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Formulation and evaluation of herbal face pack

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Abstract

Herbal cosmetics are becoming more popular as a result of consumers' growing desire for safe and natural skincare products. The creation and assessment of a herbal face pack utilising plant-based components that have long been recognised for their medicinal advantages is the main goal of this study. A balanced formulation was created by combining the chosen herbs—Multani mitti, neem, turmeric, cinnamon, sandalwood—in precise ratios with the goals of enhancing skin texture, regulating sebum, and producing a calming effect. The created face pack's physicochemical characteristics (pH, moisture content, spreadability) and organoleptic qualities (colour, texture, and odour) were assessed. The formulation showed no indications of irritation or negative reactions, adequate physical properties, and a pH suitable for skin compatibility. These results indicate that the formulated herbal face pack is a potential, economical, and safe alternative to synthetic skincare products.

Keywords: Herbal cosmetics, herbal face pack, herbs, herbal ingredients

1. Introduction

1.1 Skin Physiology

The largest organ in the body, the skin accounts for over 15% of the total weight of the body. Among its many vital functions are defence against external physical, chemical, and biological threats, preventing water loss from the body, and aiding in thermoregulation. The skin is the outermost layer of our body that protects our proteins from heat, light, bacteria, and injury. It is the largest organ in the body, storing fat, water, and vitamin D, which is essential for human health, as well as regulating body temperature. Dullness, play dissonance, and wrinkles that are taken for consideration as real problems. The skin helps regulate body temperature, shields the body from germs and the elements, and allows us to experience touch, warmth, and cold. ^[1, 2]

1.2 Skin Structure

The outermost layer of skin, the epidermis, provides a waterproof barrier and determines our skin tone. The dermis, which lies beneath the epidermis, is rich in hair follicles and connective tissue.

1. The stratum spinosum, or layer of thorny cells: Sporadic, polyhedral cells with cytoplasmic forms—sometimes referred to as "spines"—are found in 8-10 cell layers, sometimes referred to as the prickle cell layer. These cells amplify outward and make contact with nearby cells by desmosomes. This layer contains dendritic cells ^[3].
2. The stratum germinativum, also known as the bottom layer, is the deepest layer. Hemidesmosomes connect it to the storm cellar film, which separates it from the dermis. This layer contains cuboidal to columnar stem cells that are constantly producing keratinocytes through mitosis. Melanocytes are also present in this stratum ^[4].
3. The dermis: The deeper layer between the epidermis and the oily subcutaneous layer is called the dermis. It is composed of connective tissues that contain collagen and elastin strands, with a small number of cells such as fibroblasts, macrophages, and adipocytes. The subcutaneous layer is located deep within the dermis; however, it is not the skin ^[5, 6].

1.3 Function of Skin

1. It provides microbial invanon chemical specialists, other natural specialists, and a protective

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2. waterproof layer that guards against damage.
3. It releases metabolites such as urea and sodium chloride.
4. It also has an impact on maintaining electrolyte and water balance.
5. The activity of UV beams from starlight affects how vitamin D is combined with skin ergosterol [7].
6. It produces tyrosine, foam, and melanin. Skin is kept sensitive by the sebum it secretes.
7. It holds sugar, chlorides, water, and fiat. Skin is kept sensitive by the sebum it secretes.
8. Lessens the damaging effects of UV radiation.
9. Serves as a tactile organ by detecting temperature through touch.
10. Has an impact on temperature control [8].

1.4 Herbal Topical Formulation

Topical formulations made mostly of natural substances sourced from fruits, flowers, herbs, and other botanicals are known as herbal face packs. Herbal face packs promote a natural approach to skincare, in contrast to traditional face masks that could include artificial chemicals, preservatives, and scents. They are used to cleanse, exfoliate, nourish, and revitalise the skin; they are usually available in powder or paste form.

1.5 Benefits of Herbal Face Pack

1. **Natural Ingredients:** Known for their calming and restorative qualities, natural ingredients like neem, turmeric, sandalwood, rose, aloe vera, and more make up herbal packs.
2. **Gentle on Skin:** Since they don't include harsh chemicals, they are typically safe for delicate skin types and less prone to irritate or trigger allergic responses.
3. **Anti-inflammatory and Antibacterial Properties:** By inhibiting bacterial growth and soothing irritated skin, a variety of herbal components help lessen inflammation, redness, and acne.
4. **Packed with Antioxidants:** Antioxidants found in herbs like turmeric and green tea combat free radicals, preventing premature ageing and encouraging the growth of healthy skin cells.
5. **Enhances Skin Texture and Complexion:** Using herbal face packs on a regular basis can brighten the skin, exfoliate dead skin cells gently to improve texture, and improve complexion in general.
6. **Hydration and Nourishment:** Aloe vera and honey are two key ingredients that hydrate and nourish the skin while keeping pores clear.
7. **Economical and Eco-Friendly:** The majority of herbal face packs are affordable and environmentally friendly because they can be prepared at home using easily accessible natural ingredients.

1.6 Common Ingredients in Herbal Face Packs

Each of the components in herbal face packs has unique skin-benefitting properties. Among the most often utilised natural ingredients are:

1. **Turmeric-** Well-known for its antimicrobial and anti-inflammatory qualities, turmeric even out skin tone and fights acne.
2. **Neem-** Has potent antibacterial qualities and works well to treat skin infections and acne.
3. **Fuller's Earth, also known as Multani Mitti,** is a natural clay that purges the skin of excess oil and pollutants, leaving it matte and renewed.
4. **Sandalwood:** Helps to improve skin tone, lower irritation,

and has cooling properties.

5. **Aloe Vera:** Promotes healing by moisturising and calming inflamed skin.

1.7 Types of Herbal Face Packs and Their Uses

Numerous herbal face packs have been developed to address distinct skin issues. Here are a few examples:

1. **For Oily and Acne-Prone Skin:** A mixture of fuller's earth, turmeric, and neem powder helps reduce excess oil and combat bacteria that cause acne.
2. **Aloe vera, honey, and sandalwood packs** offer deep hydration and relieve irritated skin for dry and sensitive skin.
3. **For Evening and Brightening Skin Tone:** To lessen pigmentation and give a natural glow, blends of turmeric, gramme flour, and rose water are applied.
4. **For Anti-Aging:** By feeding the skin and increasing its elasticity, herbal packs enhanced with green tea, aloe vera, and honey target fine lines and wrinkles.

1.8 Possible Factors to Think About and Safety Measures

Although herbal face packs are usually safe, take the following safety measures:

1. **Patch Test:** To rule out sensitivity or allergic responses, always do a patch test prior to full-face treatment.
2. **Freshness of components:** To prevent contamination and guarantee the most possible benefits, use premium, fresh herbal components.
3. **Prevent Overuse:** Using some herbs, like turmeric, excessively can irritate or discolour the skin.
4. **Understand Your Skin Type:** To prevent dryness or excessive oiliness, use herbal packs that are appropriate for your skin type.
5. **Consultation:** Before using herbal packs, anyone with skin disorders including eczema, psoriasis, or severe acne should speak with a dermatologist.

2. Herbs Profile

2.1 Neem

Scientific Name: *Azadirachta indica*

Family: Meliaceae

Native: Indian subcontinent

Description: The evergreen, multipurpose neem tree is well-known for its agricultural and medicinal uses. Compounds having antibacterial, anti-inflammatory, and insecticidal qualities can be found in its leaves, seeds, and bark.

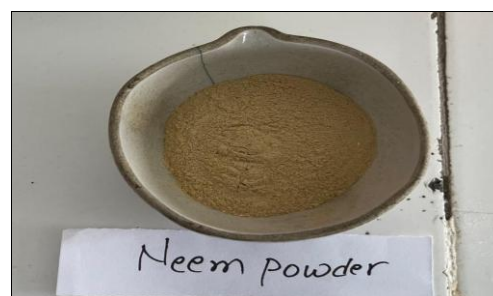


Fig 1: Neem Powder

Key Properties

- **Antimicrobial:** Effective against bacteria, fungi, and viruses
- **Anti-inflammatory:** Reduces inflammation and soothes skin conditions
- **Insecticidal:** Natural pesticide properties - Antioxidant: Protects against oxidative stress

Uses

- **Skincare:** Treats acne, eczema, and other skin conditions
- **Haircare:** Promotes healthy hair growth and reduces dandruff
- **Agriculture:** Natural pesticide and fertilizer
- **Traditional Medicine:** Used to treat various health issues, including digestive problems and infections.

2.2 Sandal Wood

Scientific Name: *Santalum album* (East Indian Sandalwood)

Family: Santalaceae

Native: Indian subcontinent and northern Australia

Description: Sandalwood is a highly valued, aromatic tree known for its fragrant heartwood and essential oil. The tree's wood and oil have been used for centuries in traditional medicine, perfumery, and skincare.



Fig 2: Sandalwood Powder

Key Properties

- **Anti-inflammatory:** Soothes and calms the skin
- **Antimicrobial:** Effective against bacteria and other microorganisms
- **Astringent:** Helps to tone and tighten the skin
- **Aromatic:** Distinctive, calming fragrance

Uses

- **Skincare:** Treats acne, reduces inflammation, and promotes healthy skin
- **Aromatherapy:** Promotes relaxation, reduces stress and anxiety
- **Perfumery:** Highly prized for its fragrance in perfumes and fragrances.
- **Traditional Medicine:** Used to treat various health issues, including digestive problems and skin conditions

2.3 Multani Mitti

Common Name: Multani Mitti (Fuller's Earth)

Description: Multani Mitti is a type of clay that is rich in minerals such as silica, magnesium, and calcium. It is known for its absorbent properties and has been used for centuries in traditional skincare and beauty treatments.



Fig 3: Multani Mitti

Key Properties

- **Absorbent:** Draws out impurities and excess oil from the skin
- **Exfoliating:** Gently removes dead skin cells and smoothens skin texture
- **Cooling:** Provides a soothing and calming effect on the skin
- **Mineral-rich:** Nourishes the skin with essential minerals

Uses

- **Skincare:** Treats acne, blackheads, and oily skin; improves skin texture and tone
- **Face masks:** Used as a face mask ingredient to deep clean and nourish the skin
- **Body wraps:** Used in body wraps to detoxify and soften the skin

2.4 Turmeric

Scientific Name: *Curcuma longa*

Family: Zingiberaceae (Ginger family)

Native: Indian subcontinent and Southeast Asia

Description: Turmeric is a perennial plant with a rhizome (underground stem) that is widely used as a spice and medicinal herb. The rhizome contains a yellow-orange pigment called curcumin, which is responsible for its medicinal properties.



Fig 4: Turmeric Powder

Key Properties

- **Anti-inflammatory:** Reduces inflammation and pain
- **Antioxidant:** Protects against oxidative stress and cell damage
- **Antimicrobial:** Effective against bacteria, fungi, and viruses
- **Anticancer:** May help prevent or slow cancer cell growth

Uses

- **Culinary:** Used as a spice in various dishes, particularly in Indian and Middle Eastern cuisine
- **Skincare:** Treats acne, reduces inflammation, and promotes healthy skin
- **Traditional Medicine:** Used to treat various health issues, including digestive problems, arthritis, and skin conditions

2.5 Cinnamon

Scientific Name: *Cinnamomum verum* (Ceylon Cinnamon) or *Cinnamomum cassia* (Cassia Cinnamon)

Family: Lauraceae

Native: Sri Lanka and other tropical regions

Description: Cinnamon is an evergreen tree with aromatic bark that is widely used as a spice and medicinal herb. The bark is harvested, dried, and rolled into quills or ground into powder.



Fig 5: Cinnamon Powder

Key Properties

- **Antimicrobial:** Effective against bacteria, fungi, and viruses
- **Anti-inflammatory:** Reduces inflammation and pain
- **Antioxidant:** Protects against oxidative stress and cell damage
- **Blood sugar regulation:** May help regulate blood sugar levels

Uses

- **Culinary:** Used as a spice in baking, cooking, and beverages
- **Skincare:** Treats acne, reduces inflammation, and promotes healthy skin

- **Traditional Medicine:** Used to treat various health issues, including digestive problems, infections, and inflammation

3. Materials and Methods**3.1 Materials****3.1.1 Selection of Herbal Ingredients**

The following herbal ingredients were selected based on their traditional use and scientifically validated dermatological benefits:

- **Neem Leaves (*Azadirachta indica*):** Antibacterial, anti-acne, anti-inflammatory
- **Sandalwood Powder (*Santalum album*):** Soothing, skin-brightening
- **Multani Mitti (Fuller's Earth):** Oil absorption, cleansing, exfoliating
- **Turmeric Powder (*Curcuma longa*):** Anti-inflammatory, complexion enhancer
- **Cinnamon Powder (*Cinnamomum zeylanicum*):** Antimicrobial, improves circulation, skin clarifying

3.1.2 Authentication of Ingredients

- Neem leaves were shade-dried and powdered, authenticated via macroscopic and microscopic evaluation.
- Sandalwood, Multani Mitti, Turmeric, and Cinnamon powders were procured from a certified herbal supplier and authenticated by organoleptic and microscopic examination.
- All powders were passed through sieve #80 to obtain fine uniform texture.

Table 1: Ingredients of Herbal Face Pack

S. No	Ingredients	Quantity	Role
1.	Neem leaf	20-30%	Known for its antimicrobial and anti-inflammatory properties, neem leaf helps reduce acne, prevent breakouts, and soothe irritated skin.
2.	Sandal wood	15-25%	Sandalwood has anti-inflammatory, antiseptic, and cooling properties, which can help reduce redness, inflammation, and skin irritation.
3.	Multani mitti	30-40%	This natural clay absorbs excess oil, reduces pores, and improves skin texture, leaving skin feeling refreshed and rejuvenated.
4.	Turmeric powder	10-20%	Turmeric's active compound, curcumin, has potent antioxidant and anti-inflammatory properties, which can help brighten skin, reduce acne, and promote even skin tone.
5.	Cinnamon	5-10%	Cinnamon has antimicrobial properties that can help combat acne-causing bacteria and improve skin circulation.

3.2 Method of preparation of Herbal Face Pack Formulation

- 1) All the powdered ingredients are passed through sieve no. 120
- 2) Each herbal powder was accurately weighed according to the quantity required.
- 3) Ingredients were blended using geometric dilution to ensure uniform mixing.
- 4) Uniform mixing of powder is achieved with the help of motor and pestle.
- 5) Titurate them to form uniform mixture.
- 6) The dry mixture was stored in airtight containers.
- 7) For application, a small amount of the powder was mixed with rose water or distilled water to make a smooth paste.
- 8) Keep it for complete drying for 15-20 minutes.
- 9) After drying wash the face with lukewarm water or with cold water.

Table 2: Formulation Table for herbal face pack

S. No.	Ingredient	100 gm
1	Neem Leaf	21 gm
2	Sandal Wood	18 gm
3	Multani Mitti	25 gm
4	Turmeric Powder	10 gm
5	Cinnamon	11 m

4. Evaluation parameter**4.1 Morphological Evaluation**

It refers to the evaluation of the herbal face pack by its color, odor, appearance, texture etc. The external characters of the formulation were examined.

4.2 Physicochemical evaluation

Physicochemical parameters were determined, including the determination of extractive value, ash value, pH and moisture content^[17].

4.3 Physical evaluation

The particle size was tested by microscopy method. The flow property of the dried powder of combined form was evaluated by performing Angle of Repose by funnel method, bulk density and tapped density by Tapping Method^[18].

- **Bulk density**

Bulk density refers to the adjustment of particles or granules to pack themselves collectively. The formula for determination of bulk density (D) is

$$D=M/V$$

Where, M is the mass of the particles & V is the total volume occupied by them.

The volume of packing can be determined in a graduated cylinder. 100 grams of weighed formulation powder was taken and slowly added to the cylinder with the help of the funnel. The initial volume was observed firstly; the sample was tapped until no further volume reduction occurred. The bulk density value was obtained from the initial volume and after tapping the volume reduced, from which tapped density was calculated.

• Hausner's ratio

Hausner's ratio is associate with the inter particle friction and predicts powder flow properties.

It is calculated as - Hausner's ratio= D/D'

• Angle of repose

The angle of repose is used to quantify the flow properties of powder because it influences cohesion among the particles. The fixed funnel cone method employs the calculation of height(H) above the graph paper that is placed on a flat tabular surface. The powdered was carefully poured through the funnel till the peak of the conical heap just touched the tip of the funnel. Here, R denotes the radius of the conical heap,

$$\theta = \tan^{-1} (h/r)$$

Where $\theta = \arctan H/R$, where θ is the angle of repose.

5. Results and Discussion

5.1 Morphological Evaluation

Herbal face pack was evaluated for morphological parameters showed in the Table 4. The colour of formulation was yellowish brown. The odour of prepared formulations was pleasant and good acceptable which is desirable to cosmetic formulations. Texture and smoothness was acceptable as per requirement of cosmetic formulations.

Table 3: Morphological Evaluation

S. No.	Parameter	Observation
1.	Colour	Yellowish-brown
2.	Odour	Pleasant
3.	Appearance	Smooth, fine
4.	Texture	Fine
5.	Smoothness	Smooth

5.2 Physicochemical Evaluation

Herbal face pack was evaluated for physicochemical parameters showed in the Table 5. The pH of formulation was found close to neutral. The ash content and moisture content were within limit.

Table 4: Phytochemical Evaluation

S.NO	Parameter	Observation
1	pH	6.87
2	Ash Content	2.8
3	Loss on Drying	88 0.32

5.3 Physical Evaluation (powder property)

Herbal face pack was evaluated for physical parameters (powder property) showed in the Table 6. Rheological findings justified the flow (powder) properties of the herbal face pack. It was found to be a free-flowing and non-sticky in nature.

Table 5: Physical Evaluation

S. No.	Parameter	Observation
1.	Tapped density	0.60gm/ml
2.	Bulk density	0.71gm/ml
3.	Angle of repose	7.5
4.	Hausner's ratio	1.40
5.	Carr's index	29.3%

6. Conclusion

The herbal face pack's promise as a gentle, natural, and efficient skincare product is demonstrated by its preparation and evaluation. Neem leaf, sandalwood, Multani Mitti, turmeric powder, and cinnamon combine to form a synergistic blend that helps with acne, inflammation, and skin texture, among other skin issues. The face pack is a promising choice for anyone looking for natural skincare alternatives because of its stability, safety, and effectiveness. The formulation can be improved and its full potential in supporting healthy, glowing skin can be explored with the aid of additional research and clinical trials.

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