

Faculty of Applied Sciences
Sabaragamuwa University of Sri Lanka

OUT OF THE PRESS
Our publications - November

Volume 4 Issue 10

06th December 2024



PEER-REVIEWED JOURNAL

ARTICLES

Development of *Mussaenda frondosa* sepal infused functional tea with enhanced antioxidant and alpha-amylase inhibitory activities

Nafla Faleel, Thilini Kananke & Namal Perera

ABSTRACT

Mussaenda frondosa (MF) is an edible species of the genus *Mussaenda* (Rubiaceae) that contains a wide array of medicinal compounds. The present study was conducted to evaluate the physicochemical and functional properties of the MF sepals and to develop a novel herbal tea with improved functional properties. Remarkably high antioxidant and α -amylase inhibitory activities were exhibited by water and ethanol extracts of MF, attributed to their high phenolic and flavonoid contents. None of the extracts showed toxicity, as evaluated by the brine shrimp lethality assay. A tea was formulated by blending different proportions (30, 40 and 50%) of dry sepals of MF with black tea. The sensory analysis showed a significantly high level of acceptance for the formula containing 40% MF (MFT-40) with augmented phenolic contents (138.82 ± 0.21 mg GAE/g), antioxidant (DPPH scavenging activity with IC_{50} of 12.23 ± 0.45 μ g/mL), and hypoglycemic activities (α -amylase inhibition with IC_{50} of 104.80 ± 0.59 μ g/mL) compared to the black tea control (with the values of 128.47 ± 0.13 mg GAE/g, 18.70 ± 0.68 μ g/mL and 153.07 ± 0.61 μ g/mL respectively). This study revealed the potential use of MF as a source of antioxidants for the development of new functional teas with enhanced health benefits.

About the Journal

Discover Food

Impact Factor – 3.2

<https://doi.org/10.1007/s44187-024-00207-3>

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Freshwater salinisation: unravelling causes, adaptive mechanisms, ecological impacts, and management strategies

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ABSTRACT

Freshwater salinisation is a growing problem worldwide, affecting surface and groundwater resources. Compared with other global environmental issues, freshwater salinisation has been studied extensively in North America, Australia, and Europe but less so in South America, Asia, and Africa. Both the natural and anthropogenic sources can contribute for freshwater salinisation, through the concentration of dissolved salts in water rising above its normal levels. This review provides a comprehensive assessment of the causes of freshwater salinisation, the impacts on freshwater communities and ecosystem functions, the adaptive mechanisms for survival in an increasingly saline environment, and the management strategies available to control freshwater salinisation. Many human activities contribute to freshwater salinisation, including road salt use, agricultural practices, resource extraction, reservoir construction, and climate change. Aquatic organisms have evolved mechanisms to survive in increasingly saline environments, but excessive salinity can lead to mortality and non-lethal effects. Such effects can have cascading impacts on the structure and function of aquatic communities and ecosystem services. Therefore, monitoring programmes and chemical fingerprinting are needed to identify highly salinised areas, determine how various human activities contribute to freshwater salinisation, and implement management strategies. Furthermore, current research on freshwater salinisation has been limited to a few regions of the world. It is essential to expand the research further into exploring the impacts of salinisation on freshwater resources in unexplored geographic areas of the world that are mainly impacted by climate change scenarios.

About the Journal

Environmental Monitoring and Assessment

Impact Factor – 2.9

<https://doi.org/10.1007/s10661-024-13388-2>

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CONFERENCE PROCEEDINGS

Anti-Diabetic, Lipid Peroxidase, Antimicrobial, Antioxidant Activities, and General Toxicity of Aqueous and Methanol Extracts of *Psidium guajava*, *Garcinia quaesita*, and *Cinnamomum verum*.

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ABSTRACT

Sri Lanka has rich Ayurvedic biodiversity, and plant-based extracts have attracted significant interest for their potential therapeutic properties. However, there is limited scientific evidence supporting their therapeutic effects. This study aims to evaluate the biological activities of aqueous and methanol extracts from selected plants. Aqueous (aq) and methanol (Mth) extracts of *Psidium guajava* (Gu) leaves, *Cinnamomum verum* bark (CB), *Cinnamomum leaves* (CL), and *Garcinia quaesita* (Ga) leaves were prepared using sonication and freeze-drying. These extracts were evaluated for in vitro anti-diabetic activity using alpha-glucosidase inhibition, lipid peroxidase using the spectrophotometry, antibacterial properties through agar disk diffusion, and preliminary cytotoxicity using the brine shrimp assay. Antioxidant activity was assessed using the ferric reducing antioxidant power assay (FRAP) and the total flavonoid content (TFC) was determined using the spectrophotometric method. Gu-Mth extract exhibited the highest alpha-glucosidase inhibition ($IC_{50} = 1.19 \pm 0.03$ mg/ml) compared to acarbose and the most significant lipid peroxidase inhibition ($IC_{50} = 158.20 \pm 2.59$ ppm) relative to BHT ($IC_{50} = 132.02 \pm 2.53$ mg/ml). CB-Mth extract demonstrated maximum antibacterial activity against selected four bacterial strains. Except for Ga-aq and Ga-Mth, the other extracts displayed no significant toxicity in the brine shrimp assay. The Gu-Mth extract had high total antioxidant activity (FRAP: 228.01 ± 10.46 mg Trolox/g) and contained elevated TFC (49.06 ± 6.22 mg quercetin/g). Methanol extracts of *Psidium guajava* leaves and *Cinnamomum verum* bark exhibit superior functional properties and can be utilized to optimize extraction processes for isolating bioactive compounds from natural plant sources.

About the Conference

1st Medan International Conference on
Biomedical Science (MICoBioS)
6-8 Nov 2024
Universitas Sumatera Utara, Indonesia

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Development of an Economical and Sustainable Protein Powder, Using Natural Ingredients for Sri Lankan Athletes

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ABSTRACT

Protein is athletes' most important nutritional component to repair and protect their muscles. This study aims to produce protein supplements at a low cost using local ingredients for Sri Lankan athletes because all the supplements available on the market are expensive. Soybean, mushroom, and millet were used as main ingredients for the preparation of the supplement. After protein content analysis by Kjeldahl method (Domínguez et al., 2017). Soybeans (0.55 kg), mushrooms (1.500 kg), and millet (0.200 kg) were used as main ingredients for the preparation of 1 kg of powder. All the ingredients were properly powdered and mixed in special lab processes. Energy (calories and kilojoules), protein content, fat content, carbohydrate content, and moisture content were evaluated for the final product. Sensory analysis, shelf-life testing, and determination of water-soluble ash content tests were carried out for this product. The final product was dissolved in water and used in three ways for sensory analysis (A- Supplement 1 tablespoon dissolved 300 ml water, B- Supplement 2 tablespoon dissolved 300 ml water, C- Supplement 3 tablespoon dissolved 300 ml water). A sample of 30 students was used to test the texture, color, aroma, taste, melting, and aftertaste of the product, and the results were analyzed using descriptive statistics and an ANOVA test. According to the Kjeldahl method results of protein content analysis, protein content in soybeans, mushrooms and millet was 27%, 14%, and 25% respectively. Further, the final product had a nutritional profile with an energy content of 329 kcal (1375 kJ) per 100 g, a protein content of 31.9%, 12.6% of fat, 25.6% of carbohydrates, 10.1% of sugar content and finally with a moisture content of 15.83%. Statistical analysis revealed that there was a significant difference between the above six components ($p < 0.05$). Sample B is the best one because the above statistical test shows the highest mean (Mean \pm Standard Deviation = 25.07 ± 3.18). Cost analysis proved that this supplement can be produced at a low cost of Rs. 1825 per kg. This study shows that a protein-based balanced protein supplement powder can be developed using local low-cost ingredients. As a result, the developed nutritional powder provides a balanced blend based on protein. In the future variations of flavors of this powder can be developed.

About the Conference

2nd International Research Conference on Healthy Delights

11 & 12 Nov 2024

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***Lasiodiplodia crassispora* and *L. pseudotheobromae* Isolated in Sri Lanka Show Mycoremediation Abilities for Decolorizing Crystal Violet**

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ABSTRACT

Synthetic dyes resist natural degradation because of their complex structures, posing risks upon their direct release into aquatic systems and adversely impacting the environment and human health. Physicochemical treatments are used for colour removal from wastewater, whereas mycoremediation offers a cost-effective and environmentally friendly alternative for decolorizing synthetic dyes. In this study, crystal violet (CV) (triphenylmethane dye) was used as a test dye to assess the decolorization ability of *Lasiodiplodia crassispora* (RUFCC2463) and *L. pseudotheobromae* (RUFCC2464) isolated from Mahakanadara Tank and Mihintale Tank respectively in Sri Lanka. These fungi were identified using a biphasic approach that included morphological characterization and molecular multi-gene analyses (ITS and tef1). Screening on potato dextrose broth (PDB) containing CV showed that *L. pseudotheobromae* achieved the highest percentage decolorization ($95.23\% \pm 0.82$), followed by *L. crassispora* ($93.18\% \pm 0.51$). This study extends beyond in vitro applications to real-world scenarios by providing novel methodologies in mycoremediation. This innovative system comprises a temporary wastewater storage chamber, four capsule incubators, and a water sterilization chamber. The mycoremediation process was conducted under sterile conditions, and the entire decolorization process took one month. Wastewater containing CV is directed into the capsule incubator from the temporary wastewater storage tank through a filtering system. The capsule chambers contain PDB with antibiotics (tetracycline 50 mg L^{-1}). Every seven days, wastewater was transferred sequentially through each capsule chamber, with each chamber retaining the wastewater for a one-week period with shaking to facilitate fungal enzymatic reactions. By the end of the fourth capsule chamber, the decolorization process was completed due to fungal activities. In the water sterilization chamber, treated wastewater was held for two days and sterilized with heat or chlorinated water, eliminating any harmful effects from the fungi used in remediation. A promising avenue for the future is the use of capsule mycoremediators for effective synthetic dye decolorization.

About the Conference

The 50th International Congress on Science,
Technology and Technology-based Innovation
25-27 Nov 2024
Thailand

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Development of glaze for red clay-based cookware

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ABSTRACT

For millennia, red clay cookware has been a mainstay in kitchens due to its attractive aesthetic, environment-sustainable production, and familiar taste of foods. However, cookware manufacturers must innovate to remain competitive in the market. A glaze can significantly enrich the functionality, durability, cover deformations and enhance the resilience of the clay cookware to thermal shock. Traditional cooking in unglazed clayware allows moisture absorption and mineral leaching, enhancing flavor and texture. The developed glaze merges these benefits with durability. It meets contemporary standards and appeals to health-conscious consumers, potentially establishing a new category of innovative glazed clay cookware in Sri Lanka. Ceramic-glazed cookware on the other hand prevents moisture transfer and simplifies cleaning, while offering thermal shock resistance and aesthetic appeal, affecting both cooking processes and food profiles. This study develops a specialized glaze for Sri Lankan red clay cookware, incorporating natural minerals such as quartz, feldspar, calcite, dolomite, zinc oxide, and ferrous oxide. The milled raw materials were sieved, and the physical and chemical properties of the slurries were optimized to meet the required standards. The raw materials were characterized by X-ray diffraction (XRD) analysis. The thermal expansion coefficient of the glaze ($\alpha_{\text{glaze}} = 5.73 \times 10^{-6}$ at 500°C) and the body ($\alpha_{\text{body}} = 5.35 \times 10^{-6}$ at 500°C) were closely matched. The quality and the durability of the final product were ensured by determining the water absorption, peel-off, freezer safety, spalling, outdoor leaving, dishwasher proof, alkali proof, acid proof, and boiling waterproof tests. The robustness and suitability of the developed glaze for practical applications were confirmed.

About the Conference

Young Scientists' Conference on
Multidisciplinary Research-2024
27 Nov 2024

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Effect of eight weeks aerobic endurance training (swimming) on long- distance freestyle performance among intermediate male swimmers

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ABSTRACT

Swimming strokes are the different techniques used by swimmers to move through the water efficiently. In the last 2023 inter-university games, it was observed that the intermediate male team at Sabaragamuwa University had a problem with their performance in events of 200 m and other long-distance events in freestyle. The problem was that they had considered the timing gap, lap by lap compared to other top players. Therefore the objective of the study was to find out the effect of eight weeks of aerobic endurance training (swimming) on long-distance freestyle performance among intermediate male swimmers in Sri Lanka. Two male intermediate long-distance swimmers from Sabaragamuwa University were selected using the purposive sampling technique to take part in the research. The training program was conducted over an eight-week period involving two intermediate male swimmers. Both samples completed training three days per week and two hours per day. The level of tested swimmers was assessed using the swimming beep test beginning and the end of the periodization as pre-test and posttest. For descriptive analysis, only data obtained at maximum loads in both pre and post-tests were accepted. As expected the study results showed that there was significant improvement evidenced in the post-test more than the pre-test. According to the norms table of the swimming beep test, both samples' performance was poor in the pre-test. However, in the post-test, both samples showed average performance. The above study concludes that the enhancement of the aerobic endurance of freestyle long-distance intermediate male swimmers at Sabaragamuwa University of Sri Lanka indicates the necessity to improve the performance of swimmers with proper training.

About the Conference

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11 & 12 Nov 2024
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