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A Review On: Herbal Moisturizer

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Abstract: Herbal moisturizers have emerged as a major segment in modern cosmeceutics, driven by rising global awareness of naturally derived skincare solutions, concerns regarding the long-term safety of synthetic additives, and the increasing demand for biocompatible, eco-friendly formulations. The growing need for biocompatible, environmentally friendly formulations, herbal moisturisers have become a significant market in contemporary cosmeceutics. Aloe vera, neem, turmeric, tulsi, cucumber, papaya, coconut oil, almond oil, jojoba oil, shea butter, and olive oil are examples of plant-based humectants, emollients, and occlusive agents that are used in these moisturisers. These substances are rich in vitamins, minerals, amino acids, polysaccharides, fatty acids, phenolic antioxidants, and anti-inflammatory phytochemicals. Dryness, increased transepidermal water loss (TEWL), flakiness, irritation, dullness, and decreased elasticity are all consequences of any disruption to the lipid matrix of the stratum corneum, the skin's outermost protective layer. By attracting atmospheric moisture through humectant activity, softening and smoothing the corneocyte layer through emollient action, and creating a semi-occlusive protective film that reduces water evaporation, herbal moisturisers address these problems and help sustain ideal hydration levels for extended periods of time. Additionally, all skin types, including sensitive and compromised skin, can benefit from the additional therapeutic benefits that herbal ingredients offer, including antimicrobial protection, anti-pollution defence, antioxidant neutralisation of free radicals, enhancement of collagen synthesis, improvement of microcirculation, and reduction of inflammatory responses. The functional performance and safety of these formulations are confirmed by evaluation parameters such as organoleptic analysis, viscosity, spreadability, pH, stability testing, microbial load, and in-vivo hydration assessment. Herbal moisturising creams present a promising and highly effective category in both dermatology and cosmetic science, offering a comprehensive, gentle, and long-term approach to maintaining skin health, hydration, and resilience.

***Key*words –** Herbal Moisturizer, Skin Hydration, Humectant, Emollient, Occlusive, Botanical Extracts, Formulation, Evaluation

I. INTRODUCTION

Since the skin is the largest organ in the human body and is constantly subjected to Environmental stress, pollution, UV radiation, temperature variations, and chemical irritants, skin moisturization is one of the most important aspects of dermatological treatment. These internal and environmental causes cause the stratum corneum, the skin's outermost protective layer, to lose its natural moisture balance, which results in flakiness, dryness, roughness, tightness, irritation, and early ageing. Moisturisers are now essential cosmetic preparations for preserving skin moisture, comfort, suppleness, and general health. A moisturiser is often described as a topical formulation that improves the natural moisturising factor (NMF) in corneocytes, restores the damaged lipid matrix, and decreases transepidermal water loss (TEWL) in order to raise the water content of the epidermis. In the past, the skincare industry was dominated by synthetic moisturisers that contained silicones, parabens, and petroleum-derived occlusives. However, worries about their long-term safety, potential irritation, and environmental impact have prompted a growing shift towards natural and plant-based formulations.

Due to their perceived safety, therapeutic versatility, and biocompatibility, herbal moisturisers made from botanical ingredients like aloe vera, neem, turmeric, tulsi, cucumber, papaya, coconut oil, almond oil, jojoba oil, shea butter, olive oil, and green tea have drawn a lot of attention. Rich in vitamins, minerals, fatty acids, amino acids, polyphenols, flavonoids, and antioxidants, these herbs not only moisturise the skin but also have anti-inflammatory, wound-healing, antibacterial, anti-aging, anti-pollution, and photoprotective properties. Herbal moisturisers take a comprehensive approach by enhancing the physiological processes of the skin, promoting natural regeneration, and fortifying the epidermal barrier, in contrast to synthetic formulations that might only concentrate on hydration. Many traditional systems of medicine, including Ayurveda, Siddha, and Unani, have documented the advantages of herbal preparations for skin health for thousands of years, and modern science has further confirmed many of these claims through scientific analysis and clinical tests.

The growing "green beauty" and "clean-label" movement, in which consumers deliberately seek out goods free of artificial perfumes, silicones, sulphates, parabens, phthalates, and mineral oils, is another factor contributing to the growing global desire for herbal cosmetics. Skincare products that are mild, cruelty-free, sustainably sourced, and environmentally conscious are preferred by modern customers. Herbal moisturisers have emerged as a crucial category in both cosmeceutical and dermal formulation research, contributing to the amazing growth of the herbal cosmetics business. Furthermore, by emphasising their biological activity, skin-benefiting mechanisms, and medicinal worth, the idea of cosmeceuticals—cosmetic products with therapeutic benefits—has reinforced the significance of herbal constituents.[1-3]

Restoring the damaged skin barrier, replacing lipids, drawing in water molecules, closing corneocyte gaps, and creating protective films that stop moisture loss are all crucial, according to the science underlying moisturising. The humectant, emollient, and occlusive properties of herbal ingredients—which are frequently combined in a single formulation—fulfill these purposes. For instance, coconut oil, shea butter, and almond oil are emollients that soften skin and fill intercellular gaps; beeswax and thicker plant butters are occlusives that seal moisture within the skin; and aloe vera and glycerin are humectants that draw in water. Additionally, the antioxidants found in herbs like neem, green tea, turmeric, and amla minimise oxidative stress, neutralise free radicals, and shield skin proteins and lipids from environmental harm. Herbal moisturisers are appropriate for a wide range of skin types, including dry, sensitive, combination, and ageing skin, because anti-inflammatory phytochemicals also help calm inflamed and sensitive skin.

Herbal moisturisers now have better stability, texture, absorption, and sensory qualities because to substantial advancements in formulation science. Oil-in-water (O/W) emulsions, which offer light, non-greasy feel, superior spreadability, enhanced bioactive distribution, and higher consumer acceptance, are commonly used to produce modern herbal moisturisers. Herbal compounds now have better bioavailability, deeper skin penetration, longer shelf life, and increased therapeutic benefits because to developments in nanoemulsion technology, liposomal encapsulation, cold-press extraction, and green formulation chemistry. Additionally, advances in dermatological testing, including corneometry, tewametry, patch tests, and in-vivo hydration studies, have made it feasible to use standardised evaluation procedures to objectively evaluate the effectiveness of herbal moisturisers.

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Herbal moisturizers are a promising and quickly developing area of cosmetic research, given the growing demand for natural, sustainable, and scientifically proven skincare products. Their integration of traditional herbal knowledge with modern formulation technology, combined with their multifunctional therapeutic benefits, positions them as highly valuable alternatives to synthetic moisturizers. Thus, a full scientific assessment of herbal moisturizing creams is important to comprehend their composition, mechanism of action, formulation techniques, evaluation parameters, advantages, limitations, and future potential in the global skincare business.[4-8]

II. SKIN ANATOMY AND RELAVANCE TO MOISTURIZER

The epidermis, dermis, and hypodermis make up the intricate, stratified human skin, each of which has a distinct role in physiological regulation, protection, and hydration. The outermost layer, the epidermis, serves as the body's first line of defence against UV rays, microbes, environmental contaminants, and mechanical stress. The stratum corneum (SC) is the most important part of the epidermis for moisturization. The well-known "brick-and-mortar" structure is formed by flattened, dead corneocytes embedded in a lipid matrix composed of ceramides, cholesterol, and free fatty acids. By regulating water retention and reducing transepidermal water loss (TEWL), this architecture keeps skin hydrated. Amino acids, urea, lactates, PCA, and electrolytes make up the Natural Moisturising Factor (NMF) inside corneocytes, which is essential for drawing in and binding water molecules to maintain the skin's suppleness and flexibility. Cracking, flaking, tightness, and obvious dryness are the results of any disruption of these lipids, proteins, or NMF components.

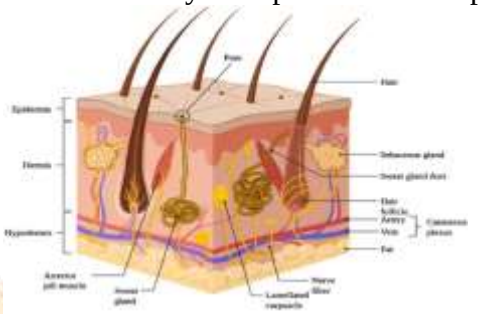

Fig. 1 Structure of Skin

The dermis, a thick layer of connective tissue rich in blood arteries, lymphatics, collagen, elastin fibres, sweat glands, and sebaceous glands, is located underneath the epidermis. This layer supplies the top layers with hardness, flexibility, temperature control, and nutrients. Sebum, a naturally occurring oily material that lubricates the skin's surface and adds to barrier lipids to help prevent excessive moisture loss, is produced by sebaceous glands. Adipose tissue, which cushions internal organs, insulates the body, and stores energy, is found in the deeper hypodermis, commonly known as the subcutaneous layer. The three layers work together to keep the skin hydrated, repair damage, fend off infections, and adjust to changes in the environment. Supporting the stratum corneum's barrier function using topical treatments that replenish lipids, strengthen the NMF, lower TEWL, and restore the smooth, intact architecture necessary for healthy, radiant skin is the main goal of moisturization science.[9-12]

III. NEED OF MOISTURIZER

- Skin hydration can be compromised by physiological and environmental causes. Lipids can be stripped and SC moisture reduced by low ambient humidity, cold conditions, frequent washing, or exposure to irritants. Excessive transepidermal water loss (TEWL) and xerosis are caused by poor barrier function in a number of medical diseases, including psoriasis, ichthyosis, and atopic dermatitis.
- The stratum corneum becomes dry and prone to breaking below a key water content level. Roughness, flaking, cracking, redness, and a tight feeling are typical indicators of dry skin.
- Chronic dryness can cause inflammation and itching if treatment is not received. Therefore, using a moisturiser on a daily basis is essential to restoring the lipid barrier, replacing lost water, and reducing these symptoms.
- Moisturisers assist preserve a healthy look and function by re-establishing the skin's capacity to hold onto moisture. [13-15]

IV. CLASSIFICATION OF MOISTURIZER

Moisturizing agents are generally categorized into three functional classes:

1. Humectants: Humectants are crucial for rehydrating dry, moisture-deficient skin since they are hygroscopic substances that draw and hold water in the stratum corneum. These molecules have hydrophilic functional groups that bind water naturally, drawing moisture upward from the lower layers of the epidermis and, given the right humidity, even from the outside world. By raising the water content of corneocytes, humectants improve skin suppleness, elasticity, and smoothness while also improving the function of the Natural Moisturizing Factor (NMF). They assist enzymatic mechanisms responsible for regular desquamation, preventing roughness and flaking. Natural humectants like aloe vera gel, honey, glycerin, sorbitol, hyaluronic acid, amino acid derivatives, and plant mucilage are commonly used in herbal moisturisers.

2. Emollients: By filling the tiny spaces between desquamating corneocytes, emollients—lipidbased substances—soften and smooth the skin, enhancing the stratum corneum's texture and structural stability. These components build the intercellular lipid matrix, restore lost skin lipids, and produce a smooth, flexible surface that improves suppleness and lessens obvious dryness symptoms. In order to preserve the epidermal barrier, emollients work by imitating the skin's natural sebum and replenishing important fatty acids like oleic, linoleic, palmitic, and stearic acids. Plant oils and butters, like coconut oil, olive oil, almond oil, jojoba oil, grape seed oil, shea butter, and cocoa butter, are frequently included in herbal formulations because they provide antioxidants, vitamins, and anti-inflammatory phytochemicals in addition to acting as emollients.

3. Occlusives: Occlusives are necessary for sustained hydration and barrier protection because they are heavy, hydrophobic substances that create a semi-permeable protective film on the skin's surface to stop transepidermal water loss (TEWL). Occlusives enable the deeper epidermal layers to gradually and efficiently refresh the stratum corneum by locking in moisture and lowering evaporation by up to 30–99%. For extremely dry, cracked, or damaged skin that has trouble retaining moisture because of lipid deficits or barrier disruption, this protective layer is especially helpful. Natural occlusives like beeswax, shea butter, cocoa butter, and thick plant-based waxes, which offer breathability while retaining potent moisture-locking properties, are frequently included in herbal moisturisers. Herbal occlusives, in contrast to those generated from petroleum, frequently provide further advantages such improved skin nourishment, anti-inflammatory action, and antioxidant support.[16-18]

V. HERBAL INGREDIENTS USED IN MOISTURIZER

1. Aloe vera (Aloe barbadensis Miller)

- Rich source of polysaccharides (acemannan) that enhance skin hydration by improving moisture retention.
- Exhibits soothing and anti-inflammatory properties, beneficial for irritated and sensitive skin.
- Promotes wound healing and supports repair of superficial skin damage.
- Improves overall skin hydration and elasticity.

2. Neem (Azadirachta indica)

- Possesses strong antibacterial and anti-inflammatory activity due to the presence of azadirachtin and nimbidin.
- Helps control microbial growth on the skin surface, thereby preventing acne and infections.
- Aids in reducing skin dryness and irritation while purifying the skin.
- Suitable for formulations intended for acne-prone and sensitive skin.

3. Turmeric (Curcuma longa)

- Contains curcumin, a potent antioxidant and anti-inflammatory compound.
- Reduces skin inflammation, irritation, and redness.
- Supports wound healing and improves skin texture.
- Enhances skin radiance by combating oxidative stress.

4. Cucumber (Cucumis sativus)
   - High water content provides instant hydration and cooling effect to the skin.
   - Soothes sensitive and irritated skin.
   - Helps reduce puffiness and dryness.
   - Improves skin freshness and moisture balance.

5. Tulsi (Ocimum sanctum)
   - Rich in antioxidants and exhibits antimicrobial activity.
   - Protects skin from environmental pollutants and oxidative damage.
   - Helps reduce redness and inflammation.
   - Maintains skin clarity and freshness. [19-20]

VI. MECHANISM OF ACTION

The fundamental mechanisms of action of herbal moisturisers are the same as those of conventional ones. The humectant components, such as glycerin, honey, and aloe polysaccharides, increase the water content of the skin by drawing moisture from the dermis or the surrounding air into the epidermis. The stratum corneum's lipid matrix is then penetrated by the emollient oils and lipids, which fill up intercellular gaps and smooth the skin's surface. Lastly, occlusive materials (thick plant oils, beeswax) provide a thin, waterproof layer over the skin that significantly reduces transepidermal water loss. When combined, these processes replenish the SC's hydration and strengthen the natural barrier that prevents more water evaporation. [23-24]

VII. FORMULATION METHOD (O/W EMULSION)

Oil-in-water (O/W) emulsions are the most common formulation for herbal creams. The following steps are often involved in an O/W procedure:

1. Oil phase: Combine and heat the components that dissolve in oil. To completely melt and homogenize, for instance, olive oil, coconut oil, and beeswax can be mixed and heated to between 60 and 70 degrees Celsius. According to a reported formulation, beeswax thickened the mixture to provide a protective barrier on the skin, coconut oil supplied hydration and a calming effect, and olive oil offered nourishment and moisture. This step may also use stearic acid or emulsifying waxes.

2. Aqueous phase: Prepare the water phase separately by combining hydrophilic substances (glycerin, honey), distilled water (or rosewater), and any water-soluble herbal extracts or gels (such as vitamin E, aloe vera gel, or herbal decoctions). Bring this combination up to a temperature comparable to that of the oil phase.

3. Emulsification: To create an emulsion, gradually pour the aqueous phase into the heated oil phase (or vice versa) while continuously stirring. As the mixture cools, keep stirring so that the cream thickens and stabilizes. The emulsion is maintained by neutralizers like triethanolamine or surfactants like polysorbate.

4. Cooling and finishing: Once blended, cool the mixture to room temperature with gentle stirring. Adjust pH if necessary (to skin-friendly ~5.5–6). Finally, preservatives (e.g. phenoxyethanol) or antioxidants can be added to ensure microbial stability and shelf life. [21-23]

The resulting herbal O/W cream should have a smooth, spreadable consistency.

VIII. EVALUATION PARAMETER

To guarantee quality, safety, and effectiveness, herbal moisturizers are assessed using a variety of criteria. Important tests consist of:

- Organoleptic/Physical: Color, odor, and general appearance; viscosity (rheometer); pH (electrode); the cream should have a moderate viscosity for spreadability and a skin-friendly pH (≈5–6).
- Spreadability: Determined by how simple it is to distribute a predetermined amount between glass slides; a higher spread index denotes superior skin coverage.
- Homogeneity: Verify that the texture is consistent and that there are no lumps or oil globules.
- Stability: To identify phase separation, use centrifugation and accelerated aging (such as 4°C/45°C storage). Additionally, color/odor stability and thermal stability (freeze-thaw cycles) are tracked.
- Moisturizing efficacy: To confirm the benefits of hydration, human volunteers may undergo instrumental tests like corneometry (skin capacitance) or tewametry (TEWL).
- Safety: Dermatological or patch tests for human skin irritation or sensitization. Microbial tests guarantee that there is no contamination in the formulation.[24-25]

IX. ADVANTAGE , LIMITATION AND APPLICATION

Advantage: Herbal moisturizers offer several skincare advantages by utilizing natural bioactives. They are frequently kinder to skin; according to one study, “the primary benefit of herbal moisturizers is that they improve skin dryness without any side effects.” In addition to providing basic hydration, plant-derived substances can provide anti-inflammatory and antioxidant chemicals (from aloe, turmeric, etc.). Due to their perceived safety and environmental friendliness, many customers favor them. They frequently don’t contain artificial fragrances or harsh preservatives, which lowers the possibility of irritation. Additionally, vitamins and nutrients from botanical oils and extracts help improve the resilience and appearance of skin.

Limitation: Standardization and shelf life are problems for herbal preparations. Batch-to-batch variability can result from natural extracts’ concentration variations based on the source. Watercontaining herbal creams may be more vulnerable to microbiological growth or decreased stability in the absence of appropriate preservatives. Sensitive people may experience adverse reactions to certain herbal compounds. Many goods rely on traditional knowledge because it is expensive to thoroughly evaluate and validate each botanical active’s effectiveness. Lastly, compared to synthetic analogs, some botanicals may have short-term effects or inadequate skin penetration. These restrictions highlight the necessity of meticulous quality control (approved raw materials, stability testing) in the creation of herbal cosmetics.

Application: To restore moisture, strengthen the barrier, and preserve general skin health, herbal moisturisers are applied topically to the skin. They can be used in both morning and evening skincare regimes and are appropriate for daily usage. To improve absorption and enhance microcirculation, a tiny amount of the cream is gently rubbed onto dry, clean skin using circular motions. Applying the moisturiser after cleansing or bathing, when the skin is slightly moist, yields the best results since humectants like glycerin and aloe vera can draw in and hold on to more water. On restore softness and smoothness, apply herbal moisturisers on the face, hands, feet, elbows, knees, and other dry areas. [26-27]

X. FUTURE SCOPE

Herbal moisturisers have a bright future because to market demand and scientific advancements. Future studies will probably concentrate on personalisation and sophisticated distribution methods. For instance, plant extracts' bioavailability and controlled release can be enhanced by nanotechnology (such as nano-emulsions, liposomes, and phytosomes). Herbal formulations can be customised to meet specific demands by using AI and machine learning methods to analyse skin data. Furthermore, there is increasing interest in creating multipurpose herbal solutions that combine moisturization with other advantages (UV protection, anti-aging peptides). Future trends will also be influenced by sustainability; ethical botanical sourcing and eco-friendly packaging are important concerns. Lastly, the evidence base will be strengthened by additional clinical research on certain herbal combinations. In conclusion, the next generation of potent, scientifically supported natural moisturisers is anticipated to be produced by fusing contemporary formulation science with traditional herbal expertise.[28]

XI. CONCLUSION

Traditional botanical knowledge and contemporary dermatology come together in herbal moisturisers. These creams successfully restore skin moisture and strengthen the barrier by combining humectants, emollients, and occlusives derived from plants (Table 1). Their growing appeal is a reflection of customer demand for "chemical-free" skincare products and a larger trend towards clean beauty. Numerous botanicals also have beneficial anti-inflammatory and antioxidant properties that help with irritation and indications of ageing in addition to dryness. But maintaining stability and quality consistently is still difficult. To fully achieve the promise of herbal moisturisers, ongoing advancements like strict standardisation and nano-delivery techniques are required. Herbal formulations are anticipated to play a significant part in moisturising and safeguarding skin health in the next years with appropriate scientific validation and innovation.

XII. ACKNOWLEDGEMENTS

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XIII. CONFLICT OF INTEREST

The authors declare no conflict of interest.

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