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FORMULATION AND EVALUATION OF HERBAL MEDICATED BATH BOMB

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Keywords

Herbal bath bomb, Cosmetic chemistry, Effervescence, Natural ingredients, Therapeutic benefits.

Abstract

OBJECTIVE: The field of cosmetic chemistry continually explores innovative products, one of which is the "Bath Bomb." This study aimed to formulate and evaluate a herbal medicated bath bomb designed to offer both therapeutic and cosmetic benefits such as relaxation, skin detoxification, and hydration. The bath bombs were developed using herbal ingredients like Neem, Tulsi, Rose, Lemongrass, and Honey, combined with sodium bicarbonate and citric acid, which act as key effervescent agents. Starch was employed to enhance the structural integrity of the bath bombs.

METHODS: The preparation method involved mixing the active ingredients through effervescence and diffusion techniques. Once formulated, the bath bombs were assessed based on their physical appearance, pH, effervescence time, and potential for skin irritation. Three formulations (F1, F2, and F3) were tested to compare their efficacy.

RESULT AND DISCUSSION: The results demonstrated that formulation F1 exhibited the most optimal performance, with a pH of 7.1 and an effervescence time of 30 seconds. It also passed the skin irritation test, proving it to be safe for topical use. All formulations showed good physical appearance, and none resulted in any skin irritation during testing. Formulation F1 had the most suitable balance of pH and effervescence time, making it superior to F2 and F3.

CONCLUSION: In conclusion, the development of a herbal medicated bath bomb was successful, and formulation F1 emerged as the most promising.

This product holds potential in the cosmetic industry for offering a therapeutic, cost-effective bath experience.

1. INTRODUCTION

In recent years, the demand for natural and herbal products in the cosmetic industry has significantly increased. Consumers are becoming more aware of the benefits of using herbal ingredients due to their skin-friendly properties, fewer side effects, and environmental sustainability. One such product gaining popularity is the bath bomb, a personal care item designed to enhance the bathing experience by offering relaxation and skin care benefits. Bath bombs are primarily composed of weak acids and bases that, when introduced to water, undergo an effervescent reaction, releasing fragrances, essential oils, and other active ingredients.[1] This not only provides a soothing and aromatic bath but also imparts various therapeutic effects such as skin softening and detoxification. Incorporating herbal components like Neem, Tulsi, Rose, Lemongrass, and Honey into bath bombs can elevate their cosmetic value by adding antimicrobial, anti-inflammatory, and moisturizing properties. These herbs are well-known in traditional medicine for their ability to cleanse and rejuvenate the skin. Combining them with effervescent agents such as sodium bicarbonate and citric acid offers a holistic approach to skincare, merging the benefits of modern cosmetic technology with natural remedies.[2] In the pharmaceutical field, bath bombs offer an innovative and patient-friendly method for delivering topical treatments and providing relief from a variety of skin conditions, such as eczema, psoriasis, and dry skin. The combination of effervescence and water activation allows for enhanced skin penetration and a more enjoyable treatment experience. Additionally, incorporating natural ingredients such as essential oils, salts, and botanicals aligns with the growing consumer demand for natural and holistic approaches to personal care.[3]

Bath bombs have gained significant attention in both the pharmaceutical and cosmetic industries for their unique ability to deliver a relaxing and therapeutic bathing experience.[4] These effervescent formulations are designed to dissolve upon contact with water, releasing active ingredients, fragrances, and colors that contribute to the overall wellness of the user. While they are often regarded as luxury items, bath bombs can serve a functional role in delivering pharmaceutical agents, essential oils, and skin-nourishing ingredients.[5]

This paper will explore the formulation, mechanism of action, and potential pharmaceutical applications of bath bombs, focusing on their role as a delivery system for active ingredients and their benefits for skin health. Key aspects of the formulation process, such as ingredient selection, pH balance, and effervescence, will be discussed to highlight their relevance in achieving optimal therapeutic outcomes.

The objective of this study is to formulate and evaluate a herbal medicated bath bomb, focusing on its physical appearance, pH, effervescence time, and potential skin irritation. By developing a product that is both affordable and beneficial for the skin, this study aims to contribute to the growing cosmeceutical market that emphasizes natural and effective skincare solutions [6].

2. MATERIAL AND METHOD

The ingredients used in the formulation of the herbal medicated bath bomb included natural extracts and other excipients. The key herbal components were Neem, Tulsi, Rose, Lemongrass, and Honey, all of which were selected for their known therapeutic and cosmetic properties. The effervescent agents used were Sodium Bicarbonate and Citric Acid. Starch was included in the formulation to

enhance binding and ensure the bath bomb retained its shape. All ingredients were procured from local suppliers.[7]

2.1 Key herbal components

2.1.1 Neem (Azadirachta indica)

Neem is a widely known medicinal plant, often referred to as the "village pharmacy" due to its diverse therapeutic properties. Its leaves are rich in bioactive compounds like flavonoids, tannins, and nimbidin, which possess anti-inflammatory, antimicrobial, and antioxidant activities. In skincare, neem is used for its ability to soothe irritated skin, reduce inflammation, and combat acne. Its inclusion in a bath bomb enhances skin health and provides a protective layer against infections.[8]

2.1.2 Tulsi (Ocimum sanctum)

Commonly known as Holy Basil, Tulsi is revered in Ayurvedic medicine for its adaptogenic properties. It is packed with essential oils, eugenol, and ursolic acid, which offer anti-inflammatory, antibacterial, and stress-relieving effects.[9] Tulsi is often used in skincare formulations to purify the skin, soothe irritations, and provide a calming effect. In a bath bomb, Tulsi aids in detoxification, helping the skin to relax and rejuvenate.[10]

2.1.3 Rose (Rosa damascena)

Rose petals are rich in antioxidants, vitamins, and essential oils. They possess anti-inflammatory and astringent properties that make them ideal for skincare. Rose extracts help balance the skin’s pH, reduce redness, and provide hydration.[11] The soothing fragrance of roses is also known for its calming and mood-enhancing effects, making rose a popular ingredient in cosmetic formulations aimed at providing a luxurious and relaxing experience.[12]

2.1.4 Lemongrass (Cymbopogon citratus)

Lemongrass is widely used in aromatherapy due to its refreshing citrusy scent and is also beneficial in skincare for its antibacterial, antifungal, and anti-inflammatory properties. The essential oils in lemongrass help in detoxifying the skin, tightening pores, and reducing acne. It also helps in alleviating stress and fatigue, making it a suitable addition to bath bombs that are intended to promote relaxation and skin purification.[13]

2.1.5 Honey

Honey has been used in traditional medicine for centuries due to its remarkable moisturizing and antimicrobial properties. It is rich in natural sugars, enzymes, and amino acids that promote skin hydration and healing.[14] Honey also acts as a humectant, helping to retain moisture in the skin, which makes it a valuable ingredient in cosmetic products aimed at maintaining skin softness and elasticity. In bath bombs, honey soothes the skin, leaving it soft, nourished, and glowing.[15]

2.1.6 Sodium Bicarbonate (Baking Soda)

Sodium bicarbonate, commonly known as baking soda, plays a crucial role in bath bombs by reacting with citric acid to produce carbon dioxide gas, which creates the effervescent fizz.[16] Beyond this, sodium bicarbonate has mild exfoliating properties that help in removing dead skin cells, leaving the skin smooth and refreshed. It is also known for balancing the skin's pH and providing relief from irritation, making it a beneficial addition to bath formulations.[17]

2.1.7 Citric Acid

Citric acid is a natural acid found in citrus fruits and is a key ingredient in bath bombs for its role in producing effervescence when combined with sodium bicarbonate. [18] This reaction releases carbon dioxide, which creates the fizzing effect that enhances the sensory experience of the bath. Citric acid also has a mild exfoliating effect and helps in improving the skin's texture by promoting the shedding of dead skin cells. Additionally, it helps maintain the pH balance of the skin, ensuring that it remains healthy and vibrant after use [19].

2.2 Extraction of Herbal Ingredients

The herbal ingredients used in the bath bomb formulation, including Neem (Azadirachta indica), Tulsi (Ocimum sanctum), Rose (Rosa damascena), Lemongrass (Cymbopogon citratus), and Honey, were sourced and prepared through standard extraction methods.[20,21] The plant materials were thoroughly washed, air-dried, and ground into fine powder. Each powdered material was subjected to a solvent extraction process using water as the solvent. The extracts were filtered using muslin cloth and stored in clean, airtight containers until further use. Honey was added directly without requiring any extraction process due to its natural liquid form [22].

2.3 Formulation of Bath Bomb

The bath bomb formulation was developed using a combination of natural ingredients, such as herbal extracts and binding agents. The primary base ingredients for the bath bomb included sodium bicarbonate and citric acid, which react together to create the effervescence when in contact with water. A small amount of starch was added to maintain structural integrity and improve binding during the molding process.

The formulation was prepared by first thoroughly mixing the dry ingredients, including sodium bicarbonate, citric acid, and starch. Once the dry components were combined, the herbal extracts (Neem, Tulsi, Rose, and Lemongrass) and honey were gradually added to the mixture, ensuring even distribution throughout the blend. The mixture was pressed into spherical molds using moderate pressure and left to set for 24 hours, allowing the bath bombs to harden.[24].

Table 1: Formulation Batches of the Bath Bomb.

S. No.	Composition	F1	F2	F3
1	Tulsi	0.25	0.25	0.25
2	Neem	0.5	0.5	0.5
3	Lemongrass	0.25	0.25	0.25
4	Rose	1	1	1
5	Honey	1	1	1
6	Sodium Bicarbonate	15	10	10
7	Citric Acid	5	5	10
8	Starch	1	1	1

2.4 Evaluation Parameters [25,26]

After the formulation was complete, the bath bombs were evaluated based on several parameters:

2.4.1. **Physical Appearance**: The physical appearance of the bath bombs, including color and texture, was observed and noted.

2.4.2. **pH Determination**: The pH of each formulation was tested by dissolving a small portion of the bath bomb in distilled water and using a pH meter.

2.4.3. **Effervescence Time**: The time taken for the bath bomb to fully dissolve in water and produce effervescence was recorded.

2.4.4. **Skin Irritation Test**: A patch test was conducted on volunteers to ensure that the bath bombs did not cause any irritation or adverse reactions when applied to the skin [16].

3. RESULT AND DISCUSSION

Formulation of Herbal Medicated Bath Bomb:

It was Formulated Successfully.

3.1 Evaluation Parameters

After formulating the herbal bath bombs, they were evaluated based on four key parameters:

Physical Appearance, pH, Effervescence Time, and Skin Irritation Test.

The results are presented in the table below:

Table 2: Results of Evaluation Parameter

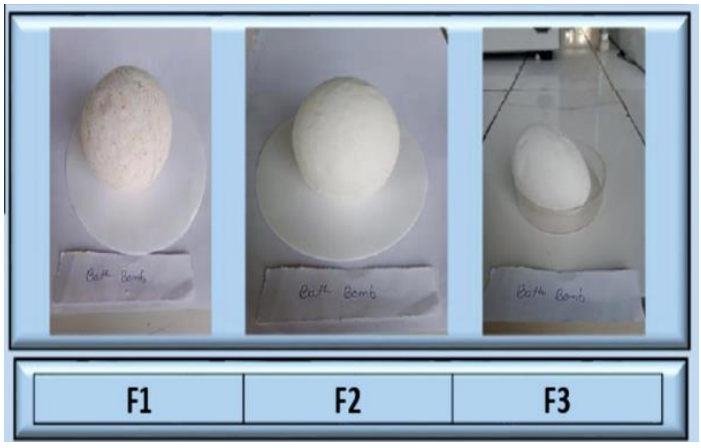
S. No.	Evaluation Parameter	F1	F2	F3
1	**Physical Appearance**	Good	Good	Good
2	**pH**	7.1	6.5	7.9
3	**Effervescence Time (sec)**	35	42	52
4	**Skin Irritation Test**	None	None	None

3.2 Discussion of Results:

- **Physical Appearance**: All three formulations (F1, F2, F3) had a good appearance, indicating successful binding and consistency of the mixture.
- **pH**: The ideal pH range for a bath bomb lies between 7 and 7.5 for skin compatibility. F1 showed an optimal pH of 7.1, closest to the desired range, while F3 had a slightly higher pH.
- **Effervescence Time**: The effervescence time of F1 (35 seconds) was quicker compared to F2 and F3, which took longer to dissolve in water.

  Skin Irritation Test: None of the formulations caused skin irritation, confirming the safeof the bath bombs for topical use.

IMAGES



4. CONCLUSION

Based on the evaluation parameters, Formulation 1 (F1) showed the most promising results, with an optimal pH, effervescence time, and no irritation. Therefore, F1 can be considered the most effective formulation.

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