

Formulation and Evaluation of Herbal Face Pack

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Abstract – The present study aimed to formulate and evaluate a herbal face pack using natural ingredients with cleansing, nourishing, and skin-enhancing properties. The formulation was developed using red lentil (*Lens culinaris*), turmeric (*Curcuma longa*), sandalwood (*Santalum album*), licorice (*Glycyrrhiza glabra*), neem (*Azadirachta indica*), multani mitti (Fuller's earth), and aloe vera (*Aloe barbadensis*) powder as the major constituents due to their antimicrobial, anti-inflammatory, antioxidant, exfoliating, and skin-brightening properties. The herbal face pack was prepared in powdered form to provide ease of application and improved shelf stability. The formulation was evaluated for organoleptic characteristics, flow properties, pH, moisture content, and skin irritation. The prepared face pack exhibited a light greenish-brown color with acceptable flow characteristics, an angle of repose of 32.22°, bulk density of 0.48 g/mL, tapped density of 0.58 g/mL, Hausner's ratio of 1.208, and Carr's index of 17.24%. The pH of the formulation was found to be 6.1, indicating compatibility with skin, while the loss on drying was 7%, suggesting suitable stability. No redness, swelling, or irritation was observed during the skin irritation study. The results indicate that the formulated herbal face pack is safe, effective, economical, and suitable for maintaining healthy, radiant, and refreshed skin.

Keywords -- Herbal Face Pack, Natural Ingredients, Antimicrobial Activity, Antioxidant Activity, Exfoliation, Skin Brightening, Physicochemical Evaluation, Skin Irritation Test

I. INTRODUCTION

Everybody wants to get fair and charming skin. Nowadays, acne, blackheads, pimples, and dark circles are common among youngsters. According to Ayurveda, skin problems are normally due to impurities and accumulated toxins in the blood caused by improper diet and lifestyle, which are causing skin-related diseases. Various herbs and medicines are described in Ayurveda for blood purification. The herbal paste which is applied on the face to treat acne, pimples, scars, marks and pigments are known as "mukhalepa" in Ayurveda. The process of smearing this herbal mix on the face is known as "mukhalepana". This beauty therapy is popular as a facial. The smooth powder which is used for facial application is "face pack".

A good herbal face pack must supply necessary nutrients to the skin. It should penetrate the subcutaneous tissues in order to deliver the required nutrients. Different types of skin need different types of herbal face packs.

The face packs mentioned in Ayurveda help get rid of wrinkles, dark circles, pimples, and acne. Herbal face packs increase the fairness and smoothness of skin. We can get the maximum benefits of herbal face packs by using them according to our skin type.

Importance of Herbal Face Packs in Skincare [1]:

- 1) Herbal face packs play an important role in skincare due to their natural origin, therapeutic benefits, and minimal side effects. They are widely used to maintain healthy skin, improve complexion, and protect the skin from environmental damage. Herbal formulations contain bioactive constituents such as flavonoids, tannins, alkaloids, vitamins, and essential oils that nourish and rejuvenate the skin naturally.
- 2) Herbal face packs help in cleansing the skin by removing dirt, excess oil, and dead skin cells from the surface of the skin. They improve blood circulation and promote healthy, glowing skin. Many herbal ingredients possess antimicrobial, anti-inflammatory, antioxidant, and soothing properties, which help in reducing acne, pigmentation, irritation, and signs of aging.
- 3) Unlike synthetic cosmetic products, herbal face packs are generally safer, biodegradable, and suitable for long-term use. Ingredients such as Aloe vera, Curcuma longa, sandalwood, neem, and rose powder provide moisturizing, cooling, and skin-healing effects. Herbal face packs are also economical and can be formulated according to different skin types such as oily, dry, sensitive, and combination skin.
- 4) Due to increasing awareness regarding the harmful effects of synthetic chemicals in cosmetics, the demand for herbal skincare products has increased significantly. Therefore, herbal face packs are considered an effective and natural approach for enhancing skin complexion.



A. Benefits of herbal formulations over synthetic^[2]:

1. Fewer side effects
2. Natural and plant-based origin
3. Better compatibility with skin and body
4. Rich in bioactive constituents
5. Eco-friendly and biodegradable

B. Different types of skin types and their characteristics^[3]:

Different skin types have different levels of sebum (oil) production, hydration, sensitivity, and barrier strength. Because of these differences, each skin type requires specific ingredients that help maintain balance and prevent skin problems. Herbal and natural ingredients are often preferred because they are gentle, nourishing, and rich in bioactive compounds.

➤ *Normal skin type:*

Normal skin is balanced — neither too oily nor too dry. It has adequate moisture, small pores, smooth texture, and minimal sensitivity.

➤ *Oily skin type:*

Oily skin produces excess sebum due to overactive sebaceous glands. This often causes enlarged pores, shine, blackheads, and acne.

➤ *Dry Skin type:*

Dry skin lacks moisture and natural oils. It often feels rough, flaky, tight, and may develop irritation easily.

➤ *Combination skin type:*

Combination skin contains both oily and dry areas. Usually, the T-zone (forehead, nose, chin) is oily, while cheeks remain dry or normal.

➤ *Sensitive skin type:*

Sensitive skin reacts easily to environmental factors, fragrances, chemicals, or harsh skincare products. Redness, itching, and irritation are common.

➤ *Acne – prone skin type:*

Acne-prone skin is more susceptible to pimples, inflammation, clogged pores, and bacterial infection. It may be oily or combination type.

➤ *Steps to apply a face pack^[4]*

Applying a face pack is simple, but doing it the right way helps your skin get the most benefit.

Here are the steps, one should follow while applying a face pack.

- a. **Step I:** Clean your face
- b. **Step II:** Apply the face pack
- c. **Step III:** Let it sit
- d. **Step IV:** Rinse it off
- e. **Step V:** Moisturize

Topical drug delivery^[5]:

In recent years, various methods have been developed to deliver drugs to the body, including oral, sublingual, rectal, parenteral, topical, and inhalation routes for treating diseases. Topical drug delivery involves applying a drug formulation directly to the skin to treat conditions that affect the skin, such as psoriasis. This method targets the skin's surface or layers for therapeutic effects. While semi-solid products like creams and ointments are the most common, other forms such as foams, sprays, medicinal powders, solutions, and medicated toothpastes can also be used.

• *Advantages of topical drug delivery:*

1. Simple and convenient for use.
2. Avoids first-pass metabolism.
3. Acts as an alternative to oral medications.
4. Reduces the risk of gastrointestinal complications.
5. Lower risk of abuse or misuse.

II. MATERIALS AND METHODS

A. Collection of Plant Materials

Red lentil (*Lens culinaris*), turmeric powder (*Curcuma longa*), sandalwood powder (*Santalum album*), aloe vera powder (*Aloe barbadensis*), multani mitti (Fuller's earth), and licorice roots (*Glycyrrhiza glabra*) were procured from a local store in Maharashtra, India. Fresh neem leaves (*Azadirachta indica*) were collected from nearby surroundings. Licorice roots and neem leaves were washed with distilled water and dried at room temperature before further processing.

B. Preparation of Fine Powders

Red lentils were cleaned, washed, dried, pulverized, and sieved to obtain a uniform fine powder.

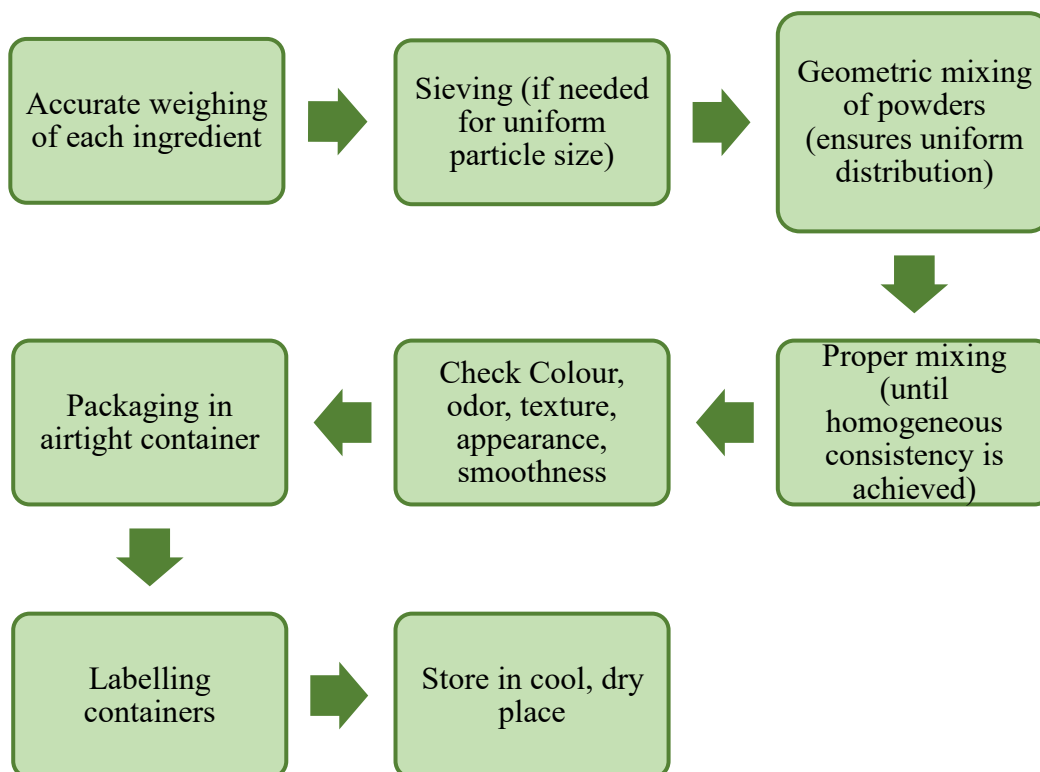
Dried licorice roots were cut into small pieces, ground, and sieved to obtain a fine powder. Dried neem leaves were ground and sieved to obtain a uniform fine powder. All prepared powders were stored in airtight containers until further use.

C. Ingredients and their role

Table 1 – Ingredients and their role

Sr. No	Ingredients	Scientific name	Role
1.	Red lentil	<i>Lens culinaris</i>	Natural exfoliant; removes dead skin cells and improves skin texture.
2.	Turmeric	<i>Curcuma longa</i>	Antimicrobial and anti-inflammatory; helps brighten skin and reduce acne.
3.	Sandalwood	<i>Santalum album</i>	Cooling and soothing agent; reduces irritation and enhances complexion.
4.	Licorice	<i>Glycyrrhiza glabra</i>	Skin-lightening and antioxidant agent; helps reduce pigmentation and blemishes.
5.	Multani mitti	<i>Solum fullonum</i>	Absorbs excess oil, deep cleanses pores, and tightens skin.
6.	Neem	<i>Azadirachta indica</i>	Antibacterial and antifungal agent; helps control acne and skin infections.
7.	Aloe vera	<i>Aloe barbadensis Mill.</i>	Moisturizer and skin healer; provides hydration and soothes inflammation.

Formulation process of face pack ^[6]



III. FORMULA TABLE [7]

Table 2 – Formula table

Sr. No	Ingredients	F1 10 gm	F2 10 gm	F3 10 gm	F4 10 gm	F5 10 gm
1.	Red lentil (gm)	2	2	2	2	2
2.	Turmeric (gm)	1.5	2	0.5	1.5	0.5
3.	Sandalwood (gm)	2	0.5	1.5	1.5	1.5
4.	Licorice (gm)	0.5	1.5	2	0.5	0.5
5.	Multani mitti (gm)	1.5	2	1.5	1.5	2
6.	Neem (gm)	1	1	2	2	1.5
7.	Aloe vera (gm)	1.5	1	0.5	1	2

IV. HERBAL FACE PACK



Fig 1 – Herbal face pack (Batch F5)



V. EVALUATION PARAMETERS [8]

1) Organoleptic Evaluation:

It refers to the evaluation of herbal face pack based on the parameters such as color, odor, texture, appearance and smoothness.

2) Physicochemical Evaluation:

It refers to the evaluation herbal face pack based on pH and loss on drying (LOD).

➤ **pH test:**

1. Preparation of sample solution (1 gm herbal face pack and 100 ml distilled water and then stir)
2. Calibration of pH meter
3. Dip the pH electrode into prepared solution
4. Record the observation when the reading stabilizes

➤ **Loss on drying (LOD):**

- a. Take a clean, dry empty dish and weigh it
- b. Add 2 – 5 gm of herbal face pack and weigh it
- c. Place the dish in hot air oven at 105°C
- d. Dry for 2-3 hours
- e. Weigh again
- f. Repeat heating and weighing until constant weight is obtained

➤ **Loss on drying (%) = $\frac{W_2 - W_3}{W_2 - W_1} \times 100$**

W₁ = weight of empty dish

W₂ = weight of empty and sample before drying

W₃ = weight of dish and sample after drying

3) Rheological Evaluation:

It refers to the evaluation of herbal face pack based on angle of repose, bulk density, tapped density, hausner's ratio, and carr's index.

➤ **Angle of repose:**

The angle of repose is the maximum angle formed between the surface of a pile of powder and the horizontal plane when the powder is allowed to flow freely. It is used to evaluate the flow property of the powder blend. The formula is: **$\tan \theta = h/r$**

Where,

θ = angle of repose,

h = height of powder

r = radius of the heap

➤ **Bulk density:**

Bulk density of a herbal face pack is the ratio of the mass of the powdered formulation to its bulk volume, including the spaces between particles. It indicates how densely the powder particles are packed.

The formula is:

Bulk density = M / V_b

Where,

M = mass of the powder

V_b = bulk volume of the powder

➤ **Tapped density:**

Tapped density of a herbal face pack is the ratio of the mass of the powdered formulation to the volume occupied after mechanically tapping the container until no further volume change occurs. It reflects how the powder settles and packs under vibration or tapping.

The formula is:

Tapped density = M / V_t

Where,

M = mass of the powder

V_t = tapped volume of the powder

➤ **Hausner's ratio:**

Hausner's ratio for a herbal face pack is a measure of the flowability of the powdered formulation. It is determined from the relationship between tapped density and bulk density. It is calculated as:

Hausner's ratio = $\frac{\text{tapped density}}{\text{bulk density}}$

➤ **Carr's index:**

Carr's Index for a herbal face pack is a measure of the compressibility and flow properties of the powdered formulation. It is calculated using bulk density and tapped density.

It is calculated as:

Carr's index = $\frac{\text{tapped density} - \text{bulk density}}{\text{tapped density}} \times 100$

➤ *Irritancy test :*

It refers to the evaluation of herbal face pack based on swelling of skin after face pack application, redness and irritation of skin after application of face pack.

VI. RESULT AND DISCUSSION

Table 3 – Evaluation of herbal face pack

Sr.no.	Parameters	Batch F1	Batch F2	Batch F3	Batch F4	Batch F5
1	Nature	Powder	Powder	Powder	Powder	Powder
2	Color	Light yellow	Light yellow	Green	Green	Light greenish brown
3	Odor	No fragrance	No fragrance	Mild	Mild	Mild
4	Texture	Coarse	Coarse	Fine	Fine	Fine
5	pH	5.2	5.3	5.7	5.8	6.1
6	LOD	6%	6.2%	6.2%	6.5%	7%
7	Angle of Repose	45.72	37.94	32.67	35.88	32.22
8	Bulk density	0.3 g/cm ³	0.4 g/cm ³	0.4 g/cm ³	0.42 g/cm ³	0.48 g/cm ³
9	Tapped density	0.4 g/cm ³	0.5 g/cm ³	0.5 g/cm ³	0.55 g/cm ³	0.58 g/cm ³
10	Hausner's ratio	1.333	1.25	1.25	1.309	1.208
11	Carr's index	25	20	20	23.63	17.24
12	Redness	No redness	No redness	No redness	No redness	No redness
13	Irritation	No irritation	No irritation	No irritation	No irritation	No irritation

VII. CONCLUSION

The prepared herbal face pack was obtained as a fine powder with a light greenish-brown color and characteristic herbal odor. The pH of 6.1 indicates compatibility with normal skin pH. The angle of repose (32.22°), Hausner's ratio (1.208), and Carr's index (17.24%) suggest good flow properties of the powder blend. The bulk density and tapped density were found to be 0.48 g/mL and 0.58 g/mL, respectively, indicating satisfactory packing characteristics. The loss on drying was 7%, showing acceptable moisture content. No redness, swelling, or irritation was observed during the irritancy test, confirming that the formulation is safe for topical application. Overall, the formulated herbal face pack

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