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Formulation and Evaluation of Herbal Cream

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Abstract
Aloe vera is a medicinal plant widely used in traditional systems such as Ayurveda, Siddha, and Homeopathy for centuries. The gel obtained from the inner mucilaginous part of the aloe leaf is commonly utilized in cosmetic and therapeutic preparations. Unlike the outer leaf extract, aloe gel does not contain anthraquinones, which are responsible for the plant's laxative effects. Aloe vera is rich in biologically active constituents including vitamins, enzymes, minerals, sugars, saponins, and amino acids, contributing to its skin-beneficial properties.Face creams are semi-solid topical formulations designed to moisturize, nourish, and enhance skin appearance. The purpose of this study is to develop a herbal face cream and assess its quality and performance. The prepared formulation was evaluated based on parameters such as pH, consistency, stability, homogeneity, appearance, and organoleptic characteristics. The results indicated satisfactory performance and stability of the developed cream.

Keywords: Aloe vera, Avocado oil, Cocoa butter, Herbal cream, Evaluation.

INTRODUCTION

In today's fast-moving world, maintaining personal health and skincare has become increasingly challenging. Stress, pollution, and lifestyle changes negatively impact skin health, creating a growing demand for safe and natural cosmetic products. Herbal formulations are gaining popularity because they are perceived as safer alternatives to synthetic products.

Handmade or herbal creams offer the advantage of ingredient control, allowing individuals to avoid parabens, artificial fragrances, and harsh chemicals. Natural ingredients, though gentle, can be highly effective. Many plant-based components possess moisturizing, soothing, antioxidant, and skin-repairing properties. They help improve skin tone, maintain hydration, and reduce dryness and fine lines.

The development of herbal face creams focuses on combining beneficial natural ingredients to achieve effective skincare while ensuring safety and stability. Proper formulation and evaluation are essential to confirm the quality, consistency, and performance of the final product.

Moisturizing is an essential part of skincare, regardless of whether a person has oily, dry, sensitive, or flaky skin. Face creams are formulated with emollients that help repair damaged skin cells and maintain adequate hydration. Many people with oily skin believe they do not require moisturizers due to excess sebum production; however, this is a misconception. Sebum is a natural oil that protects and maintains skin health. When the skin becomes dehydrated, it may produce even more oil to compensate, which can clog pores and lead to acne and breakouts.

Herbal cosmetics are becoming increasingly popular due to the availability of innovative plant-based ingredients and the growing demand for safe, high-quality products. Cosmetics are preparations applied externally to enhance and protect the skin. Face creams help cleanse, soften, and improve overall skin texture. Traditional systems of medicine, particularly Ayurveda, utilize plant extracts extensively for therapeutic purposes. Aloe vera, scientifically known as Aloe barbadensis, belongs to the Liliaceae family, which includes numerous species. It is a succulent plant that thrives in warm and dry climates and is widely cultivated for its medicinal and cosmetic benefits.

Avocado oil contains antioxidants and anti-inflammatory components that help maintain smooth, firm, and elastic skin. It is readily available in health and cosmetic stores and offers multiple skincare benefits, such as:

- Calming irritated skin
- Healing rough or cracked skin
- Providing deep moisturization
- Improving skin hydration
- Supporting protection against environmental damage, including UV exposure
- Enhancing the skin's natural barrier

Although sometimes mistaken for an essential oil, avocado oil is actually a carrier oil. It is thick in consistency and typically green in color.

Cocoa butter is a natural fat extracted from cocoa beans. It is obtained through processes such as fermentation, drying, roasting, and pressing of the beans. The extracted fat forms cocoa butter, while the remaining solid material

is processed into cocoa powder. Cocoa butter is widely used in skincare products due to its rich moisturizing properties.
Cocoa butter is widely used as an active ingredient in lotions, creams, and lip balms due to its rich moisturizing properties. Historical records indicate that cocoa has been consumed and utilized in various forms since around 460 AD. Recent scientific studies have highlighted its potential health benefits, including antioxidant and anti-inflammatory effects, which make it valuable in skincare formulations.

Cream

A cream is a semi-solid dosage form consisting of oil and water phases. Based on the dispersion of these phases, creams are classified into two main types:
Oil-in-Water (O/W) Creams:
In this type, small droplets of oil are dispersed within a continuous water phase. These creams are less greasy, lighter in texture, and easily washable with water. They are generally preferred for cosmetic use because they provide a pleasant feel on the skin.
Water-in-Oil (W/O) Creams:
Here, fine droplets of water are dispersed throughout a continuous oil phase. These creams are thicker and more oily in nature. They form a protective barrier over the skin, helping to reduce moisture loss from the stratum corneum and are suitable for dry skin conditions.
Face creams are primarily applied to soften, cleanse, and improve the overall texture of the skin. Emollient preparations are available in different forms such as creams, lotions, oils, and gels. Emollients help soothe and relax the skin by maintaining hydration and forming a protective layer.
They are particularly beneficial in managing skin conditions like eczema and psoriasis by preventing dryness and irritation. In addition to therapeutic uses, creams are also incorporated into cosmetic products such as lipsticks and other beauty preparations to enhance texture and appearance.
Uses of Cream:
Medicated and cosmetic creams serve multiple purposes, including-

- Cleansing the skin
- Enhancing beauty and appearance
- Softening and smoothing the skin
- Providing protection against bacterial and fungal infections
- Supporting the healing of minor cuts, burns, and wounds

Ingredients

The formulation of the herbal face cream consists of three main parts: the water phase, the oil phase, and additional functional ingredients.
1. Water Phase
The aqueous phase includes ingredients that provide hydration and help maintain skin moisture balance:

- 30 g Aloe vera gel
- 40 g Distilled water
- 7.5 g Glycerin

Aloe vera gel acts as a soothing and moisturizing agent. Distilled water serves as the base solvent, while glycerin functions as a humectant that attracts and retains moisture in the skin.
2. Oil Phase
The oil phase contains components responsible for nourishment, texture, and emulsion stability:

- 13 g Avocado oil
- 3.7 g Cocoa butter
- 5 g Emulsifying wax
- 3 g Cetyl alcohol

Avocado oil provides essential fatty acids and enhances skin softness. Cocoa butter contributes to deep moisturization and improves consistency. Emulsifying wax helps blend the oil and water phases into a stable emulsion. Cetyl alcohol acts as a thickening agent and stabilizer, improving the cream's texture.
3. Additional Functional Ingredients
These ingredients enhance preservation and fragrance:

- 0.5 g Preservative
- 3 drops Lavender essential oil
- 2 drops Geranium essential oil
- 2 drops Orange essential oil

The preservative prevents microbial growth and extends shelf life. Essential oils are added for fragrance and may also provide mild skin-soothing and refreshing properties.

ABOUT INGREDIENTS

Aloe Vera Gel
Aloe vera gel is a natural emollient and film-forming substance known for its hydrating, soothing, and protective properties. It possesses antimicrobial and anti-inflammatory activities, making it highly beneficial in skincare formulations. One of its primary functions is to provide deep moisturization by delivering water directly to the skin tissues and helping maintain moisture balance.

Aloe vera also contributes to calming irritated or inflamed skin and is particularly useful for sensitive, sunburned, or environmentally damaged skin. Traditionally, it has been applied to treat minor burns and skin
injuries due to its cooling and healing effects. Because of its refreshing nature, it is commonly included in products designed to soothe and relax the skin.
In cosmetic emulsions, aloe vera gel supports skin hydration and may assist in controlling dryness and irritation. When combined with other anti-inflammatory agents, it can enhance overall therapeutic effectiveness. Studies indicate that higher concentrations of aloe vera may improve blood circulation at the site of application, further supporting skin repair and nourishment.

Figure 1: Aloe Vera Gel

Avocado Oil

Avocado oil acts as an effective emollient and carrier oil in cosmetic formulations. It helps deliver active ingredients deeper into the skin while providing nourishment and softness. Due to its soothing and mild antibacterial properties, it is especially suitable for sensitive and irritated skin.
Research indicates that avocado oil supports collagen production and improves skin elasticity. By enhancing connective tissue function, it helps maintain smoothness and long-term hydration. It is also beneficial in managing minor skin concerns such as dryness, roughness, and mild inflammation.
In addition to its moisturizing effects, avocado oil offers some protection against environmental damage, including sun exposure. Compared with several other plant-based oils such as peanut, olive, coconut, and corn oils, it has demonstrated favorable performance in cosmetic applications.
Avocado oil is widely incorporated into skincare and beauty products, including cleansing creams, moisturizers, lip balms, makeup bases, bath oils, sunscreens, and sun-care preparations. It also contributes to the stabilization of oil-in-water emulsions in cream formulations.

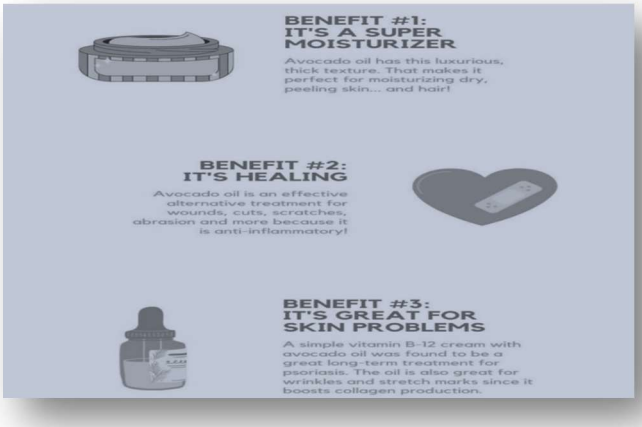

Figure 2: Benefits of Avocado Oil

Cocoa Butter

Cocoa butter is a natural fat obtained from cocoa beans and is widely used in cosmetic and skincare preparations. It is well known for its excellent moisturizing ability and plays an important role in improving the texture and consistency of creams. Due to its rich emollient properties, it is especially beneficial for dry and sensitive skin.
This ingredient possesses antioxidant activity and contains vitamin E, which supports overall skin health. Vitamin E contributes to the protection of skin cells from oxidative damage and helps maintain healthy skin structure. The high concentration of fatty acids present in cocoa butter enhances skin hydration by forming a protective barrier on the surface. This barrier reduces transepidermal water loss and keeps the skin soft and supple.
Cocoa butter is commonly included in formulations intended for managing dryness, eczema, and dermatitis because of its soothing and protective nature. Additionally, naturally occurring phytochemicals in cocoa butter may provide protective benefits against environmental stressors.

Figure 3: Cocoa Butter

Preservative (Geogard Ultra)
Geogard Ultra is a broad-spectrum preservative commonly used in cosmetic formulations to prevent microbial contamination. It functions by slowly releasing gluconic acid, which helps maintain product stability and extends shelf life. This preservative is typically available in powdered form and is suitable for use in water-based and emulsion systems. Its inclusion in the formulation ensures product safety and protects against the growth of bacteria, yeast, and mold.

Lavender Essential Oil
Lavender essential oil is widely recognized for its therapeutic and skincare benefits. It exhibits anti-inflammatory, antimicrobial, antiseptic, and mild analgesic properties. Due to these characteristics, it is often incorporated into cosmetic products to soothe irritated skin and support healing.
Lavender oil may assist in cleansing minor wounds after washing and help regulate natural skin functions. It is also known for its calming aroma, which can reduce stress and promote relaxation. Because stress can aggravate certain skin conditions, this effect may indirectly support skin health.
Suitable for most skin types, lavender oil is commonly used in managing acne, mild burns, sunburn, dermatitis, eczema, and psoriasis. Additionally, it may promote skin cell regeneration and enhance the overall effectiveness of other essential oils when blended together.

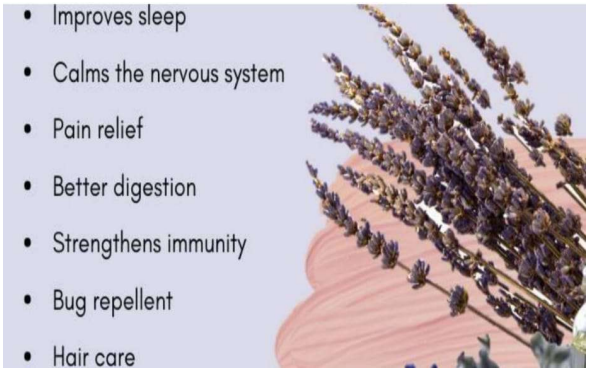

Figure 4: Lavender Essential Oil

Geranium Essential Oil
Geranium essential oil is widely used in skincare and aromatherapy due to its multiple therapeutic properties. It is commonly applied in the management of various skin conditions and is also believed to help improve mood and emotional well-being. The oil is valued for its ability to promote balanced skin tone and may assist in repelling insects naturally.
In dermatological applications, geranium oil is beneficial for soothing irritated skin, minor burns, and blemishes. It may support improved blood circulation and help regulate sebum production, making it suitable for both dry and oily skin types. By maintaining oil balance, it contributes to healthier and clearer skin.
Geranium essential oil is often associated with anti-aging benefits. It may help reduce the appearance of wrinkles, fine lines, and sagging skin, while promoting a firmer and more youthful look. Its astringent properties assist in tightening pores and improving skin texture. Additionally, it provides moisturizing and refreshing effects that help revitalize dull and dehydrated skin.
The oil also exhibits anti-inflammatory, antibacterial, and antifungal properties, which may help manage conditions such as acne, eczema, dermatitis, psoriasis, and minor fungal infections. Regular and controlled application can soothe irritated skin and support overall skin repair.

Figure 5: Geranium Essential Oil

Orange Essential Oil

Orange essential oil is widely utilized in perfumery and cosmetic formulations due to its pleasant citrus fragrance and therapeutic properties. In skincare applications, it is valued for its anti-inflammatory, antibacterial, antispasmodic, and soothing characteristics, making it particularly suitable for sensitive and delicate skin.

The oil has demonstrated antimicrobial activity against certain bacteria and fungi, which supports its use in skin care products aimed at maintaining skin hygiene. Additionally, orange essential oil is commonly used in aromatherapy to help reduce stress and anxiety. It may also contribute to mood enhancement, although further scientific research is required to fully confirm its effectiveness in managing depressive symptoms.

Some preliminary studies suggest that orange essential oil applied in aromatherapy may assist in relieving mild and temporary pain. Laboratory research has also indicated that certain components of orange oil and its derivatives may influence abnormal cell growth under controlled conditions. However, more comprehensive clinical investigations are necessary to validate these findings.

Figure 6: Orange Essential Oil

Procedure

1. Accurately measure the required quantities of the aqueous phase and the oil phase separately.

2. Transfer each phase into separate heat-resistant beakers for further processing (as illustrated in Figure 7).

Figure 7: Beakers containing the oil phase and water phase separately.

3. Heat both the oil phase and the aqueous phase using a water bath method. Fill a saucepan halfway with water and warm it until it reaches a gentle simmer. Lower the heat and carefully place the beakers containing the two phases into the warm water. Ensure that the water does not come to a rolling boil while the beakers are immersed. Continue heating until the cocoa butter and emulsifying wax are completely melted. This process typically requires about 15–20 minutes (see Figure 8).

Figure 8

4. Once the cocoa butter and emulsifying wax have completely melted, carefully take the beakers out of the water bath. Handle them with caution, as the glass and contents will be very hot and may

cause burns. Use protective gloves or appropriate tools if necessary (see Figure 9).

Figure 9

5. Combine the heated aqueous phase with the melted oil phase. Carefully add the water phase into the oil and wax mixture while stirring gently. It is recommended to pour the water into the oil phase rather than adding oil to water, as this helps minimize product loss along the walls of the beaker (see Figure 10).

Figure 10

6. After combining the two phases, the mixture will quickly turn opaque and develop a creamy appearance, which is completely normal. Use a small hand whisk or an electric milk frother to thoroughly blend the oil and water phases, allowing proper emulsification to occur. This step requires some time, as the mixture must also cool gradually.
7. Whisk the mixture, allow it to rest for about five minutes, and then whisk again. Continue this cycle of stirring and resting until the emulsion becomes thick and remains stable without separating, even after standing for five minutes (see Figure 11)

Figure 11

8. Once the emulsion has properly formed, cooled, and achieved a thicker consistency, the final ingredients can be incorporated. Place the beaker on a digital weighing balance to determine the exact weight of the formulation. Then, slowly add the preservative in small increments until the recommended quantity is reached (generally between 0.5–1 g, depending on the specific preservative and manufacturer's instructions) (see Figure 12).

Figure 12

9. Finally, incorporate the essential oil into the prepared cream. Since it is added in small drop quantities, using a weighing balance is not required. Add the desired number of drops and mix thoroughly to ensure uniform distribution throughout the formulation (see Figure 13).

Figure 13

10. As the final step, transfer the prepared cream into a suitable storage container. It is recommended to use glass, PET plastic, or aluminum containers, as these materials provide proper stability and protection for the formulation. Avoid using unsuitable materials that may react with or affect the product quality.
11. Make sure to label the container clearly with the product name and the date of preparation for proper identification and record-keeping (see Figure 14).

Figure 14

Evaluation

1. Homogeneity:

The uniformity of the prepared cream was assessed by observing its appearance and checking its texture by touch to ensure even consistency without lumps or phase separation.

2. Organoleptic Properties:

The formulation was examined for sensory characteristics including color, odor, texture, and overall appearance. These parameters help determine the physical acceptability and quality of the cream.

3. Stability Study:

The stability of the cream was evaluated using a centrifugation method. A sample was placed in a centrifuge tube and rotated at approximately 3750 rpm for 30 minutes (or between 5000–10,000 rpm for 15 minutes). The sample was then observed for any signs of phase separation or instability.

4. Skin Whitening Assessment:

Five volunteers participated in a one-month observation study. The formulation was applied regularly and monitored. Results indicated no pigmentation changes; the cream functioned primarily as a cleansing and skin-conditioning agent rather than a bleaching product.

5. After-Feel Test:

The cream was evaluated for smoothness, spreadability, emollient effect, and the amount of residue remaining

after application of the recommended quantity. The formulation showed satisfactory results.

6. Irritation Test:

The product was applied to the skin and observed for any signs of redness, swelling, or irritation. No adverse reactions were noted, suggesting the formulation is safe for topical use.

7. Washability (Removal Test):

The cream was easily removed from the skin using normal tap water, indicating good washability.

8. Microbial Limit Test:

To check microbial safety, the cream sample was inoculated onto agar medium using the streak plate method. A control plate without the cream was also prepared. The plates were incubated at 37°C for 24 hours and then examined for microbial growth by comparing the sample plate with the control.

RESULTS

s.no	parameter	results
1	Color	Cream-coloured
2	Odour	Characterstics fragrance
3	pH	5.2
4	After feel	Smooth and emollient
5	Irritation test	No irritation observe safe for skin
6	Washability	Easily removed with tap water
7	Microbial growth test	No mocrobial growth detected
8	Skin whitening effect	No whitening effect observed
9	Homogeneity	Uniform and consistent
10	Stability test	No face separation formulation stable

Conclusion

Based on the conducted evaluation tests, the formulated herbal face cream was found to be suitable for topical application. The cream exhibited a uniform texture, pleasant characteristic odor, and an acceptable pH of 5.2, which is compatible with skin. It demonstrated good emollient properties, leaving the skin soft and smooth after application.

No signs of irritation, redness, or allergic reactions were observed, confirming its safety. The formulation was easily washable with water and showed no microbial contamination. Stability testing indicated no phase separation, confirming that the product remains physically stable.

Overall, the herbal ingredients contributed to skin soothing and improved texture without causing whitening effects. The prepared formulation can therefore be considered safe, stable, and effective for cosmetic use.

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