



HERBAL THERAPEUTICS IN PSORIASIS MANAGEMENT: A COMPREHENSIVE REVIEW OF ANTI-PSORIATIC MEDICINAL PLANTS

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ABSTRACT

This review provides a comprehensive overview of the anti-psoriatic potential of medicinal plants traditionally used in the management of psoriasis. It discusses the pathophysiology of psoriasis, limitations of existing therapies, and the role of plant-derived biomolecules—including flavonoids, alkaloids, terpenoids, phenolics, and saponins—in modulating inflammatory pathways, oxidative stress, and keratinocyte hyperproliferation. Experimental evidence from in vitro assays, such as HaCaT keratinocyte proliferation, nitric oxide inhibition, cytokine quantification, and oxidative stress models, as well as in vivo animal models including mouse tail and imiquimod-induced psoriasis, are critically reviewed. Medicinal plants such as Aloe vera, Curcuma longa, Wrightia tinctoria, Cassia tora, Centella asiatica, and Thespesia populnea demonstrate promising antipsoriatic activity through multi-targeted mechanisms. Overall, this review highlights the

therapeutic relevance of herbal plants in psoriasis management and emphasizes the need for standardized extracts, mechanistic validation, and well-designed clinical trials to facilitate their integration into modern dermatological practice.

KEYWORDS: Psoriasis, Medicinal plants, Anti-psoriatic activity, Herbal therapy, Keratinocyte proliferation, Inflammation, HaCaT cells, Imiquimod-induced psoriasis.

INTRODUCTION

Skin diseases encompass a wide range of conditions affecting the skin and subcutaneous tissues, including inflammatory, infectious, genetic, and allergic disorders that contribute substantially to the global health burden. According to data from the Global Burden of Disease Study 2010, skin and subcutaneous diseases such as eczema, psoriasis, acne, and fungal and bacterial infections were among the most prevalent conditions worldwide, ranking as the fourth leading cause of non-fatal disease burden and significantly contributing to years lived with disability across countries of varying income levels. These diseases not only cause physical discomfort through symptoms like itching, scaling, and lesions but also negatively impact psychological well-being and quality of life, highlighting their importance as a public health priority.^[1]

SKIN

Skin is the body's outer covering that protects it from injury, infection, and dehydration, while also helping to regulate temperature and sense the environment.^[2]

Anatomy of Skin

The human skin is a complex, multi-layered organ that serves as the body's primary protective barrier. It consists of three main structural levels: the epidermis, the dermis, and the hypodermis. The outermost layer, the epidermis, acts as a waterproof shield and creates our skin tone through cells called melanocytes. Directly beneath lies the dermis, a thick layer containing tough connective tissue, sweat glands, and hair follicles that provide the skin with its elasticity and strength. Deepest of all is the hypodermis (or subcutaneous fat), which attaches the skin to underlying bone and muscle while providing insulation and energy storage. Together, these layers work in harmony to regulate body temperature, enable the sense of touch, and defend the internal systems against environmental hazards.^[3]

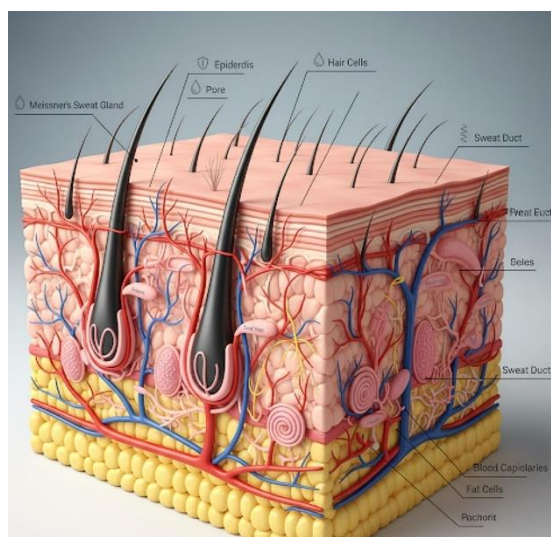


Figure 1: Anatomy of skin.

Importance of skin

- The skin acts as the primary protective barrier against physical injury, ultraviolet radiation, pathogens, and chemical agents.
- It plays a crucial role in immune surveillance by housing immune cells that detect and respond to invading microorganisms.
- The skin regulates body temperature through sweating and modulation of blood flow, maintaining thermal homeostasis.
- It prevents excessive water and electrolyte loss, thereby preserving internal fluid balance and barrier integrity.
- Sensory receptors in the skin enable perception of touch, pain, pressure, and temperature, facilitating interaction with the environment.
- The skin contributes to metabolic functions by synthesizing vitamin D upon exposure to sunlight, which is essential for bone health and immune regulation.^[3]

Skin diseases

Skin disease refers to any condition that affects the normal structure or function of the skin. These conditions may result from infections, immune system disorders, genetic factors, or environmental exposure. Skin diseases can be short term or chronic and commonly cause symptoms such as itching, redness, inflammation, discoloration, or abnormal skin growth.

Chronic conditions like psoriasis and eczema can significantly reduce quality of life if not properly treated. Early diagnosis and appropriate management help prevent complications.^[4]

List of skin diseases**Psoriasis**

Psoriasis is a chronic immune-mediated inflammatory skin disease characterized by excessive keratinocyte proliferation leading to well-defined, scaly plaques on the skin.^[5]

Acne Vulgaris

Acne vulgaris is a disorder of the pilosebaceous unit caused by increased sebum production, follicular hyperkeratinization, bacterial colonization, and inflammation.^[5]

Skin Cancer

Skin cancer is a disease in which skin cells begin to grow out of control and form abnormal growths or tumors. It usually starts in the epidermis (the outermost layer of the skin) when DNA damage often caused by ultraviolet (UV) radiation from the sun or tanning devices leads cells to multiply abnormally.^[6]

Vitiligo

Vitiligo is an acquired depigmentary disorder resulting from the loss of functional melanocytes, leading to well-demarcated white patches on the skin.^[7]

Rosacea

Rosacea is a chronic inflammatory facial skin disorder marked by persistent redness, visible blood vessels, and sometimes acne-like lesions.^[8]

Psoriasis

Psoriasis is a long-lasting, non-contagious skin disease in which the immune system causes skin cells to grow too quickly, leading to thick, red patches covered with white or silvery scales. The disease often comes and goes and may cause itching, pain, and discomfort.^[9]

Historical background of psoriasis

- Psoriasis is one of the oldest known skin diseases, with descriptions resembling the condition found in ancient medical texts. References to scaly skin disorders similar to psoriasis appear in early Egyptian papyri and were later described in classical Greek medicine. Hippocrates (460–370 BCE) used the terms “lopoi” and “psora” to describe itchy and scaly skin conditions, although psoriasis was not clearly distinguished from other dermatoses at that time.^[9]

- During the Roman era, the physician Galen introduced the term psoriasis from the Greek word psora, meaning “itch,” but the disease was still often confused with leprosy, leading to social stigma and isolation of affected individuals. This confusion persisted throughout the Middle Ages, when skin diseases with scaling were broadly categorized and poorly understood.^[10]
- A major breakthrough occurred in the 19th century when the English dermatologist Robert Willan and later Ferdinand von Hebra clearly differentiated psoriasis from leprosy and other skin disorders based on clinical features. Von Hebra described psoriasis as a distinct, chronic, non-infectious disease characterized by erythematous plaques with scaling, laying the foundation for modern dermatology.^[11]
- In the 20th century, advances in histopathology revealed excessive keratinocyte proliferation as a hallmark of psoriasis. Later research identified the role of immune dysregulation, particularly T cells and inflammatory cytokines, shifting psoriasis from a purely skin disorder to an immune-mediated systemic disease.^[12]
- In recent decades, molecular and genetic studies have further clarified the pathogenesis of psoriasis, leading to the development of targeted biologic therapies. Today, psoriasis is recognized as a chronic inflammatory disease with both cutaneous and systemic manifestations, and ongoing research continues to improve treatment and patient outcomes.^[9]

Causes of Psoriasis

Primary Causes of Psoriasis

- **Genetic predisposition:** Psoriasis develops mainly due to inherited genes that affect immune regulation and skin cell growth.^[9]
- **Immune system dysfunction:** Overactivation of immune cells, especially T-cells, leads to excessive inflammation and rapid skin cell proliferation.^[11]

Secondary Causes (Triggering / Aggravating Factors)

- **Infections:** Throat infections caused by streptococcal bacteria can trigger the onset or worsening of psoriasis.^[9]
- **Skin injury (Koebner phenomenon):** Cuts, burns, surgery, or trauma can induce psoriatic lesions at the injury site.^[10]
- **Psychological stress:** Emotional or mental stress can aggravate psoriasis flare-ups.^[9]

- **Medications:** Drugs such as beta-blockers, lithium, and antimalarials may worsen psoriasis.^[11]
- **Lifestyle factors:** Smoking, alcohol consumption, obesity, and cold climate can increase disease severity.^[9]

Symptoms of Psoriasis

Primary Symptoms of Psoriasis

- **Red, raised patches (plaques):** Well-defined red areas on the skin covered with white or silvery scales.^[9]
- **Scaling and flaking:** Excessive shedding of dry, thickened skin due to rapid skin cell turnover.^[11]
- **Symmetrical lesions:** Lesions often appear on both sides of the body, commonly on elbows, knees, scalp, and lower back.^[9]
- **Chronic and recurrent course:** Symptoms persist for long periods with episodes of flare-ups and remission.^[10]

Secondary Symptoms of Psoriasis

- **Itching and burning sensation:** Affected areas may feel itchy, sore, or painful.^[9]
- **Dry, cracked skin:** Skin may split and bleed, especially in severe cases.^[11]
- **Nail changes:** Thickened, pitted, or discolored nails, sometimes with nail separation.^[9]
- **Joint pain and stiffness:** Some patients develop joint inflammation known as psoriatic arthritis.^[10]
- **Emotional and psychological effects:** Anxiety, stress, and reduced quality of life may occur due to visible skin lesions.^[9]

Severity of Psoriasis

The severity of psoriasis is determined based on the extent of skin involvement, intensity of lesions, and the impact on the patient's quality of life. It is commonly classified into mild, moderate, and severe forms using clinical assessment tools.

- **Mild psoriasis** involves limited skin lesions affecting a small body surface area, usually with minimal symptoms.
- **Moderate psoriasis** shows wider skin involvement with noticeable plaques, scaling, and inflammation that may interfere with daily activities.

- Severe psoriasis is characterized by extensive body surface involvement, intense inflammation, marked scaling, and significant physical and psychological burden.
- Clinical tools such as the Psoriasis Area and Severity Index (PASI), Body Surface Area (BSA), and Dermatology Life Quality Index (DLQI) are widely used to objectively assess disease severity and guide treatment decisions.^[13]

Types of Psoriasis^[14]

Plaque Psoriasis

A common form of psoriasis characterized by raised, red patches of skin covered with silvery scales. These plaques usually appear on areas like the elbows, knees, scalp, and lower back. Plaque psoriasis is the most frequently diagnosed type.



Figure 2: plaque Psoriasis.

Guttate Psoriasis

Guttate psoriasis often begins suddenly and shows many small, drop-shaped, red scaly spots over the trunk and limbs. It frequently follows a throat infection, especially in children or young adults.



Figure 3: Guttate Psoriasis.

Inverse (Flexural) Psoriasis

This type occurs in skin folds — such as under the arms, breasts, buttocks, or groin — and appears as smooth, red, inflamed patches without the typical scaling seen in plaque psoriasis.



Figure 4: Inverse (Flexural) Psoriasis.

Pustular Psoriasis

Characterized by white-yellow pustules (non-infectious pus-filled blisters) surrounded by reddened skin. It can be localized to areas like the hands and feet or widespread and severe.



Figure 5: Pustular Psoriasis.

Erythrodermic Psoriasis

A rare and serious form in which large areas of skin become intensely red and inflamed, often peeling off in sheets. It can cause severe symptoms including intense itching or burning and requires urgent medical care.



Figure 6: Erythrodermic Psoriasis.

Nail Psoriasis

This type affects the nails, causing pitting (small dents), discoloration, abnormal nail growth, and separation of the nail from the nail bed. Some people have nail psoriasis without significant skin plaques.



Figure 7: Nail Psoriasis.

Psoriatic Arthritis

Although it primarily affects joints, psoriatic arthritis occurs in people with psoriasis. It causes joint pain, stiffness, and swelling, and can lead to long-term joint damage if untreated.

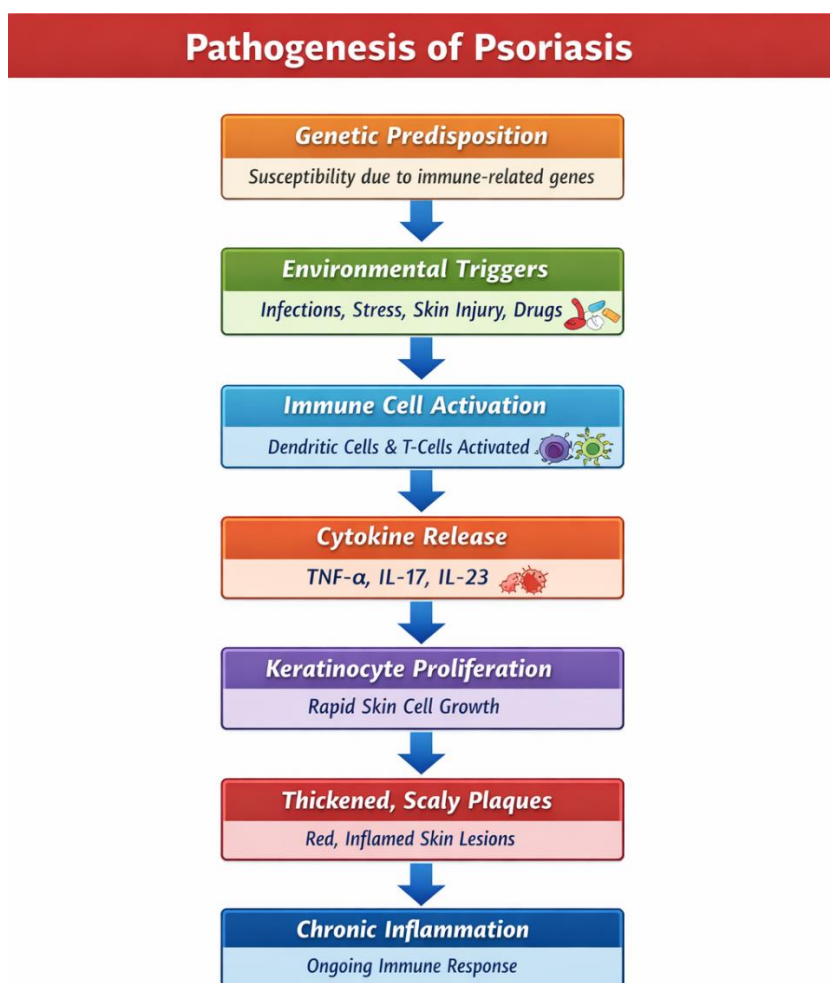


Figure 8: Psoriatic Arthritis.

Pathogenesis of psoriasis

Psoriasis is a chronic immune-mediated inflammatory skin disease that develops due to an abnormal interaction between the immune system and skin cells. In genetically predisposed individuals, environmental triggers activate immune cells, particularly dendritic cells and T lymphocytes. These activated immune cells release inflammatory cytokines such as tumor necrosis factor- α (TNF- α), interleukin-17 (IL-17), and interleukin-23 (IL-23), which play a key role in disease development.^[11]

These cytokines stimulate keratinocytes to proliferate rapidly and differentiate abnormally, resulting in thickened epidermis and excessive scaling. The inflammatory mediators also promote infiltration of immune cells into the skin, increased blood vessel formation, and sustained inflammation, leading to characteristic erythematous plaques. Disruption of the skin barrier further aggravates inflammation and maintains the chronic nature of the disease. Thus, psoriasis is driven by a self-perpetuating cycle of immune activation and abnormal keratinocyte response.^[12]



Herbal plants used for the treatment of psoriasis

conventional therapies such as corticosteroids, immunosuppressants, and biologics are effective, their long-term use is often associated with adverse effects, high cost, and relapse after discontinuation. This has increased interest in herbal medicines as alternative or complementary therapeutic options for psoriasis. Herbal plants have been traditionally used in various systems of medicine, including Ayurveda, Traditional Chinese Medicine, and folk medicine, for managing skin diseases. Owing to their natural origin, better patient tolerance, and lower risk of systemic toxicity, herbal therapies are increasingly explored for the long-term management of psoriasis.^[9]

Plant-derived biomolecules active against psoriasis

Several plant-derived biomolecules have been reported to exhibit antipsoriatic activity by targeting inflammation, keratinocyte proliferation, and immune dysregulation:

- **Flavonoids** – Possess anti-inflammatory and antioxidant properties that reduce cytokine-mediated skin inflammation and inhibit abnormal keratinocyte proliferation.
- **Terpenoids** – Modulate immune responses and exhibit anti-proliferative effects on hyperactive skin cells.
- **Alkaloids** – Reduce inflammatory signaling and cytokine production in psoriatic lesions.
- **Phenolic acids** – Exhibit antioxidant and anti-inflammatory activities that protect skin cells and improve barrier function.
- **Saponins** – Help regulate immune responses and promote wound healing in affected skin areas.

These biomolecules act through multiple mechanisms, including inhibition of TNF- α , IL-17, and IL-23, suppression of NF- κ B signaling, and reduction of oxidative stress, making them promising candidates for complementary psoriasis therapy.^[15]

Bioassay (in vitro) for anti psoriatic activity

HaCaT Keratinocyte Proliferation Assay

- Measures the effect of drugs or plant compounds on keratinocyte growth.
- Common methods: MTT assay, BrdU incorporation, or cell counting.
- Significance: Helps identify antiproliferative agents relevant to psoriasis.^[16]

Cytokine Quantification Assay

- Measures pro-inflammatory cytokines such as TNF- α , IL-17, IL-23.
- Methods: ELISA, qPCR, multiplex bead assays.
- Significance: Assesses anti-inflammatory activity of compounds.^[16]

Nitric Oxide Assay

- Measures the ability of drugs or plant-derived compounds to inhibit nitric oxide production in cultured cells, which reflects their anti-inflammatory potential.
- Common methods: Griess reagent assay, measurement of nitrite concentration in cell culture supernatant.
- Significance: Helps identify agents with anti-inflammatory activity by assessing suppression of nitric oxide, a key mediator of inflammation.^[17]

DPPH Assay

- Measures the ability of drugs or plant-derived compounds to scavenge free radicals, indicating their antioxidant potential.
- Common method: DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging assay by measuring the decrease in absorbance at 517 nm.
- Significance: Helps identify antioxidant agents by evaluating their capacity to neutralize free radicals, which play a major role in oxidative stress and related diseases.^[17]

Oxidative Stress Assay

- Measures ROS levels and antioxidant effects of biomolecules.
- Significance: Evaluates compounds that reduce oxidative stress contributing to psoriatic inflammation.^[18]

Medicinal Plants Exhibiting Anti- Psoriatic Activity**ALOE VERA**

Figure 9: Aloe vera (Aloe barbadensis Miller)

Family: Asphodelaceae

Part used

- Leaf gel (inner parenchymatous gel)
- Mature leaves (3-year-old plants, 50–55 cm length)

Extraction

- Method: Aqueous extraction
- Solvent: water

Method of assay

In-vitro antipsoriatic evaluation

- Cell line: HaCaT human keratinocyte cells
- Assay method: Sulforhodamine-B (SRB) cytotoxicity assay
- Reference standard: Fluorouracil
- Concentration range tested: 5–100 µg/mL
- Measurement: Absorbance at 550 nm

Result reported

- Maximum inhibition:
 - 71.55% inhibition at 100 µg/mL
- Moderate inhibition:
 - 69.05% at 50 µg/mL
- Comparable to standard drug:
 - Fluorouracil: 72.03% inhibition
- Indicates strong antipsoriatic potential via inhibition of keratinocyte hyperproliferation.^[19]

TURMERIC



Figure 10: Turmeric (*Curcuma longa* L.)

Family: zingiberaceae

Part used

- Rhizome (Stem)

Extraction

- Method: Soxhlet extraction
- Solvent: Ethanol

Method of assay

Mouse tail model of psoriasis

- Animals divided into 3 groups (n = 6)
 - Group A: Control (cream base)
 - Group B: Curcumin cream 1%
 - Group C: Curcumin cream 2%

Result reported

- Control group showed low orthokeratosis: 17.06 ± 2.5
- Curcumin 1% cream: 43.4 ± 0.75
- Curcumin 2% cream: 44.4 ± 0.98
- Topical curcumin was well tolerated, with minimal side effects except mild orange staining of the skin.^[20]

CASSIA TORA



Figure 11: Cassia tora (Senna tora (L.) Roxb).

Family: Fabaceae

Part used

- Leaves

Extraction

- Method: Ethanolic extraction
- Solvent: Ethanol

Method of assay**In vivo antipsoriatic activity**

- Model used: UV-B induced photodermatitis model

Result reported

- Ethanolic extract (400 mg/kg) and isolated flavonoids showed significant antipsoriatic activity
 - Significant reduction in relative epidermal thickness ($p < 0.01$) compared to positive control
 - Flavonoids from *Cassia tora* leaves possess significant antipsoriatic activity.^[21]

INDIGO

Figure 12: Indigo (*Indigo naturalis*).

Family: Fabaceae

Part used

- leaves and stems

Extraction

- Method: Organic solvent extraction
- Solvent: Ethanol or Methanol

Method of assay

- Immunohistochemical staining
 - Proliferating Cell Nuclear Antigen (PCNA)
 - Involucrin (marker of keratinocyte differentiation)
- Cell viability assay on cultured keratinocytes

Result reported

- Decreased PCNA expression → reduced keratinocyte proliferation
- Increased involucrin expression → enhanced keratinocyte differentiation
- Reduced keratinocyte viability after treatment
- Indigo showed cell cycle arrest but only indirubin regulated PCNA and involucrin effectively
- Confirms anti-psoriatic activity via regulation of keratinocyte proliferation and differentiation.^[22]

WRIGHTIA TINCTORIA

Figure 13: Wrightia tinctoria R.Br.

Family: Apocynaceae

Part used

- Leaves

Extraction

- Method: Soxhlet extraction
- Solvent: Ethanol and Water

Method of assay**Anti-psoriatic activity evaluated by**

- Mouse Tail Test
 - Measures:
 - Degree of orthokeratosis
 - Epidermal thickness
 - Standard drug: Isotretinoin / Isoretinoic acid (0.5 mg/kg)
- Antioxidant assays (supportive mechanism)
 - DPPH radical scavenging assay
 - Nitric oxide scavenging assay
 - Hydrogen peroxide scavenging assay

Result reported

- Hydro-alcoholic leaf extract at 200 mg/kg showed:
 - Significant increase in orthokeratosis ($P < 0.01$)
 - Drug activity: 70.18%
 - Higher activity than standard drug (57.43%)
- Extract also showed strong antioxidant activity confirms scientific validation of traditional use in psoriasis.^[23]

PONGAMIA PINNATA

Figure 14: Pongamia pinnata

Family: Fabaceae

Part used

- Leaves

Extraction

- Method: Maceration
- Solvent: Ethanol and Water

Method of assay**In vivo model**

- Imiquimod-induced psoriasis mouse model
- 5% Imiquimod cream applied topically for 7 days to induce psoriasis

Result reported

- Significant reduction in psoriasis severity:
 - Decreased erythema, scaling, and skin thickness
 - PASI score reduced from “Very marked” to “None” after treatment
 - Histopathology showed:
 - Restoration of normal skin architecture
 - Reduced hyperkeratosis and inflammation
 - Extract rich in:
 - Flavonoids, alkaloids, saponins, carbohydrates
- No skin irritation observed.^[24]

PORTIA TREE

Figure 15: Portia tree (*Thespesia populnea* (L.) Corr).

Family: Malvaceae

Part used

- Leaves

Extraction

- Method: Soxhlet extraction
- Solvent: 95% Ethanol

Method of assay**In-vivo anti-psoriatic activity using Mouse Tail Model**

- Animals: Male albino mice (25–30 g)
- Dose: 500 mg/kg (topical application)
- Duration: 14 days
- Parameters evaluated
 - Degree of orthokeratosis
 - Relative epidermal thickness
 - Drug activity
- Histopathological evaluation using Hematoxylin & Eosin staining
- Standard drug: Tazarotene gel (0.1%)

Result reported

- Orthokeratosis:
 - Control: $17.30 \pm 4.09\%$
 - *Thespesia populnea* extract: $65.31 \pm 2.59\%$
 - Standard (Tazarotene): $90.03 \pm 2.00\%$
- Drug activity: 58.05%
- Relative epidermal thickness: Significantly reduced compared to control
- Ethanolic leaf extract showed significant anti-psoriatic activity, validating its traditional use in psoriasis treatment.^[25]

CHAMOMILE

Figure 16: Chamomile (*Matricaria chamomilla* L.)

Family: Asteraceae

Part used

- Flower

Extraction

- Method: Steam distillation
- Solvent: No organic solvent used (essential oil obtained via steam/water distillation)

Method of assay

- GC–MS analysis for chemical composition
- In vitro assays on HaCaT keratinocytes (CCK-8 cell viability assay, qRT-PCR, Western blot, Immunofluorescence)
- In vivo IMQ-induced psoriatic-like skin inflammation mouse model
- PASI scoring and H&E histopathology
- Luminex assay for inflammatory cytokines

Result reported

- The essential oil significantly alleviated psoriatic-like skin inflammation.
- It reduced epidermal hyperplasia, inflammatory cell infiltration, and PASI score in IMQ-induced psoriatic mouse models.
- The oil inhibited inflammatory signaling pathways, particularly PI3K/Akt/mTOR and p38 MAPK.
- decreased pro-inflammatory cytokines such as IL-1 β , IL-6, TNF- α , and IFN- γ , demonstrating strong anti-psoriatic and anti-inflammatory activity.^[26]

SOLANUM XANTHOCARPUM



Figure 17: *Solanum xanthocarpum*.

Family: Solanaceae

Part Used

- Stem of the plant

Extraction

- Method: Ethanolic extraction
- Solvent: Ethanol

Method of Assay

- Imiquimod-induced psoriatic mouse model

Result Reported

- The extract showed significant anti-psoriatic activity
- Significant reduction in PASI score
- Marked inhibition of inflammatory cytokines (TNF- α , IL-1 β , IL-6, IL-17)
- Restoration of altered biochemical and antioxidant parameters
- Histopathology confirmed reduced hyperkeratinization.^[27]

RUBIA CORDIFOLIA



Figure 18: Rubia cordifolia.L

Family: (Rubiaceae)

Part Used

- Root (Radix Rubiae)

Extraction

- Method: Ethanolic extraction
- Solvent: Ethyl acetate (EA)

Method of Assay

In vitro studies

- Cell line: HaCaT human keratinocyte cells
- Antiproliferative assay: Determination of IC_{50} value
- Apoptosis assays:
 - Morphological observation of apoptotic changes
 - Annexin V–PI staining
 - Mitochondrial membrane potential assay

In vivo study

- Animal model: Mouse tail model
- Formulation: Standardized EA fraction formulated as a topical gel
- Evaluation: Histological analysis of epidermis (granular layer and epidermal thickness)

Result Reported

- EA fraction showed strong antiproliferative activity on HaCaT cells
 - $IC_{50} = 0.9 \mu\text{g/ml}$ (more potent than crude extract)
- EA fraction induced apoptosis in keratinocytes:
 - Increased apoptotic cells (Annexin V–PI assay)
 - Reduced mitochondrial membrane potential (dose- and time-dependent)
- In mouse tail model:
 - Increased thickness and number of granular layers
 - Increased epidermal thickness
 - Indicates enhanced keratinocyte differentiation
- Overall, the EA fraction demonstrated promising antipsoriatic activity.^[28]

CROTOLARIA JUNCEA



Figure19: *Crotolaria juncea* (*Crotolaria juncea* Linn.).

Family: Leguminosae

Part Used

- Seeds
- Extraction
- Method: Soxhlet extraction
- Solvent: Petroleum ether (for petroleum ether extract, CJPE)

Method of Assay

In vitro antipsoriatic activity

- MTT assay
- Cell line used: HaCaT (human keratinocyte cells)
- Test concentrations: 25, 50, 100, 200, and 400 µg/ml
- Incubation period: 24 hours

Mechanistic studies

- Nitric oxide (NO) production assay
- Lipid peroxidation assay

Result Reported

- plant extracts exhibited antiproliferative activity against HaCaT cells.
- Significant antipsoriatic activity was observed with Petroleum ether extract of *Crotalaria juncea* (CJPE)
- Extracts inhibited nitric oxide production and lipid peroxidation.
- The antipsoriatic effect is attributed to antioxidant-mediated mechanisms.
- Results scientifically support the traditional use of these plants in psoriasis treatment.^[29]

VITEX GLABRATA



Figure 20: *Vitex glabrata* (*Vitex glabrata* R.Br.).

Family: Verbenaceae

Part Used

- Leaves

Extraction

- Method: Soxhlet extraction
- Solvent: Ethanol

Method of Assay

In vitro antipsoriatic activity

- MTT assay
- Cell line used: HaCaT (human keratinocyte cells)
- Test concentrations: 25, 50, 100, 200, and 400 µg/ml
- Incubation period: 24 hours

Mechanistic studies

- Nitric oxide (NO) production assay
- Lipid peroxidation assay

Result Reported

- The plant exhibited antiproliferative activity against HaCaT cells.
- Extracts inhibited nitric oxide production and lipid peroxidation.
- The antipsoriatic effect is attributed to antioxidant-mediated mechanisms.
- Results scientifically support the traditional use of this plant in psoriasis treatment.^[29]

PHYLLANTHUS SIMPLEX



Figure 21: Phyllanthus simplex Retz.

Family: Phyllanthaceae.

Part used

- Whole plant

Extraction

- Method: Soxhlet extraction
- Solvent: Ethanol

Method of Assay

- MTT Assay using HaCaT cells (human keratinocyte cell line)
 - Different concentrations of extract (25, 50, 100, 200, 400 µg/mL) were incubated with cells.
 - Cell viability was measured to assess inhibition of keratinocyte proliferation.
- NO production assay – to measure nitric oxide inhibition.
- Lipid peroxidation assay – to evaluate antioxidant activity

Result Report

- Extracts of *Phyllanthus simplex* showed promising antiproliferative activity against HaCaT keratinocytes, indicating potential antipsoriatic effects.
- The extracts also reduced nitric oxide production and lipid peroxidation, suggesting that their activity may involve an antioxidant mechanism.^[29]

WOODFORDIA FRUTICOSA



Figure 22: Woodfordia fruticosa (L.) Kurz.

Family: Lythraceae

Part used

- Flowers

Extraction

- Method: Soxhlet extraction
- Solvent: Ethanol

Method of Assay**In vivo antipsoriatic activity**

- Experimental model
 - Novel psoriasis-like mouse model
 - Psoriasis was induced using Complete Freund's Adjuvant (CFA) and formaldehyde

Result reported

- The ethanolic extract showed significant antipsoriatic activity
- Observed effects included
 - Reduction in skin inflammation
 - Decrease in scaling and erythema
 - Improvement in histopathological skin structure
- The activity was attributed to:
 - Flavonoids and polyphenols
 - Anti-inflammatory
 - Antioxidant
 - Immunomodulatory effects.^[30]

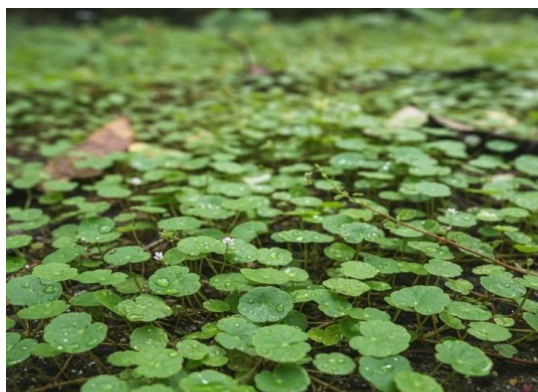
CENTELLA ASIATICA

Figure 23: Centella asiatica (L.) Urban.

Family: Umbelliferae

Part used

- Whole plant

Extraction

- Method: Soxhlet extraction
- Solvent: Ethyl acetate

Method of Assay**In Vitro (Cellular) Assays**

- Antioxidant Assays
 - DPPH, ABTS, FRAP tests to assess radical scavenging and antioxidant capacity.
- Inflammation & Cell Injury Model:
 - Human keratinocyte cells (*HaCaT*) were stimulated with LPS (20 µg/mL) to induce inflammation.
- Cell Analyses
 - Annexin V-FITC/PI staining to measure apoptosis.
 - RT-PCR and Western blot for gene and protein expression of inflammatory pathways (NF-κB, JAK/STAT3).

In Vivo (Animal) Model

- Psoriasis-like skin inflammation was induced in mice using 5% imiquimod (IMQ) cream.
- Mice were then treated with CAE solution at different doses (10, 20, 40 mg/mL) for 7 days.

Result Report

- Psoriasis-like skin lesions in mice were significantly improved with CAE treatment (especially at 40 mg/mL).
- Skin scaling and inflammation were reduced and inflammatory factors were significantly lowered in both serum and lesion tissues.^[31]

CONCLUSION

This review highlights that a wide range of medicinal plants such as *Aloe vera*, *Curcuma longa*, *Wrightia tinctoria* and *Thespesia populnea* offer a sophisticated, multi-targeted approach to treating psoriasis by simultaneously inhibiting skin cell overgrowth, reducing oxidative stress, and dampening inflammatory cytokine activity. Unlike standard pharmacological treatments that often carry a burden of high costs and significant long-term side effects, these botanical alternatives demonstrate comparable efficacy with improved patient tolerance. While the evidence from laboratory and animal models is compelling, the

transition to mainstream clinical use is currently hindered by a lack of standardized extraction methods and large-scale human trials. Consequently, future efforts should prioritize the identification of specific active markers and the development of advanced delivery systems to transform these traditional remedies into scientifically validated, holistic therapies.

REFERENCES

1. Hay, R. J., et al. "The Global Burden of Skin Disease in 2010: An Analysis of the Prevalence and Impact of Skin Conditions." *Journal of Investigative Dermatology*, 2014; 134(6): 1527–1534. Nature Publishing Group, doi:10.1038/jid.2013.446.
2. Lopez-Ojeda, Wilmer, et al. "Anatomy, Skin (Integument)." StatPearls, StatPearls Publishing, 2025, NCBI Bookshelf, www.ncbi.nlm.nih.gov/books/NBK441980/
3. Razzaghi, Ahmad, et al. "Physiology, Integument." StatPearls, StatPearls Publishing, 2025, NCBI Bookshelf, www.ncbi.nlm.nih.gov/books/NBK554386/
4. Nemeth, Valerie, Hasnain A. Syed, and Justin Evans. Eczema. StatPearls, StatPearls Publishing, 2025, NCBI Bookshelf, www.ncbi.nlm.nih.gov/books/NBK538209/
5. "Skin Diseases." National Institute of Arthritis and Musculoskeletal and Skin Diseases, National Institutes of Health, June 2025, <https://www.niams.nih.gov/health-topics/skin-diseases>
6. Centers for Disease Control and Prevention. Skin Cancer Basics. 1 July 2024, U.S. Department of Health and Human Services, <https://www.cdc.gov/skin-cancer/about/index.html>
7. Ahmed Jan, Naila, and Sadia Masood. Vitiligo. StatPearls, StatPearls Publishing, 2025, NCBI Bookshelf, <http://www.ncbi.nlm.nih.gov/books/NBK559149/>
8. Rosacea. StatPearls, StatPearls Publishing, 2025, NCBI Bookshelf, <http://www.ncbi.nlm.nih.gov/books/NBK557574/>
9. World Health Organization's 2016 Global Report on Psoriasis <https://www.who.int/publications/i/item/global-report-on-psoriasis>

10. Parisi, Rosa et al. "Global epidemiology of psoriasis: a systematic review of incidence and prevalence." *The Journal of investigative dermatology*, 2013; 133(2): 377-85. doi:10.1038/jid.2012.339
11. Nestle, Frank O et al. "Skin immune sentinels in health and disease." *Nature reviews. Immunology*, 2009; 9(10): 679-91. doi:10.1038/nri2622
12. Lowes, Michelle A et al. "Immunology of psoriasis." *Annual review of immunology*, 2014; 32: 227-55. doi:10.1146/annurev-immunol-032713-120225
13. Weigle, Nancy, and Sarah McBane. "Psoriasis." *American family physician*, 2013; 87(9): 626-33. <https://pubmed.ncbi.nlm.nih.gov/23668525/>
14. Dhabale, Anushka, and Shailesh Nagpure. "Types of psoriasis and their effects on the immune system." *Cureus*, 2022; 14(9). DOI: 10.7759/cureus.29536
15. Nowak-Perlak, Martyna, et al. "Promising Strategies in Plant-Derived Treatments of Psoriasis—Update of In Vitro, In Vivo, and Clinical Trials Studies." *Molecules*, 2022; 27(3): 591. MDPI, doi.org/10.3390/molecules27030591doi.org/10.3390/molecules27030591
16. Colombo, Irma et al. "HaCaT Cells as a Reliable In Vitro Differentiation Model to Dissect the Inflammatory/Repair Response of Human Keratinocytes." *Mediators of inflammation*, 2017; 7435621. doi:10.1155/2017/7435621
17. Perera, Hettiarachchige Dona Sachindra Melshandi et al. "In vitro pro-inflammatory enzyme inhibition and anti-oxidant potential of selected Sri Lankan medicinal plants." *BMC complementary and alternative medicine*, 3 Oct. 2018; 18(1): 271. doi:10.1186/s12906-018-2335-1
18. Dobrică, Elena-Codruța et al. "The Involvement of Oxidative Stress in Psoriasis: A Systematic Review." *Antioxidants (Basel, Switzerland)* 29 Jan. 2022; 11(2): 282., doi:10.3390/antiox11020282
19. ALMEHMADI, AWATIF M., et al. "ANTIPSORIATIC POTENTIALS OF ALOE VERA GEL ON HACAT CELLS WITH STUDYING SOME PHYSICAL PARAMETERS, PHYTOCHEMICAL AND BIOLOGICAL ACTIVITIES AGAINST MULTIPLE MICROBIAL PATHOGENS." *Acta Poloniae Pharmaceutica*, 2024; 81(5): 841-850. DOI: 10.32383/appdr/199360
20. Hassan, Bassam A. "Evaluation of Antipsoriatic activity of topical curcumin by using mouse tail model." *Thi-qar Medical journal*, 2018; 16(2): 172-184. <http://jmed.utq.edu.iq/index.php/main/article/view/26>

21. Singhal, Manmohan, and Niraj Kansara. "Cassia tora Linn Cream Inhibits Ultraviolet-B-Induced Psoriasis in Rats." *ISRN dermatology*, 2012; 346510. doi:10.5402/2012/346510
22. Lin, Yin-Ku et al. "Anti-psoriatic effects of indigo naturalis on the proliferation and differentiation of keratinocytes with indirubin as the active component." *Journal of dermatological science*, 2009; 54(3): 168-74. doi:10.1016/j.jdermsci.2009.02.007
23. Srivastava, Rajani. "A review on phytochemical, pharmacological, and pharmacognostical profile of *Wrightia tinctoria*: Adulterant of kurchi." *Pharmacognosy reviews*, 2014; 8(15): 36. DOI:10.4103/0973-7847.125528.
24. Wadher, K., Dabre, S., Gaidhane, A. et al. Evaluation of antipsoriatic activity of gel containing *Pongamia pinnata* extract on Imiquimod-induced psoriasis. *Clin Phytosci*, 2021; 7(20). <https://doi.org/10.1186/s40816-021-00256-6>
25. Dwarampudi, L. Priyanka, et al. "Phytochemical Evaluation and Anti-Psoriatic Activity of the Ethanolic Extract of the Leaves of *Thespesia populnea*." *Indian Journal of Biochemistry & Biophysics*, 2023; 60(2): 172–179. DOI: <https://doi.org/10.56042/ijbb.v60i2.70686>
26. Chen, Guang et al. "Essential Oil of *Matricaria chamomilla* Alleviate Psoriatic-Like Skin Inflammation by Inhibiting PI3K/Akt/mTOR and p38MAPK Signaling Pathway." *Clinical, cosmetic and investigational dermatology*, 8 Jan. 2024; 17: 59-77. doi:10.2147/CCID.S445008
27. Parmar, Komal M et al. "Anti-psoriatic potential of *Solanum xanthocarpum* stem in Imiquimod-induced psoriatic mice model." *Journal of ethnopharmacology*, 2017; 198: 158-166. doi:10.1016/j.jep.2016.12.046
28. Lin, Z X et al. "Ethyl acetate fraction of the root of *Rubia cordifolia* L. inhibits keratinocyte proliferation in vitro and promotes keratinocyte differentiation in vivo: potential application for psoriasis treatment." *Phytotherapy research : PTR*, 2010; 24(7) 1056-64. doi:10.1002/ptr.3079
29. Singh, Sushil K et al. "Assessment of in vitro antipsoriatic activity of selected Indian medicinal plants." *Pharmaceutical biology*, 2015; 53(9): 1295-301. doi:10.3109/13880209.2014.976713
30. Srivastava, Amit Kumar et al. "Antipsoriatic activity of ethanolic extract of *Woodfordia fruticosa* (L.) Kurz flowers in a novel in vivo screening model." *Indian journal of pharmacology*, 2016; 48(5): 531-536. doi:10.4103/0253-7613.190740
31. Pei Lin, Hong-yu Shi, Yin-ying Lu, Jun Lin, *Centella asiatica* alleviates psoriasis through JAK/STAT3-mediated inflammation: An in vitro and in vivo study, *Journal of*

Ethnopharmacology, 2023; 317: 116746. ISSN 0378-8741,
<https://doi.org/10.1016/j.jep.2023.116746>.