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A Review on Herbs Used in Skin Diseases

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ABSTRACT:

Skin disorders represent a significant global health issue, affecting millions of individuals and often resulting in chronic conditions that impair quality of life. Herbal medicine has long been employed in the treatment of dermatological conditions due to its accessibility, cost-effectiveness, and lower incidence of side effects compared to synthetic drugs. This review provides an overview of commonly used medicinal herbs in the management of skin disorders, including Aloe vera, Azadirachta indica (neem), Curcuma longa (turmeric), Calendula officinalis, and Melaleuca alternifolia (tea tree oil). The therapeutic properties of these herbs such as anti-inflammatory, antimicrobial, antioxidant, and wound-healing effects are examined in the context of skin conditions like acne, eczema, psoriasis, and fungal infections. Additionally, the paper discusses the current scientific evidence supporting their use, along with considerations for safety, standardization, and formulation. The integration of herbal remedies into dermatological practice holds promise as a complementary approach to conventional therapies.

KEYWORDS: Skin, health, Skin disorders, Herbal medicine, Medicinal properties

1. INTRODUCTION:

The skin is the largest organ of the human body and serves as a protective barrier between the internal environment and the outside world.[1] It plays crucial roles in protecting against harmful microorganisms, regulating body temperature, sensing touch and pain, preventing water loss, and producing vitamin D when exposed to sunlight. Structurally, the skin is composed of three main layers: the epidermis, dermis, and hypodermis.[2]

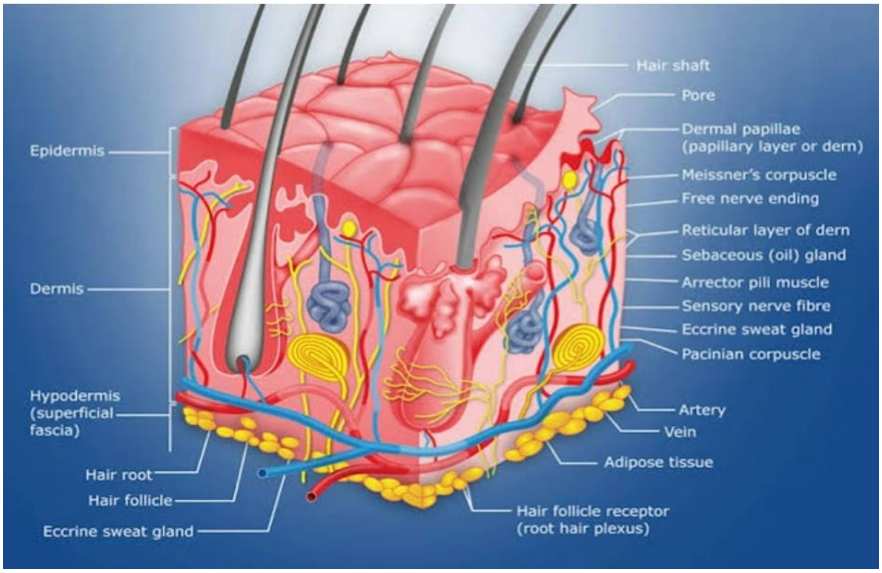

Figure: 1 Structure Of Skin [1,2]

Epidermis: The epidermis is the outermost layer and is made up primarily of keratinized epithelial cells called keratinocytes. This layer provides a tough, waterproof barrier that protects the body from environmental damage.[3] Other important cells in the epidermis include melanocytes, which produce melanin and give the skin its color, Langerhans cells, which are involved in immune defense, and Merkel cells, which help detect touch.[4] The epidermis itself is arranged in several sublayers, with the deepest being the stratum basale (where new cells are formed) and the outermost being the

stratum corneum (composed of dead, flattened cells that are eventually shed). The epidermis does not contain blood vessels and receives nutrients through diffusion from the underlying dermis.[5]

Dermis: Beneath the epidermis lies the dermis, a much thicker layer composed of connective tissue. It contains blood vessels, lymphatic vessels, nerve endings, sweat glands, sebaceous (oil) glands, and hair follicles.[6] The dermis provides strength and elasticity to the skin through the presence of collagen and elastin fibers. It is divided into two regions: the upper papillary layer, which forms ridges (like fingerprints) and contains capillaries and sensory receptors, and the deeper reticular layer, which provides structural support.[7]

Hypodermis: The innermost layer of the skin is the hypodermis, also known as the subcutaneous layer. It consists mainly of fat (adipose tissue) and loose connective tissue.[8] This layer helps insulate the body, acts as a cushion to protect underlying muscles and organs, and serves as an energy reserve. Overall, the three layers of the skin work together to protect the body, maintain homeostasis, and provide sensory information about the environment.[9]

1.1 Importance of skin health

1. First Line of Defense: a) Barrier Protection: Skin acts as a shield against bacteria, viruses, pollution, and harmful UV rays. b) Prevents Dehydration: It helps retain moisture and keeps internal organs protected.[10]

2. Temperature Regulation: The skin regulates body temperature through sweating and blood flow, helping to prevent overheating or chilling.[11]

3. Sensory Function: Skin contains nerve endings that help you feel touch, pressure, pain, and temperature—essential for safety and daily interaction.[12]

4. Vitamin D Production: Sunlight on the skin triggers vitamin D synthesis, crucial for bone health, immune function, and mood regulation.[13]

5. Reflects Internal Health: Skin can reveal signs of Nutrient deficiencies (e.g., dry or pale skin), Hormonal imbalances, Allergies or autoimmune disorders, Liver or kidney issues[14]

6. Self-Confidence and Mental Health: Healthy skin can improve self-esteem and body image. Chronic skin conditions like acne, eczema, or psoriasis can affect mental health and quality of life.[15]

7. Healing and Recovery: Healthy skin heals faster after injury or surgery and is less prone to infections or complications.[16]

1.2 Prevalence of skin disorders globally :

Skin disorders are among the most common health problems worldwide, affecting people across all ages, ethnicities, and geographic regions. According to global estimates, nearly 900 million people live with a skin disease at any given time, making it one of the leading causes of non-fatal disease burden.[17] The Global Burden of Disease (GBD) studies have consistently ranked skin conditions as a major contributor to Years Lived with Disability (YLDs), with some reports placing them as the 4th leading cause of non-fatal disease globally.[18] Among the most prevalent conditions are acne, which affects over 600 million people, and fungal skin infections, impacting nearly 990 million individuals, especially in humid and tropical regions. Other widespread conditions include eczema, with up to 20% prevalence in children and 10% in adults, and psoriasis, which affects about 2–3% of the global population.[19] Viral and bacterial skin infections, particularly among children and adolescents, have seen significant increases in both incidence and prevalence over the last few decades.[20] Prevalence rates vary by region, age, climate, and socioeconomic status developing countries often report higher rates of infectious and parasitic skin diseases, while chronic inflammatory conditions are more common in industrialized nations.[21] Despite their low mortality, skin disorders carry a high burden due to physical discomfort, stigma, psychological impact, and financial cost. Many cases go unreported due to limited access to healthcare or cultural stigma, suggesting that the real burden may be even higher than reported.[22] These findings highlight the need for increased awareness, better access to dermatological care, and stronger public health strategies to manage and prevent skin diseases globally.[23]

1.3 Limitations of Conventional Treatments for Skin Disorders

While conventional treatments such as topical creams, oral medications, and phototherapy are widely used to manage skin conditions, they come with several important limitations:

1. Side Effects and Toxicity: Many conventional drugs, especially steroids and immunosuppressants, can cause side effects like skin thinning, irritation, redness, or systemic effects such as liver or kidney damage with prolonged use. Oral antibiotics and antifungals may lead to gastrointestinal upset, resistance development, or other organ toxicities. Long-term use of corticosteroids can cause dependence and rebound worsening of skin conditions.[24]

2. Limited Efficacy: Conventional treatments often focus on symptom control rather than curing the underlying disease. Some chronic conditions like psoriasis, eczema, or vitiligo can be resistant or only partially responsive, requiring long-term treatment. Infections may recur if treatments fail to eradicate the root cause or due to reinfection.[25]

3. Resistance Development: Overuse or misuse of antibiotics and antifungals can lead to drug resistance, making infections harder to treat. Resistant strains require stronger, often more toxic drugs, which further complicates treatment.[26]

4. Patient Compliance Issues: Many treatments require frequent application or long duration, leading to poor adherence. Side effects and inconvenience can cause patients to stop therapy prematurely, increasing risk of relapse or complications.[27]

5. Cost and Accessibility: Some treatments, especially newer biological drugs for severe cases, can be expensive and not affordable for many patients. Access to dermatological care and prescription medicines is limited in low-resource settings.[28]

6. Lack of Personalization: Conventional therapies often use a one-size-fits-all approach, not considering individual differences in genetics, skin type, or disease triggers. This can reduce effectiveness and increase the risk of side effects.[29]

7. Incomplete Understanding of Disease: For many skin disorders, the exact causes are complex and multifactorial, involving immune, genetic, and environmental factors. Conventional treatments may not address all these aspects, limiting long-term success.[30]

8. Psychological Impact Not Addressed: Many skin conditions cause mental health issues like anxiety or depression. Conventional treatment often overlooks these psychological dimensions, missing a holistic approach.[31]

3.4 Rising Interest in Herbal and Alternative Medicine for Skin Disorders:

In recent years, there has been a significant increase in the use and interest in herbal and alternative medicine as complementary or alternative options for managing skin disorders. This trend is driven by several factors related to the limitations of conventional treatments, cultural preferences, and growing awareness of natural therapies.[32]

1. Concerns About Side Effects of Conventional Drugs: Many patients seek herbal remedies due to the side effects and toxicity risks associated with long-term use of steroids, antibiotics, and immunosuppressive drugs. Herbal treatments are often perceived as safer, gentler, and more suitable for long-term use.[33]

2. Holistic and Personalized Approach: Alternative medicine emphasizes a holistic approach, addressing not only the skin symptoms but also underlying lifestyle, diet, mental health, and environmental factors. This aligns with patients' desire for more personalized care and disease prevention rather than just symptom control.[34]

3. Cultural and Traditional Practices: Herbal medicine has deep roots in many cultures worldwide, such as Ayurveda in India, Traditional Chinese Medicine (TCM), and indigenous healing systems. The revival and integration of these practices reflect both cultural pride and recognition of their potential benefits.[35]

4. Scientific Validation and Research: Recent scientific studies have started to explore the bioactive compounds in medicinal plants, confirming many have anti-inflammatory, antimicrobial, antioxidant, and wound-healing properties. This evidence supports their potential as effective treatments for conditions like eczema, psoriasis, acne, and fungal infections.[36]

5. Cost-Effectiveness and Accessibility: Herbal remedies often provide a more affordable and accessible alternative, especially in low-resource settings where access to dermatologists and pharmaceuticals is limited. Locally available plants can be used to prepare effective topical applications or internal treatments.[37]

6. Consumer Demand for Natural and Organic Products: There is a growing global demand for natural, organic, and chemical-free skincare products. Many consumers prefer herbal formulations for daily skincare due to concerns about synthetic chemicals and preservatives found in many conventional products.[38]

7. Integrative Medicine Trends: Healthcare systems in some countries are increasingly adopting integrative medicine models, combining conventional and complementary approaches to provide comprehensive care. Dermatologists and researchers are collaborating to incorporate herbal therapies into standard treatment protocols.[39]

2. OBJECTIVE:

- To identify and document commonly used medicinal herbs in the treatment of various skin disorders such as acne, eczema, psoriasis, dermatitis, and wounds.
- To explore the active phytochemical constituents responsible for the therapeutic effects of these herbs on skin health.
- To review the pharmacological mechanisms by which these herbs exert anti-inflammatory, antimicrobial, antioxidant, or wound-healing effects.
- To evaluate scientific evidence from preclinical and clinical studies supporting the efficacy and safety of herbal treatments for skin conditions.
- To compare herbal remedies with conventional dermatological treatments highlighting advantages, limitations, and potential for integrative use.
- To assess the potential side effects, toxicological concerns, and contraindications associated with herbal treatments in dermatology.
- To identify gaps in current research and suggest directions for future studies on herbal interventions for skin disorders.

3. REVIEW OF LITERATURE:

- The review by Menon and Kligman (2009) provides a comprehensive overview of the human skin's barrier function from a holistic perspective. It emphasizes that the skin barrier is not solely dependent on the stratum corneum but involves a complex interplay of lipids, proteins, environmental factors, and repair mechanisms. The authors highlight variations in barrier function due to age, body site, and environmental exposure, and stress the importance of adaptive and repair processes in maintaining barrier integrity. They also underline the relevance of barrier dysfunction in skin disorders such as atopic dermatitis and suggest that effective management requires a multifactorial approach. While the review is informative, it also notes the need for more human-specific research and standardized assessment methods. [1]
- Filingeri (2016) presents a comprehensive review of the neurophysiology of skin thermal sensations, detailing how humans detect temperature and wetness through complex interactions between thermoreceptors, ion channels (especially TRP channels), and central neural pathways. The study highlights that while skin lacks specific wetness receptors, wetness perception arises from combined thermal and tactile inputs. It also explores how these sensations contribute to thermoregulation and behavioral responses. This review offers valuable insights for applications in thermal comfort, clinical diagnostics, and prosthetic design, while noting the need for more human-centered research on sensory variability and adaptation.[12]
- Gunjan et al. (2015) review the growing herbal medicine market, noting its significant contribution to the global pharmaceutical industry, projected to exceed USD 1,100 billion by 2015. With a 15% annual growth in medicinal plant trade, the article highlights the importance of natural plant compounds in developing effective treatments for various diseases.[38]
- Witkowska et al. (2024) review the wound healing effects of Centella asiatica's active compounds, which promote collagen synthesis, reduce inflammation, and offer antioxidant protection. The study highlights advanced delivery methods like hydrogels and nanostructures that improve healing in wounds such as diabetic ulcers and burns, reinforcing C. asiatica's important role in modern wound care.[83]
- Roh et al. (2017) review green tea polyphenols, especially EGCG, highlighting their antioxidant, anti-inflammatory, and anti-melanogenic effects that protect against skin photoaging. These compounds reduce UV-induced oxidative stress, inhibit collagen breakdown, and prevent pigmentation. By modulating key signaling pathways, green tea polyphenols offer promising benefits for skincare formulations aimed at preventing and treating photoaged skin.[87]
- Anand et al. (2022) review the use of 119 medicinal plants in India for treating various skin diseases, highlighting traditional knowledge and Ayurvedic formulations. They emphasize the plants' therapeutic potential and call for further scientific studies to validate their safety and effectiveness for modern dermatology.[90]

4. CLASSIFICATION OF SKIN DISEASES:

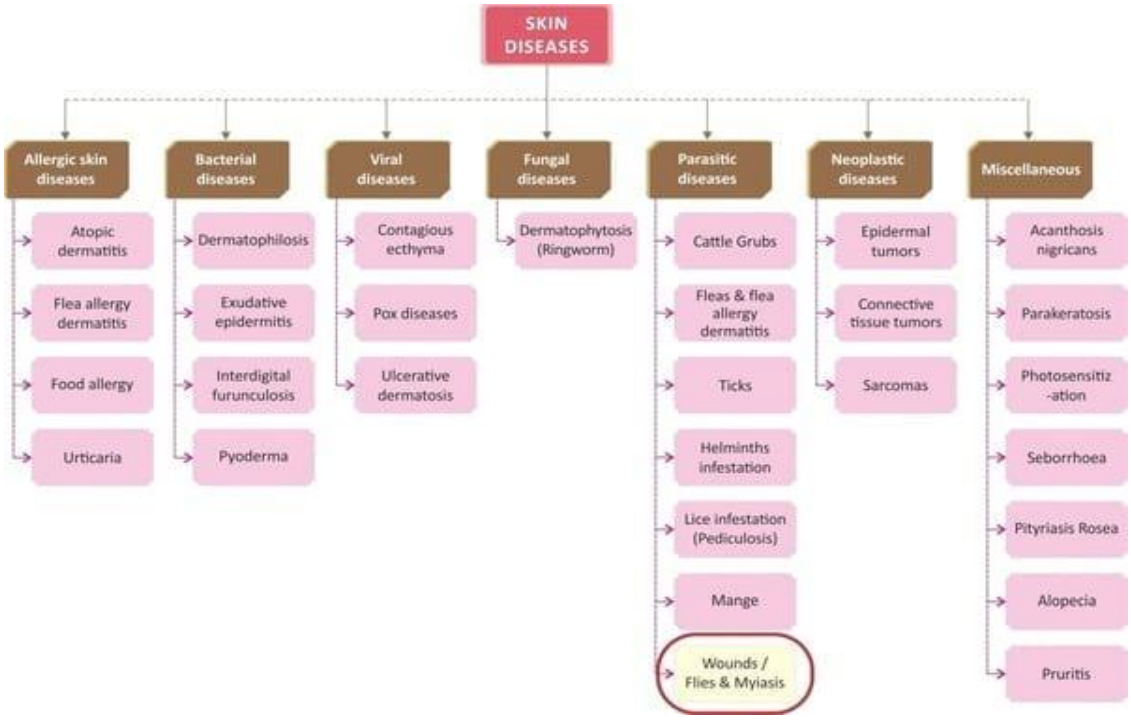

Diagram: 1 Classification of skin disease [40, 41,42, 43,44,45,46]

Allergic skin diseases [40]

Bacterial skin diseases [41]

Viral skin diseases [43]

Fungal skin diseases [44]

Parasitic skin diseases [45]

Neoplastic skin diseases [46]

Miscellaneous skin diseases [47]

5. OVERVIEW OF HERBAL MEDICINE IN DERMATOLOGY:

Herbal medicine, also referred to as phytotherapy, plays a growing role in dermatology as patients and practitioners alike increasingly seek natural, holistic alternatives to conventional skin treatments.[47] For centuries, herbal remedies have been integral to traditional healing systems like Ayurveda, Traditional Chinese Medicine (TCM), Siddha, and Unani, where plants are used not just to treat disease symptoms but to restore overall bodily balance. In dermatology, herbs are used for a wide variety of skin conditions, including acne, eczema, psoriasis, fungal infections, wounds, burns, and pigmentation disorders.[48] Some of the most widely used and scientifically studied herbs include neem (Azadirachta indica), known for its antibacterial and antifungal properties; turmeric (Curcuma longa), valued for its potent anti-inflammatory and antioxidant effects; aloe vera, praised for its soothing and healing capabilities; and tea tree oil, which has demonstrated antibacterial activity, particularly against acne-causing bacteria.[49] The growing popularity of herbal medicine is largely driven by dissatisfaction with the side effects, cost, and recurrence rates associated with conventional treatments like corticosteroids, antibiotics, and immunosuppressants.[50] Herbal remedies are often seen as more natural, gentler on the skin, more accessible, and culturally familiar, especially in developing regions where access to formal dermatological care is limited. Moreover, the global demand for chemical-free and eco-friendly skincare has led to a surge in herbal cosmetic products. Scientifically, increasing research supports the therapeutic efficacy of many herbal treatments. [51] Clinical studies have shown, for example, that aloe vera accelerates wound healing, turmeric reduces inflammation in chronic skin

conditions, and indigo naturalis (used in Chinese medicine) can significantly reduce psoriatic plaques. Despite these promising findings, there are limitations.[52] Herbal treatments often lack standardization, with variations in plant quality, formulation, and dosage leading to inconsistent results. Additionally, many herbal products are not rigorously tested in large-scale clinical trials, and their unregulated use can lead to allergic reactions, contamination, or interactions with prescription drugs.[53] Still, the integration of herbal medicine into modern dermatological practice is growing, with many practitioners adopting an integrative approach combining evidence-based herbal therapies with conventional treatments to achieve better outcomes, reduce side effects, and support long-term skin health.[54] As research advances and more high-quality evidence becomes available, herbal medicine is likely to become an even more important part of dermatological care worldwide.[55]

6. HERBS USED IN SKIN DISEASES

1. Aloe vera: Aloe vera is a popular medicinal plant widely used for treating skin disorders due to its anti-inflammatory, antimicrobial, and healing properties. The gel from its leaves soothes irritation, hydrates dry skin, and promotes wound healing.[56] It is effective in managing acne, eczema, psoriasis, sunburns, and minor cuts. Rich in vitamins, enzymes, and polysaccharides, aloe vera helps reduce redness, itching, and promotes skin regeneration. It can be applied fresh or used in gels and creams. Generally safe for most skin types, a patch test is recommended before use.[57]

Figure: 2 Aloe vera [56]

2. Neem (Azadirachta indica): Neem is a traditional Ayurvedic herb known for its strong antibacterial, antifungal, and anti-inflammatory actions. It is commonly used in treating skin conditions like acne, eczema, psoriasis, and fungal infections.[58] Neem purifies the blood and helps detoxify the skin from within. Topically, neem oil or paste made from its leaves can reduce inflammation, control sebum production, and prevent breakouts. Its natural compounds like nimbin and azadirachtin contribute to its skin-healing effects.[59]

Figure: 3 Neem [59]

3. Turmeric (Curcuma longa): Turmeric is a golden-yellow root known for its potent anti-inflammatory and antioxidant properties, largely due to the active compound curcumin. It is widely used to treat acne, wounds, and chronic inflammatory skin conditions such as eczema and psoriasis.[60] Turmeric also has skin-brightening effects and is often applied in face masks to reduce pigmentation and promote an even complexion. It supports faster healing and protects the skin from oxidative stress.[61]

Figure: 4 Turmeric [60]

4. Calendula (Calendula officinalis): Calendula, or marigold, is a gentle herb with soothing, anti-inflammatory, and wound-healing properties.[62] It is particularly effective for sensitive skin and is commonly used for rashes, eczema, cuts, scrapes, diaper rash, and sunburns.[63] Calendula promotes tissue regeneration and reduces inflammation. Its extracts are commonly found in natural creams, ointments, and balms. It also has mild antimicrobial activity, making it suitable for preventing infection in minor wounds.[64]

Figure: 5 Calendula [62]

5. Tea Tree (Melaleuca alternifolia): Tea tree oil is a potent essential oil derived from the leaves of the tea tree. It is best known for its antimicrobial, antifungal, and anti-inflammatory properties.[65] It is commonly used to treat acne, dandruff, athlete's foot, and fungal nail infections. When diluted properly, it helps reduce pimples, calm inflammation, and cleanse the skin. However, due to its strength, it should always be used with a carrier oil or in diluted commercial formulations to avoid irritation.[66]

Figure: 6 Tea Tree [66]

6. Gotu Kola (Centella asiatica): Gotu kola is an herb that supports skin regeneration by stimulating collagen production. It is highly effective in healing wounds, minimizing scars, reducing stretch marks, and treating skin conditions such as eczema and psoriasis.[67] It contains active compounds like asiaticoside and madecassoside that promote cell repair and improve skin elasticity. Gotu kola is often found in topical creams for scar treatment and anti-aging formulas due to its rejuvenating properties.[68]

Figure: 7 Gotu Kola [67]

7. Chamomile (Matricaria chamomilla): Chamomile is a gentle herb known for its calming, anti-inflammatory, and antioxidant effects on the skin.[69] It is ideal for sensitive or irritated skin and is used to relieve eczema, rashes, and allergic skin reactions. Chamomile extracts reduce itching and redness and promote skin healing. Its soothing nature makes it popular in baby skin products and facial care creams for delicate skin.[70]

Figure: 8 Chamomile [69]

8. Lavender (Lavandula angustifolia): Lavender is widely used in skincare for its antiseptic, anti-inflammatory, and calming properties. It is beneficial in treating minor burns, cuts, acne, and insect bites.[71] Lavender oil helps reduce redness, promotes healing, and also provides a relaxing aroma that soothes the senses. It is often used in aromatherapy and skincare formulations for its skin-balancing and stress-reducing effects.[72]

Figure: 9 Lavender [72]

9. Tulsi / Holy Basil (Ocimum sanctum): Tulsi, or holy basil, is a sacred herb in Ayurveda with powerful antibacterial, antifungal, and anti-inflammatory actions.[73] It is particularly useful in treating acne and skin infections, thanks to its ability to detoxify and purify the skin. Tulsi also helps in reducing stress-related skin issues and promotes a clear complexion. It can be applied as a paste made from fresh leaves or used in herbal face masks and cleansers.[74]

Figure: 10 Tulsi / Holy Basil [73]

10. Licorice Root (Glycyrrhiza glabra): Licorice root is known for its skin-brightening and anti-inflammatory properties. The compound glabridin helps inhibit melanin production, making it effective for treating hyperpigmentation, dark spots, and melasma. It also soothes inflamed skin and is beneficial in conditions like eczema and rosacea. Licorice is often included in creams and serums aimed at evening out skin tone and calming redness.[75]

Figure: 11 Licorice Root [75]

7. MECHANISM OF ACTION:

Herbs have been used for centuries in the management of various skin disorders due to their natural bioactive compounds, which exhibit anti-inflammatory, antimicrobial, antioxidant, immunomodulatory, and wound-healing properties.[76] Aloe vera (Aloe barbadensis Miller) is widely used for burns, wounds, psoriasis, and eczema. Its gel contains compounds such as acemannan, gibberellins, and glucomannans, which promote fibroblast proliferation, enhance collagen synthesis, and accelerate re-epithelialization. Additionally, it inhibits cyclooxygenase (COX) pathways, reducing the synthesis of pro-inflammatory prostaglandins, while its high water content and mucopolysaccharides help retain skin moisture and improve hydration.[77] Turmeric (Curcuma longa), mainly through its active component curcumin, exerts powerful anti-inflammatory effects by downregulating nuclear factor-kappa B (NF-κB), which controls the expression of various pro-inflammatory cytokines like IL-1β, IL-6, and TNF-α. Curcumin also scavenges reactive oxygen species (ROS), increases glutathione levels, and enhances the activity of antioxidant enzymes such as superoxide dismutase (SOD), making it beneficial in inflammatory skin conditions such as psoriasis and acne.[78] Neem (Azadirachta indica) contains bioactive compounds like nimbidin, azadirachtin, and quercetin, which exhibit strong antibacterial, antiviral, and antifungal activities. Nimbidin also shows anti-inflammatory action by inhibiting macrophage activity and reducing the release of histamine and prostaglandins. Neem oil is effective in treating bacterial infections, fungal dermatitis, and eczema due to its ability to modulate immune responses and reduce oxidative stress.[79] Tea tree oil (Melaleuca alternifolia) is a potent essential oil used for acne, fungal infections, and wounds. Its main active ingredient, terpinen-4-ol, disrupts microbial cell membranes, leading to leakage of intracellular contents and microbial death. It also inhibits the production of inflammatory mediators, including TNF-α and IL-8, contributing to its anti-acne and anti-inflammatory effects.[80] Calendula (Calendula officinalis) contains flavonoids, triterpenoids, and carotenoids that contribute to its healing properties. It promotes granulation tissue formation, enhances angiogenesis, and upregulates collagen production in the wound bed.[81] Its anti-inflammatory action is due to inhibition of pro-inflammatory enzymes such as COX-2 and lipoxygenase (LOX), making it useful in treating ulcers, dermatitis, and minor burns. Chamomile (Matricaria chamomilla) is rich in apigenin, bisabolol, and chamazulene, which help reduce inflammation by inhibiting histamine release and blocking pro-inflammatory cytokines.[82] Apigenin also has mild sedative and antispasmodic properties, which contribute to its soothing effects on irritated skin. Chamomile is commonly used in the treatment of eczema, rosacea, and allergic skin conditions. Gotu

kola (Centella asiatica) is a powerful wound healer due to the presence of triterpenoids such as asiaticoside and madecassoside, which stimulate fibroblast proliferation, collagen synthesis (particularly type I and III), and angiogenesis.[83] It also reduces inflammation by downregulating TNF-α and IL-1β, and protects against oxidative stress, making it effective in healing scars, stretch marks, and psoriasis. Licorice (Glycyrrhiza glabra) contains glabridin, which inhibits tyrosinase activity and melanogenesis, making it useful in treating hyperpigmentation disorders such as melasma.[84] Glycyrrhizin, another major compound, has a corticosteroid-like effect and reduces inflammation by inhibiting phospholipase A2 and the production of arachidonic acid derivatives. Licorice is also antimicrobial and antioxidant, aiding in the treatment of rosacea and eczema. Witch hazel (Hamamelis virginiana) contains high levels of tannins, particularly hamamelitannins, which act as astringents by constricting blood vessels and drying out excess oil on the skin.[85] It also inhibits COX enzymes, thus reducing inflammation and redness in acne-prone or irritated skin. Lastly, green tea (Camellia sinensis) is a potent antioxidant and anti-inflammatory herb rich in catechins, especially epigallocatechin-3-gallate (EGCG).[86] EGCG neutralizes free radicals, inhibits UV-induced DNA damage, and modulates inflammatory pathways by inhibiting NF-κB and MAPK signaling. Green tea also exhibits antibacterial effects, particularly against Propionibacterium acnes, making it effective in managing acne and photodamaged skin. These herbs provide a multi-faceted approach to managing skin conditions by targeting underlying inflammation, infection, oxidative stress, and tissue damage.[87]

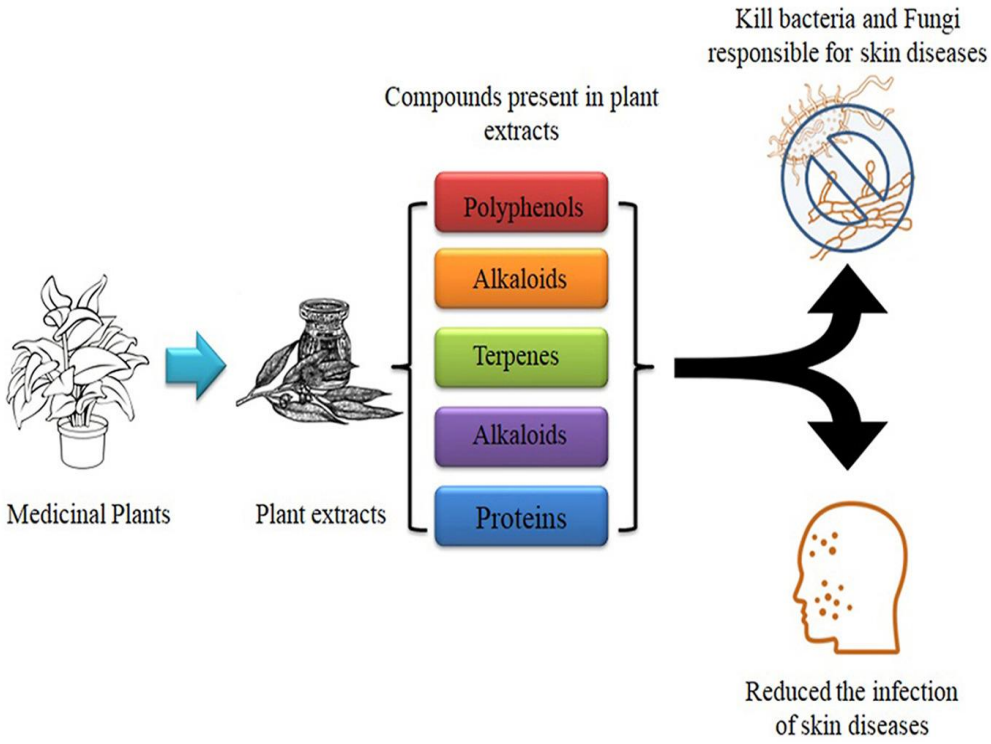

Figure: 12 General Mechanism of action [88,89,90)

8. FUTURE PROSPECTS:

The future of herbal treatments for skin disorders lies in integrating traditional knowledge with modern scientific approaches. Advancements in formulation technologies such as nano-carriers, liposomes, and transdermal delivery systems are expected to enhance the bioavailability, stability, and targeted action of herbal compounds. There is a growing need for large-scale, well-designed clinical trials to validate efficacy and safety, along with standardization of herbal extracts to ensure consistent quality. Emerging areas such as personalized herbal medicine, AI-driven compound screening, and biomarker-guided therapy offer promising avenues for precision treatment. Additionally, regulatory harmonization, sustainable sourcing, and mechanistic studies will play a critical role in bringing herbal dermatological products into mainstream practice. With increasing consumer demand for natural therapies, herbal remedies are poised to become valuable adjuncts or alternatives in the management of chronic and inflammatory skin conditions.

9. CONCLUSION:

The use of herbs in the treatment of skin disorders has garnered increasing attention due to their therapeutic potential, minimal side effects, and historical significance in traditional medicine systems. A wide range of medicinal plants including Aloe vera, neem, turmeric, calendula, and tea tree oil exhibit beneficial properties such as anti-inflammatory, antimicrobial, antioxidant, and wound-healing effects. These properties make herbal remedies valuable in managing common dermatological conditions like acne, eczema, psoriasis, and fungal infections. While traditional knowledge provides a strong foundation for their use, scientific validation through clinical and pharmacological studies remains essential to ensure their efficacy, safety, and standardization. Moreover, challenges such as quality control, formulation stability, and potential allergic reactions must be addressed. In conclusion, herbs represent a promising adjunct or alternative in the treatment of skin disorders. Continued research, combined with regulatory oversight, can help

bridge the gap between traditional practices and modern dermatological therapy, paving the way for the safe integration of herbal remedies into mainstream skincare and medicine.

10. RESULT:

The review highlighted that numerous medicinal herbs exhibit significant therapeutic potential in treating various skin diseases due to their anti-inflammatory, antimicrobial, antioxidant, and wound-healing properties. Key herbs such as Aloe vera, Neem (Azadirachta indica), Turmeric (Curcuma longa), Tulsi (Ocimum sanctum), and Tea tree (Melaleuca alternifolia) were found to be particularly effective against conditions like eczema, acne, psoriasis, and fungal infections. The study also noted that herbal formulations tend to have fewer side effects compared to synthetic drugs and support skin regeneration. Overall, the results emphasized the value of integrating herbal remedies into dermatological treatments, while also stressing the need for further clinical validation and standardization of dosage and formulations.

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