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Formulation & evaluation of herbal face mask

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Abstract

The present study focuses on formulating and evaluating an herbal face mask utilizing natural ingredients known for their skincare benefits, including neem powder, aloe vera, glycerin, xanthan gum, lemon oil, and vitamin E. The primary objective was to develop a cost-effective, eco-friendly, and efficacious topical skincare product that aligns with the increasing consumer demand for herbal cosmetics. Three formulations (F1, F2, F3) were prepared using varying concentrations of active ingredients and evaluated based on physical appearance, pH, spreadability, homogeneity, irritancy, and stability under different storage conditions. Among the three, formulation F2 demonstrated superior performance, showing optimal pH (4.9), highest spreadability (5.6 cm), excellent texture, and stability without phase separation. Using Eudragit polymer as a film-forming agent contributed to the smoothness and adhesion of the mask, while aloe vera and neem provided hydration, anti-inflammatory, and antimicrobial properties. The results indicate that the herbal face mask, particularly formulation F2, is a promising alternative to chemical-based skincare products, offering natural therapeutic benefits along with consumer safety and acceptability. This formulation holds potential for large-scale production and commercialization.

Keywords: Herbal cosmetics, face mask sheet, skin care

Introduction

The largest organ, the skin, serves as a barrier of defense. Herbal formulations are becoming more popular in modern cosmetic sciences because of their efficacy and low risk of adverse effects. Neem's antibacterial and anti-inflammatory properties are widely recognized. A natural moisturizer that promotes skin renewal is Aloe Vera. Ethanol is a solvent and preservative, and vitamin E has antioxidant qualities. ^[1] This research investigates the development of an herbal gel intended for skincare. The skin is the body's largest organ and acts as a protective barrier against the entry of microbes. Therefore, maintaining skin health is a crucial component of overall personal well-being. Additionally, skin condition has a psychological and social impact on individuals and their interactions. To date, there has been no universally accepted classification of facial skin types. Cosmetics refer to the act of embellishing something or someone with ornamental additions. The Food and Drug & Cosmetics Act describes cosmetics as products intended to be applied, poured, sprinkled, or sprayed on, as well as those that alter one's appearance. The category of cosmetics includes skin care creams, lotions, powders, perfumes, lipsticks, nail polish for fingers and toes, eye and facial makeup, colored contact lenses, hair dyes, and hair sprays. There is a growing demand for children's cosmetics in the global market, which are considered a valuable gift from nature. Cosmetics are not only used to enhance an individual's appearance but also serve purposes in caring for the skin and body.

Herbal Sheet Mask

Herbal sheet masks have existed for a considerable time, and their benefits are nearly limitless. These masks can hydrate the skin, eliminate excess oils and impurities, and enhance the appearance of pores. Materials such as microfibers or cellulose are utilized in the production of these sheet masks. These facial masks are affordable, making them accessible for everyone to use with ease. They are also budget-friendly, allowing individuals to save time at the spa and avoid purchasing expensive cosmetics. With growing awareness of the environmental harm caused by industrialization, there is a trend toward using products with

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natural ingredients. Natural extracts are versatile and function as antioxidants, contributing to the creation of pharmaceutical products [2, 3].

Mechanism of Herbal face mask [4]

- Hydration: Sheet masks are infused with moisturizing elements such as fruit extracts, glycerin, and seed oils.
- Improved Ingredient Absorption: The liquid formula aids in delivering active ingredients directly to the skin.
- Convenience: Simple to apply and free of mess.
- Relaxation: A calming and indulgent experience.
- Hydrates the skin.
- Removes excess oil.
- Cleanses impurities and supports healthy skin. Instant and Long-Lasting Results. They make your skin look dewier, brighter, renewed, and rejuvenated.

Materials and Methods

The herbal face mask was prepared using a variety of natural and functional ingredients, each selected for its specific skin-enhancing properties. The ingredients used in the formulation include neem powder, Aloe Vera gel, Eudragit polymer, ethanol, glycerin, xanthan gum, vitamin E, lemon essential oil, and methyl paraben as a preservative. These components were chosen for their anti-inflammatory, moisturizing, film-forming, antioxidant, stabilizing, and antimicrobial benefits, contributing to the overall effectiveness of the face mask Table 1.

Table 1: Therapeutic potential of herbal ingredients

Ingredients	Uses
Neem powder	Anti-inflammatory properties
Eudragit polymer	film-forming agent
Ethanol	Solvent
Glycerin	Moisturizer
Aloe vera & Xanthan gum	Hydrating & thickening agent
Vitamin E & Lemon oil (Essential oil)	Antioxidant. & to brighten the skin respectively.
Methyl Paraben	Antimicrobial agent

Neem Powder includes neem powder because of its strong antibacterial and anti-inflammatory qualities. By promoting skin clarity and smoothness, it provides anti-aging benefits, calms inflamed skin, and combats germs that cause acne. It is a useful herbal element for preserving good skin because of its naturally occurring bioactive ingredients. [5] Aloe vera is employed because of its remarkable calming and hydrating properties. It moisturizes the skin, lowers inflammation, and speeds up the healing of small cuts or irritations because it is high in vitamins, enzymes, and amino acids. Its antibacterial properties also help to preserve the protection and health of the skin. [6] Figure 1.



Fig 1: Aphical representation of Neem and Aloevera

Eudragit Polymer polymer serves as a film-forming agent. It enhances the adherence and simplicity of application of the

mask by forming a consistent, smooth coating across the skin's surface. It also improves the product's overall sensory experience and has a relaxing impact. Ethanol used as a solvent in the formulation, ethanol aids in the dissolution and uniform dispersion of different constituents. By preventing microbial growth, it also serves as a moderate preservative, extending the product's stability and shelf life. Its volatile nature guarantees that the gel applied to the skin dries quickly. Glycerin is A well-known humectant that draws and holds moisture in the skin is glycerin. Because it draws water from the environment and the deeper layers of the skin, it keeps the skin smooth, silky, and moisturized. Its presence bolsters the face mask's overall hydrating action. In gel formulation, Xanthan Gum serves as a stabilizing and thickening agent. It gives a combination of viscosity, which improves spreadability and guarantees a uniform consistency. Additionally, it keeps the mask's structural integrity intact by halting the gradual separation of its constituents. The inclusion of vitamin E stems from its potent antioxidant qualities. It aids in the neutralization of free radicals, which cause damage and aging of the skin. Furthermore, it enhances texture, promotes skin hydration, and lessens the visibility of wrinkles and fine lines, giving the skin a younger, healthier appearance. Lemon essential oil enhances the face mask's sensory appeal and practicality. While its antimicrobial qualities aid in skin cleansing and protection, it also helps to brighten the skin and improve complexion. Additionally, it has a revitalizing citrus scent that improves consumer satisfaction. [7] The formulation's shelf life is increased using methyl paraben as a preservative. By stopping the growth of bacteria, fungi, and other microbes, it guarantees the product's longevity and safety. When used within controlled limits, it is well known for being safe in cosmetics and personal hygiene products.

Method of Preparation

Fresh aloe vera gel was obtained by thoroughly washing and blending the aloe vera leaves. Xanthan gum was gradually added to distilled water with constant stirring until it became fully hydrated, forming a stable gel base. To this base, other ingredients were added sequentially: aloe vera gel, neem powder, glycerin, vitamin E, Eudragit polymer, ethanol, lemon essential oil, and methyl paraben (used as a preservative). All ingredients were incorporated into the formulation in specific concentrations (% w/w) as detailed in the formulation table. Continuous stirring was applied throughout the process to ensure a uniform and homogeneous gel. Table 2 The prepared herbal face mask gel was then stored in airtight containers and kept under controlled conditions for further evaluation and testing. [8]

Table 2: List of ingredient involved in Herbal Face Mask (F1-F3)

S. no.	Ingredients	F1 (%)	F2 (%)	F3 (%)
1	Neem powder	2	2	2
2	Aloe-vera	12	12	12
3	Eudragit polymer	4	4	4
4	Ethanol	5	5	5
5	Xanthan gum	1	0.5	2
6	Methyl Paraben	0.25	0.25	0.25
7	Lemon oil	2	2	2
8	Vitamin E	1	1	1

Evaluation Parameters

1. **Physical Appearance:** This involves evaluating the face mask sheet's color, scent, and texture. A perfect formulation should display an appealing color that

corresponds with the ingredients' characteristics, a calming natural aroma, and a silky texture free of grittiness or separation. The visual aspect also indicates the product's attractiveness to consumers^[9].

2. **pH Measurement:** The pH of a topical product should align with the skin's natural pH, which is around 5.5 to 6.5. A pH level that is excessively high or low could lead to skin irritation. In our research, the pH varied between 6.2 and 6.6, indicating that all formulations are appropriate for application on the skin^[4].
3. **Spreadability:** This evaluation assesses how easily the face mask sheet can be applied to the skin, which is vital for promoting patient compliance. The Spreadability assessment was carried out using a standardized slip-and-drag method. A formulation that spreads easily requires less effort in the application process. Among the three batches evaluated, F2 exhibited the highest Spreadability. The measurement unit used is square centimeters^[1].
4. **Irritancy Test:** This evaluation examines the ease of application of the face mask sheet on the skin, which is crucial for encouraging patient adherence. The assessment of Spreadability was conducted using a standardized slip-and-drag technique. A formulation that spreads effortlessly necessitates less effort during the application process.
5. **Homogeneity and Phase Separation:** A visually consistent product demonstrates an even distribution of

components. The lack of phase separation implies physical stability. Each formulation displayed uniform texture without any indications of separation over time.

6. **Stability Studies:** The formulations were kept at room temperature, in refrigerated conditions, and at an elevated temperature of 45 °C for a month. The face mask sheet showed stability without any notable alterations in texture, pH, or appearance, indicating its potential for shelf life^[10].

Results and Discussion

All three formulations (F1- F3) were evaluated for a range of physicochemical characteristics. The findings revealed the following conclusions: F1 showed adequate properties with moderate viscosity and Spreadability, making it workable but somewhat less efficient than the other two formulations. F2 exhibited the best results for nearly all metrics, featuring a pH of 5.0 and the highest Spreadability at 5.7 cm. Furthermore, it retained a smooth texture and color without any signs of phase separation under all storage conditions, demonstrating its exceptional physical and chemical stability. F3 included the highest concentration of active ingredients. While it boasted excellent pH and viscosity, it's slightly darker hue and a marginally reduced Spreadability of 5.2 cm compared to F2 made it less attractive to consumers, although it still proved effective Table 3.

Table 3: Summarization of the charecteristics of Formulation (F1-F3)

Parameter	F1	F2	F3	Remarks
Color	Light brownish	Dark Brownish	Brownish	Acceptable
Odor	Pleasant	Pleasant	Pleasant	Acceptable
PH	4.7	4.9	5.0	Acceptable
Texture	Rigid	Smooth	Smooth	Optimal
Spreadability	5.1	5.6	5.7	Within the skin range

In summary, F2 stood out as the most balanced and effective formulation of the three, offering outstanding viscosity, Spreadability, stability, and consumer acceptability. Figure 2.

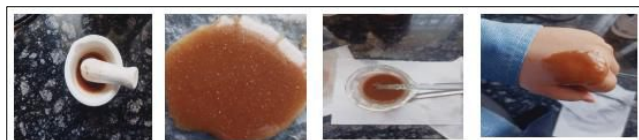


Fig 2: Formulation and evaluation of face mask

Conclusion

This herbal face mask is considered a long-lasting and efficient method of skin improvement. For this reason, the way work-study programmers are now set up works well. With natural components including neem powder, glycerin, Aloe vera, lemon oil (essential oil), Xanthan gum, ethanol, addition of Preservative methyl paraben, attempts are being made to make an herbal face mask. Aloe vera, having anti-inflammatory & anti-bacterial properties, makes it a gentle treatment for soothing inflamed skin and reducing redness. Neem powder contributes to smooth skin, and it possesses Anti-aging qualities. Aloe vera shows skin hydration. To get rid of dull skin, remove dead skin. Vitamin E possesses antioxidant properties. Furthermore, acne improves skin and lessens wrinkles. Anti-oxidant properties are shown in

Vitamin E. It increases the mask's efficacy by clearing out pollen and opening the pores. Aloe vera is an excellent skin protector, and aloe vera possesses antimicrobial activity. Eudragit polymer forms a smooth film. Provides a calming effect, in addition to its Anti-aging benefits. It also protects against inflammation. Preservative adds methyl paraben. It's used in almost safe use of paraben as Preservatives in food, medicine, and personal care cosmetics and personal care sectors. Additionally, Face mask sheet is the solution for healthy skin, nourishing and soothing skin tone, treating aging, sunburn, and many other skin problems. This product can be manufactured on a large scale and commercialized as an alternative to the chemical sheet mask.

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