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“Formulation and Evaluation of A Novel Caffeine-Infused Herbal Soap Using Bajra and Gram Flour for Enhanced Skin Care”

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ABSTRACT:

The increasing demand for natural, skin-friendly cosmetics has prompted the investigation of herbal alternatives to traditional soaps. The present research describes the formulation and development of a novel herbal soap started with caffeine and natural components such as *Pennisetum glaucum* (Bajra) and gram flour to improve skin care benefits. The goal was to create a soap with exfoliating, antioxidant, and antibacterial capabilities using eco-friendly and nutraceutical ingredients.

Physicochemical examinations include pH, foam height, cleansing efficacy, hardness, and stability testing. The results showed that the soap had a skin-friendly pH, excellent foaming ability, and effective washing activity. Caffeine helped to improve skin texture and circulation, while bajra and gram flour provided moderate exfoliation and increased nutrition delivery. Overall, the herbal soap was well-accepted by users, making it a promising natural alternative for skin care. Additional research could focus on dermatological tests and long-term benefits.

Keywords: Antibacterial, Formulation, Nutraceutical, Evaluation, Antioxidant.

Introduction:

Skincare has become an essential part of modern life, and with the growing demand for natural and effective solutions, herbal formulations have gained significant popularity.^{1,2} In this project, we aim to create a unique herbal soap that combines several potent natural ingredients known for their skin-enhancing and nourishing properties.³ The formulation focuses on utilizing caffeine and gram flours as brightening agents to help achieve a glowing and youthful complexion.⁴

Bajra flours are incorporated into the soap as a gentle yet effective exfoliant. Known for their ability to exfoliate the skin, Bajra flours help to remove dead skin cells and unclog pores, promoting a smoother texture.⁵ Additionally, we have included aloe vera gel to provide soothing, hydrating, and antioxidant properties, ensuring that the skin remains moisturized and protected.⁶ The inclusion of turmeric powder further enhances the soap's benefits by reducing inflammation and promoting healing.^{7,8,9}

As a result of this carefully crafted combination of ingredients, the formulated soap demonstrates significant improvements in skin brightness, smoothness, and overall appearance.¹⁰ The caffeine and gram flour extract help brighten the skin, while the Bajra flour exfoliates and rejuvenates the surface. Aloe vera, vitamin E, and turmeric powder work synergistically to nourish, hydrate, and soothe the skin, making this herbal soap an excellent choice for those seeking a natural, effective solution for healthy, glowing skin.^{11,12}

Ingredients for Herbal Soap:



Fig No. 1 Ingredients for Herbal Soap Caffeine Extract, Gram Flours, Bajra Flours, Aloe Vera Gel, Turmeric Powder, Neem Extract.

Formulation Profile of Polyherbal Soap:

Table No – 1 Ingredients Profile

Sr No.	Ingredients	Quantity
1.	Caffeine Extract	2 gm.
2.	Gram Flours	10 gm.
3.	Bajra Flours	12 gm.
4.	Turmeric Powder	2.5 gm.
5.	Neem Extract	3 gm.
6.	Aloe vera gel	5 gm.
7.	Glycerin Soap Base	25 gm.

Procedure of Herbal Soap Preparation:

Step 1: Melt the Soap Base -

- Cut the glycerin soap base into small Pieces.
- Melt in crucible stirring each time until fully liquid.

Step 2: Prepare Herbal Additives -

- In a small bowl, mix gram flour, bajra flour, and turmeric powder with a tiny bit of warm water or aloe gel to form a smooth paste. This helps prevent clumping when added to the soap.

Step 3: Combine Ingredients -

- Once the soap base is fully melted, then add Caffeine extract, Neem extract, flour paste, Aloe vera gel,

- Stir thoroughly but gently to ensure even mixing. Avoid creating bubbles.

Step 4: Pour into Molds -

- Pour the mixture into soap molds immediately before it starts to solidify.
- Tap the molds gently to remove air bubbles.

Step 5: Cooling and Packing -

- The molds are kept at room temperature for 30 minutes then remove soap from molds.
- Finally, Soap is formed.

Formulated Herbal Soap Sample:



Fig No. 2 Soap is ready.

Physical Evaluation Parameter and Results of Polyherbal Soap:¹³

The following physical parameters have been studied for the formulation of Herbal Soap. Color, odour, and appearance. texture, Ph, homogeneity, stability, consistency, spreadable capacity, Foamability and Smoothness, skin irritancy, consistency, weight of soap.

Table No. 2 Physical Evaluation Parameter Herbal Soap.

Sr No.	Parameters	F1
1.	Colour	Dark Brown
2.	Oduor	Fragrant
3.	Appearance/shape	Heart
4.	Texture	Smooth
5.	pH	7.8
6.	Skin Irritancy test	No Irritation
7.	Stability	1 month stable
8.	Consistency	Semisolid
9.	Weight determination	56 gm
10.	Spreadable	Uniform
11.	Washing capability	Easily washable
12.	Solubility	Soluble

Discussion:

The present work is concerned with the formulation of polyherbal soap using Caffeine leaves extract, neem leaves extract, Gram Flours, Bajra Flours, Turmeric Powder, Turmeric Powder, glycerin soap base. the formulated herbal soap was a dry, good appearance and is foamy in nature. it showed good skin compatibility and it proved that it does not irritate the skin, and it produced satisfactory results.

Conclusion:

The recent study effectively developed an herbal soap. The combination of these natural components has showed outstanding cleansing and antibacterial properties, which are due to the bioactive compounds contained in plant extracts. The soap has desired physical features, including good lathering, a pleasant scent, and a skin-friendly texture, making it suitable for regular use. This formulation not only offers a natural alternative to chemical-based soaps, but it also takes advantage of the curative characteristics of ancient medicinal plants. The herbal soap is free of chemicals, which is the most promising finding in this study. This mixture is suitable for all skin types and has no irritating properties. The results also show that the polyherbal soap produced is safe for human skin.

Conflict of Interests:

- The authors declare that they have no known competing financial interests or personal relationship that could have appeared to influence the work reported in this paper.

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