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Review Article

A Review on Polyherbal Face Scrubs Enriched with Ethnopharmacological Botanicals: Natural Approaches to Skin Exfoliation and Rejuvenation

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ABSTRACT

The increasing consumer demand for natural skincare products has led to a resurgence in the use of herbal formulations. Polyherbal face scrubs, enriched with ethnopharmacological botanicals, offer a synergistic approach to skin exfoliation and rejuvenation. This review explores the scientific basis of exfoliation, the role of various herbal ingredients, and the formulation aspects of polyherbal face scrubs. It also discusses evaluation parameters and market trends, highlighting the potential of these natural formulations in modern skincare. The study draws upon traditional knowledge and modern scientific findings to highlight the exfoliating, antioxidant, anti-inflammatory, antimicrobial, and skin-rejuvenating properties of key botanicals such as *Curcuma longa* (turmeric), *Camellia sinensis* (green tea), *Azadirachta indica* (neem), *Aloe barbadensis* (aloe vera), *Juglans regia* (walnut shell), *Melaleuca alternifolia* (tea tree), *Multani mitti* (Fuller's earth), and *Avena sativa* (oatmeal). These ingredients provide both physical exfoliation and essential phytoconstituents like flavonoids, polyphenols, saponins, and essential oils that contribute to skin homeostasis. The review also discusses various formulation strategies, preparation techniques, physicochemical evaluations, and standardization methods. Emphasis is placed on ingredient compatibility, particle size optimization, pH balance, viscosity, and stability. Incorporating ethnopharmacological knowledge adds value by linking traditional herbal use with contemporary dermatological science. The review concludes that polyherbal face scrubs represent a promising, well-tolerated alternative to synthetic exfoliants, aligning with the global shift toward green cosmetology and holistic skin health.

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INTRODUCTION

The skin, being the largest and most exposed organ of the human body, serves as the primary barrier against environmental stressors such as pollutants, ultraviolet radiation, dust, and microbial invasion. Daily exposure to these elements can lead to several accumulating dead skin surfaces, clogged pores, and dull skin, resulting in multiple dermatological problems. Hence, skin hygiene and enhancing natural skin renewal through the exfoliation process stand out as essential in skincare routines.¹ Facial scrubs are semi-solid topical formulations designed specifically to exfoliate the superficial layer of the skin, remove dead cells, and stimulate microcirculation. Among these; herbal facial scrubs have very much used now a days because it has better biocompatible with few side effects and effective. Unlike synthetic scrubs that are sometimes harsh, can cause irritation or induce allergic reactions so these herbal formulations stand as a gentler, yet equally effective, option of treatment derived from centuries-old proven traditional medicinal practices. The comeback of herbal cosmetics is due to the growing consumer awareness about the harmful effects of synthetic chemicals and a global trend towards sustainable, nature-inspired solutions. Ethnopharmacology-the scientific study of the traditional use of plants for medicines-helps greatly in recognizing plants having potent therapeutic effects. Thus, based on ethnopharmacology we formulated the facial scrub along with evaluation of a following various ingredient were added in formulation: Aloe vera, green tea, Tea tree oil, Turmeric, Oatmeal, and Multani mitti-these ingredients have been well documented for their individual dermatological properties such as moisturizer, anti-inflammatory, antioxidant, antimicrobial, and gentle exfoliation. Under this study, it is proposed that a safe and efficacious polyherbal face scrub possessing the

capability to enhance skin texture and clarity as a result of the synergistic interaction of the above-mentioned traditional medicinal plants will be formulated and developed. The polyherbal facial scrub formulation thus provide holistic benefits to skincare, Cutting from the application of traditional herbal wisdom integrated with modern formulation techniques.²

MATERIAL AND METHOD :

Sr. No.	Ingredient	Role in Formulation
1	Oatmeal	Natural exfoliating agent
2	Multani Mitti	Oil and dust cleanser
3	Honey	Moisturizer and skin softener
4	Coconut Oil	Skin soother and softener
5	Aloe Vera Gel	Natural moisturizer
6	Green Tea Extract	Antioxidant
7	Turmeric Extract	Anti-inflammatory and glow enhancer
8	Tea Tree Oil	Antimicrobial agent
9	Carbopol 940	Gelling agent
10	Methyl Paraben	Preservative
11	Propylene Glycol	Moisturizer and humectant

1.Oatmeal



- Indian Name: Jaee
- Scientific Name: *Avena sativa*
- Part Used: Seeds (powdered form)
- Kingdom: Plantae
- Division: Magnoliophyta
- Class: Liliopsida
- Order: Poales
- Family: Poaceae
- Genus: *Avena*

- Species: *A. sativa*

Description:

Oatmeal is derived from the ground seeds of *Avena sativa* and has long been used in dermatology due to its soothing and anti-irritant effects. It contains beta-glucan, avenanthramides, and antioxidants that provide anti-inflammatory, moisturizing, and protective properties. Oatmeal acts as a gentle exfoliant, removing dead skin cells without causing irritation, and forms a barrier that locks in moisture, making it ideal for sensitive or dry skin. It also helps relieve itching and redness, providing a calming effect on inflamed skin.³

2. Multani Mitti



- Indian Name: Multani Mitti
- Scientific Name: Fuller's Earth
- Part Used: Clay
- Kingdom: Mineral (non-botanical).

Description:

Multani Mitti, or Fuller's Earth, is a natural clay composed mainly of hydrous aluminum silicates. Known for its strong oil-absorbing, cleansing, and cooling properties, it has been widely used in Ayurvedic and Unani medicine to treat acne, blackheads, and other skin conditions. It tightens the skin, shrinks pores, and promotes blood circulation, making the skin appear firm and glowing. When used in face scrubs, it acts as a detoxifying agent, drawing out impurities and

toxins while offering a refreshing and soothing effect.⁴

3.Hony



Description:

Honey is a sweet and viscous substance made by several species of bees, the best-known of which are honey bees. Honey is made and stored to nourish bee colonies. Bees produce honey by gathering and then refining the sugary secretions of plants (primarily floral nectar) or the secretions of other insects, like the honeydew of aphids. This refinement takes place both within individual bees, through regurgitation and enzymatic activity, and during storage in the hive, through water evaporation that concentrates the honey's sugars until it is thick and viscous

Benefits:

1. Honey is wonderful moisturizer.
2. Fights acne.
3. Cleanses pores.
4. Mild exfoliator.
5. Diminishes scar.
6. Reduces wrinkles and fine lines.

4.Aleo Vera Gel



- Kingdom: Plantae.
- Order: Asparagales
- Family: Asphodelaceae
- Subfamily: Asphodeloideae
- Genus: Aloe
- Species: A. vera
- Binomial name: Aloe vera

Description:

It originates from the Arabian Peninsula, but also grows wild in tropical, semitropical, and arid climates around the world. It is cultivated for commercial products, mainly as a topical treatment used over centuries. The species is attractive for decorative purposes, and succeeds indoors as a potted plant. ⁵ The leaves of Aloe vera contain significant amounts of the polysaccharide gel acemannan, which can be used for topical purposes. Aloe skin contains aloin which is toxic. Products made from Aloe vera usually only use the gel. There are many products containing aloe vera's acemannan, including skin lotions, cosmetics, ointments and gels for minor burns, skin abrasions, insect bites, and windburn ⁶

Benefits:

1. Helps soothe sunburn.
2. Helps to moisturize the skin.
3. Boosts healing of wounds.
4. Fights skin-ageing.
5. Reduces infection and acne.
6. Lightens blemishes on the face.

5.Green tea Extract



- Indian Name: Hari Chai
- Scientific Name: *Camellia sinensis*
- Part Used: Leaves
- Kingdom: Plantae
- Division: Magnoliophyta
- Class: Magnoliopsida
- Order: Ericales
- Family: Theaceae
- Genus: *Camellia*
- Species: *C. sinensis*

Description:

Green tea is obtained from the unoxidized leaves of *Camellia sinensis*; a small evergreen shrub native to East Asia. Rich in polyphenols, especially catechins like EGCG (epigallocatechin gallate), it is known for its strong antioxidant and anti-inflammatory properties. Green tea extract is widely incorporated into skincare formulations to fight oxidative stress, reduce inflammation, and control sebum production. Its antimicrobial activity helps combat acne-causing bacteria, while its astringent nature tightens pores and tones the

skin. Green tea also shields the skin from environmental pollutants and UV-induced damage, contributing to a clearer, firmer, and more youthful complexion.⁷

6. Turmeric Extract



- Kingdom: Plantae
- Order: Zingiberales
- Family: Zingiberaceae
- Genus: Curcuma
- Species: C. longa
- Binomial name: Curcuma longa

Description:

Turmeric is a perennial herbaceous plant that reaches up to 1 m (3 ft 3 in) tall. It has highly branched, yellow to orange, cylindrical, aromatic rhizomes. The leaves are alternate and arranged in two rows. They are divided into leaf sheath, petiole, and leaf blade. From the leaf sheaths, a false stem is formed. The petiole is 50 to 115 cm (20–45 in) long. The simple leaf blades are usually 76 to 115 cm (30–45 in) long and rarely up to 230 cm (7 ft 7 in). They have a width of 38 to 45 cm (15 to 17+1/2 in) and are oblong to elliptical, narrowing at the tip.⁸

Benefits of Turmeric Powder:

It has antioxidant and anti-inflammatory qualities.

1. Adds natural glow.
2. Treats acne breakouts.

3. Help with acne scarring.
4. Reduce dark circles.
5. Slows down skin ageing.
6. Moisturise dry skin.
7. Reducing stretch marks.

7. Tea Tree Oil



- Indian Name: Tea Tree Tel
- Scientific Name: *Melaleuca alternifolia*
- Part Used: Leaves (oil extracted)
- Kingdom: Plantae
- Division: Magnoliophyta
- Class: Magnoliopsida
- Order: Myrtales
- Family: Myrtaceae
- Genus: *Melaleuca*
- Species: *M. alternifolia*

Description:

Tea tree oil is a pale yellow essential oil extracted from the leaves of *Melaleuca alternifolia*, a plant native to Australia. Known for its strong antiseptic, antibacterial, antifungal, and anti-inflammatory properties, it has long been used in traditional and modern medicine for treating skin infections, acne, and wounds. It contains active compounds like terpinen-4-ol and alpha-terpineol, which help eliminate acne-causing bacteria and soothe irritated skin. In skincare formulations, tea tree oil is commonly used for oily and acne-prone

skin due to its ability to control sebum, reduce redness, and unclog pores:

Benefits of Tea Tree Oil:

- Kills acne-causing bacteria
- Reduces redness and swelling
- Helps unclog pores
- Controls excess oil production
- Speeds up healing of blemishes

8. Carbopol 940



- **Category:** Synthetic polymer / Gelling agent
- **Chemical Name:** Carbomer 940
- **Synonyms:** Carbomer, Carbopol 940, Acrylic acid polymer

Description:

Carbopol 940 is a synthetic, high-molecular-weight, cross-linked polymer of acrylic acid. It is used extensively in cosmetics and pharmaceutical formulations due to its ability to thicken, suspend, and stabilize products. When neutralized, it forms a clear gel with high viscosity even at low concentrations. It is known for giving a smooth, non-tacky, and elegant feel to topical formulations.

- **Appearance:** White, fluffy, hygroscopic powder
- **Solubility:** Swells in water and alcohol to form gels

Uses of Carbapol:

- Thickening agent

- Suspending agent
- Stabilizer

Benefits:

1. Provides excellent spreadability and consistency to formulations.
2. Enhances skin feel by forming a smooth base.
3. Stabilizes emulsions in gel-based cosmetic products.
4. Compatible with a wide range of active ingredients.

9. Methyl Paraben



- Category: Preservative
- Chemical Name: Methyl 4-hydroxybenzoate
- Molecular Formula: C₈H₈O₃
- Molecular Weight: 152.15 g/mol

Description:

Methylparaben is a methyl ester of p-hydroxybenzoic acid, widely used as a preservative in cosmetics, pharmaceuticals, and food products. It prevents microbial growth and ensures product safety and shelf life. It is effective against a broad spectrum of bacteria and fungi.

- **Appearance:** White crystalline powder
- **Solubility:** Slightly soluble in water, soluble in alcohol

Function in Formulation:



1. Antimicrobial preservative
2. Prevents contamination during product storage and usage

Benefits:

1. Prevents spoilage by inhibiting microbial growth.
2. Extends the shelf life of herbal formulations.
3. Maintains product integrity in multi-use containers.
4. Safe at low concentrations as per regulatory standards.

10. Propylene Glycol



- Indian Name: Glycerin
- Scientific Name: Propane-1,2,3-triol
- Part Used: Synthetic/Vegetable-derived humectant
- Kingdom: N/A (Chemical compound)

Description:

Glycerine is a clear, odourless, viscous liquid widely used in cosmetics for its strong humectant property. It attracts water from the environment into the skin, keeping it hydrated and soft. It enhances skin barrier function, smoothens rough patches, and improves skin elasticity. Glycerine also acts as a solvent and stabilizer in formulations. It is especially useful in combination with other botanical ingredients to enhance their absorption and performance in skincare products.

Benefits of Glycerine:

1. Provides deep hydration
2. Softens rough, dry skin
3. Improves skin texture
4. Enhances formulation stability
5. Promotes skin healing

Procedure for Herbal Face Scrub Preparation

Main process for formulation of herbal face scrubs:

1. Preparation of Herbal Ingredients:

- Oatmeal and Multani Matti powders were sieved to obtain fine powder and checked for any foreign particles.
- Green tea powder and turmeric powder were taken.

2. Hydration of Gelling Agent:

- Carbopol 940 was dispersed slowly in distilled water and allowed to hydrate completely.
- Once fully swollen, propylene glycol was added to improve texture and moisturization.

3. Mixing of Active Components:

In another beaker, aloe vera gel, honey, coconut oil, and tea tree oil were mixed properly one by one.

4. Integration of Solid Exfoliants:

The sieved oatmeal and Multani Matti powders were slowly incorporated into the active compound (i.e., aloe vera gel, coconut oil, tea tree oil, and honey) with constant stirring to ensure even dispersion and avoid clumping.

5. Addition of Functional Extracts:



Green tea extract and turmeric extract were added for their antioxidant and anti-inflammatory effects.

6. Preservation and Final Touches:

Methyl paraben was added as a preservative. The final pH was checked and adjusted using dilute citric acid or sodium hydroxide to fall within the skin-friendly range (pH 5.5–6.5).

7. Packaging:

The prepared herbal face scrub was filled into airtight poly containers, labelled, and stored at room temperature for evaluation.¹⁰

Formulation of Herbal Face Scrub

Sr. No.	Ingredient	Formulation Batch		
		F1	F2	F3
1	Oatmeal	3 g	4 g	5 g
2	Multani Mitti	3 g	4 g	5 g
3	Honey	2 g	2 g	2 g
4	Coconut Oil	2 g	2 g	2 g
5	Aloe Vera Gel	2 g	2 g	2 g
6	Green Tea Powder	q.s.	q.s.	q.s.
7	Turmeric Powder	q.s.	q.s.	q.s.
8	Tea Tree Oil	1 g	1 g	1 g
9	Carbopol 940	2 g	2 g	2 g
10	Methyl Paraben	2 g	2 g	2 g
11	Propylene Glycol	2 g	2 g	2 g

EVALUATION OF HERBAL FACE SCRUB

After formulation, all three batches (F1, F2, and F3) of the herbal face scrub were subjected to the following evaluation parameters:

1. Organoleptic Properties

The formulations were evaluated visually and by sensory perception for:

- Colour – Appearance and visual appeal
- Odour – Natural fragrance
- Texture – Smoothness or presence of coarse particles

- Consistency – Uniformity and stability of the formulation

2. Spreadability

Spreadability determines how easily the scrub can be applied to the skin.

Method:

Two clean glass slides were taken. A fixed amount of scrub was placed between the slides. A known weight (30g) was placed on the top slide to form a uniform layer. After removing the weight, the time (in seconds) taken by the upper slide to slip down was recorded.

Formula:

$$\text{Spreadability} = \frac{m \times l}{t} \quad \text{Spreadability} = \frac{m \times l}{t}$$

Where:

m = weight tied to the upper slide (30g)

l = length of the slide (7.5 cm)

t = time taken for the slide to move

Lower time indicates better spreadability.

3. pH Determination

The pH of the scrub (1% aqueous solution) was measured using a calibrated digital pH meter. A pH range close to skin (4.5–6.5) indicates safety and suitability for topical use.

4. Foamability

A small quantity of scrub was rubbed on the skin with a few drops of water to observe the formation of foam. Foamability suggests the cleansing ability of the scrub.

5. Grittiness



The scrub was gently rubbed between fingers to detect the presence of coarse or gritty particles. An ideal scrub should have mild abrasiveness to exfoliate without damaging the skin.

The ease with which the scrub could be washed off the skin with plain water was noted. A good formulation should leave no greasy or sticky residue.¹¹

6. Washability

RESULT AND DISCUSSION:

Parameter	F1	F2	F3
Colour	Greenish Yellow	Greenish Yellow	Greenish Yellow
Odour	Pleasant	Pleasant	Pleasant
Texture	Good	Good	Good
Spreadability	Easily Spreadable	Easily Spreadable	Easily Spreadable
Consistency	Good	Good	Good
Foamability	No	No	No
pH	6.4	6.8	6.7
Grittiness	Yes	Yes	Yes
Washability	Easily Washable	Easily Washable	Easily Washable

The objective of the present research was to formulate and evaluate a polyherbal face scrub designed to exfoliate dead skin cells, unclog pores, and enhance the appearance of the skin using natural ingredients. In today's world, there is a growing interest in herbal formulations due to their safety, efficacy, and minimal side effects. The study utilized traditional herbs including Masoor dal (Lentil), Poppy seeds, Neem powder, Turmeric powder, Aloe vera gel, Honey, Rose water, and Citric acid, each known for their individual skin benefits. The research began with a thorough literature review followed by ingredient selection based on their ethnopharmacological relevance. Three formulations (F1, F2, and F3) were developed by varying the concentration of actives and excipients. The formulations were evaluated based on physical appearance, pH, spreadability, foamability, grittiness, and washability. All formulations showed acceptable organoleptic properties, good consistency, and proper pH range (6.4–6.8) suitable for facial application. The absence of foam confirmed the mild and non-soapy nature of the product, while the presence of mild grittiness ensured effective exfoliation. Overall, the prepared formulations exhibited good

stability and performance characteristics. The study demonstrates that such a polyherbal face scrub can be effectively developed using naturally available ingredients to serve as a gentle, exfoliating, and skin-friendly cosmetic product.¹²

CONCLUSION:

The present study successfully formulated and evaluated a polyherbal face scrub using natural ingredients with known ethnopharmacological properties. The scrub demonstrated desirable physical characteristics, ideal pH, and effective spreadability and washability, indicating its suitability for topical facial application. The stable nature and compatibility of the formulation suggest that it can serve as an effective, safe, and natural alternative to chemical-based exfoliating products. This research further emphasizes the potential of integrating traditional herbal knowledge with modern cosmetic formulation practices. The polyherbal face scrub, due to its exfoliating, antibacterial, anti-inflammatory, and moisturizing properties, can be considered an ideal candidate for daily skincare routines to promote healthy, glowing skin naturally.¹³



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