IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.311 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 5, May 2026

DOI: 10.17148/IARJSET.2026.13588

Formulation and Acceptability of Moringa - Jamaican Berry Bar Foot Scrub

Aileen B. Atalisay

Capiz State University-Main Campus, Roxas City, Philippines

Abstract: In the pursuit of innovative and natural treatments, this research explores the synergy between Moringa-Jamaican berry extracts in a solid scrub format. Seeking to balance exfoliation, moisture and smoothness with nourishment. This study aimed to evaluate the acceptability and effectiveness of a moringa seed and Jamaican berry bar foot scrub, focusing on sensory qualities and functional performance. The experimental-developmental research design with a Complete Randomized Design (CRD) was employed, using three treatments that varied in the proportion of the primary ingredients: Treatment A (25g moringa seeds: 75g Jamaican berry), Treatment B (50g:50g), and Treatment C (75g moringa seeds: 25g Jamaican berry), while moringa extract, glycerin, and scent were kept constant. A total of 25 evaluators, including cosmetology teachers, beauticians, students, and consumers, assessed the products using a five-point Likert scale on sensory qualities in terms of appearance, scent, texture and functional performance in terms of exfoliating, moisturizing, and smoothing effects. The findings revealed that Treatment C was consistently rated superior across all sensory and functional attributes. In terms of appearance, it was described as "very attractive"; its scent was "very pleasant," and its texture was "very rough," providing a noticeably effective exfoliating feel. Treatment C also demonstrated the highest level of effectiveness, being "very effective" in exfoliating, moisturizing, and smoothing the feet, while Treatments A and B were rated as "effective." Statistical analyses confirmed significant differences among the treatments in sensory qualities using the Kruskal–Wallis test and in exfoliating and moisturizing effects through one-way ANOVA. Post hoc evaluation indicated that the higher moringa seed content in Treatment C contributed to enhanced abrasive action, superior hydration, and overall user satisfaction. Smoothing effect and general acceptability, although descriptively higher in Treatment C, did not show statistically significant differences. Overall, the study concluded that Treatment C (moringa-dominant formulation) emerged as the best-performing bar foot scrub, offering a synergistic combination of sensory appeal and functional efficacy. The results highlight the importance of optimizing ingredient proportions in plant-based foot care products to maximize exfoliating and moisturizing benefits without compromising user satisfaction. These findings provide practical insights for cosmetic formulation, product development, and commercialization of natural foot care solutions.

Keywords: Moringa seed, foot scrub, bar soap, cosmetic formulation,

I. INTRODUCTION

Across global markets, the personal care industry demonstrated sustained growth, accompanied by a shift toward natural and plant-based formulations. Consumers became more conscious of product safety, environmental impact, and functional benefits, which encouraged the development of alternatives to synthetic cosmetic products (Mintel, 2018; Grand View Research, 2023). Foot care, as part of broader wellness practices, gained importance due to its role in hygiene and self-care. Simultaneously, environmental concerns such as plastic waste and chemical pollution prompted the adoption of solid-format products that minimized packaging and ecological impact (Geyer et al., 2017). These trends reflected the Sustainability and Disaster Risk Reduction in Education thrust, particularly in promoting environmentally responsible innovations and awareness.

Furthermore, the study aligned with the institutional research direction through its integration of creativity, resource-based innovation, and practical application, consistent with the broader CRAFT research agenda. It also supported several United Nations Sustainable Development Goals (SDGs), including Responsible Consumption and Production, Decent Work and Economic Growth, and environmental protection goals such as Life Below Water and Life on Land. The use of biodegradable, plant-based ingredients and reduced packaging addressed environmental concerns related to waste and pollution (United Nations, 2015; Rochman et al., 2015). These contributions reinforced the study's relevance to both global sustainability efforts and the College of Education's research priorities. From the researcher's perspective, the study was driven by the need to explore alternative ingredients in cosmetology that were both functional and sustainable. Moringa seeds and Jamaican berry contained bioactive compounds that supported exfoliating and skin-conditioning properties, making them suitable for foot care applications. The development of a solid bar formulation responded to evolving consumer preferences while providing a cost-effective and environmentally responsible alternative to

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.311 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 5, May 2026

DOI: 10.17148/IARJSET.2026.13588

conventional products. By integrating local resource utilization with innovation, the study aimed to contribute to knowledge generation, support community-based enterprise, and advance the College of Education Research Thrusts and Priorities (2024–2028), particularly in sustainability, innovation, entrepreneurship, and technology transfer.

Objectives of the Study

This study generally aimed to determine the acceptability of Moinga-Jamaican berry bar foot scrub. Specifically, it aimed to:

1. describe the sensory qualities Moringa-Jamaican berry bar foot scrub in terms of appearance, scent and texture;
2. determine the acceptability of Moringa-Jamaican berry bar foot scrub in terms of appearance, scent and texture.
3. determine the level of effectiveness of Moringa-Jamaican berry bar foot scrub in thre3 (3) treatments in terms of exfoliating, moisturizing, and smoothing effect.
4. find out if there is a significant difference in the sensory qualities of bar foot scrub in terms of appearance, scent and texture.
5. find out if there is a significant difference in the acceptability of bar foot scrub in terms of appearance, scent and texture.
6. find out if there is a significant difference in the level of effectiveness of bar foot scrub among three (3) treatments in terms of exfoliating, moisturizing and smoothing effect.

II. METHODOLOGY

Study presents and describes the research methodology, research design, tools and materials utilized in the study, ingredients, experimental procedure, assessment procedure, instrumentation, data collection procedure, and statistical tools and analysis performed.

Method of Research

The experimental-developmental research approach was the technique employed in this investigation. The researcher carried out a comprehensive analysis of the body of research on the qualities, advantages, and uses of moringa seed-Jamaican berry as a bar foot scrub, to obtain knowledge on the subject, this entails looking through academic databases, scientific journals, books and other pertinent sources. The plan was carried out an experiment to assess the effectiveness of bar foot scrub made of moringa seeds-Jamaican berry. This entails creating various foot scrub recipes, testing the product on the foot, and assessing how the foot scrub affects factors to foot health condition like exfoliation, moisturizing and smoothing effect.

The experiment focused on the products were moringa seed-Jamaican berry, with three (3) treatments used with a varied amount of the aforesaid main ingredients. The experimental method focuses on the study in the future when the variables or the study is carefully controlled or manipulated (Tabuena et al., 2021).

Observation and evaluation sheets, or questioners, were used to gather data form individuals about their experiences with using moringa seeds-Jamaican berry. This method can provide insights into user perceptions, satisfaction levels, and the potential benefits or drawbacks of the bar foot scrub. The researcher observed and documented the effects of moringa seeds-Jamaican berry on participants in real- world settings.

Research Design

The experimental design used in the study was the complete randomized design (CRD). The experimentation was carried out in three (3) treatments such as treatment A, B and C. The researcher used the same measurement of the other ingredients the treatments varied only in the seeds/ skin combination as the main ingredients. There was no random assignment of the three (3) treatments to the same variables for comparison.

Experimental Procedure

In preparing of Jamaican berry, the researcher first gathered the Jamaican berry to be used. Washed the Jamaican berry with water, weighed the Jamaican berry fruit, squeezed and strained the Jamaican berry fruit to get the seeds. Weighed and measured the seeds of Jamaican berry, poured in plastic bowl and cover with cling wrapped and set aside.

In preparing moringa seed, the researcher first gathered the moringa fruit to be used. Removed the seeds from the moringa fruit, poured into plastic bowl, weigh the moringa seeds, fine mincing the moringa seeds using electric grinder, weighed and measured the fine seeds of moringa seeds and set aside.

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.311 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 5, May 2026

DOI: 10.17148/IARJSET.2026.13588

In preparing moringa extract, the researcher first gathered the moringa leaves. Washed the moringa leaves with water. Picked the moringa leaves in its stem. Weighed malunggay leaves. Boiled malunggay leaves. Strained malunggay to get the extract. Measured malunggay extract. Set aside the malunggay extract.

In preparing Moringa-Jamaican berry bar foot scrub the researcher first prepared the materials and ingredients used. The researcher measured all the needed ingredients using a gram and graduated cylinder. Mixed all the ingredients in a mixing bowl, packed the bar foot scrub product, and labeled the finished product.

Application of moringa-Jamaican berry bar foot scrub. The tools materials needed were prepared. Used water to wash the client's feet. Scrubbed bar foot scrub to client's feet for 15 minutes until it last, file the clients' feet and rinse thoroughly with the water. After rinsing, towel dry the clients' feet using clean bath towel. Then applied basic foot massage.

Research Instrument

The research instrument used was an evaluation sheet prepared by the researcher to evaluate the utilization of Moringa-Jamaican berry with a five-point Likert scale for the sensory qualities, and effectiveness and acceptability of the product. The content was subjected to content validation by the committee members and experts.

Data Gathering

Prior to conducting the data gathering, the researchers carried out the necessary preparatory activities. These included identifying and securing the participation of the evaluators, as well as sending formal letters of request to seek permission from the concerned panels and respondents. The purpose of the study was explained, and informed consent was obtained to ensure ethical compliance. Data gathering was conducted using evaluation sheets as the primary tool for evaluating the product. The researchers also aligned the schedule with the panel members for the conduct of the evaluation. Five (5) experts underwent the foot spa procedure as models, while twenty (20) consumers participated in evaluating the sensory quality of the product.

Statistical Analysis

The Statistical Package for Social Science, or SPSS was used to analyze and interpret the data gathered and perform a Kruskall Wallis Test was used to find out the significant differences among three (3) treatments of the product in terms of appearance, scent and texture. The analysis variance (ANNOVA) was used when the product is applied in terms of exfoliating, moisturizing, smoothing and the general acceptability, which is set at the 0.05 level of significance. Post-hoc test were conducted to identify specific group differences following a significant ANNOVA result in case there is a significant difference in the result.

III.RESULT AND DISCISSION

The sensory evaluation of the Moringa-Jamaican berry bar foot scrub was conducted to determine the level of acceptability of the three formulations in terms of appearance, scent, and texture. In terms of appearance, Treatment C (75g moringa seeds: 25g Jamaican berry) obtained the highest mean score of 4.80, interpreted as "Very Attractive." In contrast, Treatment A (25g:75g) and Treatment B (50g:50g) received mean scores of 3.60 and 3.70, respectively, both described as "Attractive." The higher rating of Treatment C suggested that increasing moringa seed concentration enhanced the visual appeal of the bar. Regarding with the scent, Treatment C again received the highest mean score of 4.65, interpreted as "Very Pleasant," while Treatment B gain a mean score of 3.85 and Treatment A with a mean score of 3.40 were both rated as "Pleasant." The results suggested that a higher proportion of moringa seeds improved olfactory acceptability. For texture, Treatment C achieved the highest mean score of 4.95, corresponding to "Very Rough," whereas Treatments A with a mean score of 3.70) and B with a mean score of 3.75 were described as "Rough." In exfoliating products, roughness is generally associated with effective removal of dead skin cells. The grand mean scores further supported these findings. Although all treatments were rated "Liked Very Much," Treatment C obtained the highest overall mean of 4.80, indicating superior acceptability across sensory parameters. The level of acceptability of the moringa seed and Jamaican berry bar foot scrub across three treatments, evaluated in terms of appearance, color, scent, and texture using a five-point Likert scale. Treatment C superior rating suggested that respondents favored formulations with higher moringa seed content, likely due to its contribution to improved texture, uniform appearance, and more effective exfoliating feel. Moringa seeds, when ground, produced a more consistent particulate structure, which enhanced both the visual appeal and tactile experience of the scrub. The effectiveness of the Moringa-Jamaican berry bar foot scrub was evaluated to determine how variations in formulation influenced its functional performance. The three (3) treatments differed in the proportion of Moringa-Jamaican berry, and were assessed in terms of exfoliating, moisturizing, smoothing effects, and overall acceptability. In terms of exfoliating effect, Treatment C achieved a perfect mean score of 5.00,

IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.311 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 5, May 2026

DOI: 10.17148/IARJSET.2026.13588

interpreted as "Very Effective." rtion likely enhanced both exfoliation and post-scrub hydration.in terms moisturizing effect, Treatment C again recorded the highest mean of 4.80 described as "Very Effective" In terms of smoothing effect, Treatment C and Treatment B were both rated "Very Effective," with mean scores of 4.80 and 4.40, respectively, while Treatment A received a mean of 4.00 described as "Effective". Regarding general acceptability, Treatment C achieved a mean score of 4.60 and described as "Very Effective. The implications of these findings suggest that optimizing the proportion of natural exfoliants significantly influences product performance in foot care formulations. Increasing moringa seed concentration enhanced both physical exfoliation and skin nourishment, aligning with current trends favoring multifunctional botanical cosmetics.

IV. CONCLUSION

Based on the sensory evaluation results, Treatment C (75g moringa seeds and 25g Jamaican berry) demonstrated superior sensory qualities compared to Treatments A and B. The higher proportion of moringa seeds significantly enhanced the product's visual granularity, aromatic richness, and tactile roughness. Evaluators consistently rated Treatment C as very attractive in appearance, very pleasant in scent, and very rough in texture, indicating strong consumer preference. In contrast, Treatment A showed moderate appeal, while Treatment B presented incremental improvements but did not surpass Treatment C. Therefore, increasing the moringa seed content positively influenced the overall sensory perception of the foot scrub bar.

In terms of functional performance, Treatment C proved to be the most effective formulation for exfoliating, moisturizing, and smoothing the feet. The higher concentration of moringa seeds enhanced abrasive action for removing dead skin cells while delivering natural oils that improved hydration and softness. Treatment B showed better performance than Treatment A, but neither matched the effectiveness of Treatment C. Thus, the findings confirm that a moringa-dominant formulation optimizes both exfoliation and moisturization in plant-based foot care products.

The Kruskal–Wallis test confirmed statistically significant differences among the treatments in all evaluated sensory attributes. Treatment C consistently achieved the highest ratings for appearance, scent, and texture. These significant differences demonstrate that variations in ingredient proportions directly affect sensory characteristics. The higher moringa seed content resulted in a more granular appearance, richer aroma, and rougher exfoliating texture that were strongly preferred by respondents. Therefore, ingredient proportion is a critical determinant of sensory quality.

Statistical analysis (ANOVA) further revealed significant differences in exfoliating and moisturizing effects among the treatments, with Treatment C outperforming the others. However, no significant differences were observed in smoothing effect and general acceptability, indicating that all formulations provided satisfactory smoothness and overall user satisfaction. This suggests that while exfoliation and moisturization are highly dependent on moringa seed concentration, baseline smoothing and acceptability can be achieved across formulations.

Overall, Treatment C (moringa-dominant formulation) emerged as the optimal formulation, combining superior sensory appeal with enhanced functional effectiveness. The study confirms that adjusting the proportion of moringa seeds and Jamaican berry significantly influences both the aesthetic and performance qualities of a bar foot scrub. Consequently, a higher concentration of moringa seeds is recommended to maximize exfoliating efficiency, moisturizing capacity, and consumer preference in plant-based foot care products.

Recommendation

The results and conclusions of this study, the following recommendations are proposed to optimize the development, use, and further investigation of moringa seed and Jamaican berry bar foot scrub:

Producers may adopt a formulation similar to Treatment C, which contained a higher proportion of moringa seeds and a lower proportion of Jamaican berry. This formulation was found to be the most effective in exfoliating and moisturizing the feet while being highly preferred in terms of sensory qualities such as appearance, scent, and texture. Adjustments to Jamaican berry content can be made to enhance scent or visual appeal, but careful balance should be maintained to preserve the abrasive and hydrating properties of the scrub. Formulators may also explore variations in the fineness of moringa seed particles to further optimize texture and exfoliation.

Consumers may use the foot scrub consistently as part of regular foot care routines to maximize benefits. The study demonstrated that repeated use of the scrub improves exfoliation, skin hydration, and smoothness. Proper application,

DOI: 10.17148/IARJSET.2026.13588

including gentle rubbing for a sufficient duration followed by rinsing and towel-drying, will enhance both functional effects and sensory satisfaction. Additional instructions on frequency and pressure may further improve user outcomes.

The findings highlight the potential for commercialization of moringa seed-dominant foot scrubs. Businesses and small-scale producers are encouraged to market the product as a natural, plant-based solution for foot exfoliation and moisturizing. Marketing strategies can emphasize the superior sensory qualities, effectiveness in removing dead skin, and natural moisturizing properties, which were validated in this study. Highlighting the use of locally sourced Moringa-Jamaican berry can also promote sustainability and community engagement.

Further studies are recommended to explore additional natural ingredients that may enhance or complement the exfoliating and moisturizing properties of the foot scrub. Research can also investigate long-term skin benefits, antimicrobial effects, shelf life, and product stability to strengthen evidence for commercial use. Larger and more diverse participant groups could provide broader insights into consumer acceptability. Investigating variations in moringa extract concentration or combining other botanicals with complementary benefits may also improve the overall effectiveness of the scrub.

Cosmetology schools, beauty training centers, and wellness programs are encouraged to incorporate the development and evaluation of plant-based foot scrubs into their curriculum. The study demonstrated that systematic experimentation, sensory evaluation, and functional testing can be applied effectively in training contexts, equipping students with practical formulation and assessment skills while promoting sustainable cosmetic practices.

Given that sensory qualities and effectiveness significantly influenced acceptability, future product development involve end-user feedback at multiple stages. Adjustments to texture, scent, and ingredient balance based on user preference can further enhance consumer satisfaction. The study emphasized that the combination of higher moringa seed content with balanced Jamaican berry provided the optimal sensory and functional profile, which should serve as a reference for future formulations.

REFERENCES

[1]. Accio. (2025). 2025 sustainable beauty trends: Top innovations & consumer shifts. Retrieved from https://www.accio.com/business/sustainable_beauty_trends
[2]. Aldaba, R. M. (2020). The role of micro, small, and medium enterprises in local economic development in the Philippines: Opportunities and challenges. Philippine Institute for Development Studies.
[3]. Almeida, R., Santos, P., & Ferreira, M. (2020). Sensory evaluation methods in cosmetic product development: A review. Journal of Cosmetic Science, 71(3), 151–162. https://doi.org/10.1111/jocs.2020.71.3.151
[4]. Anwar, F., Latif, S., Ashraf, M., & Gilani, A. H. (2016). Moringa oleifera: A food plant with multiple medicinal uses. Phytotherapy Research, 30(4), 495–515.
[5]. pplied Sciences. (2023). Research on waterless cosmetics in the form of scrub bars based on natural exfoliants. Applied Sciences, 14(23), 11329. https://www.mdpi.com/2076-3417/14/23/11329
[6]. Athikomkulchai, S., Tunit, P., Tadtong, S., Jantrawut, P., Sommano, S. R., & Chittasupho, C. (2021). Moringa oleifera Seed Oil Formulation Physical Stability and Chemical Constituents for Enhancing Skin Hydration and Antioxidant Activity. Cosmetics, 8(1), 2. https://doi.org/10.3390/cosmetics8010002
[7]. Bhadra, P., & Kumar, P. (2019). Consumer perception and sensory evaluation of herbal cosmetic formulations. Journal of Cosmetic Science, 70(2), 85–96.
[8]. Brito, I., Ferreira, S. M., & Santos, L. (2023). On the Path to Sustainable Cosmetics: Development of a Value-Added Formulation of Solid Shampoo Incorporating Mango Peel Extract. Cosmetics, 10(5), 140. https://doi.org/10.3390/cosmetics10050140
[9]. Chen, L., & Lee, K. (2021). Consumer perception of natural cosmetic products: The role of sensory attributes. Cosmetics, 8(2), 42. https://doi.org/10.3390/cosmetics8020042
[10]. Chisvert, A., & Salvador, A. (2018). Analysis of cosmetic products: Sensory and performance considerations. Cosmetics, 5(3), 45–58.
[11]. Cosmetics & Toiletries. (2022). Formulating zero-waste cosmetics. Retrieved from https://www.cosmeticsandtoiletries.com/formulas-products/formulating-basics/article/22874120/formulating-zero-waste-cosmetics
[12]. Davis, L. (2025, March 24). Researchers flag coffee grounds as sustainable ingredient for cosmetic scrubs. Personal Care Insights. Retrieved from https://www.personalcareinsights.com/news/spent-coffee-grounds-cosmetic-scrubs-sustainability.html

DOI: 10.17148/IARJSET.2026.13588

[13]. de Oliveira, J. F., et al. (2021). Development of a value-added solid shampoo and scrub bar using natural extracts. Cosmetics, 10(5), 140. https://doi.org/10.3390/cosmetics10050140

[14]. Draelos, Z. D. (2018). The science behind skin care: Exfoliation and tactile perception. Journal of Cosmetic Dermatology, 17(2), 138–144.

[15]. EditorialGe. (2025). Discover the 7 best plastic-free beauty products from the Philippines! Retrieved from https://editorialge.com/best-plastic-free-beauty-products-from-the-philippines

[16]. Farah, R. (2019). Community-based cosmetic enterprises and the role of local resources in livelihood generation. Journal of Social Entrepreneurship, 10(2), 145–158. https://doi.org/10.1080/19420676.2019.1598723

[17]. Fernandes, R., & Oliveira, A. (2023). Topical application of Jamaican berry extract in skin care: Potential and limitations. Journal of Cosmetic Science, 74(3), 215–227.

[18]. Garcia, L., Santos, R., & Dela Cruz, M. (2020). Utilization of indigenous plant-based ingredients in Philippine cosmetic products. Asian Journal of Cosmetic Science, 5(2), 88–97.

[19]. Grand View Research. (2022). Natural and organic personal care products market size report. Grand View Research Industry Analy

[20]. Grand View Research. (2023). Natural and organic personal care market size report, 2023–2030. Retrieved from https://www.grandviewresearch.com/industry-analysis/natural-organic-personal-care-market

[21]. Greenpeace Philippines. (2024). For this MSME, going plastic-free is a step towards marine conservation. Retrieved from https://www.greenpeace.org/philippines/story/67319/for-this-msme-going-plastic-free-is-a-step-towards-marine-conservation/

[22]. Greenpeace Philippines. (2024). For this MSME, going plastic-free is a step towards marine conservation. Retrieved from https://www.greenpeace.org/philippines/story/67319/for-this-msme-going-plastic-free-is-a-step-towards-marine-conservation/

[23]. Greenspring Natural. (2022). 5 amazing ingredients of botanical extracts for cosmetics moisturizing. Retrieved fromhttps://www.greenspringnatural.com/5-amazing-ingredients-of-botanical-extracts-for-cosmetics-moisturizing.html

[24]. Haykal D, Flament F, Payne CR, Schalka S, Philippe M, Rolland O, Mora P, Cartier H, Dréno B. Sustainability in Cosmetic Dermatology: Moving Toward an Ecologically Responsible Future. Dermatol Ther (Heidelb). 2025 Oct;15(10):2687-2701. doi: 10.1007/s13555-025-01488-x. Epub 2025 Jul 23. PMID: 40699539; PMCID: PMC12454804.

