to make students regain their interest to study as many respondents in our study mentioned the word 'boring' when it comes to on-line classes. Hence, Friendly Edu is designed for interactive learning with special features which includes personal space for students, interactive on-line tools, and a bi-directional communication support system to keep students engaged during and after the delivery of lessons.

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Safer Cosmetic for Children

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Abstract

Excessive sun exposure is much related to the subsequent development of skin cancer. Moreover, 80% of total lifetime sun exposure happen during childhood. Researchers suggested the routine of sun screen use can be initiated since young age and they have calculated that this approach may reduce subsequent skin cancer by 78%. Therefore, sun screen use for children that including avoiding excessive sun exposure and covering exposed skin is one of the most important approach to prevent the development of skin cancer. In the aspect of sun screen use among children, high quality and safe ingredients implemented in sun screen formulation must be taken into consideration, since children skin is more sensitive than adults. In Malaysia, there is still unavailable local sun screen product that specifically formulated for children and Malaysian currently is depending on imported brands. Unfortunately, according to experts, nearly three quarters of the imported sun screen products on the market contained with toxic ingredients such as oxybenzone, retinyl palmitate and ethylhexyl methoxycinnamate that can cause hormone disruptor, cancer and photoallergic, respectively. Besides, the sun screens are also mostly had SPFs above 50 which contain more sun-filtering chemicals that can lead to other sun damage. Therefore, this project invented a sun screen lotion specifically formulated for children use with safer ingredients (mineral UV filters) and Malaysian local plant (Roselle) extracts implementations. Through this, a collaborative with Universiti Teknologi Malaysia has been assessed since this institution owned years of experiences in research on Roselle plant extraction. The extracted Roselle are found to be enriched with vitamin C (12.41 mg/g) and E (466 ppm) from its calyxes and seeds, respectively which offer skin moisturizing and anti-oxidant effects for further nourishment of children skin. The mineral UV filters used are titanium and zinc oxide which less irritating to children's skin and no adverse events. This is the first sun screen product in Malaysia that will fulfil the needs of children for its safer approach in protecting the skin. Furthermore, this invention is impactful towards Malaysian children to educate them on importance of safe cosmetics since young age by developing a sun screen lotion formula from nutritious and high quality local ingredients for effectively protect children's skin from UV radiation, thus the worst UV damage (skin cancer) can be prevented.

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ZMAYZ Hair Serum

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Abstract

Corn silk (Stigma maydis) is a type of natural fiber, with long silky threads that grows underneath the husk of a corn. It has several medicinal values, *and* contains proteins, carbohydrates, vitamins, minerals, and fiber. It has been used as an herbal remedy for a variety of illnesses. Corn silk has a hair-like appearance, and it helps to nourish and give a natural shine to the hair. Hence, we have invented a hair serum by using corn silk. We have extracted the compounds of the corn silk through infusion technique, by steeping the fresh corn silk in a mixture of glycerin and water. The resultant infusion was then added with essential oil and tocotrienol. Emulsifying agents and preservatives were also added into the solution. We have named our product ZMAYZ which was inspired by the scientific name of corn which is Zea Mays. The tagline for our product is 'Be amaze with ZMAYZ'. The formulation is mildly scented, non-greasy and moisturizing. Just shake and spray ZMAYS Hair Serum and get the silky and shiny hair.

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Lemon Aloe Vera Moisturizer Treatment Cream: 2 in 1 Innovation Cream

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Abstract

Moisturizer cream is a cosmetic purposed cream used for protecting, moisturizing, and preventing our skin from dryness and other skin problems. These functions are normally performed by sebum produced by healthy skin. 2 in 1 moisturizer cream with treatment properties would be very beneficial for daily usage. Therefore, in this project, our group invented a Lemon Aloe Vera Moisturizer Treatment Cream which contains a lot of benefits from ingredients used to make this product. This product was made from scratch by using ingredients which are aloe vera gel, lemon, essential oil lemon, vitamin E and olive oil. Aloe vera gel and olive oil were blended, then all other ingredients were added to the mixture. The mixture was refrigerated until further use. Aloe vera was proven to have moisturizing effects on dry skin, removing dead cells and give protection against UV light. Similarly, lemon's active ingredients such as citric acid, limonene, vitamin C and pinene exerted health benefits including therapeutic purposes, antioxidant properties, combat free-radicals and preventing degenerative diseases. In addition, vitamin E also have an antioxidant and anti-inflammatory properties, shown to treat a variety of skin conditions. This product will be a potential 2 in 1 cream which can be use as both moisturizer and treatment cream. Therefore, this cream can be an alternative to improve skin dryness and other skin problems.

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