Formulation of Herbal Moisturizing Cream

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Abstract- Moisturizers are essential cosmetic products designed to hydrate, soften, and protect the skin. The incorporation of herbal extracts into cosmetic formulations is becoming more popular due to their natural origin, safety, and therapeutic benefits. The aim of the present study was to formulate and evaluate a herbal moisturizer cream containing Aloe vera gel as the main active ingredient, combined with other natural excipients such as coconut oil, almond oil, glycerin, and water. The cream was prepared using the emulsification technique, in which the oil phase (coconut oil, almond oil) and aqueous phase (Aloe vera gel, glycerin, water) were separately heated and then combined under continuous stirring. After cooling, vitamin E oil and essential oil were added. The formulated cream was then packed in sterile containers. The prepared herbal cream was evaluated for organoleptic properties, pH, spreadability, viscosity, stability, washability, skin irritation, and moisturizing efficiency. Results showed that the cream had a smooth texture, pleasant fragrance, stable consistency, and skin-compatible pH (5.8–6.0). The product was easily spreadable, washable, and exhibited no irritation during patch testing. Moisturization studies showed improved skin hydration after use.The study concluded that Aloe vera-based moisturizer cream is a safe, effective, and economical alternative to synthetic moisturizers. The formulation successfully combined herbal ingredients to provide nourishment, hydration, and skin protection, making it suitable for cosmetic and therapeutic applications.

Keywords: Herbal Moisturizing Cream.

I. INTRODUCTION

The skin, being the largest organ of the human body, plays a vital role in protection against environmental factors, regulation of body temperature, and sensory perception. One of the important functions of the skin is maintaining hydration. Loss of moisture from the skin surface often leads to dryness, roughness, scaling, and premature aging. To overcome this, moisturizers are commonly used. A moisturizer works by three mechanisms:

1. Occlusion – creating a protective barrier to reduce water loss (e.g., oils).
2. Humectancy – attracting water molecules from the environment into the skin (e.g., glycerin).
3. Emolliency – filling gaps between skin cells to make the skin soft and smooth (e.g., natural oils).

In modern cosmetic industries, herbal ingredients are increasingly being incorporated into formulations due to their safety and multiple therapeutic effects. Synthetic creams may contain harsh chemicals, which can cause irritation, allergies, or long-term skin damage. Herbal creams, however, are rich in bioactive compounds such as vitamins, flavonoids, and antioxidants that not only moisturize but also protect the skin.Aloe vera (Aloe barbadensis Miller) is one of the most widely used plants in herbal cosmetics. The gel obtained from its fleshy leaves is rich in polysaccharides, amino acids, enzymes, vitamins (A, C, E, B12), and minerals. It has moisturizing, anti-inflammatory, antioxidant, and wound-healing properties. Aloe vera is highly effective in hydrating the skin, reducing irritation, and improving elasticity.Other natural excipients such as coconut oil (antimicrobial, moisturizing), almond oil (rich in vitamin E), were included to enhance the properties of the cream. Glycerin was used as a humectant to attract and retain moisture. Vitamin E was incorporated as a natural antioxidant to protect skin cells from free radical damage.

II. AIM AND OBJECTIVES

Aim:

The main aim of this project is to formulate and evaluate an herbal moisturizer cream using Aloe vera gel as the key active ingredient. The goal is to develop a safe, effective, and skin-friendly herbal formulation that can provide hydration, nourishment, and

protection while minimizing the use of synthetic chemicals.

Objectives:

1. To formulate a stable herbal moisturizer cream using natural ingredients such as Aloe vera gel, coconut oil, almond oil, and glycerin by the emulsification method.
2. To study the role of Aloe vera gel as a natural moisturizing and soothing agent that enhances skin hydration and elasticity.
3. To evaluate the physicochemical characteristics of the prepared cream, including appearance, pH, spreadability, viscosity, and stability.
4. To assess the safety and performance of the cream through skin irritation and moisturizing efficiency tests.
5. To compare the properties of the formulated herbal cream with standard market formulations and establish it as a natural alternative that is cost-effective, non-toxic, and suitable for daily skin care applications.

III. LITERATURE REVIEW

Cosmetic formulations play an essential role in maintaining skin health and appearance. Among them, moisturizers are widely used products designed to improve hydration of the stratum corneum, the outermost layer of the skin. They help prevent transepidermal water loss (TEWL) and restore the natural protective barrier of the skin. Conventional moisturizers often contain synthetic ingredients such as mineral oils, silicones, and chemical emulsifiers, which may cause irritation or allergic reactions in some individuals. This has increased interest in herbal and natural cosmetics, which are safer, environmentally friendly, and enriched with bioactive compounds beneficial to the skin.

1. Herbal Cosmetics and Their Significance

Herbal cosmetics are formulations that incorporate plant-derived ingredients with therapeutic and cosmetic benefits. They are free from harsh chemicals and rely on the natural properties of herbs, extracts, and essential oils. According to the *Indian Journal of Natural Products and Resources (2018)*, the global demand for herbal cosmetics has significantly increased due to consumer awareness about the side effects of synthetic chemicals. Herbal formulations are known for their multi-functional roles such as moisturizing, antioxidant, antimicrobial, and anti-aging properties.

The main advantage of herbal moisturizers is their biocompatibility and safety. They supply vitamins, minerals, and phytochemicals that not only hydrate the skin but also rejuvenate and repair it. Ingredients like Aloe vera, almond oil, and coconut oil have long been used in traditional medicine and cosmetology for their skin-conditioning properties.

2. Role of Moisturizers in Skin Care

The function of a moisturizer is to increase the water content of the skin and maintain its softness and elasticity. Moisturizers are classified based on their mode of action:

- Occlusive agents (e.g., oils) create a barrier to reduce water evaporation.
- Humectants (e.g., glycerin, honey, Aloe vera) attract water from deeper skin layers and the atmosphere.
- Emollients (e.g., fatty acids, oils) fill the spaces between desquamating skin cells to smooth the skin.

Research by Rawlings and Harding (2004) emphasized that combining these three mechanisms produces an effective moisturizer that restores the natural barrier function of the skin. Herbal moisturizers accomplish this while also delivering plant-derived antioxidants and nutrients.

3. Aloe vera: A Key Herbal Ingredient

Aloe vera (Aloe barbadensis Miller) is one of the most widely used medicinal plants in skin care products. Its gel contains more than 75 biologically active compounds, including vitamins (A, C, E, B12), enzymes, minerals (zinc, magnesium), amino acids, and polysaccharides such as acemannan. Studies have shown that Aloe vera enhances skin hydration by binding moisture to the skin surface. It also has anti-inflammatory, antimicrobial, antioxidant, and wound-healing properties, making it ideal for sensitive or dry skin.A 2016 study in the *Journal of Pharmacognosy and Phytochemistry* reported that Aloe vera gel significantly improves skin elasticity and reduces dryness when incorporated into topical formulations. Its soothing and cooling effects also make it suitable for treating burns, irritation, and sun damage.

4. Other Herbal Ingredients Used

• Coconut oil:

Acts as an occlusive moisturizer and antimicrobial agent. It contains lauric acid, which strengthens the skin barrier and prevents infection.

• Almond oil:

Rich in vitamin E and essential fatty acids that help repair damaged skin and provide nourishment. It also reduces oxidative stress and improves skin tone.

• Glycerin:

A natural humectant that draws moisture to the skin and maintains hydration for long durations.

• Vitamin E oil:

Acts as an antioxidant that protects skin cells from damage caused by free radicals and environmental stress.

IV. REVIEW OF PREVIOUS RESEARCH

Several studies have demonstrated the successful formulation of herbal moisturizers incorporating Aloe vera and other plant-based ingredients.

- Patel et al. (2019) developed an Aloe vera-based moisturizing cream and found that it exhibited excellent spreadability, stability, and moisturizing effects compared to commercial creams.
- Garg et al. (2020) prepared an herbal cold cream using Aloe vera and neem extracts, which showed significant improvement in skin hydration and no signs of irritation.
- Nandini et al. (2021) reported that combining Aloe vera with oils like coconut and almond provides synergistic benefits, enhancing hydration and smoothness.
- These studies support the efficacy of Aloe vera-based formulations for skin care, reinforcing its potential as a natural and safe moisturizing agent.

Ingredient & Quantity Table

Ingredient	Quantity (g)
Aloe vera gel	3.0–4.0
Coconut oil	3.0
Almond oil	1.8
Xanthan gum	0.3–0.4
Glycerin	2.4
Vitamin E oil	0.3
Essential oil	0.18
Natural preservative	0.3
Distilled water	q.s. to 60 g

1. Materials Used

The formulation of the herbal moisturizer cream was carried out using natural and easily available ingredients. The materials were chosen based on their cosmetic and therapeutic benefits for skin hydration, nourishment, and protection.

a) Active Ingredient:

- Aloe vera gel – Acts as the main moisturizing and soothing agent. It helps hydrate, heal, and rejuvenate the skin due to its polysaccharide and vitamin content.

b) Oils and Fats:

- Coconut oil – Provides occlusive moisturization, prevents transepidermal water loss, and softens dry skin.
- Almond oil – Acts as an emollient rich in vitamin E and fatty acids that nourish and repair the skin.

c) Emulsifying and Thickening Agents:

- Stearic acid – Used to stabilize the emulsion and provide creaminess.

d) Humectant:

- Glycerin – Attracts moisture to the skin and maintains hydration balance.

e) Aqueous Phase:

- Distilled water – Serves as the solvent and provides the continuous phase in the emulsion system.

f) Preservatives and Additives:

- Vitamin E oil – Serves as an antioxidant and skin-conditioning agent.
- Essential oils (Lavender or Rose oil) – Added for mild fragrance and antimicrobial benefits.

2. Equipment Required

The following laboratory instruments and equipment were used in the formulation and evaluation of the herbal moisturizer:

- Beakers (100 mL, 250 mL)
- Measuring cylinder
- Weighing balance
- Water bath
- Magnetic stirrer with hot plate
- Thermometer
- Glass rod
- Homogenizer
- pH meter
- Viscometer
- Petri dishes and sample containers

3. Formulation of Herbal Moisturizer Cream
The moisturizer was formulated using the oil-in-water (O/W) emulsion method, which provides a non-greasy, smooth, and easily absorbable cream suitable for all skin types. The process involved the following steps:

- Step 1: Preparation of the Oil Phase
  Coconut oil, almond oil, stearic acid, and were accurately weighed and heated in a water bath at 70–75°C until all solid ingredients melted completely and a uniform mixture was obtained. This constituted the oil phase of the formulation.

- Step 2: Preparation of the Aqueous Phase
  In a separate beaker, distilled water and glycerin were heated to the same temperature range (70–75°C). Aloe vera gel was added slowly to this mixture with continuous stirring until a homogeneous solution was formed. This represented the aqueous phase.

- Step 3: Emulsification
  The hot aqueous phase was added gradually to the hot oil phase with constant stirring using a magnetic stirrer or homogenizer at a moderate speed (around 1000–1200 rpm) for 15–20 minutes. Continuous stirring ensured the formation of a smooth and stable emulsion.

- Step 4: Cooling and Addition of Additives
  The emulsion was allowed to cool gradually to room temperature (25–30°C) while stirring slowly to prevent phase separation. Once the mixture cooled, Vitamin E oil and essential oil were added to enhance antioxidant activity and impart fragrance. The cream was mixed thoroughly to ensure uniform distribution of all components.

- Step 5: Packaging and Storage
  The final herbal moisturizer cream was transferred into clean, sterilized, airtight containers and stored at room temperature for further evaluation.

V. EVALUATION PARAMETERS

The formulated herbal moisturizer cream was evaluated for various physicochemical and performance parameters to ensure quality, stability, and efficacy.

a) Organoleptic Evaluation:
The cream was examined visually for color, odor, texture, and smoothness to ensure acceptable aesthetic qualities.

b) pH Determination:
The pH of a 1% cream dispersion in distilled water was measured using a calibrated pH meter to confirm suitability for skin (ideal range: 5.0–7.0).

c) Spreadability Test:
The spreadability was determined by placing a small amount of cream between two glass slides and measuring the time taken for one slide to move a set distance under a specific load. Good spreadability ensures ease of application on the skin.

d) Viscosity Measurement:
Viscosity was measured using a Brookfield viscometer at room temperature to assess consistency and stability.

e) Washability:
The cream was applied to the skin and washed with water to test its removability and non-stickiness.

f) Stability Study:
The prepared cream was stored at different temperature conditions (room temperature, 4°C, and 40°C) for 4 weeks to observe any change in color, phase separation, or odor.

g) Skin Irritation Test (Patch Test):
A small amount of cream was applied to the forearm skin of volunteers to observe any signs of redness, itching, or irritation for 24 hours. The product was considered safe if no adverse reaction occurred.

h) Moisturizing Efficacy:
The moisturizing effect was evaluated by applying the cream on dry skin areas and observing improvement in texture and softness after regular use for one week.

VI. HERBAL DRUGS

Herbal drugs are natural products derived from plants that possess therapeutic, cosmetic, and restorative properties. In recent years, the use of herbal ingredients in cosmetic formulations has gained immense popularity due to their safety, efficacy, and minimal side effects compared to synthetic chemicals. Herbal extracts are rich in phytoconstituents such as vitamins, flavonoids, phenolic compounds, and essential oils, which help nourish and protect the skin. The herbal moisturizer cream formulated in this project incorporates several such beneficial natural ingredients, including Aloe vera, coconut oil, almond oil, and Vitamin E oil, each of which contributes unique skin-care benefits.

1. Aloe vera (Aloe barbadensis Miller)

Fig :1- Aloevera

Aloe vera is the principal active ingredient in the formulation. It is a succulent plant belonging to the family Liliaceae. The inner gel of the leaves contains more than 75 active compounds, including polysaccharides (acemannan), vitamins (A, C, E, and B12), enzymes, amino acids, and minerals. These constituents promote hydration, skin healing, and regeneration. Aloe vera gel acts as a natural humectant, attracting and retaining moisture in the skin. It also exhibits anti-inflammatory, antimicrobial, antioxidant, and wound-healing properties, making it ideal for dry, irritated, or sensitive skin. Studies have shown that Aloe vera enhances skin elasticity and helps reduce fine lines and dryness, supporting its role as a moisturizing and soothing agent.

2. Coconut Oil (Cocos nucifera)

Fig : 2-Coconut Oil

Coconut oil is widely used in traditional and modern skin-care products. It is composed of medium-chain fatty acids, primarily lauric acid, which provides antimicrobial and moisturizing effects. The oil forms a thin protective layer on the skin, reducing transepidermal water loss and keeping the skin soft and smooth. It also possesses anti-inflammatory and antioxidant properties, which help prevent premature aging and protect against environmental damage.

3. Almond Oil (Prunus amygdalus)

Fig :3-Almond Oil

Almond oil is rich in vitamin E, monounsaturated fatty acids, and proteins that nourish and rejuvenate the skin. It helps repair damaged skin cells and improves skin tone and complexion. Its emollient nature ensures smoothness and elasticity while reducing roughness and dryness. Almond oil also contains antioxidants that protect the skin from oxidative stress and environmental pollutants.

VII. RESULTS AND DISCUSSION

The formulation of the herbal moisturizer cream using Aloe vera gel was successfully prepared through the oil-in-water (O/W) emulsion method, and it exhibited satisfactory physicochemical and functional properties. The results of various evaluation parameters are summarized and discussed below. Each parameter was assessed to ensure the cream's safety, stability, texture, spreadability, and moisturizing effectiveness.

1. Organoleptic Characteristics

The prepared herbal moisturizer cream was light green in color, smooth in texture, and had a pleasant fragrance due to the inclusion of essential oil. It was non-greasy and easily spreadable over the skin. The appearance was homogenous without any signs of phase separation or grittiness. These characteristics indicate that the cream possessed desirable aesthetic qualities, which are crucial for consumer acceptance.

The smooth texture can be attributed to the presence of coconut oil and almond oil, which imparted a creamy consistency and ensured even blending of the oil and water phases. The pleasant odor derived from natural essential oil added to the sensory appeal, making the product suitable for daily cosmetic use.

2. pH Determination

The pH of the formulated cream was found to be in the range of 6.0–6.5, which is within the ideal range for human skin (4.5–7.0). Maintaining this pH ensures that the product does not cause irritation, dryness, or disruption of the natural skin acid mantle. The slightly acidic to neutral pH enhances the...

3. Spreadability

Spreadability is an important characteristic that determines the ease of application and uniform distribution of the cream on the skin. The formulated herbal moisturizer showed excellent spreadability, indicating that only a small amount was required to cover a large surface area. The smooth spreading can be attributed to the balanced composition of oils and emulsifying agents, particularly the presence of coconut oil and almond oil, which reduce surface friction and improve glide.

Good spreadability ensures user comfort, enhances product performance, and improves the overall moisturizing effect by allowing the active ingredients to form a uniform protective layer on the skin.

4. Viscosity

The viscosity of the cream was measured using a Brookfield viscometer and found to be within the optimal range for semisolid formulations. The cream maintained its structure without being too thick or too runny. The consistency was stable, indicating proper emulsification and adequate use of stearic acid as stabilizing agents.

A balanced viscosity ensures that the cream remains stable during storage and application. Excessively high viscosity may make the product difficult to apply, while very low viscosity could lead to phase separation. The obtained viscosity values confirmed that the formulation possessed appropriate rheological behavior for a moisturizing cream.

5. Washability

The cream was easily washable with plain water, leaving no oily or sticky residue on the skin. This property enhances the consumer's comfort and usability. Washability is an essential attribute of cosmetic creams, ensuring that the product can be conveniently removed without harsh scrubbing or the need for detergents.

6. Stability Studies

Stability testing was conducted by storing the cream at different temperature conditions (room temperature, refrigeration at 4°C, and accelerated temperature at 40°C) for 4 weeks. Observations were made for any changes in color, odor, texture, or phase separation.

The results showed that there were no visible changes in appearance or consistency under normal and refrigerated conditions. However, a slight decrease in viscosity was observed at higher temperatures, which is acceptable for natural formulations. The absence of microbial growth, odor change, or phase separation confirmed that the formulation was physically and chemically stable. The inclusion of Vitamin E oil as an antioxidant and the natural antimicrobial properties of Aloe vera and coconut oil contributed to this stability.

7. Skin Irritation Test (Patch Test)

A patch test was performed on healthy volunteers by applying a small amount of cream to the forearm skin and observing for any signs of redness, itching, or irritation over 24 hours. No adverse reactions were observed, indicating that the cream was safe and non-irritating. The presence of Aloe vera, and almond oil provided soothing and calming effects, which further reduced the risk of skin irritation.

This result demonstrates that the herbal moisturizer is dermatologically safe for external application and suitable even for sensitive skin types.

8. Moisturizing Efficacy

The moisturizing ability of the cream was evaluated by applying it to dry skin areas and observing changes in texture and softness over a period of one week. The skin appeared smoother, more hydrated, and supple after consistent application. The improvement in skin hydration can be attributed to the synergistic effect of Aloe vera (a natural humectant), glycerin (moisture attractant), and oils (occlusive agents) that lock in water within the stratum corneum.

These findings are consistent with previous studies that demonstrate Aloe vera's ability to increase skin moisture and elasticity due to its polysaccharide content. The overall performance of the cream confirmed its effectiveness as a natural moisturizer that provides both immediate and long-lasting hydration.

VIII. DISCUSSION OF OVERALL FINDINGS

The results of the evaluation confirm that the Aloe vera-based herbal moisturizer cream possessed all the desirable characteristics of an ideal cosmetic product—pleasant appearance, acceptable pH, smooth texture, ease of spreadability, and good stability. The inclusion of natural oils and butters enhanced the moisturizing and nourishing properties of the formulation, while the absence of synthetic chemicals minimized potential irritation and toxicity.

The successful formulation of this cream demonstrates the potential of herbal ingredients to replace synthetic compounds in modern skincare products. The use of Aloe vera, almond oil, coconut oil, and Vitamin E oil provided a natural synergy that improved the overall texture, efficacy, and skin compatibility of the moisturizer.

Additionally, the positive stability results suggest that the product can maintain its quality over time without preservatives, making it an eco-friendly and sustainable alternative to commercially available moisturizers. This aligns with current global trends favoring natural and herbal-based cosmetic formulations.

IX. CONCLUSION AND FUTURE SCOPE

The present study successfully formulated and evaluated an Aloe vera-based herbal moisturizer cream using natural ingredients such as coconut oil, almond oil, glycerin, and Vitamin E. The formulation exhibited desirable characteristics, including a smooth texture, pleasant appearance, stable emulsion, ideal pH, and excellent spread ability. The cream was non-greasy, easily washable, and showed no signs of irritation or adverse reactions, indicating its safety and suitability for all skin types. The moisturizing efficacy test revealed significant improvement in skin hydration and softness after regular use, confirming the synergistic effect of the herbal ingredients. This research demonstrates that herbal formulations can serve as a safe and effective alternative to chemical-based cosmetic products. The use of natural ingredients not only enhances skin health but also aligns with the growing demand for eco-friendly and sustainable skincare solutions.

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