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A Comprehensive Review of Herbal Moisturizing Cream: Formulation, Evaluation and Therapeutic Potential

Vivek Popat Raut¹, Rohit Abaso Malgunde², Prof. Dhudheswar Kshirsagar³, Dr. Nitin Gawai⁴

Mahadev Kanchan College of Pharmaceutical Education and Research, Uruli Kanchan, Pune, Maharashtra, India

Abstract: Herbal cosmetics have emerged as a significant segment of the personal care industry, driven by increasing consumer preference for natural, chemical-free products. Moisturizing creams represent one of the most widely used cosmetic formulations, designed to maintain skin hydration, improve elasticity, and protect against environmental stressors. The integration of herbal bioactive compounds into cream bases offers a multifunctional approach to skincare, addressing concerns such as dryness, aging, and inflammation. This comprehensive review examines the formulation and evaluation of herbal moisturizing creams, encompassing the selection of herbal ingredients, preparation methodologies, and quality control parameters. Key herbal components discussed include *Commiphora mukul* (guggul) for its collagen-stimulating and anti-aging properties, *aloe vera* for its moisturizing and soothing effects, and various plant extracts rich in antioxidants and anti-inflammatory compounds. The review synthesizes findings from recent scientific studies, including clinical evaluations demonstrating significant improvements in skin hydration, viscoelasticity, and firmness.

The formulation of herbal moisturizing cream involves the incorporation of standardized plant extracts into emulsion-based delivery systems. Evaluation parameters include pH (typically 5.5–6.5), viscosity, spread ability, homogeneity, stability, and skin compatibility assessment. Clinical studies have demonstrated that herbal creams containing ethanolic extracts of botanicals such as *Glycyrrhiza glabra*, *Curcuma longa*, and *Centella asiatica* significantly improve skin extensibility (32.27%), firmness (28.86%), and hydration (15.97%) compared to control formulations.

Keywords: Herbal cream, moisturizing, *Commiphora mukul*, *aloe vera*, formulation, evaluation, skin hydration.

I. INTRODUCTION

A. Background and Significance

The skin serves as the body's primary protective barrier against environmental stressors, including ultraviolet radiation, pollutants, and microbial pathogens. Maintaining optimal skin hydration is essential for preserving barrier function, preventing transepidermal water loss, and ensuring overall skin health. Moisturizing creams are semisolid emulsions designed for external application, formulated to hydrate the skin, improve elasticity, and provide a protective barrier.

The growing consumer preference for natural and chemical-free skincare products has catalyzed significant interest in herbal moisturizing creams. Herbal cosmetics contain natural substances extracted from plants that offer health benefits and nutritional value without toxic or adverse effects. The global herbal cosmetics market is projected to grow by USD 41.1 billion from 2025 to 2029, expanding at a compound annual growth rate of 7.1% during the forecast period. This growth is driven by increasing awareness of the harmful effects of synthetic ingredients and a shift toward sustainable, eco-friendly beauty solutions.

Herbal moisturizing creams offer several advantages over conventional synthetic formulations. They provide multifunctional benefits, including moisturization, anti-aging effects, antioxidant protection, and skin-brightening properties. Additionally, herbal ingredients often possess anti-inflammatory and antimicrobial activities that contribute to overall skin health.

B. Objectives of the Review

This comprehensive review aims to systematically examine the formulation and evaluation of herbal moisturizing cream. The specific objectives include:

- 1) To profile key herbal ingredients used in moisturizing cream formulations, including *Commiphora mukul*, *aloe vera*, and other bioactive plant extracts.
- 2) To present comprehensive methodologies for extraction, formulation, and preparation of herbal creams.

- 3) To evaluate physicochemical properties, stability parameters, and skin compatibility of formulated herbal creams.
- 4) To review clinical evidence supporting the efficacy of herbal moisturizing creams.
- 5) To analyze current market trends and future perspectives in herbal skincare.

II. HERBAL INGREDIENTS FOR MOISTURIZING CREAM

A. *Commiphora mukul (Guggul)*

Commiphora mukul, commonly known as guggul, is a plant native to the Indian subcontinent that has been extensively used in traditional Ayurvedic medicine. The resin obtained from the plant contains rich bioactive constituents, including guggulsterones, which stimulate collagen production, prevent wrinkle formation, and enhance skin texture.

Recent research has focused on incorporating *Commiphora mukul* extract into face cream formulations for its anti-aging and skin-tone-improving properties. A study by Vigneshwaran et al. developed a herbal face cream containing *Commiphora mukul* extract (1 gm) alongside aloe vera gel (2 ml), glycerin (6 ml), and other excipients. The formulated cream demonstrated favorable physicochemical properties, including pH of 6.52–6.66, viscosity of 190–210 cP, and excellent spreadability (5 ± 0.6 g·cm/s).

B. *Aloe Vera (Aloe barbadensis)*

Aloe vera gel is a mucilaginous, colorless substance obtained from the parenchyma cells of *Aloe barbadensis* leaves. It contains 98.5% water, with the remaining solid components comprising polysaccharides, vitamins, minerals, enzymes, and phenolic compounds. The gel provides moisturizing, soothing, and anti-inflammatory benefits to the skin.

The moisturizing properties of aloe vera are attributed to its polysaccharide content, which forms a protective film on the skin surface, reducing transepidermal water loss. Additionally, aloe vera contains gibberellins and auxin, hormones with anti-inflammatory and wound-healing properties that reduce skin inflammation. Aloe vera is particularly effective in treating chronic skin conditions such as psoriasis, acne, and eczema.

C. *Other Herbal Actives*

Clinical research has validated the efficacy of various herbal extracts in improving skin viscoelastic properties. A landmark study by Ahshawat et al. formulated herbal cosmetic creams using ethanolic extracts of ten botanicals, including *Glycyrrhiza glabra* (licorice), *Curcuma longa* (turmeric), *Centella asiatica* (gotu kola), *Punica granatum* (pomegranate), and *Emblica officinalis* (amla). These herbal extracts were incorporated into a cream base at concentrations ranging from 0.12% to 0.9% w/w. The formulations demonstrated significant improvements in skin extensibility (32.27%), firmness (28.86%), and hydration (15.97%) after six weeks of application. The multifunctional benefits of these botanicals include antioxidant protection, collagen synthesis stimulation, and anti-inflammatory activity.

III. FORMULATION METHODOLOGY

A. *Extraction Methods*

The preparation of herbal moisturizing cream begins with the extraction of bioactive compounds from plant materials. Various extraction techniques are employed depending on the nature of the plant material and the desired active constituents.

Maceration: This traditional method involves soaking powdered plant material in a suitable solvent (ethanol, water, or hydroalcoholic mixtures) for a specified period, followed by filtration and concentration. For *Commiphora mukul*, powdered material is extracted with 100 ml of ethanol using maceration for 8 hours, and the extract is filtered through cotton wool and concentrated.

Ethanolic Extraction: Ethanolic extracts are commonly used in herbal cream formulations due to the ability of ethanol to extract both polar and non-polar bioactive compounds.

B. *Cream Base Preparation*

The cream base serves as the vehicle for delivering herbal actives to the skin. A well-designed cream base should be compatible with the herbal extracts, provide appropriate consistency, and facilitate absorption.

The cream base is typically prepared using a phase inversion emulsification technique. The oil phase may include oils such as *Prunus amygdalus* (almond oil) and *Sesamum indicum* (sesame oil), along with cetyl alcohol, stearic acid, and emulsifiers. The aqueous phase contains humectants such as glycerin and propylene glycol, along with honey and preservatives.

C. Formulation Protocol

Table 1: Composition of Herbal Moisturizing Cream (F1–F3)

Sr. No	Ingredient	F1	F2	F3	Role
1	Stearic Acid (gm)	13	14	15	Emulsifier
2	Cetyl alcohol (gm)	0.1	0.2	0.3	Emollint
3	Aloevera gel(ml)	2	2	2	Moisturizer
4	Extract (gm)	1	1	1	Active ingredient
5	Glycerine (ml)	6	6	6	Humectant
6	Triethanolamine(ml)	0.2	0.2	0.2	pH adjuster
7	Lavender oil (ml)	0.5	0.5	0.5	Antimicrobial
8	Citric acid (gm)	0.025	0.025	0.025	pH adjuster
9	Beeswax(gm)	3	3.5	4	Consistency agent
10	Distilled water (ml)	q.s	q.s	q.s	Vehical

Preparation Method:

- Aqueous Phase Preparation: Water-soluble ingredients, including glycerin, aloe vera gel, and triethanolamine, are dissolved in distilled water and heated to 70–75°C.
- Oil Phase Preparation: Oil-soluble ingredients, including stearic acid, cetyl alcohol, beeswax, and lavender oil, are heated together to 70–75°C until completely melted.
- Emulsification: The aqueous phase is gradually added to the oil phase with continuous stirring at moderate speed. The mixture is stirred until a uniform emulsion forms and cools to room temperature.
- Incorporation of Herbal Extract: The Commiphora mukul extract is incorporated into the cooled cream base with gentle mixing to ensure uniform distribution.
- pH Adjustment: Citric acid is added to adjust the pH to the desired range (5.5–6.5).
- Packaging: The formulated cream is transferred to suitable containers and stored in a cool, dry place.

IV. EVALUATION PARAMETERS

A. Physicochemical Evaluation

Comprehensive physicochemical evaluation ensures the quality, stability, and acceptability of the formulated herbal moisturizing cream.

Table 2: Evaluation Parameters of Herbal Moisturizing Cream

Parameter	F1	F2	F3	Acceptable Range
Color	Off-white	Off-white	Off-white	Uniform
Order	Pleasant	Pleasant	Pleasant	Characteristics
Ph	6.52 ± 0.2	6.59 ± 0.2	6.66 ± 0.2	5.5-6.5
viscosity	190 ± 0.4	200 ± 0.4	210 ± 0.4	150-250
Consistency	Excellent	Good	Good	Smooth
Spreadability (g.cm/s)	5 ± 0.6	4.4 ± 0.6	3.8 ± 0.6	Good
Homogeneity	Good	Good	Good	Uniform

pH Determination: The pH of the cream is measured using a calibrated pH meter. The pH should be compatible with the skin's natural pH (5.5–6.5) to avoid irritation.

Viscosity Measurement: Viscosity is determined using a Brookfield viscometer at controlled temperature. The viscosity of herbal creams typically ranges from 190–210 cP, depending on the formulation.

Spreadability: Spreadability is evaluated using a glass plate apparatus, measuring the extent to which the cream spreads under a specified weight. Higher spreadability values indicate better application properties.

Homogeneity: Homogeneity is assessed visually and by tactile evaluation to ensure the absence of phase separation, clumping, or visible particulates.

B. Stability Studies

Stability studies are essential for determining the shelf life and storage conditions of herbal moisturizing cream. Studies typically involve:

Thermal Stability: Storage at room temperature, 40°C, and 45°C for specified periods, with periodic evaluation of physicochemical parameters. · **Centrifugation Test:** Centrifugation at various speeds to assess emulsion stability. · **Freeze-Thaw Cycling:** Alternating freeze and thaw conditions to evaluate stability under temperature fluctuations.

Clinical studies have demonstrated that herbal cream formulations remain stable with respect to texture, color, and odor over extended periods, with no signs of phase separation or microbial contamination.

C. Skin Compatibility Assessment

Skin compatibility is evaluated through irritation studies and patch tests to ensure the safety of the formulation for topical application.

Skin Irritation Test: A study by Park and Lim evaluated the skin irritation potential of a cream formulation containing herbal extract in 34 female participants. The results showed no adverse reactions, confirming that the formulation was non-irritating.

Efficacy Evaluation: Clinical studies have demonstrated significant improvements in skin hydration and viscoelastic properties with herbal cream application. Ahshawat et al. reported increases in skin extensibility ($32.27 \pm 1.7\%$) and firmness ($28.86 \pm 0.86\%$) after six weeks of application of herbal cream formulations compared to control.

D. Clinical Evidence And Market Perspective

Clinical research has validated the efficacy of herbal moisturizing creams in improving skin health. The study by Ahshawat et al. represents a landmark investigation in this field, demonstrating that herbal cream formulations containing ethanolic extracts of ten botanicals significantly improve skin viscoelastic properties and hydration. The formulations CAA4 and CAA5 showed increases in extensibility (32.27% and 29.89%, respectively), firmness (28.86% and 29.89%, respectively), and skin hydration (15.97% and 18.27%, respectively) compared to control. The clinical and therapeutic application of herbal creams has been demonstrated for various skin conditions, including skin aging, dermatitis, and inflammation. These research studies show that herbal cream has a great deal of therapeutic potential, with expertise in managing a wide range of conditions. The global herbal cosmetics market is experiencing significant growth, with the skin care segment holding the largest market revenue share in 2024. North America dominated the market with 38.65% revenue share, driven by rising preference for natural, chemical-free, and sustainable beauty products. The Asia Pacific region is anticipated to witness the fastest growth, driven by rising adoption of herbal beauty regimens in countries such as India, China, and Japan.

V. CONCLUSION

The formulation and evaluation of herbal moisturizing cream represents a significant advancement in natural skincare. The integration of scientifically validated herbal ingredients, including Commiphora mukul, aloe vera, and other botanicals, with comprehensive quality control parameters ensures the development of safe, effective, and stable products.

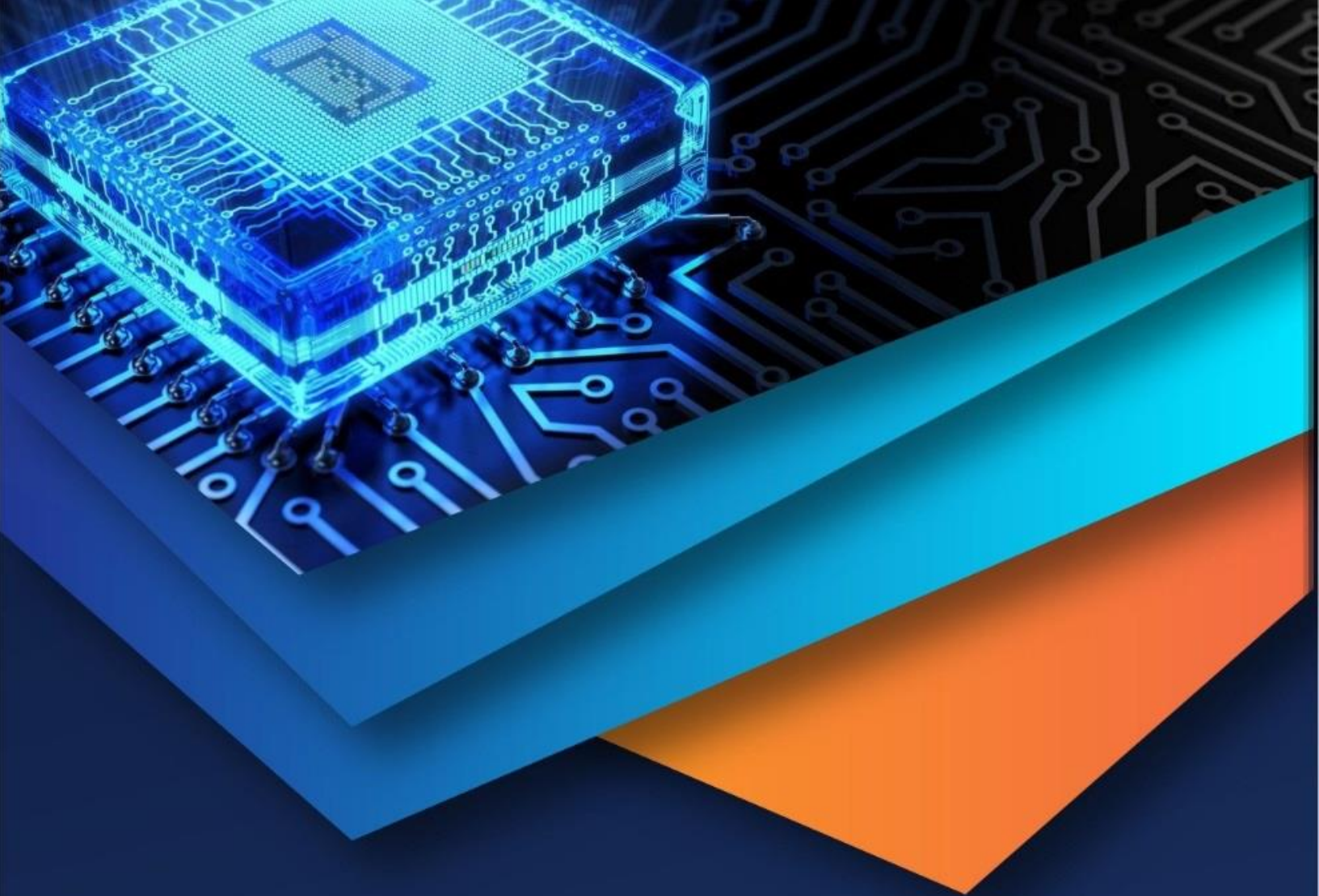
Clinical evidence supports the efficacy of herbal moisturizing creams in improving skin hydration, viscoelasticity, and firmness. The multifunctional benefits of herbal ingredients, including antioxidant, anti-inflammatory, and collagen-stimulating activities, position them as valuable alternatives to synthetic skincare products.

The growing consumer demand for chemical-free, sustainable, and effective skincare solutions underscores the importance of continued research in this area. Future directions should include long-term clinical trials, standardization of herbal formulations, and exploration of novel delivery systems for enhanced efficacy. The herbal moisturizing cream exemplifies the successful integration of traditional herbal wisdom with modern pharmaceutical science, offering a promising approach to natural skincare.



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