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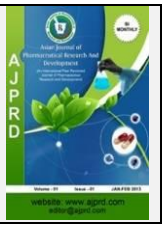

Open Access Research Article

Formulation and Evaluation of Body Scrub Using Walnut Shell Powder

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A B S T R A C T

This project focuses on the formulation and evaluation of a body scrub utilizing walnut shell powder as a natural exfoliating agent. Exfoliation is a crucial aspect of skincare as it removes dead skin cells, improves skin texture, and promotes healthier-looking skin. In this study, an emulsion-based body scrub was prepared using walnut shell powder alongside moisturizing agents, a cream base, and fragrance. Walnut shell powder was selected for its natural abrasive properties, which gently scrub away impurities from the skin surface. The formulated product was evaluated for various physical and cosmetic parameters, including appearance, texture, spreadability, pH, washability, and stability. The results demonstrated that the scrub possessed excellent exfoliating properties, stable physical characteristics, and safe application parameters. This study concludes that walnut shell powder can be successfully and safely incorporated into body scrub formulations for cosmetic use.

Keywords: Body Scrub, Exfoliation, Walnut Shell Powder, Herbal Cosmetics, Skincare.

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INTRODUCTION

Cosmetics are defined as products used for cleansing, beautifying, and enhancing the attractiveness of the appearance. They are developed to remove dirt, control oil, and fight acne, available in various forms with distinct roles to play on the skin. The skin surface requires frequent cleansing to remove dead skin, grime, crusts, and applied makeup to remain healthy and maintain a good appearance. Body skin constantly releases sweat and dead skin cells, which can lead to unpleasant odors, pimples, and other skin issues if proper hygiene is not maintained.

A body scrub is a semi-solid cosmetic preparation containing abrasive particles that help remove dead skin cells from the outermost layer of the skin. Using a body scrub makes the skin feel soft and glowing, unclogs pores, and improves blood circulation. Exfoliation enhances skin renewal and provides a smoother, brighter appearance. Natural components with mild exfoliating qualities, such as grains, fruits, and herbs, are increasingly preferred over synthetic materials because they are safer and more environmentally friendly.

Walnut shell powder, obtained from the hard outer shell of *Juglans regia*, is widely used as a natural abrasive material in cosmetic formulations. It contains lignin, cellulose, and hemicellulose, contributing to its durability and hardness. Due to its granular structure, it effectively removes dead skin cells without damaging the underlying skin, making it an excellent biodegradable alternative to synthetic exfoliating agents. This study aims to formulate a stable and effective body scrub using walnut shell powder and evaluate its cosmetic parameters.

MATERIALS AND METHODS

Materials

The herbal ingredient, Walnut Shell Powder, was procured from the market. All pharmaceutical excipients, including Stearic Acid, Cetyl Alcohol, Liquid Paraffin,

Triethanolamine, Glycerin, Sodium Lauryl Sulfate (SLS), Methyl Paraben, Propyl Paraben, Rose Oil, and Distilled Water, were collected from the Pharmaceutics Laboratory at Sharda School of Pharmacy.

Table 1: Categories and Roles of Ingredients

Ingredients	Biological Source / Chemical Nature	Category / Use
Walnut shell powder	*Juglans regia* (Juglandaceae)	Natural exfoliating agent, abrasive
Stearic acid	Animal fats and vegetable oils	Thickening agent, emulsifying agent
Cetyl alcohol	Natural fats and oils	Emollient, stabilizer
Liquid paraffin	Mixture of liquid hydrocarbons	Moisturizing agent, lubricant
Triethanolamine	Synthetically prepared	pH adjusting agent, neutralizing agent
Glycerin	Vegetable oils / synthetic	Humectant, moisturizing agent
Sodium lauryl sulfate	Derived from lauryl alcohol	Surfactant, foaming agent
Methyl paraben	Synthetically prepared	Preservative (anti-microbial)
Propyl paraben	Synthetically prepared	Preservative (anti-microbial)
Rose Oil	Petals of *Rosa damascena*	Fragrance, skin-conditioning agent
Distilled water	Purified water	Solvent, vehicle

Formulation Design

The body scrub was prepared using the ingredients listed in the formulation table below.

Table 2: Formulation Table of Walnut Shell Powder Body Scrub

No.	Ingredients	Quantity (g/ml)
1	Walnut shell powder	5 gm
2	Stearic acid	10 gm
3	Cetyl alcohol	5 gm
4	Liquid paraffin	10 gm
5	Triethanolamine	2 gm
6	Glycerin	5 gm
7	Sodium lauryl sulfate	1 gm
8	Methyl paraben	0.2 gm
9	Propyl paraben	0.1 gm
10	Rose Oil	1 gm
11	Distilled water	q.s. to 100 ml

Figure 1: Material and Chemical used

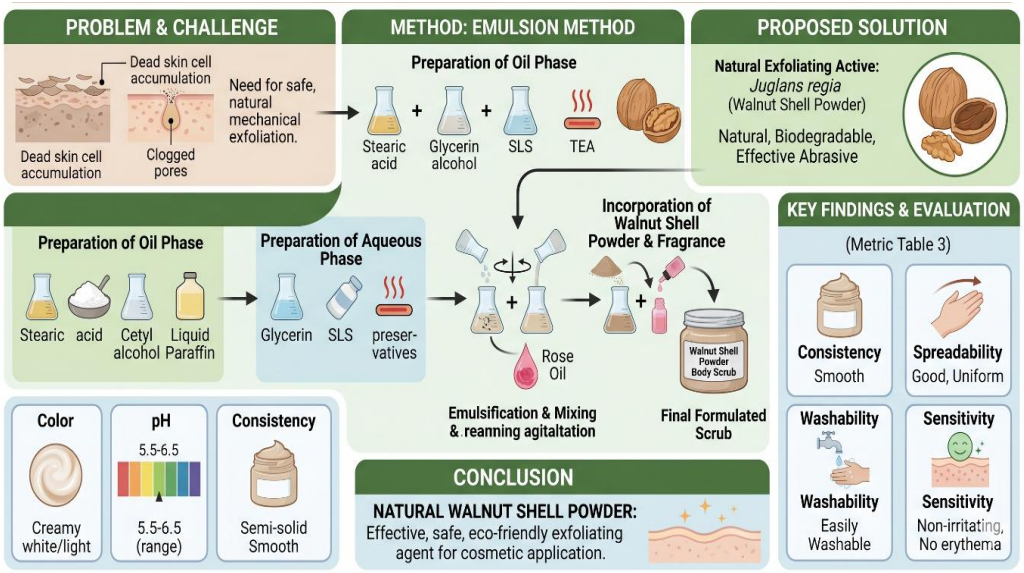

Figure 2: Process flow for Body Scrub

Preparation of Body Scrub

The formulation was carried out through an emulsion method using the following steps:

Preparation of Oil Phase:

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Required quantities of stearic acid, cetyl alcohol, and liquid paraffin were accurately weighed and transferred into a clean, dry beaker. The mixture was heated gently on a water bath at a maintained temperature between 70-75°C with constant stirring until all components melted into a clear, uniform oil phase.

Figure 3: Preparation of Oil Phase

Preparation of Aqueous Phase:

In a separate clean beaker, distilled water was taken, and glycerin, sodium lauryl sulfate, methyl paraben, and propyl paraben were added. The mixture was stirred thoroughly to dissolve the ingredients completely. This phase was separately heated on a water bath to 70-75°C to match the oil phase and ensure proper emulsification.

Figure 4: Preparation of Aqueous Phase

Emulsion Formation: Once both phases reached 70-75°C, the aqueous phase was slowly added to the oil phase with continuous and gradual stirring to prevent phase separation. Upon forming a smooth emulsion, triethanolamine was slowly added under continuous stirring to neutralize the stearic acid, yielding a stable cream base.

Figure 5: Emulsion Formation

Addition of Scrubbing Agent & Fragrance: The prepared cream base was allowed to cool to approximately 40°C. Finely powdered walnut shell was then incorporated and mixed thoroughly to ensure uniform distribution of the abrasive particles. Finally, rose oil was added as a perfuming agent and mixed properly.

Packaging: The finished body scrub was filled into clean container jars and labeled appropriately.

Figure 6: Product Body scrub by using the walnut shell powder

Labeling: Product labels are tags that give consumers essential details such as ingredients, usage instructions, safety warnings, and branding elements.

Figure 7: Labeled Product

EVALUATION PARAMETERS

The prepared body scrub was evaluated using the following parameters:

- **Color and Odor:** Checked visually and evaluated for scent by smelling.
- **Consistency:** Determined manually.
- **Washability:** Applied to the hand and checked manually for ease of removal by washing with water.
- **Spreadability:** Evaluated manually by applying the scrub on the hand and observing if it spread easily with a gentle rub.
- **Sensitivity:** Evaluated via a skin irritation test where the scrub was applied to the skin and left for 30 minutes before washing, followed by a visual inspection for itching, rashes, or redness.
- **Foamability:** A small amount of scrub was shaken with water in a graduated measuring cylinder, and the foam volume was measured.

- **pH:** A small amount of the scrub was applied to pH paper to evaluate acidity/alkalinity.
- **Stability:** The formulation was stored at varying temperature conditions (25°C, 37°C, and 40°C) for 1 week to observe any phase separation or color changes.

RESULTS AND DISCUSSION

The findings of the evaluation parameters are documented in Table 3.

Table 3: Evaluation Parameters and Observation Results

No.	Evaluation Parameters	Observation
1	Color	Light brown / Creamy white
2	Odor	Pleasant / Characteristic
3	Consistency	Smooth, Semi-solid
4	Washability	Easily washable with water
5	Spreadability	Good, spreads uniformly on skin
6	Foamability	Moderate foam formation
7	pH	5.5 - 6.5
8	Stability	Stable at room temperature, no phase separation
9	Sensitivity	No irritation or redness observed

The formulated scrub exhibited a pleasing light brown/creamy white color with a characteristic rose odor. The semi-solid emulsion base provided smooth consistency and good spreadability. The recorded pH of 5.5-6.5 is optimal for topical applications, and the formulation was stable across different temperatures without phase separation. The inclusion of sodium lauryl sulfate facilitated moderate foamability and excellent washability. Crucially, the skin sensitivity test confirmed the safety of the product, displaying no signs of redness or irritation.

CONCLUSION

The formulation and evaluation of a body scrub using walnut shell powder were successfully developed. The final product exhibited excellent physical properties, including a smooth texture and adequate spreadability, alongside effective exfoliating action for the removal of dead skin cells. Its pH and stability profiles remained within acceptable limits, and skin irritation tests affirmed its safety for topical use. Utilizing walnut shell powder as a natural abrasive makes the product an eco-friendly and skin-friendly alternative to synthetic exfoliants. Therefore, the formulated body scrub is highly effective and suitable for commercial cosmetic applications.

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