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“Optimizing Innovation in Knowledge, Education and Design”

EXTENDED ABSTRACT



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17.	GeraNeem: A Natural Antibacterial Hand and Body Soap from Neem and Geranium Oils <i>Nor Raihan Mohammad Shabani, Nurhidayah Ab. Rahim, Siti Nurshahida Nazli, Tengku Nilam Baizura Tengku Ibrahim, Nurhidayah Sabri & Syarifah Masyitah Habib Dzulkarnain</i>	352-357
18.	Evolution Measuring Tape (Ev_MeTa-Cx) <i>Dr. Wan Zukri Wan Abdullah, Dr. Mohd Fairuz Bachok, Ainamardia Nazarudin, Dr. Duratul Ain Tholibon & Farah Wahida Mohd Latib</i>	358-362
19.	PLC-Based Industrial Application Simulator: Four Ways Traffic Light Management System <i>Rozi Rifin, Kamaru Adzha Kadiran, Mohamad Zhafran Hussin, Muhammad Rajaei Bin Dzulkifli & Ezril Hisham Bin Mat Saat</i>	363-368
20.	The CC Guy: Enhancing Comprehension of Continuity Correction <i>Syah Runniza binti Ahmad Bakri, Noriham binti Bujang & Aidil Azli bin Alias</i>	369-373
21.	Coupling of Computation Simulation and Hands-On Experience in Process Control Laboratory Inline with IR 4.0 Oriented Education <i>Serene Lock Sow Mun, Irene Lock Sow Mei & Lim Lam Ghai</i>	374-379
22.	Vib-Phages as A Supportive Tool for Development of Antibacterial Treatment in Aquaculture <i>Ruhil Hayati Hamdan, Tan Li Peng, Ain Auzureen Mat Zin, Nora Faten Afifah Mohamad, Pang Sing Tung, Nur Hidayahanum Hamid & Lee Rui Ying</i>	380-383

CATEGORY: BSC YOUNG INVENTOR

1.	Eye Tech <i>Ahlam Abdul Aziz, Muhammad Amir Farhan Mohd Azhar, Muhammad Aiman Muhammad Azly, Muhammad Irfan Abdul Jabar & Khairun Liyana Mohd Kamal</i>	384-388
2.	Kompang Illustration by Using Equation of Curve <i>Masnira Ramli, Rosfatihah Che Mat, Zati Ascha Rejab, Nalle Nor Lyana Binti Saridon & Mohd Asmirul Fikri Bin Mukmin</i>	389-393
3.	SOAPOLOGY: Eco-Friendly Handmade Soap from Used Cooking Oil <i>Muhamad Aiman Mazlan, Muhammad Alif Haiqal Bin Asmizar, Ilhamd Bin Sazali & Nurul Hidayana Mohd Noor</i>	394-399
4.	E-SMART 2.0: A Sustainable Bin for E-Waste Disposal <i>Raja Nur Izny Kamaliyah Raja Zulkifli @ Wan Zulkifli, Tengku Nurshazwina Tengku Sahrum, Abdur Rahman Sudais Ahmad, Muhammad Mukhlis Ahmad Taufiq & Mohd Idham Mohd Yusof</i>	400-404

Assalamualaikum warahmatullahi wabarakatuh,



First and foremost, I would like to express my gratitude to the organizing committee of i-Spike 2023 for their tremendous efforts in bringing this online competition a reality. I must extend my congratulations to the committee for successfully delivering on their promise to make i-Spike 2023 a meaningful event for academics worldwide.

The theme for this event, 'Optimizing Innovation in Knowledge, Education, and Design,' is both timely and highly relevant in today's world, especially at the tertiary level. Innovation plays a central role in our daily lives, offering new solutions for products, processes, and services. By adopting a strategic approach to 'Optimizing Innovation in Knowledge, Education, and Design,' we have the potential to enhance support for learners and educators, while also expanding opportunities for learner engagement, interactivity, and access to education.

I am awed by the magnitude and multitude of participants in this competition. I am also confident that all the innovations presented have provided valuable insights into the significance of innovative and advanced teaching materials in promoting sustainable development for the betterment of teaching and learning. Hopefully, this will mark the beginning of a long series of i-Spike events in the future.

It is also my hope that you find i-Spike 2023 to be an excellent platform for learning, sharing, and collaboration. Once again, I want to thank all the committee members of i-Spike 2023 for their hard work in making this event a reality. I would also like to extend my congratulations to all the winners, and I hope that each of you will successfully achieve your intended goals through your participation in this competition.

Professor Dr. Roshima Haji Said
RECTOR
UiTM KEDAH BRANCH



WELCOME MESSAGE (i-SPIKE 2023 CHAIR)



We are looking forward to welcoming you to the 3rd International Exhibition & Symposium on Productivity, Innovation, Knowledge, and Education 2023 (i-SPIKE 2023). Your presence here is a clear, crystal-clear testimony to the importance you place on the research and innovation arena. The theme of this year's Innovation is "*Optimizing Innovation in Knowledge, Education, & Design*". We believe that the presentations by the distinguished innovators will contribute immensely to a deeper understanding of the current issues in relation to the theme.

i-SPIKE 2023 offers a platform for nurturing the next generation of innovators and fostering cutting-edge innovations at the crossroads of collaboration, creativity, and enthusiasm. We enthusiastically welcome junior and young inventors from schools and universities, as well as local and foreign academicians and industry professionals, to showcase their innovative products and engage in knowledge sharing. All submissions have been rigorously evaluated by expert juries comprising professionals from both industry and academia.

On behalf of the conference organisers, I would like to extend our sincere thanks for your participation, and we hope you enjoy the event. A special note of appreciation goes out to all the committee members of i-SPIKE 2023; your dedication and hard work are greatly appreciated.

Dr. Junaida Ismail

Chair

3rd International Exhibition & Symposium Productivity, Innovation, Knowledge, and Education 2023 (i-SPIKE 2023)

GeraNeem: A NATURAL ANTIBACTERIAL HAND AND BODY SOAP FROM NEEM AND GERANIUM OILS

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ABSTRACT

Body hygiene is crucial for maintaining daily health standards. The evaluation of medicinal plants has been addressed thoroughly to produce herbal soap made from herbal plants. Body soap from herbal ingredients shows great promise due to its natural anti-microbial properties. Neem is a well-known tree with immense medicinal properties and is the most versatile medicinal plant having a wide spectrum of biological activity. Due to its astringent, antiseptic, tonic, antibiotic and anti-infectious properties, geranium has therapeutic abilities that can calm irritated skin, clear acne, and heal bruises, burns, cuts, and eczema. The main objective of this study is to develop an herbal hand and body soap using natural main ingredients. In support of the Goal 3 of Good Health and Well-being, one of the goal of Sustainable Development Goals (SDGs), we make products which gently cleanse, nourish and soothe the skin, leaving it feeling healthy and happy. Two essential elements in this herbal body soap were formulated utilising neem and geranium oils and named GeraNeem body soap. The quality of the body soap was assessed based on the odour, colour, appearance, lathering, texture and pH. The formulations were also

tested for anti-microbial test. The antimicrobial results indicated that GeraNeem hand and body soap formulations can remove germs from hands. This study demonstrates the successful development of the formulations of GeraNeem hand and body washes by incorporating herbal extracts that can remove germs with natural ingredients.

Keywords: neem leaves, geranium, natural product, herbal body soap, essential oil

INTRODUCTION

Body washing involves cleansing body parts to eliminate dirt and pathogens and prevent the transmission of pathogenic microorganisms. Effective washing helps eliminate visible dirt from hands and reduces the presence of harmful microorganisms like *Pseudomonas aeruginosa*, *Escherichia coli* and *Staphylococcus aureus*. Body washing is crucial for protecting the skin against harmful microorganisms and preventing the spread of contagious diseases, making it a highly important precaution (Chitkara *et al.*, 2020).

Plants have proven to be a valuable source of anti-microbial agents (Sharma *et al.*, 2013). Plant extracts and oils exhibit potential as anti-microbial compounds, capable of combating various pathogenic microorganisms that cause infectious diseases and show resistance to synthetic drugs (Khan *et al.*, 2019). One major advantage of utilising natural sources is their easy availability, affordability, and harmlessness compared to chemical products. Therefore, research has increased tremendously towards making natural products with improved quality, less cost, and no side effects over chemical agents (Londhe *et al.*, 2015).

In the present context, neem plant leaves (*Azadirachta indica*) and rose geranium (*Pelargonium graveolens*) are selected for preparing herbal body soap. Neem is also called 'arista' in Sanskrit—a word that means 'perfect', complete and imperishable. The Sanskrit name 'nimba' comes from the term 'Nimbati Syasthyamdadati', which means 'to give good health'. The seeds, bark and leaves contain bioactive compounds with proven antiseptic, antiviral, antipyretic, anti-inflammatory, anti-ulcer and antifungal uses (Ahmed *et al.*, 2016). Our previous study on methanol neem leaf extract has shown the anti-microbial activity of neem against *Staphylococcus aureus* (Dzulkarnain & Rahim, 2014). The geranium plant has a strong global recognition due to its widespread use in perfumery, cosmetics, soaps, creams, and aromatherapy products exhibiting good antioxidant activity. It further relieves congestion, especially for the breast tissue, improves circulation and is excellent for stimulating and cleansing the lymphatic system, promotes a healthy immune system, and is helpful for detoxification, overcoming addiction, phlebitis, haemorrhoids, fluid retention and indigestion (Saraswathi *et al.*, 2011). In the present study, neem and geranium oils were used to formulate body soap.

METHODOLOGY

Preparation of herbal body soap

The materials needed for the preparations of GeraNeem body soap is showed in Figure 1. Soap base was added in distilled water and melted by heat. The melted soap base was left cooled until 75°C. Neem oil, geranium oil and dried rose buds were added and mixed in the liquid soap base. The liquid mixture was poured into a silicone mould and allowed to solidify.



Figure 1. The materials used for GeraNeem hand and body soap preparations.

Physical evaluation and pH analysis

The Geraneem hand and body soap was subjected to physical evaluation for odour (rose scent or other), colour (whitish, yellowish or pale yellow), appearance (opaque, translucent, transparent), lathering (yes or no) and texture (soft or hard). The soap was taken on the fingertips and rubbed between two fingertips then the grittiness was evaluated (Warra *et al.*, 2010). pH of the soap was measured using a digital pH meter.

Evaluation of anti-microbial activity

The anti-microbial efficacy of the formulated GeraNeem body soap was tested by washing muddy hands with GeraNeem body soap by applying a proper hand washing procedure. After that, one of the fingers was printed onto nutrient agar surface. Unwashed hands and hands washed with only tap water was used as the control. The plates were incubated at 37°C overnight. The plates were observed for the formation of colonies of microorganisms.

RESULTS AND DISCUSSIONS

Physical and chemical properties of GeraNeem body soap formulation.

The present study was carried out to develop an herbal body soap from plant oils that have anti-microbial property using low-cost technology. The plant used for anti-microbial activity was neem leaves with geranium. The formulation was prepared by using generally approved compositions that are compatible with any similar body cleansing formulations (Sandeep *et al.*, 2016). The body soap was analysed for physical parameters such as pH, colour and appearance. Physical analysis was done by sensory and visual inspection.

The prepared GeraNeem body soap was evaluated for its appearance, color and odor. The body soap formulation produces geranium odor. All the formulations are green in color and transparent in appearance (Table 1). The prepared herbal body soap formulations were found washed easily with tap water, not found to show any greasiness nor grittiness upon application on the skin.

Table 1. Physical properties of GeraNeem hand and body soap.

Odour	Colour	Appearance	Lathering	Texture
Rose scent	Whitish	Opaque	Yes	Hard

Determination of pH

The pH of soap prepared was determined using a pH meter (Hanna Instruments). The soap shaving was dissolved in distilled water in a beaker. The electrode of the pH meter was inserted into the solution. The pH was recorded (Table 2).

Table 2. pH determination of GeraNeem hand and body soap.

Soap	pH reading
GeraNeem	10.1*

*The value is mean of three replicates

Anti-microbial activity

The anti-microbial efficacy of the GeraNeem body soap was tested by washing muddy hands with GeraNeem body soap. The result of anti-microbial activity is shows in **Error! Reference source not found.** The result from unwashed or muddy hands showed the growth of different morphology of colonies, indicating various microorganisms from the unwashed hands after 1 day incubation. The hands that washed only with tap water also showed the growth of a few bacterial colonies on the surface of the nutrient agar. The nutrient agar that was from GeraNeem body soap showed a clear plate without single colony, indicating the microorganisms was eliminated by washing hands with GeraNeem body soap. The bacterial colonies become bigger in size after 5 days incubation while no bacterial growth was seen for the GeraNeem washed hands plate. This finding indicates the GeraNeem body soap is safe to be used.

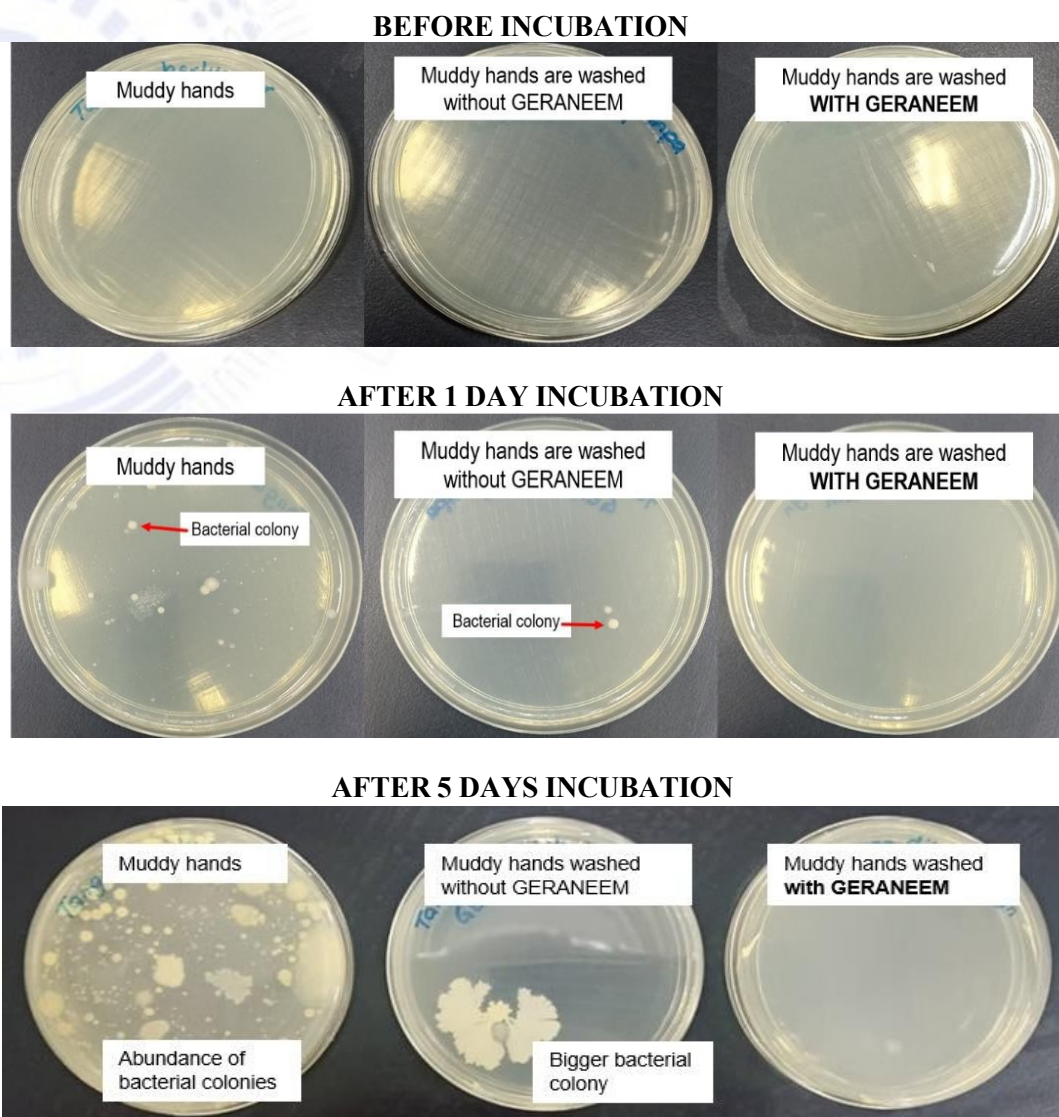


Figure 2. The plate showing the inhibition of microorganisms from the hands washed with the GeraNeem hand and body soap before and after incubation.

CONCLUSION

The results suggest that the combinations of neem leaves oil with geranium essential oil are capable of giving protection to the skin. This might be a rational basis for using herbs in preparation of hand and body soap and using these compounds in making antiseptic lotions or hand washing in place of commercially available soap with harmful ingredients.

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