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Research Article

Formulation And Assessment of Polyherbal Facial Scrub for Topical Application

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Abstract

Regular cleansing of the skin is essential to remove accumulated dirt, excess sebum, dead cells, and cosmetic residues that may affect both its appearance and function. In recent years, herbal cosmetic formulations have attracted growing interest owing to their perceived safety, better compatibility with the skin, and lower incidence of adverse effects. In the present study, a herbal facial scrub was formulated using natural ingredients such as turmeric powder, almond oil, orange peel powder, coffee powder, Malabar alba seed powder, vitamin E, and rose water, along with suitable cosmetic excipients including sodium lauryl sulfate (SLS), glycerin, and methyl paraben to ensure stability and usability of the product. The prepared formulation was evaluated for parameters including appearance, texture, spreadability, pH, grittiness, washability, irritation potential, astringent action, and emollient properties, along with its observed effects on acne, blackheads, whiteheads, and dark spots. Coffee powder and Malabar alba seed powder functioned primarily as exfoliating agents, while turmeric and almond oil contributed supportive anti-inflammatory and moisturizing effects. The results indicated that the scrub exhibited acceptable consistency, satisfactory spreadability, and a pH compatible with skin application, with no visible signs of irritation during testing. The formulation showed better performance on oily skin and satisfactory effects on normal and dry skin types, suggesting that the developed herbal facial scrub may be considered suitable for routine skincare use.

Keywords: Facial scrub, Herbal formulation, Exfoliant, Skin care, Anti-aging

Introduction

The term “cosmetic” is derived from the Greek word kosmetikos, meaning “skilled in adornment.” Historically, cosmetics have been used to enhance appearance and maintain personal hygiene. From ancient civilizations to modern society, various substances have been applied to the skin to improve aesthetic appeal and protect it from environmental damage [1].

Cosmetics are generally defined as products applied to the external parts of the body, particularly the face, to cleanse, beautify, promote attractiveness, or alter appearance without affecting the body’s structure or functions. These products are available in various forms

such as creams, lotions, scrubs, lipsticks, perfumes, eye shadows, nail polishes, and hair sprays.

In addition to beautification, modern cosmetic formulations serve multiple functional purposes. They may provide protection against ultraviolet radiation, reduce signs of aging such as wrinkles and fine lines, manage acne, soothe irritated skin, and improve overall skin tone and texture. The growing demand for herbal and natural cosmetics reflects increased consumer awareness regarding safety, skin compatibility, and long-term benefits.

Among the various cosmetic products available, facial scrubs play an important role in maintaining skin health. Facial scrubs are semi-solid preparations containing exfoliating agents that help in the removal of accumulated dirt, excess sebum, and dead epidermal cells from the skin surface. Regular exfoliation improves skin texture, unclogs pores, enhances blood circulation, and promotes the regeneration of new skin cells [2].

In recent years, herbal facial scrubs have gained considerable attention due to their safety, affordability, and reduced risk of adverse effects compared to synthetic formulations. Natural ingredients such as turmeric, coffee, orange peel, and plant seed powders not only act as physical exfoliants but also provide additional benefits including antioxidant, anti-inflammatory, and antimicrobial properties. These properties make herbal scrubs particularly suitable for managing acne, dull skin, pigmentation, and uneven skin tone. Therefore, the development of a herbal facial scrub using plant-based ingredients offers a promising approach in modern skincare formulations.

Facial Scrub and Its Mechanism of Action

A facial scrub primarily works through mechanical exfoliation. The formulation contains fine abrasive particles that gently rub against the skin surface during application. This mechanical action helps in removing dead skin cells, impurities, and clogged sebum from the stratum corneum, the outermost layer of the skin [3].

Exfoliation promotes desquamation, which enhances skin renewal and improves overall complexion. Removal of dead cells allows better penetration of moisturizing agents and active ingredients present in the formulation. Additionally, certain herbal components contribute biologically active effects. For example, coffee acts as a natural exfoliant and exhibits anti-inflammatory properties, turmeric provides antimicrobial and antioxidant effects, while almond oil functions as an emollient that helps maintain skin hydration and elasticity [4].

Table 01: Advantages and Disadvantages of Topical/Herbal Facial Scrub Formulation

Advantages	Disadvantages
Convenient and easy to apply	Skin irritation or contact dermatitis may occur due to certain ingredients or excipients
Bypasses first-pass metabolism associated with oral administration	Limited permeability of some active constituents through the skin barrier

Minimizes systemic side effects due to localized action	Enzymatic activity in the epidermis may reduce effectiveness of certain compounds
Improves skin texture and overall skin health	Larger particle size may hinder proper absorption or penetration
Provides direct delivery of active ingredients to the target site	Excessive or improper use may lead to skin irritation or barrier damage

Skin [5]

The skin is the largest organ of the human body and serves as a protective barrier between the internal environment and external surroundings. It is structurally divided into three main layers: epidermis, dermis, and subcutaneous tissue.

Epidermis

The epidermis is the outermost layer of the skin and is composed of stratified keratinized squamous epithelium. Its thickness varies in different parts of the body and is greatest on the palms of the hands and soles of the feet. The epidermis does not contain blood vessels; it receives oxygen and nutrients through diffusion from the underlying dermis. It primarily functions as a protective barrier against mechanical injury, microorganisms, and water loss.

The dermis lies beneath the epidermis and is composed of dense connective tissue containing collagen and elastic fibers. Collagen fibers provide tensile strength, while elastic fibers impart elasticity and flexibility to the skin. Damage or rupture of elastic fibers due to overstretching may result in permanent stretch marks, commonly observed in pregnancy or obesity. The dermis also contains blood vessels, nerve endings, hair follicles, sweat glands, and sebaceous glands.

Subcutaneous Tissue

The subcutaneous layer, also known as the hypodermis, is composed mainly of adipose tissue and loose connective tissue. It acts as an insulating layer, stores energy in the form of fat, and cushions underlying structures. This layer also helps anchor the skin to underlying muscles and tissues.

Sebaceous Glands

Sebaceous glands are associated with hair follicles and consist of secretory epithelial cells. They secrete an oily substance called sebum, which lubricates and protects the skin and hair. These glands are present in most parts of the body except the palms of the hands and soles of the feet [6].

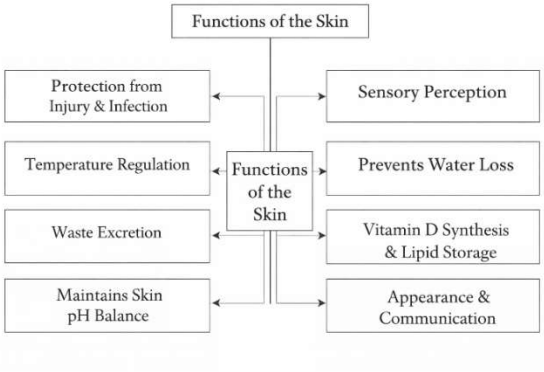

Figure 01: Functions of skin

Facial Scrub

A facial scrub is a topical skincare preparation designed to exfoliate the skin by removing accumulated dead

cells from the surface of the epidermis. Exfoliation helps in improving skin texture, reducing dullness, and promoting a brighter complexion. Regular use of facial scrubs aids in unclogging pores, minimizing excess sebum, and enhancing the overall appearance of the skin [7].

Skin is broadly categorized into dry, oily, and sensitive types, and the choice of scrub formulation should be tailored accordingly. Individuals with dry skin require scrubs containing hydrating and moisturizing agents to prevent excessive dryness and irritation. In contrast, oily skin benefits from formulations with effective exfoliating agents that deeply cleanse pores and help regulate excess sebum production. For sensitive skin, mild exfoliants with soothing ingredients are recommended to minimize the risk of irritation [8,9].

Table 02: Ideal Characteristics, Advantages, and Disadvantages of Facial Scrub

Ideal Characteristics	Advantages	Disadvantages
Gentle exfoliation	Deep cleansing	Skin irritation
Non-toxic	Removes dead skin cells	Dryness
Mild abrasive property	Improves skin texture	Over exfoliation
Effective removal of dead cells	Unclogs pores	Allergic reactions
Hypoallergenic	Brightens skin	Not suitable for all skin types
Moisturizing properties	Promotes healthy glow	Harsh formulations may damage skin barrier
Easy to use	Reduces appearance of fine lines	May disturb skin pH balance

Methodology:

All raw herbal ingredients were carefully cleaned to remove dirt and other impurities. The materials were then shade-dried to preserve their active constituents. After complete drying, the ingredients were finely powdered using a mechanical grinder and passed through a suitable sieve to obtain uniform particle size [6].

The powdered ingredients were accurately weighed according to the specified formulation. The weighed powders were then mixed thoroughly with the required quantities of other excipients to obtain a homogeneous mixture. The prepared formulation was evaluated for its physicochemical and performance parameters. Finally, the formulated facial scrub was transferred into a suitable container and properly labeled for further study [10].

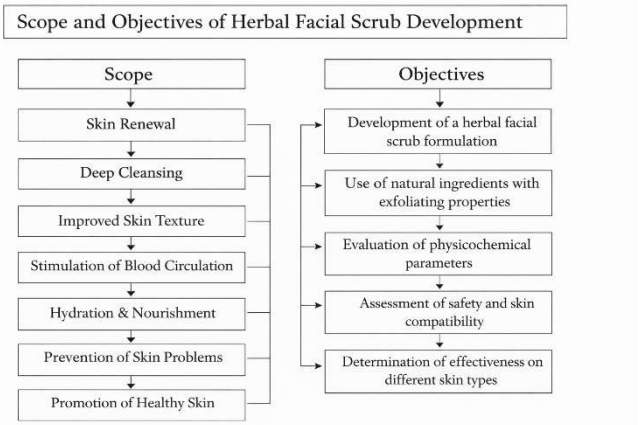

Figure 02: Flowchart illustrating the scope and objectives of herbal facial scrub development.

Table 03: Composition of the formulated herbal facial scrub showing the list of ingredients used, their respective quantities, and functional roles in the formulation [11-13].

Sl. no	Ingredients	Quantity	Uses
01	Malabar alba seeds powder	14gms	Natural exfoliant, rich in vitamins and antioxidants.
02	Vitamin E Capsule	2 ml	Moisturizing and antioxidant property.
03	Turmeric powder	2gms	Anti-inflammatory, antioxidant, skin brightening properties.
04	Badam oil	8ml	Rich in vitamin A, E & omega 6 fatty acids.
05	Orange peel powder	7gms	Exfoliant, Vitamin-C–brightening, Anti-aging properties.
06	Coffee powder	3.5gms	Exfoliant, helps to remove dead skin cells, skin smoother and anti-inflammatory activity
07	Sodium Lauryl Sulfate	0.75gms	Surfactant, exfoliation process
08	Glycerine	7.5 ml	Hydrate and soften the skin
09	Methyl paraben	0.70gms	Preservative
10	Rose water	q. s	Gentle exfoliation, cleansing and smoothing property.
11	Rose water	1gm	Thickening and suspending agent and gives creamy texture.

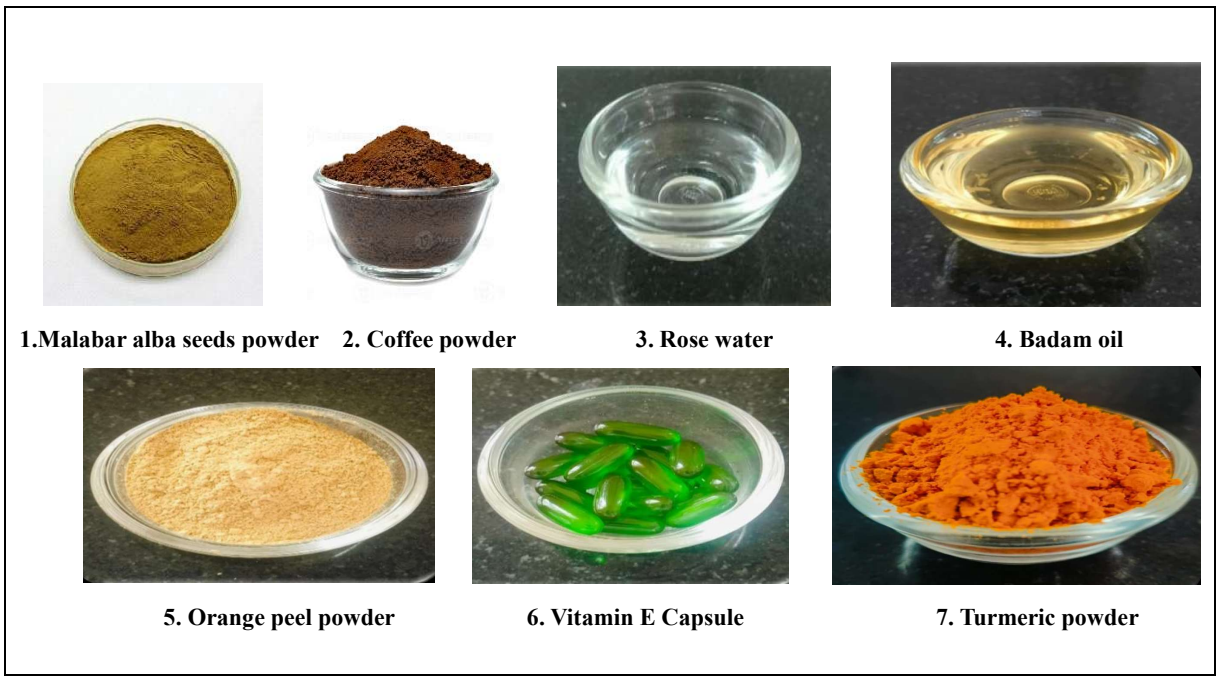

Figure 03: Ingredients used in the preparation

Evaluation Tests

The prepared herbal facial scrub was evaluated for various physicochemical and performance parameters including organoleptic properties, pH, spreadability, foamability, grittiness, washability, extrudability, and skin irritancy. The results were found to be satisfactory and suitable for topical application.

1. Organoleptic Properties

The formulation was visually inspected for colour, odour, texture, and consistency. These parameters were evaluated to ensure uniformity and aesthetic acceptability of the product [14].

2. Spreadability

Spreadability was determined by placing a small amount of the scrub between two glass slides. A weight of approximately 20 g was placed over the upper slide to allow uniform spreading of the formulation. The time required for the scrub to spread and the extent of spreading were observed. Good spreadability indicates ease of application on the skin surface [15].

3. pH Determination

The pH of the formulation was measured using a calibrated digital pH meter. A 1% aqueous solution of the scrub was prepared, and the pH was recorded to ensure compatibility with skin pH [14].

4. Foamability

A small quantity of the scrub was applied to the skin, and a minimal amount of water was added. The ability of the formulation to produce foam was observed, as foam formation contributes to cleansing efficiency [16].

5. Grittiness

The formulation was examined manually to detect the presence of coarse or gritty particles. This test ensures uniform particle size and prevents skin irritation due to abrasive particles [17].

6. Washability

The scrub was applied to the skin and rinsed with normal water to evaluate ease of removal. Good washability indicates user convenience and proper formulation balance [18].

7. Sensitivity and Irritancy Test

A small quantity of the formulation was applied to a discreet area of the skin (e.g., behind the ear) and secured with adhesive tape. The area was observed for 24–48 hours for any signs of erythema, edema, irritation, or inflammation. Absence of adverse reactions indicates safety of the formulation [19].

Result and Discussion:

The formulated herbal facial scrub was evaluated for its physicochemical and performance characteristics. The product exhibited a pale yellow colour with a pleasant odour, indicating good aesthetic acceptability. The texture and consistency were found to be satisfactory, ensuring ease of application.

The formulation demonstrated good spreadability, which facilitates uniform application over the skin surface. The pH of the formulation was found to be 6.8, which is close to the normal skin pH range, indicating suitability for topical application without causing irritation. The presence of mild grittiness confirms its exfoliating property, which is essential for effective removal of dead skin cells.

The scrub was easily washable and did not produce foam, indicating that the cleansing action was primarily due to mechanical exfoliation rather than foaming activity. Overall, the evaluation results suggest that the formulated herbal facial scrub possesses acceptable physical characteristics and is suitable for skincare use.

Table 04: Evaluation Results of Herbal Facial Scrub

SL No	Parameters	Result
01	Colour	Pale yellow
02	Odour	Pleasant
03	Texture	Good
04	Consistency	Good
05	Spreadability	Easily Spreadable
06	Foamability	No
07	Ph	6.8
08	Grittiness	Yes
09	Washability	Easily washable

Figure 04: Herbal Face Scrub

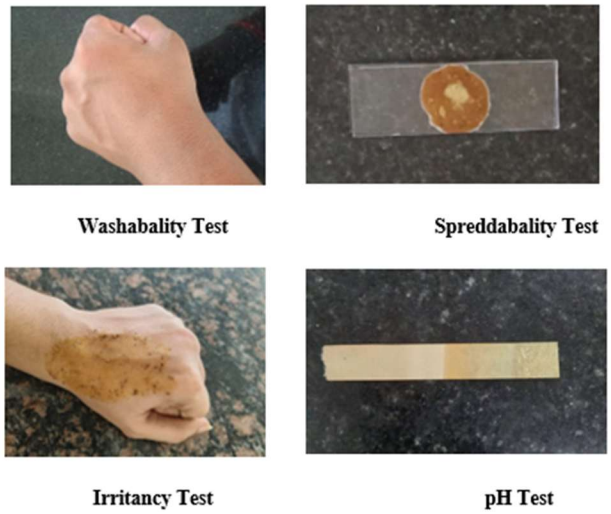

Figure 05: Evaluation Test

Conclusion:

The present study focused on the formulation and evaluation of a herbal facial scrub using selected natural ingredients with exfoliating and skin-supporting properties. The prepared formulation demonstrated satisfactory physicochemical characteristics, acceptable pH, good spreadability, mild grittiness, and ease of washability. The product was found to be stable and suitable for topical application.

The herbal ingredients used in the formulation contributed to effective exfoliation, removal of accumulated dirt, and improvement in overall skin appearance. The absence of irritation during the sensitivity test suggests that the formulation is safe for external use when applied appropriately.

Conflict of Interest

The Authors declares no conflict of interest.

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