

# FORMULATION AND EVALUATION OF MAERUA OBLONGIFOLIA POLYHERBAL FACEPACK WITH 10% GLYCERINE SOLUTION FOR SKIN WELLNESS

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## **1. ABSTRACT:**

Herbal polyherbal face packs are becoming more and more popular as safe, all-natural substitutes for washing, acne treatment, and skin lightening. The goal of the current study was to prepare and assess a polyherbal face pack made from Mearua oblongifolia leaf utilising a 10% glycerine solution as the solvent for paste preparation before application. Mearua oblongifolia powder, Multani mitti, sandalwood powder, turmeric powder, rice flour, and rose powder were combined geometrically to create a homogenous powder. Ten millilitres of glycerine were combined with ninety millilitres of water to create a 10% (w/v) glycerine solution. The organoleptic qualities, pH, spreadability, washability, and stability under accelerated circumstances of the powder and reconstituted paste were assessed. The formulation had an appropriate colour, a herbal scent, a smooth, non-gritty texture, a pH that was skin-compatible, good spreadability, and ease of washing. The mearua oblongifolia-based polyherbal face pack is a stable, safe, and cosmetically acceptable herbal treatment when reconstituted with 10% glycerine solution for skin wellness, according to stability experiments that revealed no significant alterations.

**Keywords:** Polyherbal face pack, Herbal cosmetics, Skin glow enhancement, Moisturizing agent, Skin barrier repair, Ayurvedic formulation.

## **2. INTRODUCTION:**

The sustainable and biocompatible skincare has led to a significant renaissance in the field of “Green Cosmeceuticals” where the focus is shifting from synthetic chemical formulations to the therapeutic potential of botanical extracts. In recent years, consumer preferences have moved away from synthetic additives such as parabens, phthalates, and sulphates, which are frequently associated with dermatological concerns like contact dermatitis, endocrine disruption, and chronic skin sensitivity. This shift has placed polyherbal face packs at the forefront of natural skincare research. These formulations utilize the principle of synergism a biochemical phenomenon where the combined effect of multiple botanical agents is greater than the sum of their individual activities. By integrating various plant-based powders, these face packs provide a multi-targeted approach to skin health, functioning through the physical adsorption of impurities and the topical delivery of bioactive secondary metabolites such as flavonoids, alkaloids, and polyphenols.

Among these botanical candidates, Maerua oblongifolia (Capparaceae), traditionally recognized as Ramkandamool, serves as the lead active ingredient in this formulation. Historically used in ethnomedicine for its cooling and tonic properties, contemporary phytochemical screenings of its foliage reveal a high concentration

of alkaloids and glycosides that exhibit potent antimicrobial, antioxidant, and anti-inflammatory activities. These properties make *M. Oblongifolia* an exceptional candidate for treating localized skin pathologies, including acne vulgaris and hyperpigmentation, by neutralizing free radicals and inhibiting the growth of cutaneous pathogens. To enhance the functionality of this lead plant, a meticulously designed matrix of traditional ingredients is employed, beginning with Multani mitti (Fuller's Earth). As a montmorillonite-rich clay, Multani mitti possesses a high cation exchange capacity, allowing it to act as a powerful adsorbent that draws out deep-seated toxins and excess sebum from the pilosebaceous unit, thereby refining the skin's texture.

The therapeutic core of the pack is further reinforced by Sandalwood powder (*Santalum album*) and Turmeric powder (*Curcuma longa*). Sandalwood, containing the sesquiterpene alcohols alpha-santalol and beta-santalol, provides essential antiseptic and cicatrizant benefits, which aid in soothing inflammation and promoting the healing of minor skin lesions. Simultaneously, the curcuminoids in Turmeric act as natural inhibitors of the tyrosinase enzyme, which is the rate-limiting step in melanin synthesis. This action effectively reduces post-inflammatory hyperpigmentation and brightens the overall complexion. To manage the physical exfoliation of the skin, Rice flour is incorporated; it is rich in ferulic acid and allantoin, providing mild photoprotective properties while its granular structure facilitates the mechanical removal of dead keratinocytes, promoting cellular turnover and a smoother skin surface.

To balance these cleansing and exfoliative agents, Rose petal powder (*Rosa damascene*) is included for its mild astringent and hydrating properties. Rich in natural vitamins and essential oils, rose powder helps restore the skin's acid mantle and maintains the natural pH balance, preventing the potential dryness that can occur with clay-based masks. A critical innovation in this formulation is the use of a 10% glycerine solution for reconstitution. Glycerine, a potent humectant, prevents the rapid desiccation of the herbal paste on the skin's surface. By maintaining a moist environment, it facilitates the deeper penetration of the bioactive constituents into the epidermal layers and ensures uniform spreadability during application. Consequently, this study focuses on the systematic design, development, and multi-parametric evaluation of this *Maerua oblongifolia* based polyherbal face pack to establish a scientifically validated, safe, and standardized herbal cosmetic for modern skin wellness.

The convergence of these distinct botanical profiles into a single, standardized matrix represents a shift from anecdotal traditional use to evidence-based cosmeceutical science. By establishing a rigorous evaluation framework—incorporating physicochemical parameters, microbial limits, and irritancy testing—this study aims to validate the *Maerua oblongifolia* polyherbal face pack as more than a rudimentary home remedy. It stands as a sophisticated delivery system for bio-active metabolites, engineered to harmonize with the skin's natural physiology. Ultimately, this research seeks to provide a benchmark for the development of green skincare, ensuring that the transition toward sustainability is supported by clinical safety and measurable dermatological efficacy, thereby bridging the gap between ethnomedicinal heritage and modern pharmaceutical standards.

### **3. MATERIAL AND METHOD:**

**1. The following ingredients were used for the preparation of the polyherbal face pack:**

**Table No: 3.1 formula of face pack**

Sr. No	Ingredients	Quantity (for 100 gm)	Role of ingredient
01	Maerua Oblongifolia	25 gm	Anti Inflammatory
02	Sandalwood powder	20 gm	Cooling
03	Multani Mitti	20 gm	Oil Absorption
04	Turmeric powder	10 gm	Skin brightening agent
05	Rice flour	15 gm	Exfoliant
06	Rose powder	10 gm	Astringent

**2. The following ingredients were used for the 10% glycerine solution:**

**Table No: 3.2 formula of 10% glycerine solution**

Sr. No	Ingredients	Quantity (for 10%)	Role of ingredient
01.	Glycerine	10 mL	Humectant
02.	Water	90 mL	Solvent

#### **Preparation of the polyherbal face-pack powder**

1. The maerua oblongifolia foliage was collected, shade-dried, pulverized, and passed through a 100–120 mesh sieve to obtain a fine powder.
2. Individual herbal powders (sandalwood, Multani mitti, turmeric, rice flour, and rose petal powder) were similarly sieved to ensure uniform particle size. The powders were then blended within geometrically in a clean mortar using the dry blending method to obtain a uniform, free-flowing polyherbal face-pack powder.
3. The homogeneous blend was stored in an airtight container, protected from light and moisture.

#### **Preparation of 10% glycerine solution and application**

1. A 10% glycerine solution was prepared by dissolving 10 mL of glycerine in 90 mL of distilled water. For each use, 10 g of the formulated polyherbal powder was mixed with 10% glycerine solution to obtain a pastel form.
2. Which was prepared by gently stirred to form a smooth, spreadable paste.
3. The paste was applied immediately or used within a short time to avoid drying before applications.

## 4.RESULTS AND DISCUSSION:

The *Maerua oblongifolia* foliage-based polyherbal face-pack powder was evaluated for organoleptic, physicochemical, powder flow, glycerine-solution, and skin-irritancy properties. The results are presented below and discussed in the context of herbal cosmetic standards.

### 1. Organoleptic Evaluation:



**Fig No:4.1 Organoleptic Tests**

The formulated face-pack powder showed a brownish-cream color, pleasant odour, and fine, smooth texture with no visible coarse or gritty particles. These organoleptic characteristics are desirable for cosmetic face packs, as they indicate a well-prepared, homogeneous blend suitable for facial application and are comparable to those reported for other herbal face-pack formulations.

### 2. Physicochemical Evaluation:

#### I.pH:

The pH of the polyherbal face-pack powder reconstituted in distilled water was found to be approximately 6.5, which lies within the skin-compatible range (near neutral, pH 5.5–6.5).



**Fig No: 4.2 pH Test**

This suggests that the formulation is unlikely to cause irritation or alteration of the skin's natural acids.

## II.Solubility:

The formulated face pack was insoluble in water and alcohol, consistent with the nature of clay- and starch-rich herbal cosmetic powders.



**Fig No:4.3 Solubility Test**

This insolubility is advantageous for a face-pack system, as it allows the formulation to remain as a paste on the skin surface for a sufficient duration before washing.

## III.Residue after evaporation:

Residue after evaporation was calculated as 92% (initial sample mass = 25 mg; residue mass = 23 mg), indicating that only a small fraction of the formulation is volatile or water-soluble material. This suggests good solid-content retention and stability of the herbal constituents.

## IV.Loss on drying:

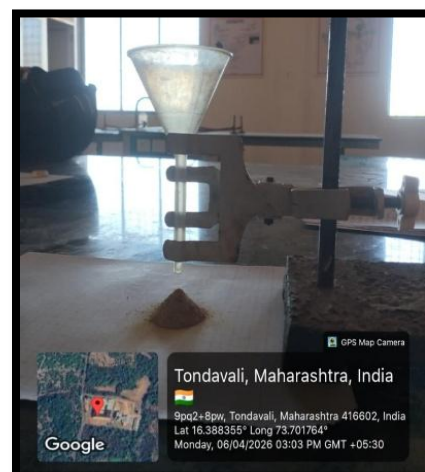
Loss on drying was found to be 8%, reflecting the moisture content of the powder. This value is within acceptable limits for herbal cosmetic powders and indicates that the product is sufficiently dry to resist microbial growth and caking during storage.

### 3. Powder flow properties:

- Bulk density: 0.33 g/mL
- Tap density: 0.40 g/mL
- Carr's index: 17.5%
- Hausner's ratio: 1.21
- Angle of repose: 28.8°



**Fig No: 4.4 Bulk Density.**



**Fig No: 4.5 Angle of Repose**

The values of Carr's index (17.5%) and Hausner's ratio (1.21) indicate that the powder has good flow characteristics, as Carr's index below 20% is generally considered indicative of free-flowing powder. The angle of repose (28.8°) further supports acceptable flow ability, since angles below 30° are typically associated with good powder flow. These flow properties are favourable for batch processing and ensure uniform dosing of the face-pack powder.

#### 4. Evaluation of 10% glycerine solution:

The 10% glycerine solution used for reconstituting the powder was evaluated for density, viscosity, and pH.

- Density: 1.01 g/cm<sup>3</sup>
- Viscosity: 1.09 cP (using water as reference,  $\eta_2 = 1$  cP,  $t_1 = 65$  s,  $t_2 = 60$  s)
- pH: 6.5

The density (1.01 g/cm<sup>3</sup>) and viscosity (1.09 cP) are close to those of water, indicating that the 10% glycerine solution behaves as a relatively low-viscosity, easily spreadable vehicle. The pH of the 10% glycerine solution was also approximately 6.5, confirming that the solvent itself does not disturb the overall skin-compatibility of the face-pack system. Glycerine further improves moisturizing and spreading properties of the paste, enhancing user comfort and cosmetic elegance.

## 5. Skin irritancy test:

On human skin application, the *Maeua oblongifolia*-based polyherbal face-pack paste did not produce any visible signs of irritation, erythema, or itching within the observation period.



**Fig No: 4.7 Skin Irritancy Test**

The formulation was judged as non-irritant under the test conditions. This is an important finding for a cosmetic formulation, as low irritancy supports its safety for regular use on facial skin.

## **5. ADVANTAGES AND DISADVANTAGES OF FACE PACK:**

- **Advantages:**

- 1 Multi-mechanism efficacy: targets pigmentation (turmeric), pores (rose), oil control (multani mitti), irritation (sandalwood), acne (Maerua antimicrobial), and exfoliation (rice flour).
- 2 Natural and free of preservatives: powders composed solely of herbs ensure a 24-month shelf life without artificial additives.
- 3 Customisable activation: 10% glycerine provides the best humectancy/spreadability, and the user controls the paste's consistency.
- 4 Skin pH compatibility: The final pH of 5.5–6.5 is compatible with the skin's barrier (no irritation).
- 5 Cost-effective: ₹150/100g box with glycerine solution.
- 6 Customer preference: nice herbal aroma, smooth buttery texture.

- **Disadvantages:**

1. Risk of colour staining: Turmeric may momentarily turn light skin yellow (fades in two to four hours).
2. Consumer mixing with glycerine solution is necessary for activation.
3. Allergy risk: 0.5% of people are sensitive to rose pollen.
4. Short application time: 15 to 20 minutes is ideal because it dries more quickly than gels.
5. Concern for conservation: overharvesting of wild Ramakandamoola.

## **6. CONCLUSION:**

A Positive organoleptic, physicochemical, and flow characteristics were demonstrated by the maerua oblongifolia-based polyherbal face pack, which was made with Multani mitti, sandalwood powder, turmeric powder, rice flour, and rose petal powder and reconstituted with 10% glycerine solution. According to Carr's index (17.5%), Hausner's ratio (1.21), and angle of repose (28.8°), the formulation demonstrated a brownish-cream, fine, smooth powder with a nice fragrance, a pH of roughly 6.5, and high flowability. The low viscosity and appropriate density of the 10% glycerine solution allowed for pleasant application and easy spreading.

The fact that there was no skin irritation during the test suggests that the face pack is non-irritating. The 10% glycerine solution supports standardised preparation for scale health, and the overall findings indicate that the Meru oblongifolia-based polyherbal face pack is a stable, safe, and aesthetically attractive herbal formulation appropriate for frequent use in facial skincare..

## **7. FUTURE PROSPECTS:**

Future studies that go beyond the optimisation of the current formulation. In order to ensure consistent therapeutic efficacy across batches, immediate research should concentrate on Phase II clinical trials with 100 participants to quantitatively validate sebum reduction, acne lesion counts, and pigmentation improvement against commercial benchmarks. Additionally, key actives like cepharanthine and quercetin should be standardised using HPTLC.

In addition to sustained-release matrices using HPMC for extended 4-hour sebum control and complementary serum variants incorporating hydroalcoholic extracts with glycerine spheres for daily maintenance regimens, advanced formulation development could investigate nanoencapsulation of Ramakandamoola flavonoids within liposomes or chitosan nanoparticles to improve transdermal penetration by five times.

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