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“Expanding Frontiers Through Innovative Ideas”

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Edited by

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Dr. Gurmeet Kaur Surindar Singh
Dr. Noreen Hussain

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Pectin Hydrogel® Wound Dressing for Diabetic Burn Wounds

Nor Khaizan Anuar*[1,2], Nur Nadhirah Nordin[1], Wong Tin Wui[1,2] and Mohd Shahezwan Abd Wahab[1]

[1]Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, Selangor, Malaysia.
[2]Non-Destructive Biomedical and Pharmaceutical Research Centre, iPROMISE Universiti Teknologi MARA, 42300 Puncak Alam, Selangor, Malaysia

Abstract

Impaired wound healing is one of the significant complications of diabetic patients. Hence, this project focused on the development of cross-linked Pectin Hydrogel® Wound Dressing for diabetic wound treatment. Diabetic rats induced with partial thickness burn injury was used as the animal model. Pectin Hydrogel® Wound Dressing offers an alternative to the advanced wound care market using cheap and easily available material. The dressing was designed to keep the wound moist, able to absorb drainage of blood or wound exudates, and maintain an acid environment which acts as a barrier against bacteria. The moisture content of unprocessed pectin increased from 0.67 ± 0.02 to 0.80 ± 0.08 % upon transformation into hydrogel film. When immersed in an excess amount of USP phosphate buffer pH 7.4, the cross-linked Pectin Hydrogel® Wound Dressing were capable of absorbing as much as 1116.57 ± 115.22 % of the buffer solution. This can aid in the management of excess wound exudate, if any, and effectively provide an optimal moist environment to the wound. Healing rate can be improved and the surrounding skin damage due to maceration can be avoided. Based on the in vivo wound healing study using Sprague Dawley rats, Pectin Hydrogel® has evidently shown to promote wound healing in partial thickness burn injury and reduced skin damage due to maceration. The diabetic rats treated with Pectin Hydrogel® exhibited a remarkably smaller wound size and higher rate of re-epithelialization than untreated diabetic rats. In addition, the diabetic rats treated with Pectin Hydrogel® exhibited a comparable wound healing progress to diabetic rats treated with MEBO® (moist exposed burn ointment), a herbal formulation patented in the USA and used clinically in Malaysia public hospitals. This project suggested that a simple crosslinked pectin without the need to combine with other polymers is able to function as an excellent wound dressing material.

*Correspondence: norkhaizan2874@uitm.edu.my

BandPure, an Efficient and Cost-Effective Gel Extraction Kit

Normala Abd Latip*, Akmal Arif Daud and Nurliana Abd Mutalib

Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, Selangor, Malaysia.
Atta-ur-Rahman Institute for Natural Product Discovery (AuRINS), Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, Selangor, Malaysia.

Abstract

Gel extraction of DNA such as plasmid and PCR product after gel electrophoresis is an essential procedure for various downstream applications in molecular biology. Commercial kits mostly include silica spin columns to conveniently extract and purify DNA from agarose gel. However, this technique hinders the maximum yield as some amount of DNA may still adsorbed within the silica phase after elution. Apart from DNA loss during purification process, gel extraction using silica-based commercial kits is also costly for routine work. The gel extraction and purification protocol by BandPure Gel Extraction Kit omits the use of silica spin column thus improves the yield of extracted DNA and reduces the cost per reaction. The filtration-based column using environmentally friendly organic cellulose in this kit prevents DNA loss, which resulted higher and cleaner DNA yield. DNA purified using Band Pure can also be stored in dried form which has better storage stability in comparison to DNA stored in liquid eluent of other commercial kits. Together with our +midPure Plasmid Extraction Kit (Gold Medal Award (IIDEX2019)), the BandPure Gel Extraction Kit produces comparable results with any readily commercial kits. Our products allow researchers to maximize the reproducibility of their workflow and minimize their time spent on obtaining plasmid DNA for transfection, sequencing, PCR and other downstream applications.

*Correspondence: drnormala6351@uitm.edu.my

i-TRAP @ SMART Fly Catcher

Azwandi Ahmad*, Ahmad Azani Othman, Mohd Shihabuddin Ahmad Noorden and Fazleen Haslinda Mohd Hatta

Faculty of Pharmacy, UiTM Selangor, Bandar Puncak Alam, Selangor, Malaysia.

Abstract

There are many methods have been used for the assessment of medically important adult flies but there is little uniformity in techniques used. Baited-fly trap is generally useful as a standard method of studying medically important fly populations as well as for environmental control. However, the suitability and reliability of this trap is subjective and greatly depending on the climate of the study area. The aim of this work is to modify a commercial hanging fly trap available in the market in order to make it more suitable for outdoor scientific sampling in Malaysian tropical climate. The traps were constructed with some modification by adding several elements to the basic commercial hanging fly trap. These elements are plastic roof, bait container, bait protector, petroleum jelly and QR code. QR code is equipped to the trap to help the researcher to instantly record data of the trap in the field. The advantages of this modified traps are cheap, fast and easy to handle, protected from rainfall and ants, practical to bring many sets during field work, light weight, reliable as a standardized sampling and most importantly can prevent damage to the fly sample. Any bait can be used for trapping by just simply place it into the bait protector which function to prevent any fly eggs or larvae to develop in the bait. The traps are able to trap various groups of medically important adult flies belonging to families of Calliphoridae, Sarcophagidae, Muscidae, and Faniidae.

*Correspondence: azwandi047@uitm.edu.my

VITEX PAIN AWAY CHEWABLE TABLET

Mizaton Hazizul Hasan*, Aisyah Hasyila Jahidin, Yuslina Zakaria, Maziana Mahamood and Tommy Julianto Bustami Effendi

Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor, Malaysia

Abstract

VITEX PAIN AWAY CHEWABLE TABLET is a formulation of the hydroalcoholic extract from *Vitex trifolia* L. leaves. This exciting herb is widely used in traditional medicine and has many medicinal properties. V. trifolia or lemuni leaves have been traditionally used to treat headache, allergy, fever pain, and inflammation. This plant has been scientifically proven to reduce inflammation and relieve pain. VITEX PAIN AWAY CHEWABLE TABLET will take away the pain, your best choice for headache, back pain, toothache and stomach cramp. These chewable tablets disintegrate smoothly in your mouth, effortlessly. It is safe and no stomach disturbances. Let VITEX PAIN AWAY CHEWABLE TABLET be the solution, naturally. VITEX PAIN AWAY CHEWABLE TABLET, relieves pain and inflammation effortlessly.

*Correspondence: mizaton_hazizul@uitm.edu.my

New Spiro-Polyketide Svalbardine B from The Arctic Fungal Endophyte Poaceicola Sp: Extremophiles with a Greater Potential for Drug Discovery

Sadia Sultan*, Fatimah Bebe, Nurhuda Manshoor, Syed Adnan Ali Shah and Kamran Ashraf

Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Puncak Alam Campus, Bandar Puncak Alam, 42300 Kuala Selangor, Selangor, Malaysia.
Atta-ur-Rahman Institute for Natural Product Discovery (AuRins), Universiti Teknologi MARA (UiTM) Puncak Alam Campus, Bandar Puncak Alam, 42300 Kuala Selangor, Selangor, Malaysia.

Abstract

Endophytes are microorganisms that inhabit host plants asymptomatically and have a fascinating potential as a source of new drug leads. Extremophiles have always been deemed as endowed with a greater potential for drug discovery than microorganisms from “normal” ecological niches. In this respect, psychrophiles from the Arctic fulfil the criteria of an interesting source of potential new drugs. Thus, this study included 31 endophytic fungi that were isolated from 8 plants from Longyearbyen, Svalbard Island, Norway. The objective of this study was to isolate secondary metabolites from endophytic fungi whose extracts demonstrated antimicrobial properties. Ethyl acetate extracts of all the isolates were analysed by HPLC and evaluated for preliminary screening of antimicrobial activity against S. aureus, E. faecium, P. aeruginosa, E. coli, and C. albicans, using the MTT assay. The crude extracts were fractionated, and their components purified by semi-preparative HPLC. Chemical structures were determined based on spectroscopic methods including MS, NMR, UV/Vis, ECD and X-ray diffraction techniques. The culture of Poaceicola sp. yielded one known compound identified as annularin D.Five new polyketides, including (-)-cleanarol C ($C_{13}H_{14}O_4$),(-)-3,8-dihydroxy-3-hydroxymethyl-6-methoxy-4,5-dimethyl-isochroman-1-one ($C_{13}H_{16}O_6$) andsvalbardines A ($C_{16}H_{14}O_6$), B ($C_{32}H_{28}O_{12}$) and C ($C_{10}H_{14}O_4$) had their structures established. Svalbardine A was determined as a new pyranochromene, while svalbardine B was assigned a new carbon skeleton based on a spirochromone-oxanaphthalene frame. SvalbardineC was determined as a hydroxylated derivative of annularin D, while the remaining two compounds were new enantiomers of known structures. Most of the known compounds mentioned above were previously recognised for their antimicrobial properties and can be regarded as responsible for the overall activity of the crude extracts during the MTT screening, thus vindicating the initial hypothesis. It is therefore believed that this work could be the basis for a more targeted search of novel antimicrobials.

*Correspondence: drsadia@uitm.edu.my, sultansadia333@gmail.com

Burn-Away™ Stick Balm

Aida Azlina Ali*, Fazleen Hatta and Suraya Suratman

Faculty of Pharmacy, Universiti Teknologi MARA, Puncak Alam Campus, 42300 Bandar Puncak Alam, Selangor, Malaysia.

ABSTRACT

A first-degree burn is one of the mildest forms of skin injury affecting the epidermis. Common causes include sunburns and scalds. The most common symptoms are skin redness, mild pain and swelling, and skin peeling that occurs after a day or so. Treatment for first degree burn are usually aimed at soothing inflamed skin, soothe burn pain and to protect affected area from infection. First degree burns usually heal within 7 to 10 days. However, healing time may be quicker the sooner you treat the burn. Sourced from mother nature, Burn-Away™ is a blend of natural active ingredients including *Hibiscus rosa-sinensis* and *Centella asiatica*. The extracts of these plants are well known as natural potent anti-inflammatory and antibacterial, both scientifically proven for many years to be effective individually. Formulated as a stick balm, Burn-Away™ helps to sooth, rehydrate and protect skin affected by superficial burns. It acts quickly to reduce reddening and discomfort, as well as aiding in healing process.

*Correspondence: aidaaz2790@uitm.edu.my

Epigenetic Manipulation of the Secondary Metabolite Production in Arctic Fungi: Development of MECSUS Protocol for Non-Sporulating Fungi

Siti Hajar Sadiran*[1], Sadia Sultan1, Fazlin Mohd Fauzi[1], Gurmeet Kaur Surindar Singh[1] and Siti Aisyah Alias[2].

[1]Faculty of Pharmacy, Universiti Teknologi MARA, Puncak Alam Campus, 42300 Bandar Puncak Alam, Selangor, Malaysia.
[2]National Antarctic Research Centre (NARC), B303, Block B, Level 3, IPS Building, University of Malaya, 50603 Kuala Lumpur, Malaysia.

Abstract

Fungi produce a wide range of secondary metabolites that have various biological activities. Secondary metabolites production of fungi can be modified by different approaches, including culture-dependent methods, epigenetic modifiers, and genomic-based methods. In this study, secondary metabolite production of Arctic fungi was explored in the presence of epigenetic modifiers by applying an in-house protocol named MECSUS (Microtiter plate, Elicitors, Combination, Solid-phase extraction, UHPLC, Statistical analysis). A total of 41 Arctic fungi from soils collected in Longyearbyen, Svalbard Island, Norway were screened for their secondary metabolites production. The procedure for culturing non-sporulating fungi at a micro-scale level was successfully developed. Fungi were cultured on potato dextrose agar (PDA) plates and incubated at 10 °C. 15 mL of potato dextrose broth (PDB) was prepared for each 50-ml Falcon tubes and 5 steel beads were added into the tubes. Three plugs of each fungus from the PDA plates were cut using a 6 mm cork borer and inoculated into the Falcon tube. The culture was then incubated at 10 °C for 8-10 days. After the incubation period, the cultures were homogenized using a Geno/Grinder® and the homogenized cultures was then pipetted into 96-well microtiter plate with the addition of PDB and epigenetic modifiers (5- azacytidine, suberoylanilide hydroxamic acid, sodium butyrate, valproic acid and Sadenosylhomocysteine). The cultures were extracted by solid-phase extraction and all crude extracts were analysed using ultra high-performance liquid chromatography (UHPLC). Selected crude extracts from Arctic fungi (Pleosporales sp. B2C2, and Penicillium samsonianum D2CD2-2) were fractionated using preparative (HPLC) and then purified by semi-preparative HPLC. Chemical structures of the isolated compounds were determined based on spectroscopic methods, including MS, NMR, and UV/Vis. The use of modified MECSUS protocol with the epigenetic regulators approach was allowed to isolated two compounds. Curvulin was isolated from Pleosporales sp. B2C2 extract and 2,3-dihydro-2- hydroxy-2,4-dimethyl-5-trans propenylfuran-3-one was identified from the Penicillium samsonianum extract. The usage of microtiter plate as massively parallel fermenters associated with robustly validated procedures as in the MECSUS protocol allows screening a large number of fungi in various growth conditions (up to 96 of the different media at the same time) for studying the production of secondary metabolites in short times and at relatively low cost. The parallelized screening method used for culturing different strains of fungi at micro-scale level with the addition of the epigenetic regulators demonstrated that it could be used in highthroughput screening which handling and screening a large number of samples, as a strategy for exploiting metabolic potentials of strains while reducing the human resources and materials needed for preparing individual fermentations and extracts.

*Correspondence: sitihajarsd@gmail.com

An Infographic on The Current Drugs Used in Treatment of COVID-19

Ruzianisra Mohamed[1,2*], Siti Syairah Mohd Mutalip[1], Yuslina Zakaria[1,2], Zafirah Liyana Abdullah[1,2] and Nadia Jalaludin[1]

[1]Department of Pharmaceutical Life Sciences, Faculty of Pharmacy, Universiti Teknologi Mara (UiTM) Cawangan Selangor, 42300 Bandar Puncak Alam, Selangor, Malaysia.

[2]Bioinformatics Unit, Faculty of Pharmacy, Universiti Teknologi Mara (UiTM) Cawangan Selangor, 42300 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

The COVID-19 outbreak has swept the world by storm. It has been declared as a pandemic by the World Health Organization (WHO) in just a few months of the outbreak, due to its contagious nature that has spread worldwide. To date, it is estimated that there are around 24 million cases of COVID-19 has been reported with the death toll of more than 800,000 and the number of cases is not showing any signs of decline. The constant increases in the number of cases are highly associated with the fact that there are no suitable vaccines or specific antiviral drugs available for treatment of COVID-19. However, despite having to strive within the difficulties and limitation of having a proper medications, practitioners and health front-liners are determined to go with whatever resources that are available. Here, we present an infographic that summarizes the current drugs used in the treatment of COVID-19. This infographic is designed to provide a reading material for the public, especially school students where they can learn more about the COVID-19 treatment. The novelty of this infographic is to provide a reading material on the information on the drugs used in the treatment of COVID19, in addition to the widely available information on COVID-19 including the mechanism of actions and dosage.

Keywords: COVID-19, drugs, infographic

*Correspondence: ruzianisra@uitm.edu.my

StrepIHC: Innovative Alternative Approach in Developing Alzheimer's Disease Rodent Model

Gurmeet Kaur Surindar Singh*[1,2], Mazzura Wan Chik[1] and Nurul Aqmar Mohamad Nor Hazalin[1]

[1] Department of Pharmaceutical Life Sciences, Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Puncak Alam, Malaysia.

[2] Brain Degeneration and Therapeutics Group, Pharmaceutical and Life Sciences Community of Research, Universiti Teknologi MARA (UiTM), 40450, Shah Alam, Selangor, Malaysia.

Abstract

Alzheimer's disease (AD) is a neurodegenerative disease characterised by neuronal degeneration that impairs memory, behaviour, language, and visualspatial skills often diagnosed in the elderly and misunderstood as normal ageing. The prevalence of AD in Malaysia was 123000 people in 2015 and estimated increase by five folds in 2050. To date, there is no cure for AD. Current treatments of AD are only able to improve the symptoms temporarily by increasing the neurotransmitter in the brain. One of the major hurdles in finding the treatment of AD is lack of animal model that reliably predict the effectiveness of a treatment in humans. The available AD rodent model such as the transgenic mice model mostly depicts the familial AD that represents only 15-25% of AD cases worldwide. Meanwhile, the sporadic AD (the most common type of AD in human) are primarily studied using the intracerebroventricular streptozotocin (STZ) or intrahippocampal (IHC) amyloid beta (Aβ) where the formation of Aβ and tau protein are visible not less than three months of drug administration. Considering that hippocampus is abundance with brain insulin receptors, an AD model unique to hippocampal study targeting the insulin receptors (specific to the AD study) was developed by injecting STZ via the IHC route. The StrepIHC rats showed memory impairment in Morris water maze when compared to sham group as the results indicated increased escape latency and reduced time spent in target quadrant of the probe test. Meanwhile, immunohistochemistry study showed formation of Aβ as early as 3 weeks and the amount was increasing with time. The tau protein was found at week 12 of STZ treatment. This novel AD model showed faster disease development and was able to develop memory impairment, induce formation of Aβ and tau protein in shorter time. Thus, the development of this novel model may further diversify the current available AD model to study and find effective treatment for AD using the AD rodent model.

*Correspondence: gurmeet9952@uitm.edu.my

COVID-19 Frontliners Go the Extra Mile to Help Suffered Humanity

Maryam Madani Nauman*, Momina Madani Nauman, Inoka Daniel, Lalitha Krishnan and Fatin Hazad

Green Views Islamic International School Bukit Jelutong Shah Alam, Selangor, Malaysia.

Abstract

The outbreak of Covid-19 has quickly evolved from a local issue to a global crisis. In addition to the tragic human loss, the disease is having and will continue to have a profound economic impact. The outbreak has posed significant threats to international health and the economy. In the absence of treatment for this virus, there is an urgent need to find alternative methods to control the further spreading of the disease. The coronavirus pandemic is causing large-scale loss of life and severe human suffering. It is a public health crisis without precedent in living memory, which is testing our collective capacity as human beings. Let us give a big round of applause to front liner and those who are working around the clock to save lives, those that are going the extra mile by donating food to the disadvantaged communities; companies; small firms that availed their premises for quarantine purposes; privates donating capital where need be. A big applause! Remarkably, the human race continues to adapt, evolve and reinvent.

Keywords: Covid-19, health, economy, frontliners, quarantine

*Correspondence: maryamm2009.greenview@gmail.com

e-SIM: PTRL Store Inventory Management

Hizwan Nizam bin Abd Rahman*, Nurul Farhanah binti Misripin, Muhammad Fadzli bin Kamarudin, Mastura binti Ma'ad and Mohd Alimukhti bin Mansor

Pharmacology Toxicology Research Laboratory, Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

e-SIM is an inventory management system inspired by Sheetgo. It is a systematic electronic medium used for storekeeping, handling a request from users using QR code, ending with a high impact in the work process which can be performed faster, auto-update, real-time, paperless and can be done anytime and anywhere. This project shows that the built system can work faster compared to existing manual ways (kad petak) on inventory management. Laboratory staff will get the order from the end-user directly using the system and be notified by email. With this system, laboratory staff can easily view all the products stacking in the store, tracking order and knowing the current process of preparing the items needed without having to present physically, receiving items and checking-in into the store and maintaining the items in and out just by browsing using a phone or a computer. Moreover, the use of inventory management is to find the remaining quantity of items that can fulfil the demand, avoiding overstocks and out of stocks and is able to serve as a reference for next purchase planning.

*Correspondence: hizwan9457@uitm.edu.my

GO-Jees Red Diamond Body Scrub

Nur Atielia Preshahdin*, Azurah Dollah, Norhayati Mohd. Zain, Raja Noorfatihah Raja Lias and Mohd Ariff Jafar

Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

The enhancement of skin appearance occupies the greatest focus and concern for humans, especially for the female. The consumer attention is focused on newest miracle natural product-based ingredient in age-defying and anti-wrinkle compositions of skin care product. There are variety of cosmetic delivery systems, such as lotions, creams, sprays, splashes, gels and sticks that have been used to provide beneficial ingredients and compositions to skin areas. An exfoliating body scrub offers one of the most desirable delivery systems for beneficial ingredients and compositions to skin. Many options of exfoliating body scrub over the counter are sold in local pharmacies, and most of these remedies are designed with harsh chemicals. The main issue with these commercial scrubs is that they can be drying and cause irritation against consumer that regularly use the product. To solve the issues mentioned, we designed a natural product-based ingredient GO-jees Red Diamond Scrub that is effective in removes dead skin, rejuvenate and improves skin elasticity. It is designed in semi powder form which consumer has to mix it with hot water to form paste for effectively deliver active ingredients into skin. GO-jees Red Diamond Scrub is formulating with dosage of natural product-based active ingredients mainly from freeze-dried Goji Berry powder; Lycium barbarum with antimicrobial activity, anti-inflammatory properties, anti-aging activities and antioxidant activity that accelerates the healing process to allow fast recovery of the skin. The study of freeze-dried goji berry allowed to preserve most of the phytochemical characteristics of the fruits, such as polysaccharide, phenolic and carotenoids come together with Citrus limon is well known as a traditional medicine in which belong to the family rutaceae. Major property of Citrus limon include anti-inflammatory, antifungal, relieve eczema and itchiness and reduce fever. Lemon was considered rich in citral, limonene and terpineol. This product is made of natural product-based, thus it can be commercialized as a cheap, safe and effective alternative to available skin care product.

*Correspondence: nuratielia@uitm.edu.my

The 'Science at Home' Box

Sithaarthan Yogheswaran*, Shruthilaya Partiban, Sivamanikandan Sivarajah, Sharvesh Suresh and Dhivessha Jekatheesan

SJKT Ladang North Hummock, Setia Alam, 40170 Shah Alam, Selangor, Malaysia.

Abstract

During the movement control order due to COVID-19 pandemic, children were not able to go to school and their learning process were halted to some extent. Hence, we thought of an idea to come up with a handy box where parents and children can use the simple instructions and materials provided in the box to make learning science fun at home. We have designed a few experiments that comes with easy sets of instructions that can be an aid to parents to conduct the science experiments at home. Examples of experiments include 'Floating Egg', 'Swirling Milk', 'Rainbow Skittles', 'Self-Inflating Balloon' and 'Ice Fishing'. We also provide the science facts for each experiment. The science concepts that are covered in this box include density, surface tension, diffusion, acid-base reaction and states of matter. This 'SCIENCE AT HOME' box will definitely be a wonderful gift for young children.

*Correspondence: shubashini.gnanasan@gmail.com

Dal-Ilang Cube

Noor Meliza Jamil*, Idanawati Naharudin, Nor Zaleha Ishak, Siti Fariha Bakri and Nor Syakila Mohd Zaki

Department of Pharmaceutics, Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

Cleaning products are one of the essential items in laboratories, especially for the ones that handle teaching and learning activities that highly utilise labware (eg. Beakers, lab flasks and evaporating dishes). After practical or lab sessions, tonnes of labware require thorough cleaning. There are numerous cleaning products in the market, but how effective they are in removing dirt (e.g. color pigments and greasy residues)? Will they give satisfactory results? Also, some of them are quite expensive. Aim of this project is to produce a cleaning product that can easily clean the stains that are usually difficult to remove. The proposed cleaning product (i.e. Da-Ilang cube) is suitable for various applications, ideal in removing dirt on the surface of labware. The primary cleaning agent in Da-Ilang is Potash Alum or commonly known as TAWAS. TAWAS has numerous uses and often incorporated in products such as deodorant, soap, cream and lotion as a cleansing agent. An addition of TAWAS in cleaning product can enhance the effectiveness of removing stains. Da-Ilang is supplied in a cube form which is compact, less messy and easy to store. The product was compared to commonly used laboratory cleaning products (DECON 90 and Glo dishwashing liquid). All products of similar weight were tested for their ability to clean or remove the stains on glassware. Da-Ilang was shown to clean better than the other two products.

Keywords: Cleaning, Potash alum, Tawas, removing stains

*Correspondence: meliza@salam.uitm.edu.my

WHACK-A-MOLE

Nur Fazlina Aina Khairul Anua, Kamaliah Md Saman, Hasnah Ismail and Mathumalar Loganathan*

Department of Pharmacy Practice, Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

Due to the indispensable gadgets and enablers made available to Generation Z and the Millennials in this era of information technology, students of these generations require an almost 180-degree paradigm shift from the traditional teaching and learning pedagogy. They are often enthusiasts of active engagement, instant gratification and 3-Dimensional virtual reality interactions which prompt effective self-learning and retention of memory. With this in mind, a group of lecturers together with the assistance of a student embarked on enabling such forms of independent learning. We demonstrate the development of the online gamification platform, Wordwall. Two or more players can engage in this game where their goal is to hit the mole displaying the accurate statement pertaining pharmacotherapeutics of cancer. With every accurate hit, 5 marks will be awarded. A timer with 60 seconds is set and a scoreboard keeps tab of the player with the highest number of hits. Upon completion of each level, the player is given an option to advance to a more complex level of difficulty. The game can be rolled out to undergraduate students enrolled into a course on neoplastic disorders in order to assess the effectiveness of the novel teaching and learning or assessment method.

*Correspondence: drmalar@uitm.edu.my

SannySlip Sanitizer Sheet: Just Rub It

Mashani Mohamad*, Hannis Fadzillah Mohsin, Khuriah, Abdul Hamid and Nurul Aqmar Mohd Nor Hazalin

Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor, Malaysia.

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. SannySlip, a hand sanitizer dissolving sheet is invented as a compact and portable hand sanitizer. SannySlip is made from biodegradable Sodium Carboxyl Methyl Cellulose formulation that will dissolve upon rubbing to minimize waste. The sanitizing formula consists of ethanol, 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 SannySlip 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 SannySlip 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 SannySlip compared to other products. With the price of RM2.99, SannySlip has a potential to be the first hand sanitizer sheet on the market and able to compete with currently available hand sanitizers. SannySlip is a quick, easy and effective hand sanitizer that is designed to fit the new normal.

*Correspondence: mashani@uitm.edu.my

e-PharmClin Case Notes

Hanis Hanum Zulkifly*, Izzati Abdul Halim Zaki, Hasnah Ismail and Azyyati Mohd Suhaimi

Department of Pharmacy Practice, Faculty of Pharmacy, Universiti Teknologi MARA Cawangan Selangor, Kampus Puncak Alam, Selangor, Malaysia.

Abstract

Introduction: The hospital attachment and clinical clerkship are crucial for the final year pharmacy undergraduate students, aimed to expose them to the 'real world' cases and solve therapeutic problems if any. Due to COVID-19 outbreak, however, the attachment which was previously carried out at the selected hospitals in Klang Valley must be converted into virtual form. This requires extensive amount of changes especially the delivery of the attachment and hence, adaptation via the use of online platform was needed very promptly. In addition, materials (i.e., case notes) for teaching and learning to the final year students had to be created to assimilate the 'real world' cases found in the various hospitals. Development: This product is called e-PharmClin Case Notes; were handwritten by clinical lecturers based on actual cases at the hospital. This product consists of 14 different 'real-world' cases encompassing clinical cases of cardiovascular, neurological, infectious, endocrine diseases and many others. These cases reflect the actual case notes found for each patient admitted to the hospital comprising admission/emergency clerking, patient progress in the ward, lab results and investigations, and medications used in the wards and upon discharge. Usability: The e-PharmClin Case Notes was used during the virtual hospital clerkship last semester by the final year undergraduate pharmacy students. These cases were scanned and uploaded into Google Classroom for students to excess. The students then discuss these cases with the clinical lecturers and present their findings (including solving any therapeutic problems) at the end of the week. Feedbacks from end user: ''I'm able to have the overview relating to clerkship including the how to read BHT'', ''It is sufficient to expose students to hospital's BHT''.

*Correspondence: hanish2984@uitm.edu.my

Glacipro A Natural Marine Based Sunscreen

Siti Alwani Ariffin and Siti Aishah Zulkifli*

Department of Pharmaceutical Life Sciences, Faculty of Pharmacy, Universiti Teknologi Mara (UiTM) Cawangan Selangor, 42300 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

Over exposure to sunlight increased the UVB radiation that lead to potential photo-aging and skin cancer. As these trends are likely to continue for the foreseeable future, the adverse effect of UVB has become a major human health concern. A part of that new FDA testing of sunscreens shows that six common active ingredients are absorbed into the body and cause disruption of hormones and may lead to fertility problems, poor birth outcomes for babies, and perhaps cancer. Conventional sunscreen is not only harm to human but also to nature. Therefore, an alternative ingredient for sunscreen that is save and environmental friendly is urgently required. Seaweed has been proven to have natural sun-filter properties. Therefore, incorporation of natural nontoxic extract into the sunscreen formulation might ensure the effectiveness of the product. About 13 of MV fractions in red seaweed showed 70-80% of cell viability after irradiation treatment. Five of fractions (MV14, MV35, MV41, MV45 and MV50) were successfully increased in cells viability values significantly ($p<0.05$). In this study, a marine endophytic fungi extract isolated from red seaweed Glacilaria arculata Zanardini collected from Teluk Kemang Port Dickson was formulated as active ingredient of a sunscreen product, Glacipro and evaluated for UVB protection property.

*Corresponding: aishahzulkafli@gmail.com

Bluebellvine Beauty Skincare

Norafiza binti Razilah* and Junaidah binti Mat Amin

SMK Bagan Terap, Jalan Besar, Bagan Terap, 45300 Sabak, Selangor, Malaysia.

Abstract

Many skincare products in the market are synthetic and made from harmful chemicals such as mercury, hydroquinone and parabens. Not only it is widely used due to the low cost, many consumers also fall for the appealing advertising. They are unaware about the harmful ingredients that can cause various effects on the skin such as skin irritation, eczema and cancer. Research showed that the skin absorbs up to 60% of the chemical in product. Even when using small amounts of the product, the chemicals can have tremendous health and hormonal impact. The objective of this innovation is to produce skincare products based on natural resources that are organic and safer for consumers. Bluebellvine plant or its scientific name *Clitoria ternatea* is a native plant in Asian countries. It is spread in many tropical and sub-tropical countries such as China, India and South America. In Malaysia, Bluebellvine flowers are used as a dye in the making of Nasi Kerabu. Traditional Indian medicine use as a brain tonic to promote intelligence. The extract of the flower also applied to cure skin diseases and insect bites (Nadkarni K.M., 1954). Bluebellvine Beauty Skincare is a 2 in 1 product that function as mask and scrub to help individuals who have skin problems such as dry skin, acne and too oily skin. This product is made from Bluebellvine flowers, eggshells, yogurt and virgin coconut oil. These ingredients are organic and have specific nutrients to treat skin problems and improve skin health. The results of the lab test found that Bluebellvine Beauty Skincare is slightly acidic and last longer at 20 oC.

Keywords: Bluebellvine, skincare, organic.

*Correspondence: norafizarazilah@gmail.com

Diindolylmethane (DIM) Bearing Thiadiazole And Benzofuran-Based-Thiazoldinone Analogues as Urease Inhibitors: Design, Synthesis, Their In Vitro Potential and In Silico Studies

Syed Adnan Ali Shah*[1,2], Sadia Sultan[1,2], Kamran Ashraf[1,2], Muhammad Taha[3] and Zainul Amiruddin Zakari[4,5]

[1]Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor Darul Ehsan, Malaysia.
[2]Atta-ur-Rahman Institute for Natural Products Discovery (AuRIns), UiTM Cawangan Selangor Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor D. E., Malaysia.
[3]Department of Clinical Pharmacy, Institute for Research and Medical Consultations (IRMC), Imam Abdulrahman Bin Faisal University, P.O. Box 1982, Dammam 31441, Saudi Arabia.
[4]Department of Biomedical Science, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400, Serdang, Selangor, Malaysia.
[5]Halal Institute Research Institute, Universiti Putra Malaysia, 43400, Serdang, Selangor, Malaysia.

Abstract

Urease (EC 3.5.1.5) belongs to the family of amidohydrolase enzymes having two nickel atoms in their core structure. Urease involves the conversion of urea into ammonia and carbon dioxide or carbamate. Urease is broadly found in nature and bio-synthesized by different organisms such as plants, fungi, bacteria, invertebrates, algae and are found in soil as soil enzyme. The current study describes synthesis of diindolylmethane (DIM) derivatives based-thiadiazole and benzofuran-based-thiazoldinone analogues as a new class of urease inhibitors. Diindolylmethane is natural product alkaloid reported to use in medicinal chemistry extensively. Diindolylmethane-based-thiadiazole and benzofuran-based-thiazoldinone analogues were synthesized and characterized by various spectroscopic techniques 1HNMR, 13C-NMR, HREI-MS and evaluated for urease (jack bean urease) inhibitory potential. All compounds showed excellent to moderate inhibitory potential having IC50 values within the range of 0.50 ± 0.01 to 33.20 ± 1.20 µM compared with the standard thiourea (21.60 ± 0.70 µM). A structure-activity relationship (SAR) of this series has been established based on electronic effects and position of different substituents present on phenyl rings. The key binding interactions of most active compounds with enzyme were confirmed through molecular docking studies. It was inferred that some of these potent urease inhibitors might serve as novel templates in drug designing.

*Correspondence: syedadnan@salam.uitm.edu.my, benzene301@yahoo.com

OH-MySanitiser

Aida Azlina Ali, Hannis Fadzilah Mohsin, Normala Abd Latip, Nur Suraya Adina Suratman and Nurhuda Manshoor*

Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

Washing your hands is the best way to prevent the spread of germs, but you don't always have access to soap and water. Hand sanitizer and hand cleansers have become a hot commodity since the pandemic began. After an initial drought—companies are rolling out new options to keep up with the demand. It's always good to have extra hand sanitizer around for when the need arises. Our product, OH-MySanitiser is a great alternative for quick, on-the-go cleaning. For on-the-go, nothing beats single-use hand sanitizers you can fit in your purse or even your pocket. OH-MySanitiser is a single-use item stored in a breakable liquid capsules that could be easily dispensed as needed, saving the need to carry around full bottles of sanitizer, allows user to discreetly and frequently sanitise hands from common bacteria, viruses or biological agents, durably carried in a pocket. The capsule encapsulating the rinse free waterless sanitising gel is made up of polymer that solubilises upon contact with hands. Popping the capsule inside clenched hands releases a measured, optimum amount of hand sanitiser. OH-MySanitiser would dispose the need for large bulky storage, and prevent spillage. The encapsulated single use packaging prevents unwanted evaporation of alcohol and thus keeping an ideal composition for optimal sanitising purpose. Additionally, disposable and degradable gel capsule reduces plastic waste and pollution.

*Correspondence: nurhuda15@uitm.edu.my

Fun PHARM GAME

Mohd Shihabuddin Ahmad Noorden*, Siti Syairah Mohd Mutalip, Fazleen Haslinda Mohd Hatta, Ahmad Azani Othman and Mohd Shahezwan Abd Wahab

Faculty of Pharmacy, Universiti Teknologi MARA Cawangan Selangor, Kampus Puncak Alam, Selangor, Malaysia.

Abstract

"Science is interesting!" "Science is so cool!" Those are the most commonly heard phrases in schools. Yes, learning Science is not that hard, but unfortunately there are some students who feel complicated to see all career possibilities in science stream and requirements to get there, which lead to less effort in the classroom. For these students, the typical classroom learning approach could be one of the reasons for them not being able to see the direction of their career pathway and all potential opportunities. We should also accept that not every student is capable to set their career direction and perform to get there. An alternative way of interactive teaching could be used to facilitate these students to see more great opportunity. Ultimately, they will have better reasons to struggle in learning and understanding the Science subjects. This Fun Pharm Game is designed as one of the possible game-based interactive teaching learning approaches highlighting the general information on pharmacy career path to the students. All components such as game layout and colour coded cards are designed to show that basic science facts and pharmaceutical elements are interesting to help them to learn and understand pharmacy related health system issues. This role-playing game set was created according the Malaysian lower secondary school's (Form Two and Form Three) Science syllabus to as part of a student-led, small-group, active learning session. It is a user-friendly, easy-to-conduct game, and can be used at both inside or outside the classroom. Moreover, with the provided answer scheme, this game can be played with or without teacher as facilitator, which may allow more encouraging interactions and engagements between students. The presence of teacher will also help to evaluate the students' level of understanding and interest. Besides, interactive learning environment will increase students' knowledge, interest and interpersonal communication skill on the pharmaceutical related topics.

*Correspondence: shiha@uitm.edu.my

AERO-Seal™: Spray and Heal

Khuriah Abdul Hamid[1]*, Mashani Mohamad[2], Hannis Fadzillah Mohsin[3] and Nurul Aqmar Mohd Nor Hazalin[2]

[1]Department of Pharmaceutics, Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, 42300 Puncak Alam, Selangor, Malaysia.

[2]Department of Pharmaceutical Life Sciences, Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, 42300 Puncak Alam, Selangor, Malaysia.

[3]Department of Pharmacology and Chemistry, Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, 42300 Puncak Alam, Selangor, Malaysia.

Abstract

There are growing interests in the discovery of 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 as a traditional plant to cure wounds. Besides, numerous studies have reported that the extracts of *C. odorata* leaves were shown to exhibit antibacterial, anti-inflammatory, antioxidant and wound healing properties. Considering these essential qualities, AERO-Seal™ is designed and invented in unique spray form which is permeable to moisture vapour and air that allows the surrounding skin to breathe and prevent maceration. It is naturally safe and does not cause skin irritant as evident from our acute toxicity study. AERO-Seal™ spray is suitable for a variety of minor wounds including cuts and abrasions, over vaccinations, after suture removal and skin graft. AERO-Seal™ leaves a thin film after spray which is water-resistant, conformable and elastic which stays intact over skin areas and can be used on a flexible or mobile body part such as on knees and knuckles. This product is handy and travel-ready wound spray that function as wound healing aid that promotes fast healing of all kinds of minor wounds. It cleans, seals and protects the wound from bacteria and foreign debris. Overall, AERO-Seal™ is a great all-rounder for the first-aid kit and has the potential to boost Malaysia's brand of natural products.

*Correspondence: khuriah@uitm.edu.my

Telepharmacy: Future for Community Pharmacy

Noorasyikin Shamsuddin[1], Megat Helmi Megat Mohd Zubairi[2], Nusaibah Ab Rahim[1], Lee Hong Gee[1], and Syireen Alwi[1]

[1] Department of Clinical Pharmacy & Pharmacy Practice, Faculty of Pharmacy, University of Malaya, 50603 Lembah Pantai, Kuala Lumpur

[2]Pharmacap Group, Jalan Gerbang Wawasan 1, Seksyen 15, 43650 Bandar Baru Bangi, Selangor

Abstract

There is a high demand to expand the community pharmacy services with the advanced growth of the technology. The Covid-19 pandemic has recognized that pharmacists is at a unique position to deliver patient care in a depriving situation, especially in rural areas. Telepharmacy is defined as the application of telehealth technology to pharmacy practice in order to provide pharmacy operations and patients care at a distance and to improve patient outcomes, expand access to health care and enhance patients' safety. The use of telepharmacy previously was limited to medication dispensing and medication review. However, there is a paradigm shift of the use of telepharmacy to play an active role in a multidisciplinary health care team including community pharmacists and general practitioners. In this presentation, we devised a telepharmacy project using the general practitioners-pharmacists collaborative model, E-Optimahealth. This application is aimed to link community pharmacists with the primary care physicians to provide better access and care to the patients, create more business opportunities for both physicians and community pharmacists and overcoming the shortage of regular medication supplies for chronic disease patients. We will present the workflow of the proposed model, potential benefit, as well as potential challenges of this telepharmacy model.

Correspondence: noorasyikin@um.edu.my

SGLT2 Inhibitor Use in People with Chronic Kidney Disease: An Evidence-based Algorithm

Jannatul Naimah Solehah, Izzati Abdul Halim and Shubashini Gnanasan*

Department of Pharmacy Practice, Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Puncak Alam, Selangor, Malaysia.

Abstract

SGLT2 inhibitors are novel antidiabetic agents in the management of diabetes mellitus. Recently various trials showed promising benefits of SGLT2 inhibitors in improving glycaemic control. Different types of SGLT2 inhibitors are associated with different cut-off point of eGFR. Canagliflozin, Empagliflozin and Ipragliflozin are contraindicated in patients with eGFR of ≤45 mL/min/1.73 m2. Nevertheless, the cut-off points of eGFR level ≥ 30 mL/min/ 1.73 m2 were used in various large trials such as CANVAS-R, CREDENCE, and EMPA-REG OUTCOME. Thus, less is known about the safety and efficacy of SGLT2 inhibitors usage among patients with eGFR ≤30 mL/min/1.73 m2. This study was conducted to review changes in renal outcomes among T2DM patients with renal impairment upon receiving SGLT2 inhibitors and its adverse effects among patients with eGFR levels of ≥ 30 mL/min/1.73 m2 and ≤ 30 mL/min/1.73 m2. A systematic review of randomized controlled trials and observational studies that reported the renal outcomes and adverse effects related to SGLT2 inhibitors was done. The data was collected from various databases such as Cochrane Library, Pubmed, MEDLINE, and Science Direct. The outcome measures of this study were the changes in urine albumin-to-creatinine ratio (UACR), the changes in eGFR, incidence or new-onset albuminuria, the progression or new onset of macroalbuminuria, doubling of serum creatinine level, the initiation of renal replacement therapy, dialysis, or kidney transplant, death due to renal disease and adverse effects of SGLT2 inhibitors. Both patients with eGFR level ≥30 mL/min/ 1.73 m2 and ≤ 30 mL/min/1.73 m2 showed potential nephroprotective effects on the use of SGLT2 inhibitors. A simple evidence-based algorithm was created to summarize the data obtained which can be a potential guide for clinical pharmacists with regards to SGLT2 inhibitors use among patients with various stages of chronic kidney disease.

*Correspondence: shubashini@uitm.edu.my

Rodentia Biocompost Fertilizer

Abdul Halim Tormizi*, Mohamad Bashir Yaacob, Muhammad Fadhli Mohd Azahar, Nur Hidayah Husin, Nurlin Shafarah Jaafar and Nurul Aini Baharom

Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

Composting is an organised transformation of degradable organic products and wastes by microorganism into stable products. It is a long-used technology, and not popular due to its inefficiency. The failings include pathogen detection, low nutrient status, long duration of composting, long mineralization duration, and odor production. Hence, the choice of chemical fertilizers that make nutrients readily available to plants. However, chemical fertilizers contribute to greenhouse effects, environmental pollution, death of soil organisms and marine inhabitants, ozone layer depletion, and human diseases. Rodentia Biocompost Fertilizer is the right solution for better waste management and maximize productivity of produce. It is a low-maintenance pile of shredded paper and corn cob from the beddings and rodent faeces (mice, rats and rabbits), ideal for the composting. The rodent waste is a highly organic product rich in nutrients that you can use to grow vegetables or flowers as it contains high nitrogen, a good amount of potassium and phosphorus and balanced nutrients. Rodentia Biocompost Fertilizer is an effective and eco-friendly product that improves top soil quality but will definitely make your plants grow healthier and stronger. Rodentia Biocompost Fertilizer, go GREEN the right way!

Correspondence: ahalim5888@uitm.edu.my

KAPPA KEA: Embrace Your Life

Hannis Fadzillah Mohsin*[1], Zolkapli Eshak[1], Aida Hamimi Ibrahim[2], Kathleen J. Jalani[1] and Ratni Suriyani Jalal[1]

[1]Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor, Malaysia.

[2]Pusat Penyelidikan Sains dan Teknologi Makanan, Ibu Pejabat MARDI, Serdang, Selangor, Malaysia.

Abstract

Recently, the demand for herbal products for the use as traditional and alternative medicine has increased. Seeing the growing interest of the alternative medicine around the globe, KAPPA KEA effervescent tablet drink is formulated as one of the options to improve the quality of life. This product contains of multiple health benefit that the body required exclusively for the people who always on-thego. *Kappaphycus alvarezii (K. alvarezii*) extract, a local seaweed from Sabah is one of the main ingredients in this product, has been identified for their ability to decrease hypercholesterolemia and also identified as a prebiotic to promote healthy colon, thus enhanced and strengthened the immune system. The berries extract, which is a well-known antioxidant were added not only to boost a wonderful taste, but also responsible for anti-ageing and promote good health. The effervescent type tablet helps all the benefit from each tablet dissolved easily and has great bioavailability and easily absorbed into the blood stream. Besides, the dose of each effervescent tablets is standardized, and the liquid quantity can variable, allowing for taste to be adjusted according to individual preference. On the other hand, because of the pleasant berries natural flavour, this product also can promote the water intake and maintain the balance of liquid in the body, therefore will keep you hydrated all day long. Each tablet was packed in a single packaging to ensure the quality in each tablet can be maintained plus to prevent the quality of product degraded by surrounding moisture and air. Small and single packet can be conveniently fit in your pocket or purse to make it suitable to carry wherever you go. This innovation also can be used as one of the preferred functional food thus utilized and promote our local resources aligned with the government vision of 'Translating Innovation to Wealth' through 'high return on research and development investment' between research institution, university and industry.

*Correspondence: hannis@uitm.edu.my

SabBox

Tiniati Ahmad*, Kathleen J. Jalani, Mohamad Rahimi Sulaiman, Mohammad Syeth Ahmad and Aimi Amira Mohd Hisham

Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

A gift box from nature Malaysia is a well-known beautiful tropical country with hot and cold weather. As we know Malaysia is a country that full of splendid nature environment. Therefore, to conserve and save our nature is very important. And one of the ways to protect our nature is through ecofriendly Styrofoam cool box are often a storage. But it turns out that the use of Styrofoam is not safe for it is so hard to degrade which gives impact to our environment. Therefore, we need a safe and environmentally friendly cool box storage, and our group idea to design cool box from coconut coir. As we know in Malaysia, we had diversity of wonderful plants growth in Malaysia, and one of it is known as coconut. In this study, we will be using the coconut coir mix with resin and the mixture will be pour in special mould to be designed as a cool box that can used to store samples or food in hot or cold condition. The advantages of our SabBox compared to other types cool box is where it is environmental friendly which it is safe for our environment and apart from that, because coconut coir has strong characteristics and low thermal conductivity also, which is up to 0.05 W/m°C [4-5], so those components could be a potential insulator to replace the use of Styrofoam only that, we can help to local coconut production to increase generating Malaysia economy. In conclusion, SabBox is truly a gift box from nature where it can replace Styrofoam as main ingredient in cool box which it had the ability as insulator to conserve heat and cold naturally.

Keywoods: SabBox, Coconut Coir, insulator

Correspondence: tiniati@uitm.edu.my

ONYnail®: Nail Fungus Treatment Kit

Mohd Faiz Mustaffa[1], Maziana Mahamood[1], Nur Suraya Adina Suratman[1], Kalavathy Ramasamy[2] and Aishah Adam[1]

[1]Group on Affinity, Safety and Efficacy Studies (OASES), Faculty of Pharmacy, Universiti Teknologi MARA (UiTM) Selangor, Pundak Allam Campus, 42300 Bandar Puncak Alam, Selangor Darul Ehsan, Malaysia.

[2]Collaborative and Drug Discovery Research (CDDR) Group, Faculty of Pharmacy, Universiti Teknologi MARA (UiTM) Selangor, Pundak Allam Campus, 42300 Bandar Puncak Alam, Selangor Darul Ehsan, Malaysia.

Abstract

Malaysia Having healthy smooth shiny nails is an indicator of good health. If you're one of those suffering from fungal nail infection (onychomycosis), ONYnail® will be the solution. ONYnail® nail fungal treatment kit functions as both antifungal drug and nail polish. It is our secret formulation that can be utilized in to combat nail fungus while protecting and making your nails look beautiful. ONYnail ® is a topical antifungal drug using film-forming solutions. When painted on the nail, it forms a non-sticky film, that then dries in less than a minute into a hardened barrier of perfect color. The antifungal active component in our formulation penetrates deep into the nail bed for rapid results. Our unique formulation contains allicin, bioactive compound that abundantly found in onions (Allium sativum) bulbs, a scientifically proven potent antifungal compound that also works to boost the health and vitality of your nails. ONYnail ® is easy to use and is available in a variety of fashionable colors. ONYnail ® is an innovative delivery system for onychomycosis treatment formulated to improve compliance, safe and most significantly, Syariah-compliant. ONYnail ®Nail Fungus Treatment Kit is your perfect solution for fungal nail infection! Treat unsightly looking nails while looking hip and beautiful.

*Correspondence: mohdfaiz@uitm.edu.my

Discovery of Potent Extract and Essential Oil of *Heracleum Afghanicum* Kitamura. Leaves for Antibacterial and Anthelmintic Activities

Mohammad Humayoon Amini*[1,2], Kamran Ashraf[1] and Ashish Suttee[3]

[1]Department of Pharmacology & Chemistry, Faculty of Pharmacy, Universiti Teknologi MARA (UiTM) Selangor, Pundak Allam Campus, 42300 Bandar Puncak Alam, Selangor Darul Ehsan, Malaysia.

[2]Department of Pharmacognosy, Faculty of Pharmacy, Kabul University, Kabul, Afghanistan.

[3]Department of Pharmacognosy, School of Pharmaceutical Sciences, Faculty of Applied Science, LPU, Punjab, India.

Abstract

Heracleum afghanicum Kitamura. a robust perennial aromatic plant of family Apiaceae, is an endemic plant of Afghanistan. Seeds of the plant is traditionally used as spices, digestive aid and lactogenic, while its leaves are used as painkiller and antipyretic. Leaves extracts were prepared by successive Soxhlet-extraction (pet. ether, DCM, ethyl acetate and MeOH). Essential oil was obtained by Clevenger apparatus. Different solvents extract and EO of *H. afghanicum* leaves at doses range (50- 200 µg/well) and standard gentamycin (5 µg/well), were tested in vitro for their antibacterial activity against two Gram-negative (E. coli and Proteus vulgaris) and two Gram-positive (Staphylococcus aureus and Bacillus subtilis) bacteria using agar well diffusion method. The ethyl acetate extract (EAE) produced ZOIs of 21.6 – 27.8 mm and exhibited potent in vitro antibacterial property. The EO was found to contain 25 different compounds among which anethole is the principle constituent (66.12 %) based on GC-MS analysis. EO produced moderate antibacterial effects with ZOI of 8.0 – 13.6 mm. In vitro anthelmintic potential of the test samples and albendazole (as standard) at doses of 2 – 10 mg/ml were tested against adult earth worms (*Eisenia fetida*). The EAE and EO at a dose 2 mg/ml exhibited 2.16 and 11.06, respectively folds stronger anthelmintic activity as compared with standard albendazole. Thus, *H. afghanicum* leaves could be recommended for further in vivo studies aimed to develop safe and effective antibacterial and anthelmintic drugs. Further in vivo experiments will justify the safety and potency of *H. afghanicum* leaves, and hence pharma industries are highly encouraged to industrialization of this medicinal plant. Though the plant's leaves are used as fodder by local people but its industrialization for medicinal purposes would help to promote economy of the community people via sustainable collection and supply of the raw materials to the pharma industries. The plant is also recommended for veterinary medicinal purposes, as it is already used as animal feed, then there will not be serious toxicity issues.

*Correspondence: m_hamayon@yahoo.com

The Designing of Bio-Inspired 4D Printed Smart Stent for The Treatment of Atherosclerosis

Monika Nasrin Munni and Md Jasim Uddin*

Department of Pharmacy, Brac University, 66 Mohakhali, Dhaka 1212, Bangladesh.

Abstract

In the recent era, the novel percutaneous coronary intervention is bio-inspired stents due to the increasing demand for personalized devices in the treatment of atherosclerosis. Technologically engineered biodegradable 4-dimensional (4D) stents for atherosclerosis treatment have become a demanding area of research. However, the long-term existence of stents can cause in-stent restenosis, which can occur in up to 30% of cases of atherosclerosis, and this can be life-threatening for the patents. To solve the challenges, the customized designs of bio-inspired 4D stents were proposed using engineering software: AutoCAD®, SketchUp®, Rhinoceros 6.0, Autodesk Revit, and Autodesk Maya®. A total number of five novel 4D-designs were suggested to print using smart material for self-assembly and selfhealing. The optimized model of 4D stents was loaded to deliver a wide range of pharmaceutical actives. In conclusion, this study was designed to investigate the fabrication process of the bio-inspired 4D stent which can replace the traditional process of atherosclerosis.

Keywords: Stent; Bio-Inspired 4D; In-stent Restenosis; Stent design; Smart Material.

*Correspondence: jasim.uddin@bracu.ac.bd

The Corn Story: How Can We Create Zero Waste from Corn Waste

Barrathan Yogheswaran*, Sithaarthan Yogheswaran and Prakaladhan Yogheswaran

SJKT Ladang North Hummock, Setia Alam, 40170 Shah Alam, Selangor, Malaysia.

Abstract

We explored the potential use of corn waste by converting them into other products which are consumable, recyclable and biodegradable. First, we made toys from dried corn husks, corn silks and corn cobs. Secondly, we made corn silk tea. Corn silk has many medicinal properties and may be beneficial in people with diabetes, heart disease, kidney disease and so on. Finally, we recycled the corn husks by making papers out of it.

*Correspondence: shubashini.gnanasan@gmail.com

LoraNadec- Fast Disintegrating Loratadine Tablet

Shariza Sahudin*, Mumtaz Hussain, Shaharizuan Abdul Rahman, Muhamad Rizal Abd Rahim and Muhammad Aliff Shahkirin Hamdan

Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

Loratadine is a second-generation antihistamine used to manage symptoms of allergic rhinitis. Histamine is a chemical that causes many of the signs and symptoms of an allergy. Oral drug delivery remains the preferred route for administration of various drugs. Development of fast disintegrating tablets (FDTs)/oral disintegrating tablets (ODTs) are to improve patient compliance and convenience. An advantage particularly for travelling, paediatric and geriatric populations who have difficulty in swallowing conventional tablets and capsules. Loratadine market will register a 0.9% CAGR in terms of revenue, the global market size will reach US$ 150 million by 2024, from US$ 140 million in 2019. Report data showed that 58.29% of the Loratadine market demand in Loratadine Tablet, 17.22% in Loratadine Capsule in 2016 and 14.80% in Loratadine Syrup and 9.68% of the Loratadine market demand in other product. There is a clear opportunity for new enhanced oral products arising within this market segment. Sodium bicarbonate is commonly used to produce ODTs, FDTs or effervescent tablets. High sodium content in these formulations are associated with an increased risk of cardiovascular disease and hypertension in both adults and children. Hence, an alternative and safer ingredient is required to enhance disintegration of the tablets. Various processes are employed to obtain ODT tablets which require specific equipment and are more expensive compared with the standard manufacturing process. The most cost-effective way to obtain ODT tablets is by direct compression as the process is shorter and the technology is cheaper. Our value of proposition is that we have produced a prototype, which is a fast release loratadine formulation using nata de coco as disintegrant and the tablets are produced using cheap direct compression method. Therefore, it is cheap, safe and suitable to be used for any or dispersible and fast disintegrating tablets for children and elderly. Our tablet formulation showed improved and higher dissolution and disintegration times, with acceptable levels of tablet physical stability. They showed faster tablet disintegration time compared to commercial loratadine tablets.

Correspondence: shariza2280@uitm.edu.my

Development and Validation of a New Novel HPTLC AND UPLC/ QTOF–MS Method for The Analysis of Curcumin in *Curcuma longa* Linn

Kamran Ashraf[1]*, Sadia Sultan[1], Syed Adnan Ali Shah[1] and Mohd Mujeeb[2]

[1]Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor, Malaysia.

[2]Phytomedicine Lab, School of Pharmaceutical Education and Research, Jamia Hamdard, New Delhi, India.

Abstract

Background: Curcumin is the main active constituent found in *Curcuma longa* (Zingiberaceae). It shows many valuable pharmacological effects. Objective: Research was carried out to develop and validate a new novel, cost effective, precise and accurate stability-indicating high performance thin-layer chromatographic (HPTLC) and rapid, sensitive high-throughput, ultra-high performance liquid chromatography-tandem mass spectrometry (UPLC/Q-TOF-MS) method for analysis of curcumin in Curcuma longa. All previous reported analytical methods for the analysis of curcumin suffer from lower resolution, lower sensitivity and longer analytical time. Results: A very good separation of curcumin was achieved on HPTLC aluminium plates precoated with silica gel 60F254 using toluene-chloroform-methanol (5:4:1, v/v/v) as a mobile phase in HPTLC and with well reduced analysis time (RT: 2.18 min) and enhance efficiency in UPLC/Q-TOF-MS. All validation parameters were found to be satisfactory. Conclusions: New simple, precise and cost effective HPTLC and rapid, most sensitive UPLC/Q-TOF-MS methods have been developed and validated which will help the manufacturer for quality control and standardization of herbal formulations containing curcumin. It also helps in differentiating the species from the adulterant and act as a biochemical marker for C. longa in the pharmaceutical industry.

*Correspondence: kamran1368@uitm.edu.my /+60183238786

Overcoming the Pandemic: An Introduction to Hospital Pharmacists

Izzati Abdul Halim Zaki*, Hasnah Ismail and Hanis Hanum Zulkifly

Department of Pharmacy Practice, Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

When the World Health Organization (WHO) characterized that COVID-19 as a pandemic after the alarming levels of spread and severity of the coronavirus, many countries decided to enforce on the lockdowns, quarantines, and curfews. Italy started their national lockdown order on 9th March 2020 followed by Saudi Arabia, Mongolia, and many other countries. Our country, Malaysia announces the first phase of Movement Control Order (MCO) on 16th March 2020 as preventive measure by the federal government of Malaysia in response to the COVID-19 pandemic. Implementation of the MCO nationally began on 18th March 2020 with closure of all government and private premises including the higher institutions and skills training nationwide. Universiti Teknologi MARA (UiTM) has decided that the Teaching and Learning (T&L) activities will be conducted as Open and Distance Learning (ODL) rather than the conventional Face-to-Face (F2F). The biggest challenge in planning for the ODL is when it comes to the hospital attachment which is compulsory for the third-year students. There are 8 days allocation for hospital attachment and per the board of accreditation requirement, thus it is crucial for the attachment need to be conducted during the semester to avoid any problem during their registration for professional certification. Development Incorporating the component of ODL in hospital attachment indirectly changed the concept from site visit to the hospital to the virtual hospital attachment. The logbook from previous hospital attachment was revised by the team and KPP to ensure the content are suitable for the virtual hospital attachment. However, question arises on how we can show the students the real setting of hospital departments. There are hundreds of videos available online but none of it represent our local settings which in the end may cause confusion to the students. We make a collaboration with Pharma Shoppe in UiTM Kampus Puncak Alam and the Pharmacy Department of Pusat Perubatan UiTM (PPUiTM) to produce a compilation of video for the students. Once the MCO being replaced with Recovery Movement Control Order (RMCO) effective on 10th June 2020, we had a discussion to plan for the video recording process. The video recording was done for one day on 16th June 2020 since we only get permission to be in the PPUiTM for the specific day only. The team do the editing process and content validation by KPP before it was uploaded to Google Classroom as platform for the virtual hospital attachment. Feedback from students We ask students for feedback on the video provided to them during the virtual hospital attachment. “Video on DIC department was very helpful to give us a better view on how DIC pharmacist works before we start our discussion with the lecturer.” “The video helps in better understanding and give a clearer insight of pharmacy in each department (In-patient, out-patient, store management and Drug Information Centre).” “The video helps us to visualize the real situation that happen in the store department and make the learning process more interesting.” “We found that the video and additional materials provided in the google classroom were helpful as it opened our eyes about the guidelines, duties and activities of pharmacists in OPD.” Conclusion The video prepared in a short period of time successfully give some insight to the students during the virtual hospital attachment conducted during this pandemic. However, additional components on other activities by pharmacist in the hospital should be included in the next video to help the students understand better.

*Correspondence: izzatihalim@uitm.edu.my

Super Shield Face Mask

Keertikaa Jega Jeevan*, Janany Vikneswaran, Gautam Reddy Chandran and Prathees Selvam

SJK (T) Ladang Ebor Persiaran Teknologi Subang, Taman Teknologi Tinggi Subang, 40150 Subang Jaya, Selangor, Malaysia.

Abstract

Face mask is an essential item. It is mostly used by those who are not well, to prevent spreading infection to others, and as self-protection from being infected as well as from air pollution. During a pandemic, there appears to be a serious shortage of masks. Meanwhile there is also rampant air pollution. These pose a high risk of respiratory diseases for everyone. Thus, our aim is to create a reusable mask, layered with component of herbs which contain multiple properties such as natural air purifiers and anti-infectives. We used four types of herbs – ginger, turmeric, neem, and oregano. All four herbs are proven to have antimicrobial properties. We sewed fabric masks with pockets using hydrophobic and hydrophilic fabrics. About 20gm of herbs were blended with filtered water. The middle layer of the mask, the filter, is soaked in the herb water overnight and then dried for about 2 hours. Once the filter dried, it can be inserted in the mask pocket. The herb mask can protect users from infection and air pollution, prevent users from infecting others and since it is made from reusable material, can be washed, and used again. The Super Shield Herbal Mask is an alternate solution for people from all ages. Since it is reusable, it has good value for money and as it is enhanced with a layer of herbal components is gives a protective solution. In future, we would like to add more variety of herbs, so that users have more choices to choose based on their preferred fragrant.

Correspondence: jegajeevan.elumalai@gmail.com

3D Printed Microneedle System for Personalised Transdermal Drug Delivery

Md Jasim Uddin[1]* and Dennis Douroumis[2]

[1]Department of Pharmacy, Brac University, 66 Mohakhali, Dhaka 1212, Bangladesh.

[2]Faculty of Engineering and Science, School of Science, University of Greenwich, Chatham Maritime, Chatham, Kent ME4 4TB, United Kingdom.

Abstract

3D printed transdermal microneedles (MNs) are considered to be minimally invasive, painless devices that directly reach the upper portion of the dermis to administer small molecules, DNA, oligonucleotides, vaccines, hormones etc. 3D printed MN arrays were fabricated using a biocompatible resin through stereolithography (SLA) for the transderma insulin delivery for antidiabetic effect and cis-platin delivery to A-431 epidermoid skin tumours for cancer treatment. However, we have introduced a microelectromechanical system (MEMS) combine numerous advantages for drug delivery applications since they allow the spatiotemporal and dosage controlled delivery of drugs. To circumvent the pitfalls associated with typical MNs manufacturing techniques; we employed the pioneering technology of 3D printing. In vivo animal trials revealed fast insulin action with excellent hypoglycaemia control and lower glucose levels achieved within 60 min, combined with steady state plasma glucose over 4 h compared to subcutaneous injections. Moreover, in vivo evaluation with Balb/c nude mice presented sufficient cis-platin permeabilization with high anticancer activity and tumour regression. Histopathology analysis confirmed the tumour inhibition effect, showing demarcated lesions with thin fibrous capsules and necrotic cores. Finally, the in vivo studies revealed that the MN MEMS device yields fast onset action of the administered insulin for the first 10 to 20 minutes and a sustained hypoglycaemics effect in diabetic mice. The in vivo studies demonstrated that the suggested MN MEMS device is an adequate and effective alternative to traditional subcutaneous injection based approaches for insulin administration in a painless, accurate and controlled manner. The use of 3D printed microneedles demonstrates the potential for in-vivo transdermal delivery of insulin and anticancer drugs.

Keywords: 3D printed MN, Skin tumours. Microelectromechanical systems, Insulin, Anticancer drugs.

*Correspondence: jasim.uddin@bracu.ac.bd

Emote Face Mask

Idanawati Naharudin[1,2]*, Noor Meliza Jamil[2], Muhammad Rizal Abd Rahim[2], Siti Fariha Bakri[2] and Nor Hidayah Mohamed Mobin[2]

[1]Non-Destructive Biomedical and Pharmaceutical Research Centre, iPROMISE, 42300 Bandar Puncak Alam, Selangor, Malaysia.

[2]Department of Pharmaceutics, Faculty of Pharmacy Universiti Teknologi MARA (UiTM) Cawangan Selangor, 42300 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

Due to Covid-19 wearing a face mask is a mandatory if we are going to crowded places, confined space and close conversation (3C). Berita Harian newspaper, stated The Royal Malaysian Police (PDRM) arrested 315 individuals for disobeying the order of the Restoration Movement Control Order (PKPP), among which were 127 offenses of not wearing face masks. We have to wear and take it off every time they want to eat, need to have extender for Hijabi, less comfort for those wear glasses and lack of awareness. Objective of this project is to enhance and improvised the concept of face mask to tieless face mask that we called EMOTE FACE MASK.

Keywords: awareness, face mask, extender, comfort, tieless face mask

*Correspondence: idana482@uitm.edu.my

Solar Rechargeable Auto Hand Sanitizer

Mohammad Izwan Hafizi Bin Mohammad Faizol*, Muhammad Firas Bin Hawari, Nur Aina Zumaiah Binti Zuhairy and Yusra Binti Moohamadropaning Sulong.

Sekolah Kebangsaan Puncak Alam (2), 43200 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

Recently the world including our country, Malaysia has been hit by COVID 19 virus. Therefore, it is important for us to maintain personal hygiene and practice the S.O.P that has been recommended by the government. With that, it came the idea from us, a group of Year 6 students SKPA2 to modify a perfume sprayer into a tool called 'Solar Rechargable Auto Hand Sanitizier'. This tool works to spray anti-bacterial fluid on the hands automatically. The device combines a mechanical spraying system and several electronic components that serve as infrared detectors. This device uses battery power and also it can be recharged using solar power. With the creation of this project we hope it can reduce direct hand contact with antifungal sprays and reduce the infection of COVID 19.

*Correspondence: g-69354045@moe-dl.edu.my

All-In-One MTT Test Kit (EMiTT)

Hasseri Halim*, Salfarina Ramli, Izyan Hazirah Zulkurnain, Evana Kamarudin, Ihsan Safwan Kamarazaman and Nurhanani Ayub

Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Puncak Alam, 42300 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

MTT assay is a colorimetric assay frequently used to assess cell metabolic activity. The assay is based on reduction of tetrazolium salt into formazan crystal by mitochondria dehydrogenase of viable cells. MTT assay is well-known in studies that measure cell viability, cell proliferation and cytotoxicity. Although the assay can be carried out using 96 well plates, the reagents for cell culture and MTT assay are expensive and usually come in a large volume of packaging. Moreover, conventional method of MTT requires long preparation of cell media and MTT solution. Thus, it is not economical and can be intimidating for small scale projects such as student's final year project (FYP) or preliminary study for grant application. The All-In-One MTT test kit (EMiTT) is designed to have all reagents prepared for cell culture and MTT assay. EMiTT comes with supplemented media (DMEM, MEM or RPMI), trypsin, phosphate buffer saline (PBS), MTT solution, dimethyl sulfoxide (DMSO) and 96-well plates. EMiTT is economical, it reduced time preparation and comes with a simple and reliable protocol. Practically, EMiTT is convenient especially for researchers that are new with cell culture and MTT assay.

*Correspondence: hasseri2945@uitm.edu.my

Step-and-Go Hand Sanitizer Dispensers

Muhammad Hamdi Othman[1], Fairos Abdul Hamid[1], Fauziah Abas[1], Nur Hidayah Farid[1], Norhayati Mohd Monzai[2] and Rohani Omar[2]

[1]Department of Pharmacy Practice, Faculty of Pharmacy, Universiti Teknologi MARA, Puncak Alam Campus, 42300 Bandar Puncak Alam, Selangor, Malaysia.

[2]Imaging Center, Faculty of Pharmacy, Universiti Teknologi MARA, Puncak Alam Campus, 42300 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

Increasing need for the deployment of hand sanitizer owing to the sudden spread of the disease COVID-19 globally, along with the increasing awareness for the benefits associated with the use of hand sanitizer are some of the factors anticipated to drive the growth of the global automated hand. Automated hand sanitizer significantly helps to restrict the spread of COVID-19 disease as it is communicable disease and therefore requires extreme precaution to avoid its transmission through surface contact. Thus, the utilization of hands-free sanitizers has increased massively in public places. The Step-and-Go hand sanitizer is made of durable plastic. This touchless hand sanitizer is a great addition to any school, restaurant, or hotel. It can be installed quickly with minimal effort and mobile for urgent placement. The Step-and-Go hand sanitizer dispenses 1 mL of foam per activation, providing sufficient protection against germs. The foam dispenser bottle can be removes easily for interval maintenance. For added convenience, this dispenser can accommodate foam or liquid soap.

*Correspondence: hamdi8323@uitm.edu.my

Zeomask®: Peelable Face Mask for Cleansing and Hydrating the Skin

Nor Amlizan Ramli[1], Mohd Hafiz Mohd Jaafar[1], Siti Hanim Mohd Noor[1] and Siti Sarazila Mohammad Shafiee[2]

[1]Department of Pharmaceutics, [2]Department of Pharmaceutical Life Sciences, Faculty of Pharmacy, Universiti Teknologi MARA (UiTM), Cawangan Selangor, 42300 Bandar Puncak Alam, Selangor, Malaysia.

Abstract

Pollutants can be found in our surrounding environment including in air, water and daily physical objects. Our human skin is highly exposed to our surroundings, and extended exposure can result in absorption and accumulation of pollutants. Water and air that are polluted with harmful emission and free radicals can potentially result in skin problem such as hyperpigmentation, acne, hive, discolouration and eczema. A peelable mask was developed to combat these problems with a combination of ideal materials. ZeoMask® emulsion was constructed using volcanic ash (10% w/w) as its active component and glucomannan powder (2.5-3.0% w/w) act as hydrogel providing structural stability to this formulation. Volcanic ash is naturally occurring minerals, that acts as a molecular sieve which allows ion- exchange which is useful for trapping heavy metal pollutants and micro-filtration system. Glucomannan is water-soluble and its gel form has a high water content and stabilizes the formulation to form a peel-able thin film. Microbial testing showed that this formulation inhibits the growth of Candida albicans, while no zone inhibition on gram-positive bacteria (Staphylococcus epidermis and Staphylococcus aureus) and gram-negative bacteria (Escherichia coli). The peelable mask is spreadable evenly on the petri dish and let dry in the oven (36 ± 0.5 ºC) for 15 minutes to form a peelable thin layer film. As a conclusion, ZeoMask® is a potential skincare product that is able to cleanse the skin from pollutants, maintains the hydration level of the skin and works against fungal infection.

*Correspondence: nor.amlizan@uitm.edu.my