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## Formulation And Evaluation Of Herbal Face Pack

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### Abstract :

Herbal cosmetics are gaining popularity because more people want safe and natural skincare products. This study focuses on making and testing a herbal face pack using plant-based ingredients that have been known for their healing properties for a long time. Natural remedies are becoming more popular because many people believe they are safer and have fewer side effects compared to synthetic options. There is an increasing demand for herbal products in the global market. Herbal face packs or masks help boost blood circulation, refresh the skin's muscles, maintain skin elasticity, and clean out dirt from pores. This project aims to create and test a cosmetic herbal face pack suitable for all skin types using natural ingredients in different amounts. The three formulations will include various local ingredients like sandalwood powder, orange peel powder, green tea, raktachandan, aloe powder, haridra, methi powder, and multani mitti. We prepared and tested face packs based on different factors such as color, look, thickness, how easily they wash off, pH level, bulk density, tapped density, total ash content, acid-insoluble ash, particle size, and their ability to fight germs. The herbal anti-acne formula includes a hydro-alcoholic extract made from neem leaves (*Azadirachta indica*) and nutmeg fruits (*Myristica fragrans*).

**Keywords :** Cosmetic, Herbal formulation, Evaluation, Skincare, Face pack, Skin, Ingredients, Natural remedy.

### INTRODUCTION :

Since ancient times, people have known about using plants for healthy, glowing, and beautiful skin. Cosmetics are products that help clean, beautify, and enhance one's appearance. These commercially available items improve skin's look through cleansing and beautifying actions. The idea of beauty has existed as long as people have. Everyone wants to look attractive and stylish. Having beautiful skin plays a big role in that beauty and glamour. Throughout history, People have used herbs to enhance their appearance, and these uses are mentioned in ancient Ayurvedic texts. Herbal extracts help with different skin problems, hair issues, body odor, and overall beauty improvements. They can lighten the skin, reduce scars and dark spots, eliminate dark circles, and promote healthy glowing skin [1]. Everyone desires to have clear and beautiful skin. Nowadays, many young people struggle with acne, blackheads, pimples, and dark circles. Ayurveda suggests that skin issues often happen because of impurities in the blood. Toxins build up in the blood from poor diet and lifestyle choices, leading to skin problems. Ayurveda offers various herbs and remedies for cleansing the blood [2]. The skin on our face is an important part of our body that shows how healthy we are. In the past, women paid a lot of attention to their beauty and took good care of their different skin types. Even now, many people in rural and mountainous areas prefer natural remedies, like plant extracts, for their beauty products. Herbal

cosmetics are made to clean and enhance the skin. One big benefit of using herbal cosmetics is that they are natural and don't cause any harmful effects on our bodies [3].

The condition of a person's skin, especially on their face, shows how healthy they are. The skin is made up of important substances like amino acids, fats, and sugars. To keep the skin looking healthy and shiny, it's important to eat a balanced diet [4]. Different skin types need different types of herbal face packs. Making your own natural face packs and masks can help you achieve smooth, healthy, and silky skin. In Ayurveda, the herbal paste used on the face is called "Mukhalepa," which helps treat acne, pimples, wounds, stains, and pigmentation. The act of applying this herbal mixture to the face is known as "Mukhalepana." Today, we commonly refer to this treatment as a facial [5]. Herbal face packs serve various purposes such as deep cleansing, tightening the skin, boosting circulation, reducing tanning, and providing hydration and nourishment. They help improve blood flow and refresh the skin's muscles. These packs also keep the skin elastic and remove dirt. While herbal face packs enhance blood circulation in the skin, their effects are usually temporary. To maintain a glowing complexion or for regular skincare, you should use them 2 to 3 times a week [6].



Figure 1: Herbal Face Pack

## Benefits Of Face Packs:

- Herbal face packs moisturize and hydrate the skin while providing important antibacterial benefits.
- These face packs help remove dead skin cells and create a soothing and relaxing effect.
- Depending on their herbal ingredients, they can help lessen acne, pimples, scars, and blemishes.
- Typically, Neem and Tulsi face masks are effective in reducing acne and pimples.
- Facial masks designed for acne, pimples, and blackheads usually control the excess production of oil from the sebaceous glands and get rid of harmful bacteria in the skin.
- You can reduce scars and marks by mixing fine powders of sandalwood, rose petals, and orange peel with your acne face pack.[7]

## CLASSIFICATION OF FACE PACK :

### 1. Based On Type:

- Paste
- Powder
- Gel
- Hydrocolloid
- Peel off

### 2. Based On Application:

- Cleaning
- Nourishing
- Anti-acne
- Anti-aging

## MATERIALS AND METHODS :

The ingredients for making the poly herbal face pack were obtained from a local market. To create the face pack, we cleaned, dried, and ground the necessary materials. Below are the details of the materials used.

### 1. Fuller's Earth (Calcium Bentonite):

Commonly referred to as multani mitti, this substance includes bentonite, magnesium, sodium, and calcium, all of which can soak up moisture and provide many benefits for your skin. It helps make your skin look better in several ways by getting rid of blackheads and whiteheads, fading freckles, shrinking pore size, reducing acne and blemishes, and giving your skin a nice glow. Fuller's earth powder is also great for calming sunburns, cleaning the skin, and boosting blood circulation. Plus, it works as an anti-inflammatory agent.[8,9,10]

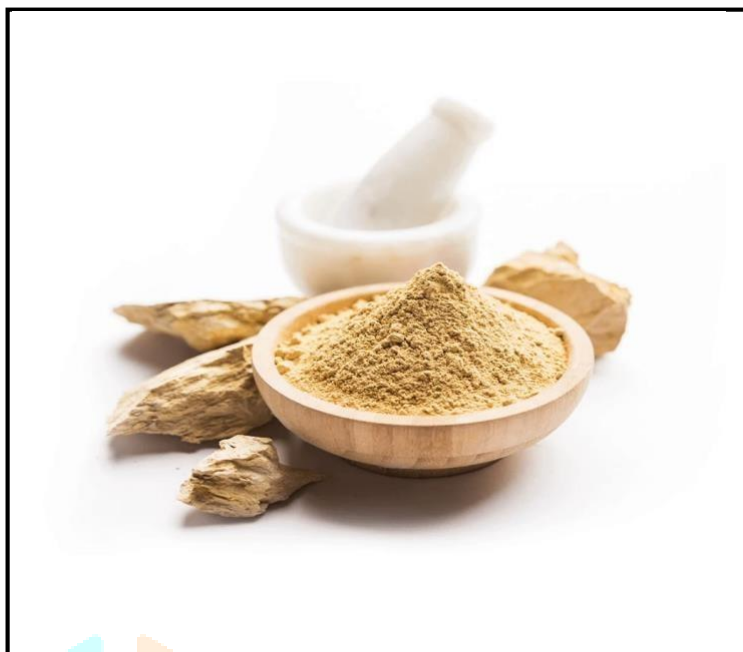


Figure 2. Multani Mitti

## 2.Sandalwood (Santalum Alba):

Sandalwood oil and powder mainly have two important compounds:  $\alpha$ -santalol and  $\beta$ -santalol. They are packed with antioxidants and have antimicrobial properties, which help keep skin cells healthy. This oil also helps reduce dryness by adding moisture back into the skin and improving its elasticity. Because it is rich in antioxidants, sandalwood can help prevent wrinkles by fighting off free radicals. Additionally, it protects the skin from environmental harm, keeping it healthy and cool.[11,12,9]



Figure 3: Sandalwood Powder

### 3. Orange Peel Powder (Citrus Aurantium Dulcis):

It comes from orange peel extract, which is then dried and turned into a powder. This powder is packed with vitamin C and other antioxidants. Vitamin C helps protect the skin from damage caused by free radicals and reduces stress from harmful UV rays. It also gives an instant glow, lightens the skin, prevents acne, blemishes, wrinkles, and helps reduce signs of aging and sun tan. Additionally, orange peel powder contains calcium, potassium, and magnesium. It also has pectin, cellulose, and hemicelluloses that help strengthen skin cells and keep the skin hydrated [8,9]. Other advantages of orange peel extract are that it helps clear out pores, gets rid of blackheads, and treats acne. It has citric acid, which works as an exfoliant [10,12].



Figure 4. Orange Peel Powder

### 4. Rose Petals Powder and Rose Oil (Rosa Indica):

Vitamin C found in rose helps to lighten and brighten the skin tone, reduce scars, shrink pores, and lessen dark spots. Rose petal powder has antibacterial qualities as well. It also gives off a nice smell and looks good when applied, making it a popular choice in cosmetic products [11,14,15]. Rose petal powder is packed with antibacterial benefits and contains helpful vitamins like K, C, and B. Additionally, it has a high level of antioxidants [16].



Figure 5. Rose Petal Powder

#### 5. Neem Leaves (*Azadirachta indica*):

The main parts of neem leaves are protein, carbohydrates, triterpenoids, flavonoids, alkaloids, minerals, calcium, phosphorus, vitamin C, and carotene. Neem also has properties that fight bacteria, reduce inflammation, and combat fungi [17]. Neem leaf powder helps lessen skin issues like eczema and psoriasis. It also aids in healing boils, prickly acne marks, scars, and other skin conditions [8,9].



Figure 6. Neem Powder

#### 6. Hibiscus leaves powder (*Hibiscus rosa-sinensis*):

The active ingredients found in hibiscus include anthocyanins and polyphenols, such as protocatechuic acid and quercetin. The phenolic compounds in hibiscus flowers help shield the skin from the damaging effects of free radicals. They also assist in lowering oxidative stress caused by UV rays and other factors like pollution, stress, and an unhealthy lifestyle. Additionally, hibiscus is a natural source of alpha hydroxy acids (AHAs)[18]. This helps to remove dead skin cells and lessen dark spots while also making your skin feel smoother. The antioxidants in hibiscus powder can also help calm down inflammation on the skin caused by acne or other issues [10].



Figure 7. Hibiscus Powder

#### Procedure Of Face Pack Formulation:

- **Weighing:** All the necessary herbal powders for making the face pack were carefully weighed one by one using a digital scale. You can find the amounts and mixtures in Table No. 1.
- **Mixing:** The mixer blended all these great ingredients well to create a smooth, fine powder.
- **Sieving:** Next, we poured the fine powder through a sieve to collect enough of it.
- **Collection and Storage:** The powder mixture was gathered and kept in a proper plastic container for evaluating the parameters.

**Formulation Table:**

Sr. No.	Common Name	Scientific Name	Quantity (for 100 gm)
1.	Orange Peel	Citrus Aurantium	35
2.	Sandalwood	Santalum Alba	20
3.	Hibiscus petals	Hibiscus Rosa-sinensis	20
4.	Rose Petals	Rosa Indica	15
5.	Multani Mitti	Calcium Bentonite	05
6.	Neem leaves	Azadirachta Indica	05

Table 1: Formulation Table Of Herbal Face Pack

**How To Apply Face Pack:**

- Take the face pack powder you prepared and put it in a bowl, based on how much you need.
- Mix in water or rose water until it's smooth, then spread it on your face. • Make sure to cover any acne and blemish spots.
- Leave it on your skin until it dries completely, which will take about 30 to 40 minutes.
- After that, rinse your face with cold water.[19]

**EVALUATION:**

The prepared face pack was tested using the following criteria to make sure it stands out:

**Organoleptic Evaluation:** The face pack was tested for different sensory qualities like color, smell, look, feel, and thickness. We checked the color and smell by looking at them and touched the pack to assess its texture.

**Rheological Evaluation :**

It included assessing the properties of the powder. The sample was tested based on different physical factors such as the angle of repose, bulk density, tapped density, and Hausner's ratio [8,11].

A. Angle of Repose: The needed sample was allowed to fall from the funnel positioned 6 cm high. We measured the height and radius of the pile for later calculations. You can find the angle of repose ( $\theta$ ) using this formula:

$$\text{Angle of repose } (\theta) = \tan (h/r)$$

Where,  $\theta$ – Angle of repose

h – Height of the heap

r – Radius of the base

B. Bulk Density: Find it by dividing the mass of the powder by its bulk volume. To measure this, you take 25 grams of a carefully weighed powder sample and put it into a graduated cylinder.

$$\text{Bulk Density} = \text{Volume/Mass}$$

C. Tapped Density: To measure it, we start by putting a known amount of powder (10 grams) into a graduated cylinder. First, we note the starting volume of the sample in the measuring cylinder. Then, we put the cylinder on a tapped density measuring device and keep tapping it for about 10 to 15 minutes. The tapped density is calculated by dividing the mass of the powder by the tapped volume, using a specific formula.

D. Housner's ratio: The flowability of powders can be measured using Hausner's ratio. This ratio compares the tapped density to the bulk density of the powder.

$$\text{Housner's Ratio} = \text{Tapped density/ Bulk density.}$$

E. Percent Compressibility: Carr's index, which is also called the compressibility index, measures how well a powder flows. It connects to how cohesive the particles are and their size. You can find the percentage compressibility index using the following equation:

$$\% \text{ compatibility} = \text{Tapped density- bulkdensity/Tapped density} \times 100$$

F. Particle size: We determined the particle size using a microscopic method following standard procedures. Analyzing particle size is important because it directly influences several properties of the powder, such as how easily it spreads and its grittiness.

### Physicochemical Evaluation:

Physicochemical evaluation included parameters like moisture Content, pH and ash values.

A. pH: The pH of the mixture was measured using a digital pH meter. First, the pH meter was calibrated with different buffer solutions. Then, a 10% (w/v) dispersion of the mixture was made in distilled water, and the pH was checked directly without any extra dilutions [11].

B. Moisture content: Moisture content and loss on drying (LOD) are key factors for plant-based products. If these agents aren't dried enough, it can cause the active ingredients to break down due to enzymes. To find out the moisture content of the product, we used the LOD method. First, we carefully weighed 3 grams of the sample and placed it in a petri dish that had been weighed beforehand (W1). Then, we recorded the weight of the petri dish with the sample (W2). Next, we put the petri dish in a hot air oven set at 100-108° C until the sample reached a constant weight [8].

C. Ash value: Ash value refers to the leftover materials after fully burning a powdered sample. It helps identify the quality or purity of a drug. A high ash value usually indicates that the product may be mixed with unwanted substances, contaminated, or changed during its making. You can find out the ash values in these ways:[8,11,20]

i). Total Ash value: Total ash value helps in finding low-quality or used-up products and is also key for spotting too much sandy or earthy material in drugs. To measure this, about 2-4 grams of the powdered sample is placed in a crucible that has already been heated and weighed. The sample is

spread evenly in the crucible and heated gradually until it turns into a white powder, which means it is free of carbon. After cooling the sample in a desiccator, its weight is recorded. The percentage of total ash is then calculated based on the weight of the air-dried sample.

ii). Acid insoluble Ash value: This process helps to find out the amount of earthy matter. Start by adding 25 ml of hydrochloric acid to a crucible that has total ash in it, then cover it with a watch glass. Gently boil the mixture for 5 minutes. Next, rinse the watch glass with 5 ml of hot water and add this water into the crucible. Collect the insoluble matter on a filter paper that doesn't contain ash and wash it with hot water until it is neutral. Then, place the filter paper with the insoluble matter back into the original crucible. Dry it on a hot plate and ignite it until you reach a constant weight. After that, cool it in a desiccator for 30 minutes before weighing the sample. Finally, calculate the percentage of acid-insoluble ash based on the airdried sample. iii). Water soluble ash value: The difference in weight between the total ash and the leftover material after treating the total ash with water is what we measure. This helps us find out if the material can be fully dissolved in water. First, we added 25 ml of water to the crucible with the total ash and boiled it for 5 minutes. Then, we collected the undissolved part on an ash-less filter paper. After that, we washed it with hot water and heated it for 15 minutes at a temperature no higher than 450° C. Finally, we let the sample cool down, weighed it, and calculated the percentage of water-soluble ash based on the air-dried sample.

#### **IRRITANCY TEST:**

The face pack was put on a 1 square cm area that had been marked on the left side of the back of the hand, and the time was noted. The skin was then checked for any irritation, redness, or swelling at regular intervals for up to 24 hours [11].

#### **WASHABILITY:**

We tested the formulation to see how well it washes off. We put the face pack on the skin and then checked how easily and thoroughly it could be washed away with regular tap water [11].

#### **RESULT:**

Following are the results of all evaluation parameters performed to ensure supremacy of prepared face pack. Organoleptic evaluation: In this study, we assessed the herbal face pack based on different sensory qualities, and the results are presented in Table 2.

Sr. No.	Evaluation Parameters	Observation
1.	Apperance	Fine powder (free flowing)
2.	Color	Pale yellow
3.	Odor	Pleasant
4.	Texture	Fine
5.	Smoothness	Smooth

Table 2. Organoleptic Evaluation

**Rheological Evaluation:**

Table 3 shows the rheological findings. These results explain the flow properties of the face pack, which was discovered to be a free-flowing and non-sticky powder.

Sr. No.	Rheological Parameters	Observations	Inference
1.	Bulk density	0.43 g/ml	Good flowability
2.	Tapped density	0.39 g/ml	Good flowability
3.	Angle of repose	32°	Angle of repose between 31-35° is considered as good
4.	Housner's ratio	1.10	Housner's ratio between 1-1.11 is considered as good
5.	Compressibility index	12%	% Carr's index between 11-15 is considered as good

Table 3. Rheological Evaluation

**Physicochemical Parameters:**

The results of the formulation are displayed in table 4. The moisture content of the face pack was measured at 6.3, which is close to the skin's pH level. Therefore, this formulation is safe for use on the skin.

Sr. No.	Physicochemical parameters	Observation
1.	pH	6
2.	Moisture content	11.53%
3.	Ash value	
	- Acid insoluble ash	0.815%
	- Water soluble ash	1.98%
	- Total ash	2.795%

Table 4. Physicochemical Parameters

**Irritancy Test:**

The formulation showed no signs of rashes, redness, irritation, or swelling during the irritancy test.

Sr. No	Parameters	Observation	
1.	Irritancy	No sign of irritation was observed	No sign of erythema, edema and irritation was observed
2.	Erythema	No sign of redness and irritation	-
3.	Edema	No sign of swelling or puffiness observed	-

Table 5. Irritancy Test

**Washability:**

The face pack can be easily washed off from skin with normal water.

Sr. No.	Parameters	Observation
1.	Washability	Easily washable

Table 6. Washability

**CHALLENGES AND FUTURE PROSPECTS IN HERBAL FACE PACK FORMULATION:**

Even though herbal face packs have many advantages, they struggle with issues like keeping their formula stable, preventing germs from contaminating them, and ensuring that the active ingredients are consistent [21]. Herbal products can vary from one batch to another because of differences in the plants used, how they are extracted, and the environment where they grow. To keep herbal cosmetic products consistent, it's important to have strong quality control, get regulatory approvals, and conduct clinical tests [22].

Future studies in herbal skincare aim to include green chemistry ideas, eco-friendly packaging, and create natural preservatives to extend the shelf life of herbal face packs. Moreover, using nanotechnology and microencapsulation methods can boost how well herbal ingredients work and how deeply they can reach the skin [23].

**DISCUSSION:**

The results from different tests showed that the face pack we made had a smooth and fine texture, a light yellow color, and a nice scent. The flow tests also showed that the powders moved easily. The irritancy Page 29 of 35 test revealed no redness, rashes, or swelling. The pH level of the formula was 6, which is close to the skin's natural pH, suggesting that the face pack is safe to use on skin. It can be washed off easily without leaving any stains.

**CONCLUSION:**

The face pack was made to nourish the skin and improve its overall look and feel. It consists of a mix of natural plant and herb powders. The natural ingredients in the formula do not change the skin's normal functions, yet they are still effective. These natural agents also cause fewer side effects compared to synthetic face packs that contain harmful chemicals. Additionally, this face pack can be used as a scrub to get rid of dead skin cells. Based on all the evaluation results, we can say that this homemade face pack is safe for use on the skin.

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