

Use of Traditional Medicine in the Treatment of Skin Diseases

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Annotation: Medicinal plants have been widely used since ancient times and continue to serve as important therapeutic resources in traditional and modern healthcare. This article examines the biological and dermatological significance of *Matricaria chamomilla*, *Aloe vera*, and *Calendula officinalis*—three medicinal species rich in bioactive compounds that contribute to their long-standing use in treating skin conditions. The phytochemical constituents of these plants, including flavonoids, terpenoids, carotenoids, polysaccharides, essential oils, and organic acids, exhibit a broad spectrum of pharmacological activities such as anti-inflammatory, antioxidant, antimicrobial, wound-healing, and immunomodulatory effects. German chamomile demonstrates therapeutic potential in reducing inflammatory mediators, enhancing skin barrier repair, and supporting wound healing, while *Aloe vera* exhibits profound regenerative, anti-inflammatory, and collagen-stimulating properties through compounds such as acemannan, aloin, and glucomannan. *Calendula officinalis*, rich in flavonoids, triterpenoids, and carotenoids, offers notable antioxidant, antiseptic, and anti-inflammatory benefits that accelerate wound

closure and alleviate dermatitis, burns, and irritations.

Given the rising global interest in natural therapies and the increasing prevalence of dermatological disorders, these plants represent valuable resources for developing safe, effective, and accessible treatments. This article highlights their chemical profiles, mechanisms of action, and therapeutic potential in managing various skin diseases.

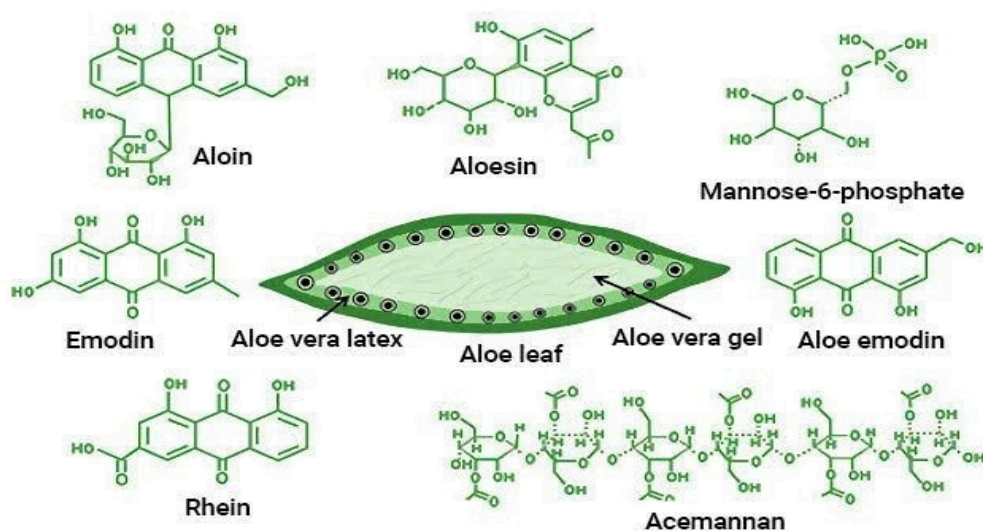
Keywords: Calendula, matrica chamomila, aloe, Polysaccharides, Aloesin, Apigenin, Saponins.

INTRODUCTION

Skin diseases are among the most common health concerns worldwide, affecting people of all ages and lifestyles. In addition to modern dermatological treatments, traditional herbal medicine continues to play an essential role in promoting skin health and treating various skin disorders. For centuries, natural plant-based remedies have been used for their healing, soothing, and restorative properties. Among the many medicinal plants applied in folk medicine, Aloe vera, *Calendula officinalis*, and *Matricaria chamomilla* stand out due to their scientifically proven therapeutic value. These plants are rich in biologically active compounds such as flavonoids, terpenoids, polysaccharides, essential oils, vitamins, and organic acids, which contribute to their anti-inflammatory, antimicrobial, antioxidant, and wound-healing effects. This article explores the chemical composition and medicinal properties of these plants and evaluates their importance in treating different skin conditions.

1 Aloe. Aloe vera is a perennial medicinal plant traditionally used since 1500 BC in Greece, China, and Mexico. Indigenous to tropical Madagascar, Saudi Arabia, and Iran, it belongs to the Liliaceae family and is similar to cactus with thick, fleshy leaves. Its gel contains over 75 compounds, including minerals, amino acids, vitamins, water, and polysaccharides.

Therapeutic Properties. Promotes wound healing by stimulating fibroblast proliferation and collagen synthesis. Reduces inflammation through inhibition of IL-6, IL-8, TNF- α , and leukocyte adhesion. Anti-itch effect due to magnesium lactate. Suppresses delayed hypersensitivity reactions and controls *Propionibacterium acnes* proliferation. Contains bioactive compounds (acemannan, aloin, glucomannan) that enhance skin regeneration and immune function..



1.1 This figure shows some of the chemical compounds present in the Aloe leaf.

Key Bioactive Compounds and Their Dermal Effects

1. Aloin

Aloin possesses anti-inflammatory, antibacterial, and antioxidant properties that help in soothing irritated skin and reducing acne. It inhibits the growth of *Staphylococcus aureus* and *Propionibacterium acnes*, which are associated with skin infections. Aloin also promotes wound healing by stimulating collagen production and preventing UV-induced skin damage.

2. Aloesin. Aloesin is known for its skin-whitening and pigmentation-regulating effects. It inhibits tyrosinase activity, the key enzyme responsible for melanin synthesis, thereby reducing hyperpigmentation and dark spots. It also exhibits anti-inflammatory and UV-protective effects, helping prevent photoaging.

3. Mannose-6-phosphate. Mannose-6-phosphate plays a major role in cellular repair and regeneration. It promotes fibroblast proliferation, which accelerates skin healing. It also improves skin hydration by supporting the extracellular matrix and facilitates the penetration of other active ingredients in the skin.

4. Emodin. Emodin exhibits strong anti-inflammatory, antimicrobial, and antioxidant activities. It helps reduce redness and swelling caused by skin irritation or infection. Emodin also has anti-aging potential, as it protects dermal cells from oxidative stress and inhibits collagen degradation.

5. Aloe-emodin. Aloe-emodin contributes to skin detoxification and wound healing. It shows antimicrobial effects against bacteria and fungi, aiding in the prevention of infections in damaged skin. Moreover, it helps regulate cell proliferation and has been reported to protect skin cells against UVB-induced damage.

6. Rhein. Rhein has potent anti-inflammatory and antibacterial effects that assist in treating skin inflammation and acne. It also enhances wound healing by stimulating keratinocyte migration and fibroblast activity. Rhein helps maintain skin barrier integrity and reduces oxidative stress.

7. Acemannan. Acemannan is a bioactive polysaccharide with remarkable moisturizing, wound-healing, and immunomodulatory properties. It activates macrophages, promoting tissue repair and collagen synthesis. Acemannan also enhances skin elasticity, accelerates the healing of burns and wounds, and provides antiviral and antifungal protection.

2. Matricaria chamomila

German chamomile (*Matricaria chamomilla* L.) from the Compositae family is known as “a star

of medicinal species” and has been used in Greece, Rome, and Egypt for thousands of years. Its chemical composition includes flavonoids, coumarins, volatile oils, monoterpenes, sesquiterpenes, diterpenes, and triterpenes.

Therapeutic Properties: Reduces inflammatory mediators (TNF- α , IL-6) and inhibits Th17 cell differentiation during eczema. Promotes wound healing and repairs skin barrier. Used topically for anti-itch, anti-inflammatory, sun protection, and antiviral purposes. Bioactive compounds include chamazulene (anti-inflammatory), α -bisabolol (wound healing, antimicrobial), apigenin (antioxidant), and flavonoids such as luteolin and quercetin (anti-allergic, antioxidant).



2.1 This image depicts a botanical illustration of the German Chamomile plant

Key Bioactive Compounds and Their Dermal Effects

The primary benefits of Chamomile on human skin are attributed to two main classes of compounds: volatile essential oils and water-soluble flavonoids.

1. Volatile Oil Components (Essential Oil)

These components are crucial for its anti-inflammatory and regenerative properties.

Chamazulene: Action: This sesquiterpene, which gives Chamomile oil its characteristic blue color after distillation, is a potent anti-inflammatory agent. It inhibits the production of pro-inflammatory prostaglandins and leukotrienes. Dermal Benefit: Effectively reduces erythema (redness), swelling, and irritation associated with inflammatory conditions like eczema, rosacea, and allergic contact dermatitis.

alpha-Bisabolol (Alpha-Bisabolol): Action: A highly prized component known for its strong wound-healing (cicatrizant) and antimicrobial activity. It penetrates the skin efficiently. Dermal Benefit: Accelerates the regeneration of damaged skin tissue, making it excellent for healing minor burns, cuts, and acne lesions. It also acts as a penetration enhancer for other active ingredients. Newer Insight: Recent studies suggest that α -Bisabolol helps inhibit enzyme activity (specifically hyaluronidase) that degrades the skin's natural hyaluronic acid, thereby indirectly supporting skin hydration and volume.

2. Water-Soluble Components (Flavonoids and Coumarins)

These compounds provide antioxidant defense and aid in soothing the skin.

Apigenin: Action: A dominant flavonoid with powerful antioxidant capacity. It scavenges free radicals generated by UV radiation and pollution. Dermal Benefit: Offers photoprotection (though not a primary sunscreen), helping to prevent photodamage and oxidative stress, which are key drivers of premature skin aging (wrinkles and fine lines). It also contributes to anti-inflammatory signaling.

Luteolin and Quercetin: Action: These flavonoids further boost the overall antioxidant and anti-allergic profile of the extract. Dermal Benefit: Helps stabilize mast cells, reducing the release of histamine, which is beneficial for calming highly sensitive or allergy-prone skin. **Coumarins (Herniarin and Umbelliferone):** Action: These compounds possess mild antiseptic and soothing properties. Dermal Benefit: Supports skin hygiene and aids in calming surface irritation.

3. Calendula

Calendula officinalis, of the Asteraceae family, is traditionally used for herpes, wounds, ulcers, skin damage, blood purification, scars, and frostbite. It is rich in flavonoids, carotenoids, triterpenoids, essential oils, polysaccharides, and saponins. Therapeutic Properties: Anti-inflammatory, antiseptic, and bactericidal. Promotes wound healing and epithelial regeneration. Reduces oxidative stress, alleviates burns, eczema, and minor skin injuries. Flavonoids, carotenoids, and triterpenoids provide antioxidant and tissue-regenerative effects. Essential oils maintain skin hygiene, reduce irritation, and provide mild analgesia.

Key Bioactive Compounds and Their Dermal Effects

- 1. Flavonoids (Quercetin, Isorhamnetin, and Rutin):** Action: These bioactive compounds are potent antioxidants that neutralize reactive oxygen species (ROS) and protect cellular structures from oxidative stress. Dermal Benefit: They help prevent premature aging by protecting collagen and elastin fibers, improve skin resilience, and reduce inflammation associated with acne and irritation.
- 2. Carotenoids (Lycopene, β -carotene, and Lutein):** Action: Naturally occurring pigments with strong antioxidant activity that protect the skin against UV-induced oxidative damage. Dermal Benefit: Promote tissue regeneration, enhance skin radiance, and support wound healing by stimulating epithelial cell renewal.
- 3. Triterpenoids (Faradiol, Taraxasterol, and Lupeol):** Action: Exhibit remarkable anti-inflammatory and antimicrobial properties, aiding in the inhibition of bacterial growth on damaged skin. Dermal Benefit: Contribute to soothing inflamed tissue, accelerating the healing of wounds, minor burns, and eczema lesions.
- 4. Essential Oils (α -Cadinol, δ -Cadinene, and Caryophyllene):** Action: These volatile components possess antiseptic and mild analgesic actions that enhance skin defense mechanisms. Dermal Benefit: Help maintain a clean skin surface, reduce irritation, and provide a natural pleasant fragrance in dermatological formulations.
- 5. Polysaccharides (Mucilage and Inulin):** Action: Function as natural humectants and emollients, improving moisture retention in the epidermis. Dermal Benefit: Deliver gentle hydration and restore the smooth texture of dry or sensitive skin.
- 6. Saponins:** Action: These natural surfactants support gentle cleansing and possess mild antimicrobial activity. Dermal Benefit: Help purify pores, making *Calendula* especially beneficial for oily and acne-prone skin types.

CONCLUSION

The traditional use of *Matricaria chamomilla*, *Aloe vera*, and *Calendula officinalis* is supported by modern research demonstrating their dermatological benefits. These plants exhibit anti-inflammatory, antimicrobial, antioxidant, and wound-healing activities, making them valuable for treating acne, burns, eczema, dermatitis, and other skin disorders. Integrating these herbal

remedies into modern dermatology offers safe, natural, and effective therapeutic alternatives, while continued research is necessary to optimize their clinical applications.

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