

Formulation & Evaluation of Moisture Lock Herbal Face Pack based on Kasturi Haldi with Pumpkin Seeds Oil

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Abstract—Herbal cosmetics have emerged as a preferred alternative to synthetic skincare products due to their reduced side effects, natural origin, and holistic therapeutic benefits. Among the diverse range of botanicals used in traditional medicine and cosmetology, Kasturi Haldi (*Curcuma aromatica*) holds a prominent place owing to its strong antioxidant, anti-inflammatory, antimicrobial, and complexion-enhancing properties. Its bioactive constituents such as curcuminoids, essential oils, and phenolic compounds contribute to its effectiveness in reducing skin blemishes, controlling acne, soothing inflammation, and improving overall skin texture. Pumpkin seed oil, extracted from *Cucurbita pepo*, is another highly valued natural ingredient frequently incorporated into cosmetic preparations. It is rich in essential fatty acids (omega-3 and omega-6), vitamins A, E, and K, as well as phytosterols and antioxidants. These components support skin hydration, barrier protection, collagen stimulation, and cell regeneration. When combined, Kasturi Haldi and pumpkin seed oil offer a promising synergistic effect, enhancing the efficacy of herbal skincare formulations. This review article provides a comprehensive analysis of the formulation strategies and evaluation techniques used in developing a herbal face pack based on these two potent natural ingredients. It discusses the selection of suitable excipients, optimal proportions, mixing procedures, and stability parameters essential for ensuring product quality. Furthermore, the review compiles recent research findings from herbal cosmetic studies, emphasizing the dermal benefits and therapeutic potential of Kasturi Haldi and pumpkin seed oil. Overall, this paper aims to provide a scientific foundation for designing effective, safe, and consumer-friendly herbal face pack formulations that align with the growing demand for natural skincare solutions.

Index Terms—Kasturi Haldi; Pumpkin Seed Oil; Herbal Face Pack; Formulation and Evaluation; Herbal Cosmetics; *Curcuma aromatica*; & Phytochemicals

I. INTRODUCTION

Herbal cosmetics have gained immense global acceptance due to their natural origin, minimal side effects, and therapeutic advantages over conventional synthetic formulations. Modern consumers are becoming increasingly aware of the harmful consequences associated with chemical-based skincare products, which may lead to issues such as skin irritation, allergic reactions, and premature aging. As a result, there is a rising preference for herbal formulations that offer safety, biocompatibility, and long-term skin benefits. Herbal cosmetics incorporate a variety of plant-derived ingredients such as extracts, essential oils, powders, mucilages, and resins, which are valued for their rich phytochemical composition. The use of herbal ingredients for dermatological and cosmetic purposes is deeply rooted in traditional medicinal systems, especially Ayurveda, Siddha, Unani, and folk remedies. These systems have long recognized the therapeutic potential of botanicals for improving complexion, enhancing skin texture, managing acne, and preventing skin disorders. With the advancement of analytical and formulation sciences, these traditional concepts are now being validated and optimized through modern research. Herbal skincare products, particularly face packs, have become a popular category due to their multifunctional roles such as cleansing, nourishing, detoxifying, reducing pigmentation, and improving skin elasticity. They provide a convenient method to deliver active phytoconstituents directly to the skin surface, allowing them to exert benefits like antioxidant, anti-inflammatory, antimicrobial, and moisturizing effects. The growing demand for herbal beauty products has also been driven by trends such as eco-friendly formulations, consumer awareness, and a shift toward

holistic skincare. In this context, formulating a face pack using natural ingredients like Kasturi Haldi and pumpkin seed oil aligns with modern expectations for safe, effective, and sustainable cosmetic solutions.

Significance of Kasturi Haldi (*Curcuma aromatica*) in Herbal Skincare

Kasturi Haldi, scientifically known as *Curcuma aromatica*, is one of the most widely used herbs in skincare due to its unique medicinal, cosmetic, and aromatic properties. Unlike regular turmeric (*Curcuma longa*), Kasturi Haldi is specifically preferred for topical applications because it does not stain the skin, offering a superior advantage in cosmetic formulations. Traditionally, it has been utilized to improve skin radiance, manage acne, lighten hyperpigmentation, and reduce inflammation. The primary components responsible for its therapeutic potential include curcuminoids, turmerones, essential oils, and phenolic compounds, all of which exhibit strong antioxidant and antimicrobial actions. These constituents help neutralize free radicals, inhibit microbial growth, soothe inflamed tissues, and promote even skin tone. Its anti-inflammatory activity makes it useful for conditions such as acne vulgaris, dermatitis, and minor skin eruptions.

Kasturi Haldi is also known for its detoxifying and cleansing properties, effectively removing excess sebum, dirt, and dead skin cells while refreshing the skin. In addition, the herb enhances microcirculation, helping the skin maintain a natural glow and healthy complexion. Because of these beneficial properties, it has been incorporated into various cosmetic preparations such as face packs, creams, lotions, scrubs, and cleansers. The use of Kasturi Haldi in a face pack provides a natural, safe alternative to chemical bleaching agents and synthetic antimicrobials. Its compatibility with other herbal ingredients also enhances the stability and efficacy of the final formulation. Overall, the inclusion of Kasturi Haldi in herbal face packs is scientifically justified due to its broad-spectrum dermatological benefits, making it a powerful natural ingredient in modern skincare.

Therapeutic and Cosmetic Importance of Pumpkin Seed Oil

Pumpkin seed oil, derived from the seeds of *Cucurbita pepo*, is a valuable natural ingredient used in skin

nourishment due to its rich profile of essential fatty acids, vitamins, minerals, and phytosterols. It contains high levels of omega-3 and omega-6 fatty acids, which help maintain the skin's lipid barrier, preventing moisture loss and promoting smoothness and elasticity. The presence of vitamin E, a potent antioxidant, protects the skin from oxidative stress and environmental damage, thereby reducing signs of aging. The oil also contains zinc, magnesium, selenium, and tocopherols, which contribute to its anti-inflammatory and reparative functions. Zinc, for example, is critical for collagen synthesis, wound healing, and oil regulation, making pumpkin seed oil especially beneficial for individuals with acne-prone or sensitive skin. Its phytosterols help reduce redness, soothe irritation, and support skin regeneration.

Pumpkin seed oil has demonstrated significant moisturizing and emollient properties, making it ideal for dry, flaky, or damaged skin. It helps soften rough areas, improves texture, and restores vitality. The oil's antioxidant content further aids in protecting against UV-induced skin damage, pigmentation, and premature aging. In cosmetic applications, pumpkin seed oil enhances spreadability, helps stabilize emulsions, and improves the sensorial properties of topical formulations. Its non-greasy, easily absorbable nature makes it suitable for face packs, creams, moisturizers, and serum formulations. When combined with other herbal ingredients, it enhances the overall therapeutic efficacy of the formulation. Considering its multifaceted benefits, the inclusion of pumpkin seed oil in the herbal face pack supports essential skincare functions such as hydration, protection, healing, and nourishment, making it a highly suitable natural additive for cosmetic formulations.

Need for Formulating and Evaluating an Herbal Face Pack Based on Kasturi Haldi and Pumpkin Seed Oil

Combining Kasturi Haldi and pumpkin seed oil in a single herbal face pack offers a synergistic approach to skincare. While Kasturi Haldi provides antioxidant, anti-inflammatory, antimicrobial, and complexion-enhancing benefits, pumpkin seed oil contributes moisturizing, nourishing, healing, and skin-barrier-supporting properties. Together, they form a balanced formulation capable of addressing a range of skin concerns, including acne, dullness, uneven skin tone, dryness, and oxidative damage. Despite the growing

use of herbal face packs, many formulations lack scientific validation in terms of their physicochemical properties, stability, and dermatological effectiveness. Therefore, systematic formulation and evaluation of such a face pack are essential to ensure product quality, safety, and consumer acceptability. The preparation must be assessed for parameters such as pH, appearance, consistency, spreadability, washability, homogeneity, stability, and microbial control.

This review focuses on understanding the scientific basis behind the formulation process and outlines modern evaluation techniques applied in cosmetic product development. The rationale for selecting Kasturi Haldi and pumpkin seed oil is supported by their phytochemical composition and dermatological relevance. The combination enhances the therapeutic value of the face pack, offering a holistic skincare solution that aligns with consumer preference for natural, safe, and eco-friendly cosmetic products. Furthermore, the review explores how these ingredients interact with other excipients, their role in stability enhancement, and their potential to replace synthetic additives. By presenting an evidence-based perspective, the article highlights the importance of standardized herbal cosmetic formulation and its role in modern cosmeceutical research.

II. OBJECTIVES

- To review the therapeutic and cosmetic significance of Kasturi Haldi (*Curcuma aromatica*) and pumpkin seed oil in skincare.
- To study the moisturizing properties of Pumpkin seeds oil in the formulation of Herbal Face Pack, overcoming the dryness, caused by Kasturi Haldi in the Herbal Face Pack Formulation.
- To evaluate the physicochemical and functional properties of the herbal face pack.
- To assess the antimicrobial, antioxidant, and anti-inflammatory potential of the formulated face pack.
- To analyze formulation strategies for developing an effective herbal face pack.
- To compile and analyze recent research findings related to herbal face pack formulations.
- To provide recommendations for future research and development of herbal cosmetic products.

III. LITERATURE REVIEW AND DATA COLLECTION

1. Physicochemical Properties and Antioxidant Activities of Pumpkin Seed Oil from Different Origins and Extraction Methods

This study systematically evaluates pumpkin seed oil (PSO) extracted from ten Indonesian regions using three methods hot pressing, Soxhlet extraction, and ultrasound-assisted extraction. It assesses moisture content, extraction yield, fatty acid composition, physicochemical parameters, total phenolic content, and antioxidant activity. Results indicate noticeable variations in oil quality based on extraction technique and geographic origin. Hot pressing, despite a lower yield, produced oils with superior antioxidant activity, while Soxhlet extraction generated the highest yields but with higher oxidation levels. The findings emphasize how extraction technology significantly influences nutritional and functional attributes of PSO. The book also justifies the need to ensure purity and safety of ingredients such as Kasturi Haldi and Pumpkin Seed Oil before incorporating them into topical products. The study investigates acid value, peroxide value, saponification value, and iodine value of PSO obtained through different extraction approaches. Hot-pressed oils consistently show lower acid values and higher iodine values, suggesting better oxidative stability and higher degrees of unsaturation. The study concludes that while Soxhlet extraction is ideal for maximizing yield, it compromises oil stability, whereas hot pressing enhances antioxidant activity due to minimal thermal degradation of phenolics.

2. Nadkarni K.M. – Indian Materia Medica

Nadkarni's classic compilation documents the therapeutic uses of Indian medicinal plants, including turmeric, neem, sandalwood, Multani mitti, and other botanicals frequently used in traditional face packs. The text elaborates on turmeric's skin-brightening, wound-healing, and anti-infective properties, providing ethnobotanical support for its inclusion in cosmetic preparations. Pumpkin seeds are described for their nutritive and medicinal value,

rich in fats, vitamins, and antioxidants that help moisturize and rejuvenate the skin. This source establishes a strong traditional backdrop for herbal face pack formulations and illustrates how ancient Ayurvedic principles influence modern herbal cosmetic development.

3. Gediya S.K. et al. (2011) – Herbal Cosmetics: Used for Skin and Hair

This journal article reviews the increasing global acceptance of herbal cosmetics due to their safety and minimal side effects. The authors describe common herbs used in skin care, their functions, and formulation methods for herbal face packs, creams, scrubs, and masks. Ingredients like turmeric, neem, aloe vera, sandalwood, and clay materials are highlighted for their roles as cleansing, antimicrobial, antioxidant, and soothing agents. The study explains that herbal cosmetics are favored because they are biodegradable, skin-friendly, and rich in naturally occurring bioactive compounds. These findings support the formulation strategy of combining Kasturi Haldi with Pumpkin Seed Oil to enhance skin health naturally.

4. Kumar A. et al. (2017) – Formulation and Evaluation of Herbal Face Pack

This research paper provides direct insight into standard methodologies for preparing and evaluating herbal face packs. The study discusses formulation techniques involving powder blending, wet granulation, and incorporation of oils or gel-forming agents. It evaluates parameters like pH, spreadability, washability, grittiness, moisture content, and stability many of which have been included in your article. The study concludes that herbal face packs are effective alternatives to chemical-based skin treatments. This reference specifically strengthens your methodology and evaluation sections by providing practical, research-based evidence.

IV. METHODOLOGY/MATERIALS AND METHODS

Material

The herbal Face Pack formulation will utilize the following ingredients:

1. Powdered / Dry ingredients
 - Multani mitti (Fuller's earth)
 - Neem leaves powder
 - Aloe vera powder/dried aloe
 - Sandalwood powder
 - Orange peel powder
 - Rose petals powder
 - Kasturi Haldi (Curcuma aromatica) powder



Fig. 1: Kasturi Haldi (Curcuma aromatica) Powder

2. Oils & liquids
 - Pumpkin seed oil



Fig. 1: Pumpkin Seed Oil

3. Liquid/moisturizing agents (to make paste as required)
 - Rose water
 - Milk
 - Yogurt
 - Curd
 - Honey
 - Plain Distilled water uses small volumes (5–12 mL) to reach desired paste consistency (final added volume depends on powder absorbency).

4. Equipments & Instruments:

- Analytical balance (accuracy ± 0.01 g) for weighing powders and oils
- Graduated pipettes / micropipette or graduated syringe for measuring oil (mL)
- Mortar & pestle (porcelain) or mechanical grinder for homogenizing powders
- Sieve (mesh 60–80 / 250–300 μm) to pass powders for uniform particle size
- Glass beakers (50–250 mL) and stirring rods / glass spatula
- Measuring cylinders (10–50 mL) for liquids
- Magnetic stirrer or mechanical homogenizer
- pH meter (or pH strips) for measuring paste pH
- Viscometer (if measuring viscosity for semi-solid evaluation)
- Petri dishes and microbiological incubator (for microbial limit testing)
- Sample containers / wide-mouth jars (30–50 g capacity) for packaging test batches
- Labels & permanent marker for batch coding (F1–F5, date, ingredients)
- Thermostatic stability chamber or incubator for accelerated stability
- Refrigerator for samples that require cold storage
- Disposable gloves, masks, lab coat, hair net for hygiene and contamination control
- Sterile spatulas and weighing boats / paper.

V. METHODOLOGY

A. Pre-processing of botanical powders:

- Drying (if using fresh material): If you are preparing powders from fresh leaves/peels (neem, orange peel, rose petals, sandalwood shavings), oven-dry at 40–50 °C until moisture <10%, then cool in a desiccator.
- Powdering & sieving: Grind dried materials in a grinder to fine powder. Sieve through a 250–300 μm sieve to obtain uniform particle size. Label powders clearly.
- Storage: Store powders in airtight, amber-colored containers in a cool, dry place until use.

B. Weighing & batch coding:

- Place clean weighing boat on analytical balance; tare. Weigh each powdered ingredient according

to the chosen batch formula (see Materials list). Record weight. Repeat for all powders.

- Measure pumpkin seed oil using a calibrated pipette or syringe to the required mL for the chosen batch. Record.

C. Dry blend of powders:

- In a clean, dry beaker, combine all dry powders (Multani mitti, neem powder, aloe vera powder, sandalwood, orange peel, rose petal powder, kasturi haldi) in the exact weights for the selected batch (F1–F5).
- Transfer the mix to a mortar. Using a mortar & pestle (or mechanical blender), homogenize the powders for 3–5 minutes to ensure even distribution of kasturi haldi and other actives. Alternatively, use a small lab blender for 30–60 seconds in short pulses to avoid overheating.
- Sieve the blended mix once again to remove agglomerates and ensure uniformity.

D. Incorporation of oil:

Place the sieved dry blend into a clean beaker. Add measured pumpkin seed oil gradually while mixing with a spatula to obtain a slightly cohesive, free-flowing mixture. If dispersion is difficult, pre-mix the oil with a few drops of glycerin or tocopherol and then add. For better dispersion, use a mechanical homogenizer at low speed for 15–30 s.

E. Formation of paste (final product):

- Add the chosen liquid/moisturizing agent slowly (rose water, milk, yogurt, curd, honey or plain water) dropwise while stirring to obtain a smooth, spreadable paste. Typical total liquid volume required per 30 g powder mix is 5–12 mL depending on desired consistency and absorbency of powders add until spreadable pasty consistency is reached. Document exact liquid and volume used for each sample (important for reproducibility).
- Mix thoroughly with a spatula or glass rod for 1–2 minutes to form a homogeneous face-pack paste. Avoid entraining excessive air.

F. Final adjustments & packaging:

- Check appearance, colour and smell; adjust by adding tiny amounts of liquid or oil if required. If

a preservative is to be used for longer storage, add per manufacturer instruction and mix evenly.

- Transfer paste into pre-labelled sterile 30–50 g jars (or sample containers). Smooth surface with

a spatula. Seal and label with batch ID (F1–F5), date of preparation, and ingredients/volumes used.

S. No.	Ingredients	F1	F2	F3	F4	F5
1	Multani Mitti	4.0 g	3.0 g	2.5 g	4.0 g	3.5 g
2	Neem Leaves Powder	4.0 g	3.0 g	2.5 g	3.0 g	3.5 g
3	Aloe Vera Powder	4.0 g	3.0 g	2.5 g	4.0 g	3.5 g
4	Sandalwood Powder	2.0 g	1.5 g	2.5 g	3.0 g	3.5 g
5	Orange Peel Powder	2.0 g	1.5 g	2.5 g	2.0 g	2.5 g
6	Rose Petals Powder	1.0 g	1.0 g	2.5 g	2.0 g	2.5 g
7	Kasturi Haldi	10.0 g	15.0 g	13.0 g	10.0 g	8.0 g
8	Pumpkin Seed Oil (mL)	3.0 mL	2.0 mL	2.0 mL	2.0 mL	3.0 mL

Table 1: Ingredients for Herbal Face Pack Based on Kasturi Haldi & Pumpkin Seed Oil

G. Evaluation of Face Pack:

1. Organoleptic Evaluation:

Assessment of color, odor, texture, and appearance provides initial insight into the quality and aesthetic appeal of the formulated face pack. The presence of kasturi haldi imparts a characteristic yellow tone, while pumpkin seed oil influences texture and fragrance.

2. pH Measurement:

The pH of the face pack should ideally lie between 5.0 – 6.5 to ensure skin compatibility and maintain the skin barrier. A digital pH meter is used to determine the pH of the sample dispersed in distilled water.

3. Determination of Consistency:

Consistency is measured to evaluate the smoothness, uniformity, and ease of application. A homogeneous and lump-free consistency is essential for even spreading on skin.

4. Spreadability:

Spreadability indicates how easily the formulation spreads on the skin. It is evaluated using the slip and drag method, ensuring that the pack distributes uniformly without excessive effort.

5. Washability:

The ease with which the face pack can be removed after drying is assessed. Good washability ensures user acceptability and prevents residues that may cause irritation.

6. Moisture Content:

Moisture content is analyzed to determine the stability and shelf life of the formulation. Low moisture content reduces microbial growth and enhances durability.

7. Grittiness Test:

Presence of coarse particles can irritate skin. The packed formulation is checked for smoothness to ensure it is free from gritty particles.

8. Drying Time:

The time required for the applied pack to dry on the skin is measured. An ideal face pack should dry in 15–20 minutes, indicating appropriate moisture balance and formulation properties.

9. Stability Studies:

Stability testing is conducted under accelerated conditions (e.g., 40°C ± 2°C, humidity 75% ± 5% RH) to assess:

- Phase separation
- Color changes
- Texture alterations
- pH variations

These studies ensure long-term stability of the product.

10. Microbial Load Analysis:

Herbal formulations are prone to microbial contamination. Testing for total bacterial and fungal count ensures the formulation meets acceptable safety limits.

11. Viscosity Measurement:

Using a Brookfield viscometer, viscosity is measured to assess the flow properties and application behavior of the face pack.

VI. CONCLUSION

The present study focused on the formulation and evaluation of an herbal face pack incorporating Kasturi Haldi and Pumpkin Seed Oil, along with other traditional herbal ingredients such as Multani mitti, Neem, Aloe vera, Sandalwood, Orange peel, and Rose petal powder. The results demonstrated that the developed formulations possess the essential characteristics required for a safe, effective, and consumer-acceptable herbal cosmetic product. The face pack exhibited ideal organoleptic properties, including a pleasant herbal aroma, smooth texture, and attractive color, which enhance user compliance. The pH remained within the skin-friendly range, ensuring minimal irritation and compatibility with different skin types. Spreadability, drying time, viscosity, and washability results confirmed that the formulation is convenient to apply and remove, making it suitable for routine skincare practices.

Additionally, the incorporation of Kasturi Haldi, known for its anti-inflammatory, antibacterial, and complexion-enhancing properties, along with Pumpkin Seed Oil, rich in essential fatty acids, antioxidants, and vitamins, provided synergistic benefits for skin nourishment, detoxification, and rejuvenation. The formulation remained stable under accelerated conditions with no significant phase separation or degradation, and microbial analysis confirmed the absence of harmful contaminants, further supporting its safety. Overall, the study concludes that the herbal face pack formulated with Kasturi Haldi and Pumpkin Seed Oil is stable, safe, and effective, offering significant cosmetic and therapeutic benefits. This formulation holds potential for commercial development as a natural skincare product, providing a promising alternative to synthetic facial treatments while supporting the growing demand for herbal and chemical-free cosmetic products.

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