Front Multidiscip Res Stud (2025) Vol 2 (1); e-ISSN: 3049-1711

Frontiers in Multidisciplinary Research and Studies

journal homepage: https://openj.edwiserinternational.com/index.php/fmrs

Review Article

A detailed review on herbal face cream: from formulation technique to evaluation parameters

Kausar Shafaat*, Pankaj Kumar, Sudhir Kumar, Nikhil Kumar, Law Kumar, Sonu Kumar and Sushanto Kumar

Department of Pharmacy, Mahadeva Lal Schroff College of Pharmacy, Aurangabad, Bihar-824101, India

ARTICLE INFO

Received: 01 March 2025
Revised: 23 April 2025
Available Online: 05 June 2025

*Corresponding author:
Kausar Shafaat, Associate Professor, Mahadeva Lal Schroff College of Pharmacy, NS 22, 23 Growth Centre near Bihar Cement Plant, Aurangabad Bihar-824101, India.

ABSTRACT

This review article explores the crucial role of emotional intelligence (EI) and leadership attributes in shaping organizational success. Emotional intelligence, the ability to recognize, understand, and manage emotions in oneself and others, is highlighted as a key factor in fostering positive interpersonal relationships and enhancing team dynamics. The article synthesizes research linking high EI in leaders to improved employee morale, productivity, and conflict resolution. Furthermore, the review emphasizes the significance of core leadership qualities such as vision, adaptability, communication, and decision-making in navigating the complexities of modern organizations. It examines the intersection of EI and leadership styles, including transformational, transactional, and servant leadership, to provide a holistic understanding of how emotional competencies contribute to effective leadership. By analyzing case studies and empirical findings, the article offers insights into how organizations can develop EI and leadership potential within their teams to drive sustainable growth, innovation, and employee well-being. The review ultimately underscores the need for organizations to prioritize emotional intelligence as a critical leadership attribute in order to cultivate a resilient and thriving workplace culture.

Keywords: *Face Cream; Herbals; Formulation technique; Evaluation parameters.*

Introduction

The term “cosmetic” originates from the Greek word *kosmētikos*, meaning “to adorn” or “to beautify.” Historically, this term has come to encompass all products used to enhance or improve physical appearance. Today, any substance applied externally to beautify, cleanse, or protect the skin is generally referred to as a cosmetic [1].

On the other hand, the word “herbal” implies natural origins and is often associated with safety, especially in contrast to synthetic products that may pose health risks due to chemical content. Increasing awareness about the side effects of synthetic cosmetics has led to a global shift in consumer preference toward herbal alternatives. According to labor and market statistics, the herbal medicine industry is witnessing significant growth, and this has extended to the herbal cosmetics sector, which is experiencing a steady rise in global demand [2,3].

Herbal creams are cosmetic products formulated using plant-based ingredients known for their beneficial properties for the skin. These plants, often referred to as “herbs,” are selected for their therapeutic qualities such as antiseptic, antibacterial, emollient (skin-softening), and anti-inflammatory effects. A good herbal cream typically contains extracts from medicinal plants like neem, papaya, aloe vera, tulsi

(holy basil), and turmeric, which are known for their skin-nourishing and healing capabilities [4].

Creams, in general, are semi-solid emulsions composed of oil and water, often used topically for various purposes including treatment, prevention, or beautification. They can be applied to different parts of the body such as the skin, eyes, nasal passages, or even sensitive areas like the genitals and anus. Creams serve to moisturize, protect, and cleanse the skin, and are available in various types to suit different needs, such as [5,6]:

- Massage creams (for hand and body care)
- Night creams (for overnight skin nourishment)
- Cleansing creams (to remove dirt and impurities)
- Cooling creams (for soothing irritated skin)
- Foundation creams (used as a base makeup)
- Disappearing creams (light formulations that blend into the skin)

What sets herbal creams apart is their use of natural tinctures, essential oils, and plant extracts instead of artificial chemicals. These ingredients not only beautify the skin but also promote its health and overall well-being, making herbal creams a preferred choice for those seeking gentle and holistic skincare solutions [7].

The Skin: Structure and Characteristics

The skin, also known as the cutaneous membrane, is the largest organ of the human body by weight and surface area. In adults, it covers an area of approximately 2 square meters and weighs around 4.5 to 5 kilograms, accounting for about 7% of total body weight [8].

The thickness of the skin varies depending on its location on the body. It can be as thin as 0.5 mm on delicate areas like the eyelids, and as thick as 4.0 mm on the heels, where protection is most needed. On most of the body, skin thickness ranges between 1 to 2 mm [9].

Skin pH and Its Role

The pH of the skin typically ranges between 4.0 and 5.6, indicating a mildly acidic environment. This acidity reflects the composition of the acid mantle, a thin film of water, natural oils (sebum), sweat, and other soluble substances found on the skin's surface. The combination of sweat and fatty acids from sebum contributes to this acidic pH, which plays an essential role in protecting the skin from microbial invasion. The natural acidity creates an inhospitable environment for many pathogens and helps maintain skin integrity by limiting the growth of harmful bacteria and fungi [10].

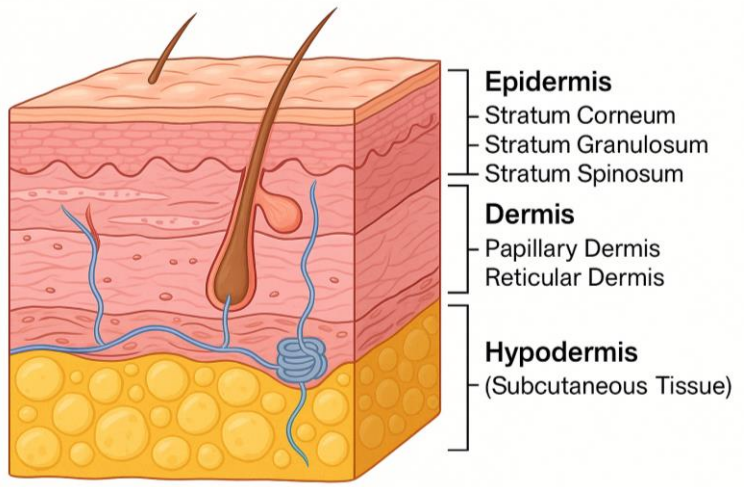

Figure 1: A cross-sectional diagram of showing different layers of the skin.

Layers of the Skin

The skin is composed of three primary layers, each with specific functions and characteristics:

Epidermis

The epidermis is the outermost layer of the skin and serves as the body's first line of defense against environmental hazards. While its average thickness is about 0.1 mm, it can become much thicker—up to 1 mm or more—on areas exposed to friction and pressure, such as the palms of the hands and soles of the feet.

The primary cell type in the epidermis is the keratinocyte, named for its role in producing keratin—a tough, fibrous protein also found in hair and nails. Keratin contributes to the strength, durability, and water-resistant nature of the skin, making it resilient to physical wear and environmental damage [11].

Layers of the Epidermis

The epidermis, the outermost layer of the skin, is composed of five distinct sublayers arranged from the surface inward. These layers play a crucial role in skin protection, regeneration, and hydration. Each layer consists of keratinocytes at different stages of development.

1. Stratum Corneum (Horny Layer)

The stratum corneum is the outermost layer of the epidermis and serves as the first barrier against environmental aggressors. It is composed of corneocytes—dead, flattened cells that have lost their nuclei and are densely packed with keratin, a tough structural protein. This keratinized layer provides mechanical strength to the skin and also plays a vital role in water retention, acting as a barrier to prevent dehydration. Although it may appear structurally simple, the stratum corneum is essential for maintaining the skin's hydration, integrity, and protective functions.

2. Stratum Lucidum (Clear Layer)

The stratum lucidum is a thin, transparent layer found only in thick, hairless skin such as the palms of the hands and soles of the feet. It lies between the stratum corneum and the stratum granulosum. This layer helps to reduce friction and shear forces, enhancing the skin's durability in areas subjected to constant mechanical stress.

3. Stratum Granulosum (Granular Layer)

In the stratum granulosum, keratinocytes begin to die as they move further from the blood supply in the dermis. These cells lose their nuclei and are filled with dark granules of keratohyalin and lamellar bodies, which are responsible for producing keratin proteins and lipid-based waterproofing compounds. This layer plays a key role in forming the skin's water barrier, preventing water loss and protecting against microbial invasion.

4. Stratum Spinosum (Prickle Cell Layer)

Also known as the spiny layer, the stratum spinosum consists of keratinocytes that have transitioned from a columnar to a polygonal shape. These cells are connected by desmosomes, which appear as spiny projections under a microscope, giving the layer its name. Here, the production of keratin begins in earnest, and the cells start to gain structural resilience.

5. Stratum Basale (Basal Layer)

The stratum basale, or basal layer, is the deepest layer of the epidermis. It consists of a single row of undifferentiated columnar stem cells, which continuously divide to replenish the upper layers. Approximately half of the newly formed cells migrate upward to begin their journey through the epidermal layers, while the rest remain in the basal layer to maintain the regenerative pool. This layer is also responsible for producing melanocytes (which give skin its pigment) and Merkel cells (involved in touch sensation).

Dermis

The dermis is the middle layer of the skin, located directly beneath the epidermis. It is approximately four times thicker than the epidermis and serves as the supportive framework of the skin. Unlike the epidermis, which is avascular (lacks blood vessels), the dermis is richly supplied with blood vessels, nerve endings, sweat glands, sebaceous (oil) glands, hair follicles, and connective tissue.

The primary components of the dermis are fibrous connective tissue proteins, primarily collagen and elastin, which provide the skin with strength, elasticity, and resilience. These fibres are embedded in a ground substance rich in glycosaminoglycans (GAGs), formerly referred to as mucopolysaccharides. These molecules help maintain skin hydration by attracting and holding water.

The dermis is functionally divided into two distinct layers:

1. Papillary Region

The papillary layer is the uppermost portion of the dermis, located just beneath the epidermis. It is composed of loose areolar connective tissue and is named for its dermal papillae—small, finger like projections that extend toward the epidermis. These papillae interlock with the epidermal ridges, creating a wavy junction that enhances the bond between the dermis and epidermis, providing both structural integrity and increased surface area for nutrient exchange.

This region also contains capillaries, sensory neurons, and immune cells, playing a crucial role in thermoregulation, sensory perception, and immune defence.

2. Reticular Region

Located beneath the papillary layer, the reticular region forms the bulk of the dermis. It is composed of dense irregular connective tissue, containing a thick network of collagen, elastin, and reticular fibers that give the skin its tensile strength and flexibility. This layer supports larger blood vessels, deep pressure

receptors, lymphatic vessels, and the deeper parts of hair follicles and glands.

The reticular region contributes significantly to the skin's ability to resist tearing and stretching, particularly during physical activity or trauma.

Hypodermis (Subcutaneous Layer)

Beneath the dermis lies the hypodermis, also known as the subcutaneous layer. This layer is primarily made up of adipose tissue (fat-storing cells) and loose connective tissue. The thickness of the hypodermis can vary widely depending on individual body composition, age, sex, and nutritional status.

The hypodermis serves several important functions:

- Thermal insulation: Helps regulate body temperature by conserving heat.
- Shock absorption: Protects underlying muscles and bones from injury.
- Energy storage: Stores fat that can be metabolized for energy.
- Mobility: Its loosely arranged structure allows the skin to move freely over underlying tissues, such as muscles and bones.

Additionally, the hypodermis houses larger blood vessels and nerves that supply the dermis and epidermis above [12].

Creams: Semi-Solid Dosage Forms in Pharmaceuticals and Cosmetics

In the pharmaceutical industry, various dosage forms are used for the delivery of active ingredients. Among these, semi-solid dosage forms, particularly creams, are widely utilized. Creams are typically intended for topical application on the skin and consist of mixtures of oil and water. They serve not only therapeutic purposes in pharmaceuticals but also hold a significant place in the cosmetic industry, where they are valued for their moisturizing and protective properties [13].

Cosmetic Creams: Purpose and Benefits

Cosmetic creams are designed to enhance the beauty and attractiveness of the skin while offering protection from harmful external (exogenous) and internal (endogenous) agents. The use of such products extends beyond merely improving external appearance—they also contribute to the long-term health of the skin by preventing or reducing various skin disorders [14].

According to cosmetic regulations, cosmetics are substances intended to be applied externally to the human body (e.g., on skin, hair, lips, or nails) for purposes such as:

- Cleansing
- Beautifying
- Promoting attractiveness
- Altering appearance

Importantly, cosmetics do not affect the structure or function of the body, distinguishing them from medicinal products.

Face Creams and Skin Complexion

Over the past few decades, face creams have gained popularity for their role in improving skin complexion and radiance. One of the key factors influencing skin tone is melanin, a pigment synthesized by melanocytes—specialized cells located in the epidermis. The process of melanin production is known as melanogenesis. Excessive melanin production can lead to hyperpigmentation and a darker complexion.

Face creams often target this process by controlling melanin dispersion, aiming to provide a brighter and more even skin tone. These creams are typically oil-in-water (O/W) or water-in-oil (W/O) emulsions.

Types of Creams Based on Emulsion Type

1. Oil-in-Water (O/W) Creams

- Composed of small droplets of oil dispersed in a continuous water phase.
- Lightweight, less greasy, and cosmetically more acceptable.
- Easily washable with water.
- Commonly used as moisturizers, face creams, and day creams.

2. Water-in-Oil (W/O) Creams

- Composed of water droplets dispersed in a continuous oil phase.
- Thicker, more moisturizing, and better at forming a protective oily barrier.
- Suitable for dry skin and night creams due to their ability to reduce water loss from the stratum corneum (outer skin layer).
- More difficult to remove and may feel heavier on the skin.

Ideal Characteristics of a Cream

To ensure effectiveness and user satisfaction, an ideal cream should possess the following properties:

- Efficient Skin Penetration: The active ingredients should effectively penetrate the skin to produce the desired therapeutic or cosmetic effect.
- Non-Toxicity: The formulation should be safe for regular use, causing no adverse effects like itching, redness, or rashes.
- Easy Spreadability: The cream should spread smoothly and evenly over the skin surface without much effort.
- Thermosensitivity: It should melt or liquefy at body temperature, allowing for quick absorption and comfort.
- Non-Irritant Nature: The cream must be gentle on the skin, avoiding any inflammatory reactions or discomfort.

Herbal Creams: Natural Alternatives for Skin Care

Herbal creams are skin care products formulated using natural ingredients derived exclusively from herbs, shrubs, and other medicinal plants. Unlike synthetic creams, which may cause adverse reactions such as allergies, rashes, or irritation, herbal creams are considered safer and more compatible with the skin, making them suitable for regular and long-term use.

The key advantage of herbal creams lies in their non-toxic nature, gentle action, and the availability of ingredients directly from nature. Their preparation is relatively simple due to the natural abundance of herbs, especially in countries like India, which has a rich biodiversity and a long-standing tradition of herbal medicine [15].

Types of Herbal Creams

Herbal creams can be formulated for various purposes, including:

- Cleansing creams – for removing dirt and impurities
- Cold creams – for moisturizing and protecting dry skin
- Foundation creams – as a base for makeup
- Vanishing creams – for smooth texture and oil control
- Night creams – for skin repair and hydration overnight
- Massage creams – for relaxation and nourishment
- Hand and body creams – for overall body hydration and protection

Historical and Cultural Background

India has a rich heritage of Ayurveda, Siddha, and Unani systems of medicine, where herbal formulations have been used for centuries. In these systems, natural creams were made using plant-based extracts to treat various inflammatory skin conditions, wounds, and infections.

From prehistoric times, herbal remedies have been used not just for their cosmetic value, but also for therapeutic purposes, such as protecting the skin from infections, healing wounds, and preventing damage caused by environmental agents. With the rise in awareness of the side effects of chemical products, the demand for herbal cosmetics has significantly increased in recent years [16].

Role of Ayurveda and Traditional Knowledge

The Ayurvedic system laid the foundation for the modern use of herbal creams. Plants like Aloe vera, Amla, and Cucumber peel have been staples in Ayurvedic, Siddha, and Homeopathic medicine for centuries. These natural ingredients are valued for their cooling, hydrating, and healing properties.

Aloe Vera gel, derived from the mucilaginous tissue in the center of the leaf, is a key base in many skin care formulations.

Cucumber peels are rich in fiber, and contain essential minerals such as magnesium, potassium, and silica, which are beneficial for skin health.

Key Ingredients in Herbal Face Creams

Calendula (Calendula officinalis)

- Known for its anti-inflammatory, antiseptic, and healing properties.
- Effective in treating insect bites, minor cuts, and skin irritations.

Aloe Vera (Aloe barbadensis)

- A widely used herbal ingredient in beauty products.
- Helps soothe irritated skin, reduce inflammation, and heal burns and wounds.
- Used as a moisturizer, to treat acne, and enhance sunscreen effectiveness.

Hibiscus (Hibiscus rosa-sinensis)

- Rich in amino acids and natural acids, often associated with skin tightening and toning.
- Believed to support collagen production, giving a youthful appearance to the skin.

Neem (Azadirachta indica)

- Acts as a powerful antifungal, antibacterial, and anti-inflammatory agent.
- Helps in reducing scars, pigmentation, acne, and itching.

Tulsi (Ocimum sanctum)

- Also known as holy basil.
- Promotes skin radiance, helps in healing wounds, and provides a natural glow.

Hibiscus abelmoschus (Abelmoschus moschatus / Okra)

- Traditionally used for the treatment of various conditions like diarrhea, gonorrhea, urinary tract infections, and skin inflammation.
- In skin care, it acts as a natural moisturizer and helps reduce itchiness.

Herbal Extracts: Essential Components in Herbal Face Cream Formulation

Herbal extracts play a vital role in the formulation of herbal face creams, as they contain the active phytochemicals responsible for delivering therapeutic and cosmetic benefits to the skin. These extracts are obtained from medicinal plants, including their leaves, roots, flowers, seeds, and bark, which are rich in natural compounds such as antioxidants, vitamins, flavonoids, and essential oils [17].

To ensure the effectiveness and safety of herbal face creams, it is crucial that the extraction of herbal ingredients is carried out using scientific and precise techniques. The method of extraction must preserve the integrity and potency of the bioactive compounds, as improper extraction can lead to loss of efficacy or instability of the final product.

Importance of Proper Herbal Extraction

1. Preservation of Active Constituents:
   Herbal plants contain delicate compounds that can be degraded by heat, light, or harsh solvents. Proper extraction techniques ensure these compounds are preserved in their most effective form.
2. Standardization:
   Standardized extracts guarantee consistent quality and potency, which is essential for maintaining the efficacy of herbal creams across different batches.
3. Purity and Safety:
   Proper extraction helps in eliminating impurities, contaminants, and non-beneficial plant material, making the extract safe for topical application.
4. Enhanced Absorption:
   Extracts prepared correctly are more easily absorbed into the skin, ensuring better penetration of beneficial compounds.

Extraction Process of Selected Herbal Ingredients

The efficacy of herbal face creams greatly depends on the quality of the herbal extracts used in their formulation. The extraction process must be carried out meticulously to preserve the bioactive compounds that contribute to the product's therapeutic and cosmetic benefits. Below are the detailed procedures for extracting various commonly used herbal ingredients [18]:

1. Tulsi (Ocimum sanctum) Extract

- Collection and Drying: Fresh tulsi leaves are harvested and subjected to drying either by natural air-drying for 3–4 days or by using a hot air oven to speed up the process.
- Pulverization: The dried leaves are ground into a fine powder.
- Extraction:
  - Take 1 gram of tulsi powder in a clean beaker.
  - Add 10 ml of dimethyl sulfoxide (DMSO) as the solvent.
  - Shake the mixture vigorously to ensure proper dissolution.
  - Heat on a water bath at 80–100°C for enhanced extraction.
  - Filter the solution to remove any particulate matter or impurities.
  - The resulting clear filtrate is used in the preparation of herbal creams.

2. Aloe Vera Extract

- Collection and Preparation: Mature and healthy aloe vera leaves are harvested and washed.
- Gel Extraction:

- Using a sterile knife, the outer green layer is carefully removed.
- The inner gel is collected and filtered to obtain a clear extract.
- This gel is rich in mucopolysaccharides, vitamins, and antioxidants, making it ideal for moisturizing and healing formulations.

3. Neem (Azadirachta indica) Extract

- Leaf Processing: Neem leaves are harvested, washed thoroughly, dried, and powdered.
- Extraction:
  - Take 5 grams of neem powder and dissolve in dimethyl sulfoxide (DMSO).
  - Heat the solution in a water bath at 80–100°C.
  - After thorough heating, the mixture is filtered to obtain a clear extract, which is incorporated into herbal creams for its antimicrobial and anti-inflammatory properties.

4. Lycopene (from Tomatoes) Extract

- Preparation: A weighed amount of tomato paste is dissolved in methanol and shaken thoroughly [19].
- Phase Separation:
  - Leave the mixture undisturbed for 3 hours.
  - Discard the upper yellow layer, and add equal volumes of carbon tetrachloride and methanol to the remaining solution.
  - Separate the upper methanolic layer, add water to form a white emulsion, and further purify using anhydrous sodium sulfate.
  - Filter and evaporate on a water bath to obtain a dark oily residue.
  - Dissolve the residue in benzene and crystallize lycopene using boiling methanol dropwise.
  - Lycopene is a powerful antioxidant beneficial for skin protection and rejuvenation.

5. Papain Extract (from Papaya)

- Fruit Preparation: Wash and peel ripe papaya.
- Extraction:
  - Cut into small pieces, blend/crush with 100 ml of distilled water, and filter.
  - The clear solution contains papain, an enzymatic exfoliant used to remove dead skin cells and reduce pigmentation.

6. Green Tea Extract

- Leaf Processing: Collect fresh green tea leaves, dry them in shade, and grind into coarse particles.
- Extraction:
  - Use a hydroalcoholic solvent mixture (70% water : 30% alcohol).
  - Perform cold maceration by soaking the plant material in the solvent.
  - After sufficient soaking, filter and dry the extract, which is then used for its antioxidant and anti-aging properties.

Identification of Phytochemicals in Herbal Extracts

To verify the presence of bioactive compounds, qualitative phytochemical screening is performed. This helps ensure the extract contains the desired medicinal constituents [20].

Tests for Alkaloids

1. Mayer's Test
   - Procedure: Mix the crude extract with 2 ml of 1% hydrochloric acid and gently heat.
   - Observation:
     - Tulsi extract: Formation of white precipitate confirms the presence of alkaloids.
     - Lycopene extract: A dark orange color indicates alkaloid presence.
2. Dragendorff's Test
   - Procedure: Add Dragendorff's reagent to the test sample.
   - Observation:
     - Tulsi extract: An orange-red coloration indicates alkaloids.
     - Lycopene extract: A yellow-orange hue confirms the presence of alkaloids.

Tests for Flavonoids

Flavonoids are antioxidant compounds that play a vital role in protecting the skin from oxidative stress and inflammation.

1. Lead Ethanoate Test
    - Procedure: Add 1 ml of lead ethanoate solution to a test tube containing the crude extract.
    - Observation: Formation of a buff-colored precipitate indicates the presence of flavonoids.
    - Significance: Suggests the extract contains plant-based polyphenols known for anti-aging and skin-soothing properties.
2. Shinoda Test
    - Procedure: Add a small amount of magnesium powder followed by a few drops of concentrated hydrochloric acid to the test tube containing the crude extract.
    - Observation: Appearance of a pink to scarlet red color indicates the presence of flavonoids.
    - Significance: Confirms the presence of compounds that may help reduce inflammation and promote even skin tone.

Tests for Tannins

Tannins possess astringent and antimicrobial properties and are commonly found in skin-care products for toning the skin [21].

- Ferric Chloride Test
    - Procedure: Add 1 ml of ferric chloride solution to the test tube containing the crude extract.
    - Observation: Development of a black or dark blue color confirms the presence of tannins.
    - Significance: Indicates potential antiseptic and pore-tightening effects in topical formulations.

Tests for Proteins

Proteins in herbal extracts may contribute to skin repair, elasticity, and hydration.

1. Biuret Test
    - Procedure: Add 2 ml of Biuret reagent to the test tube containing the crude extract. Shake well and gently warm the mixture for a few minutes.
    - Observation: Formation of a red or violet coloration indicates the presence of proteins.
    - Significance: Suggests the inclusion of amino acids or peptides that support skin rejuvenation and texture improvement.
2. Millon's Test
    - Procedure: Add 2 ml of Millon's reagent to the herbal extract in a test tube. A white precipitate may form. On heating, if the precipitate turns red, it indicates the presence of proteins.
    - Significance: Confirms the presence of tyrosine-containing proteins which are beneficial for skin nourishment.

Tests for Carbohydrates

Carbohydrates in herbal extracts help in moisture retention and forming a protective barrier on the skin.

1. Fehling's Test
    - Procedure: Mix equal parts of Fehling's A and B solutions, add 2 ml of the mixture to the herbal extract, and heat gently.
    - Observation: Formation of a brick-red precipitate confirms the presence of reducing sugars (carbohydrates).
    - Significance: Indicates hydrating agents that improve skin texture and smoothness.
2. Iodine Test
    - Procedure: Add 2 ml of iodine solution to 0.5–1 ml of the crude extract.
    - Observation: A dark blue or purple coloration indicates the presence of starch or polysaccharides.
    - Significance: Demonstrates moisturizing and film-forming properties ideal for face creams.

Methods of Herbal Face Cream Preparation

The effectiveness of a herbal face cream is not only dependent on the ingredients used but also on the method of formulation. Various techniques are employed to ensure uniform distribution, stability, and proper texture of the cream [22].

1. **Trituration Method**

- Description: A technique involving geometric dilution, where all the ingredients are mixed gradually in increasing proportions to achieve a uniform blend.
- Application:
    - Dry or powdered ingredients are mixed using a mortar and pestle.
    - For liquid components, a well is created in the center of the base for even blending.
    - Glass slabs are used when smaller quantities are involved to avoid air pockets.
- Significance: Ensures uniform consistency and minimizes product separation.

2. **Levigation Method**

- Description: This method is suitable when coarse powders need to be incorporated into a semisolid base.
- Procedure:
    - Coarse particles are rubbed with a levigating agent such as glycerin or a melted base.
    - This reduces particle size and ensures a smooth texture.
- Significance: Ideal for creating creams with a fine, uniform feel, especially when using gritty herbal powders.

3. **Fusion Method**

- Description: In this method, all solid and semi-solid ingredients are melted together in a suitable ointment or cream base.
- Procedure:
    - The ingredients are carefully heated until liquified and thoroughly mixed.
    - After complete mixing, the formulation is allowed to cool slowly while stirring to ensure uniform texture.
- Precaution: Special care is taken to avoid thermal degradation of heat-sensitive herbal components.
- Significance: This method is often used for stable emulsified creams where solubility and even dispersion are crucial.

Evaluation of Herbal Face Cream

To ensure the quality, safety, and effectiveness of the prepared herbal face cream, a comprehensive evaluation was carried out involving several physical and functional tests as described below:

1. Physical Evaluation

The prepared herbal cream was thoroughly examined for its physical characteristics, including:

- Colour: The colour of the cream was noted to check for uniformity and to detect any discoloration that might indicate instability or contamination.
- Odour: The fragrance or smell of the cream was assessed to ensure it was pleasant and consistent with herbal ingredients, as any off-odours could signal spoilage.
- Texture: The consistency and feel of the cream were evaluated by touch to determine smoothness, creaminess, and any graininess.
- State: The physical state of the formulation (whether it was semi-solid, cream-like, or oily) was recorded to confirm it met the expected criteria.

2. Irritancy Test

To evaluate the potential for skin irritation, an irritancy test was conducted:

- A 1 square centimeter area was marked on the dorsal (back) side of the left hand.
- A small quantity of the herbal cream was applied evenly to this area.
- The time of application was recorded, and the site was observed periodically for up to 24 hours for signs of skin irritation such as:
    - Erythema (redness)
    - Edema (swelling)
    - Any other adverse reactions or discomfort.
- Observations were documented carefully to confirm the cream's safety for topical use.

3. Spreadability

The ease with which the cream spreads on the skin was quantitatively measured:

- A measured amount of cream was placed between two glass slides.

- A weight of 100 grams was applied on the upper slide for 5 minutes to simulate pressure during application.
- The distance (length) the upper slide moved over the lower slide under this weight was recorded.
- The spreadability (S) was calculated using the formula:

$$S = m \times l / t$$

where:

- m = weight applied on the upper slide (100 g),
- l = length moved by the upper slide (cm),
- t = time taken (seconds).

A higher spreadability value indicates better ease of application on the skin.

4. Viscosity

The thickness and flow behaviour of the herbal cream were assessed using a Brookfield Viscometer:

- This instrument measures the resistance of the cream to flow under applied shear.
- The viscosity value helps understand the cream's consistency, which affects application and stability.

5. Homogeneity

Homogeneity ensures uniform distribution of all ingredients:

- The cream was visually inspected for any lumps, grains, or phase separation.
- It was also checked by touch to confirm a smooth, consistent texture without any gritty particles.
- Uniformity in appearance and feel indicates proper formulation and mixing.

6. Removal Test

To assess the ease with which the cream can be washed off from the skin:

- The cream was applied on a specific area and then washed with tap water.
- The ease of removal and any residue left behind were noted.
- A cream that is easily removable without leaving a greasy or sticky film is generally preferred for daily use.

7. Dye Test (Type of Emulsion)

The nature of the emulsion system (oil-in-water or water-in-oil) was determined using a scarlet dye test:

- A small amount of scarlet dye was mixed into the cream.
- A drop of this dyed cream was placed on a microscope slide and covered with a cover slip.
- Under the microscope:
  - If the dispersed globules appear red and the surrounding medium is colourless, the cream is an oil-in-water (O/W) type.
  - Conversely, if the globules are colourless and the ground appears red, it indicates a water-in-oil (W/O) type.
- This test helps classify the cream and predict its behavior on the skin.

8. After-feel

The sensory properties after application were evaluated by applying a fixed amount of cream and assessing:

- Emollience: How soft and moisturized the skin feels after application.
- Slipperiness: The level of slickness or smoothness left on the skin.
- Residue: Whether any sticky or greasy film remains, which can affect user comfort.

9. Type of Smear

After applying the cream, the nature of the film or smear formed on the skin surface was observed:

- The film could be oily, dry, greasy, or non-greasy.
- These characteristic influences skin feel and acceptability.

10. Determination of pH

The pH level of the herbal cream was measured to ensure skin compatibility and stability:

- A standard digital pH meter was used.
- The cream was diluted with a suitable solvent (usually distilled water) in a clean beaker.

- Measurement was performed at room temperature.
- The ideal pH for facial creams typically ranges from 5 to 7, matching the skin's natural pH to minimize irritation.

Conclusion

Herbal face creams offer a natural and safe alternative to synthetic skincare products, harnessing the benefits of plant-based ingredients known for their soothing, moisturizing, and healing properties. The formulation of herbal creams provides effective skin nourishment while minimizing the risk of adverse reactions. With increasing consumer demand for gentle and environmentally friendly skincare, herbal face creams are gaining widespread popularity. Continued research and development in this field will further enhance their quality, stability, and therapeutic benefits, making them an important choice in modern skincare routines

Funding

No financial assistance was provided for this project.

Conflict of Interest

None declared.

References

1. Devi M, Thalkari AB, Thorat VM. Overview of Herbal Cosmetics. Research Journal of Topical and Cosmetic Sciences. 2022;13(1):27-34.
2. Shriwas S, Choukse R, Dwivedi S. Formulation and evaluation of herbal cream containing hydroalcoholic extract of Ipomea cairica Linn. for the treatment of gynecological disorders. International Journal of Pharmacy & Life Sciences. 2019 Jun 1;10(6).
3. Leong MY, Mogana R, Selvaraja M, Chinnappan S, Por CS, Yap CS, Tan PL. A review on herbal skincare creams. Current Trends in Biotechnology and Pharmacy. 2021 Dec 23;15(4):455-70.
4. Pinki KC, Duggal S. A Review of Nano-Herbal Formulations: A Futuristic Approach in Herbal Drug Delivery. Research Journal of Pharmacy and Medical Sciences (IRJPMS). 2025;8(3):89-97.
5. Iskandar B, Liu TW, Mei HC, Kuo IC, Surboyo MD, Lin HM, Lee CK. Herbal nanoemulsions in cosmetic science: A comprehensive review of design, preparation, formulation, and characterization. Journal of Food and Drug Analysis. 2024 Dec 15;32(4):428.
6. Kaur L, Singh AP, Singh AP, Kaur T. A review on herbal cosmetics. International Journal of Pharmaceutics and Drug Analysis. 2021;9(3):196-201.
7. Saleem A, Naureen I, Naeem M, Murad HS, Maqsood S, Tasleem G. Aloe vera gel effect on skin and pharmacological properties. Scholars international journal of anatomy and physiology. 2022 Jan 7;5(1):1-8.
8. Menon GK, Kligman AM. Barrier functions of human skin: a holistic view. Skin pharmacology and physiology. 2009 Jul 31;22(4):178-89.
9. Denisow-Pietrzyk M. Human skin reflects air pollution–a review of the mechanisms and clinical manifestations of environment-derived skin pathologies. Polish Journal of Environmental Studies. 2021 Jul 7;30(4):3433-44.
10. Briganti S, Mosca S, Di Nardo A, Flori E, Ottaviani M. New Insights into the Role of PPARγ in Skin Physiopathology. Biomolecules. 2024 Jun 19;14(6):728.
11. Arda O, Göksügür N, Tüzün Y. Basic histological structure and functions of facial skin. Clinics in dermatology. 2014 Jan 1;32(1):3-13.
12. Jahangir MA, Jain P, Verma R, Taleuzzaman M, Ahsan MJ, Chettupalli AK, Muheem A, Mirza MA. Transdermal nutraceuticals delivery system for CNS disease. CNS & Neurological Disorders-Drug Targets-CNS & Neurological Disorders). 2022 Dec 1;21(10):977-93.
13. Jahangir MA, Muheem A, Anand C, Imam SS. Recent advancements in transdermal drug delivery system. InPharmaceutical Drug Product Development and Process Optimization 2020 May 1 (pp. 191-216). Apple Academic Press.
14. Jahangir MA, Khan S, Kala C. Phytonutrients and technological development in formulations. J Pharm Res Sci Technol 2022; 6 (1): 159.
15. Gilani SJ, Jahangir MA, Chandrakala, Rizwanullah M, Taleuzzaman M, Shahab MS, Shakeel K, Aqil M, Imam SS. Nano-based therapy for treatment of skin cancer. Recent patents on anti-infective drug discovery. 2018 Aug 1;13(2):151-63.
16. Jahangir MA, Khan S, Singh AD. Nanophytomedicine in clinical management: An introductory evidence-based review. J Pharm Res Sci Technol 2022; 6 (1): 158.
17. Mohanty D, Rani MJ, Haque MA, Bakshi V, Jahangir MA, Imam SS. evaluation of transdermal naproxen niosomes: Formulation optimization to preclinical anti-inflammatory assessment on murine model., 2020, 30.
18. Jahangir MA. Their Application in the Management of Disease. Biomarkers as Targeted Herbal Drug Discovery: A Pharmacological Approach to Nanomedicines. 2021 Jul 4:43.

Citation: *Shafaat K, Kumar P, Kumar S, et al. A detailed review on herbal face cream: from formulation technique to evaluation parameters. Front Multidiscip Res Stud 2025; 2(1):112. doi: 10.31531/fmrs.1000112*

19. Jahangir MA, Mohanty D, Choudhury A, Imam SS. Theranostic Applications of Functionalized Vesicular Carriers. Multifunctional And Targeted Theranostic Nanomedicines.:49.
20. Gilani SJ, Imam SS, Jafar M, Alshehri S, Taleuzzaman M, Jahangir MA. Curcumin nanomedicine and their application in the management of disease. InBiomarkers as targeted herbal drug discovery 2021 Jul 4 (pp. 43-63). Apple Academic Press.
21. Ahmed MM, Jahangir MA, Saleem MA, Kazmi I, Bhavani PD, Muheem A. Formulation and evaluation of fucidin topical gel containing wound healing modifiers. Am. J. PharmTech Res. 2015;5:232-42.
22. Archana YN, Kumar D. Transdermal Drug Delivery System: An Insight into Recent Advancements. J Pharm Res Sci Technol 2023; 7 (2): 174.