

Natural Green Alternatives to Psoriasis Treatment- A Review



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Abstract

Psoriasis is a very common chronic, disfiguring, inflammatory condition of the skin. This problem has a profound psychological impact on lowering self-esteem and interpersonal relationships. This skin disorder is seen worldwide and is thus a matter of serious concern. The prescribed synthetic drugs available in the market for the treatment of psoriasis are associated with different adverse effects, so researchers around the world are searching for new, effective, and safer drugs from natural resources. Many medicinal plants are available in nature and these plants are used for treating skin diseases. Virtually all human beings continue to rely on medicinal plants for skin diseases. The aim of this paper is to discuss the beneficial effects of assured medicinal plants for wide awareness of their utility for the treatment of Psoriasis. Plants chosen for these purposes have medicinally significant value; many of them possess active phytochemical constituents and are known as anti-psoriatic plants.

Keywords: Psoriasis; Salicylic acid; Topical treatment; Tazarotene; Anthraquinone and Acemannan

Introduction

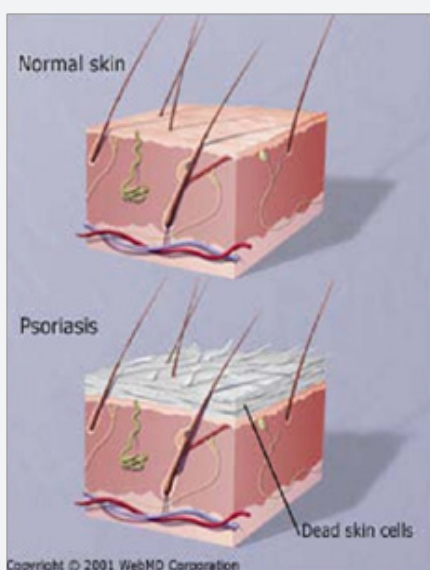


Figure 1: Normal skin and psoriasis affected dead skin cells.

Psoriasis is a complex multifunctional inflammatory skin disease characterized by T-cell (Tlymphocyte) activation, abnormal keratinocyte proliferation, local vascular changes

and neutrophil activation. Psoriasis is a common skin condition which can be itchy and painful; between 1.5% and 3% of people in the world have psoriasis. The skin is the largest organ of the human body, presenting a total area of approximately 2m². Being the most exposed part to the external environment, it is more prone to the ill-effects of radiation and ultraviolet rays [1]. Any pathology involving the skin is a matter of cosmetic concern. Since the systemic treatment for dermatological problems comes with its potential adverse effects, topical application is the preferred mode due to higher patient compliance and satisfaction. Normally, skin cells die and are replaced by new ones every three to four weeks. In psoriasis, the body begins to make new skin cells more quickly than normal and these build up on the skin in raised patches. Normal skin and psoriasis affected dead skin cells are shown in Figure 1.

This is related to the immune response, which is the way in which body fights diseases and heals wounds. In psoriasis, the immune system triggers a reaction even though there is no infection or wound to heal. The reasons why it does this are not completely understood but it is mostly caused by variations in the genes. The prescribed synthetic drugs for the treatment of

psoriasis are associated with different adverse side effects, so researchers around the sphere are searching for new, effective, and safer drugs from natural resources. Psoriasis is a long-term condition; it is not infectious and can affect all areas of the skin. This includes the nails, scalp and genital area. It can also affect areas where the skin is folded; which are known as flexural areas. Psoriasis can range from being a very mild to a very serious condition. Distribution of psoriasis severity is shown in Figure 2. At the moment there is no cure for psoriasis, but it can be well controlled by using a variety of treatments [2]. Different types of Psoriasis [3] include Plaque psoriasis, Guttate psoriasis, Pustular psoriasis, Inverse psoriasis, Erythrodermic psoriasis and Psoriatic arthritis. Generally psoriasis may be Mild to Moderate psoriasis and Severe psoriasis.

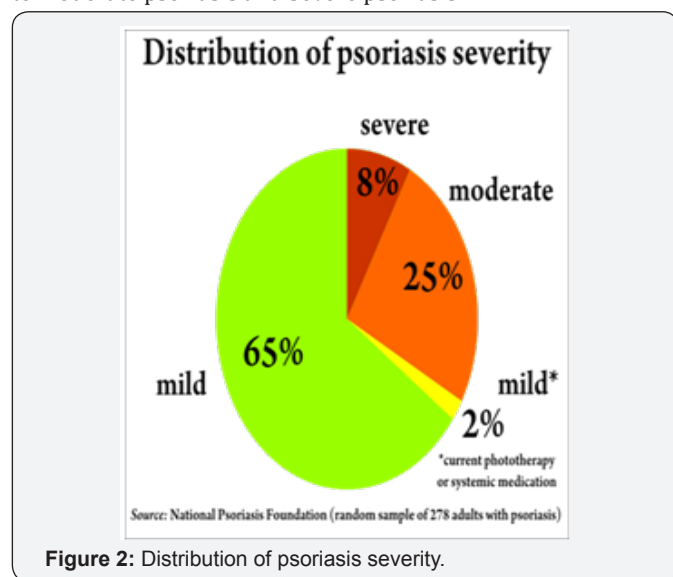


Figure 2: Distribution of psoriasis severity.

Mild to Moderate Psoriasis

Mild to moderate psoriasis, affects below 5 percent of the body surface area and sparing the hands, feet, genitals and face. These patients can often be treated successfully with topical therapies, including corticosteroids, tazarotene, vitamin D analogs, and calcineurin inhibitors [4-7]. Less commonly used

topical therapies include, salicylic acid, coal tar, non-medicated moisturizers and anthralin [5]. Relevant corticosteroids are frequently used to treat psoriasis [5,6]. The vitamin D analogs are used in combination with phototherapy to treat psoriasis in patients who have 5 to 20 percent body surface involvement. These agents have a slower commencement of action but a longer disease free interval than relevant corticosteroids [5-7]. Tazarotene is a teratogenic relevant retinoid. Tazarotene is as effective as topical corticosteroids in alleviating symptoms of psoriasis, but it is associated with a longer disease-free interval [5]. It improves symptoms with less skin atrophy than topical corti-costeroids and is considered first-aid treatments for facial and flexural psoriasis.

Severe Psoriasis

Severe psoriasis relating more than 5 percent of the body surface area or relating the feet, face, hands, or genitals of the patients. Patients suffering from severe psoriasis are generally treated with phototherapy in combination with systemic therapies [6]. Systemic therapies include acitretin, cyclosporine, metho-trexate, and biologic therapies.

Topical Treatments for Psoriasis

Topical Treatments for Psoriasis are many, but they have different side effects [8]. Coal tar generally used in treatment of psoriasis having side effects of skin irritation, odor, staining of clothes. Topical steroids used in treatment of psoriasis having side effects of hypo pigmentation and skin atrophy. Salicylic acid is the most commonly used keratolytic agent and is often advocated for removing psoriatic scale. Concentrations between 2% and 10% in an ointment base are usually dispensed. Salicylic acid is often used in combination with coal tar or corticosteroids. Tazarotene also used for psoriasis, it is best when used with topical corticosteroids but produces skin irritation, photosensitivity. Calcipotriene used in permutation with topical Steroids, and the side effects are skin irritation, photosensitivity. Calcineurin inhibitors are used for facial psoriasis, having side effects of skin burning and itching.

Table 1:

Sl. No.	Botanical Name	Family Name	Common Name & Local Name	Plant Parts Used	Ref(s).
1	<i>Angelica sinensis</i>	<i>Apiaceae</i>	Chinese angelica	Root	Koo & Arain [10]
2	<i>Alpiniagalanga</i>	<i>Zingiberaceae</i>	Thai Ginger, akkulati	Rhizome	Saelee et al. [11]
3	<i>Aloe vera</i>	<i>Liliaceae</i>	Aloes, Kathalai	Leaf	Choonhakarn et al. [12]
4	<i>Annona squamosa</i>	<i>Annonaceae</i>	Sugar Apple, Custardapple/Sitapalam	Rhizome and leaf	Saelee et al. [11]
5	<i>Andrographisnallamalayanna</i>	<i>Acanthaceae</i>	Echinacea, SiriyaaNangai/ NilaVembu	Whole plant	Parlapally et al. [13]
6	<i>Azadirachtaindica</i> A. Juss.A. Juss.	<i>Meliaceae</i>	Neem, Veppam	Leaves, bark and stemstem	Mundada et al. [14]
7	<i>Capsicum annum</i>	<i>Solanaceae</i>	Cayenne, Milagai	Leaves	Bernstein et al. [15]

8	<i>Calendula officinalis</i>	<i>Compositae</i>	Marigold, ThulukkaSaamanthi	Flowers	Brown & Dattner; Roopashree et al. [16,17]
9	<i>Cassia fistula L.</i>	<i>Caesalpinaceae</i>	Amaltas, Konrai	Fruit pulp	Tram & Son [18]
10	<i>Cassia toral.</i>	<i>Caesalpinaceae</i>	sickle senna, Thaarai	Leaves	Menter; Singhal & NirajKansara [4,19]
11	<i>Curcuma longa L.</i>	<i>Zingiberaceae</i>	Turmeric, Manjal	Rhizome	Joe & Lokesh [20]
12	<i>CentellaasiaticaL.</i>	<i>Apiaceae</i>	Indian Pennywort Vallarai	Whole plant	Sampson et al. [21]
13	<i>Givotiarottleriformis</i>	<i>Euphorbiaceae</i>	White Catamaran Tree puttali	bark	Vijayalakshmi et al. [22]
14	<i>Leucasaspera</i>	<i>Lamiaceae</i>	Common leucas, Thumbai	Aerial parts	Singh et al. [23]
15	<i>Matricariarecutita</i>	<i>Asteraceae</i>	Chamomile, Mookuthi Poo	Flowers	Murti et al. [24]
16	<i>Momordicacharantial.</i>	<i>Cucurbitaceae</i>	Bitter Gourd, iraca-valliPavai	Seeds	Zahra et al. [16,17,25]
17	<i>Nigella sativa</i>	<i>Ranunculaceae</i>	Black cumin, Karunjiragam	Seeds	Ghosheh et al.; Dwarampudi et al. [27,28]
18	<i>Psoraleacorylifolia</i>	<i>Fabaceae</i>	Psoralea, karpokarishi	Seeds	Kotiyal & Sharma; Conner & Neumeier [29,30]
19	<i>Pongamiapinnata(L.) Pierre</i>	<i>Leguminosae</i>	Pongam Tree, Pungai	Seeds	Srinivasan et al.; Chopade et al. [32,33]
20	<i>RubiaccordifoliaL.</i>	<i>Rubiaceae</i>	Indian Madder, Manjitti	Root	Karodi et al. [34]
21	<i>Smilax china</i>	<i>Smilacaceae</i>	China Root Parangichekkai	Rhizome	Anonymous; Vijayalakshmi et al. [35,36]
22	<i>Silibummarianum</i>	<i>Asteraceae</i>	Milk thistle, vishnukranti	Seeds	Sabir et al. [37]
23	<i>Tribulusterristris</i>	<i>Zygophyllaceae</i>	Puncture Vine, palleru-mullu	Fruit	Rajesh et al. [38]
24	<i>Thespesiapopulnea</i>	<i>Malvaceae</i>	Indian tulip tree Puvarasu	Bark	Vijayalakshmi et al. [39]
25	<i>Wrightiatinctorial.</i>	<i>Apocynaceae</i>	Sweet Indrajao, Paalai	Leaves	Dhanabal [40]

The literature survey revealed that fractions, isolates, extracts, chemical constituents and different formulations from plants, comprise various systems of medicine. It is also found that some of them possess anti-psoriatic activity, and anti-psoriatic formulations. Since medicinal plants are nontoxic and easily affordable, they play a vital role in pharmacological research and drug development [9]. The plant constituents are used directly as therapeutic agents and as starting materials for the synthesis of drugs due to their medicinal values. In the present paper, an attempt has been made to document the list of ethno-medicinal plants used to cure psoriasis. This could help in creating mass awareness regarding the need for conservation of such plants. Table 1. Shows the list of medicinal plants used for the treatment of psoriasis. The background and importance of these medicinal plants have been discussed below.

Angelica sinensis

Angelicas are short-lived perennials or biennials belonging to the Apiaceae family. Angelica forms a basal clump of large three-sectioned leaves, borne on clasping leaf stalks of 2 to 3 feet tall. Koo & Arain, reported that two-thirds patients got complete relief from psoriasis after oral treatment with this plant extract [10]. It is commonly known as Dong quay. This Chinese herbal

medicine extracts contain potent furocoumarin i.e. psoralen. Psoralens are potent photosensitizers in the presence of UVA. Exposure to UVA, following psoralen ingestion, causes epidermal DNA cross - linking and thus a decrease in the rate of epidermal DNA synthesis. Patients are self-administering a form of psoralen-UVA (PUVA) therapy by consuming dong quay and then receiving ultraviolet light therapy or natural sunlight.

Alpiniagalangal

Alpiniagalanga grows to a height of about 5 feet, the leaves being long, rather narrow blades; the ranched pieces of rhizome are from 3.5-7.5cm in length, and more than 2cm thick. Chanachai et al; reported the plant Alpiniagalanga, Curcuma longa and Annona squamosa were beneficial for their anti-psoriatic effect [11].

Aloe vera

The active agents have shown considerable antipruritic, analgesic, anti-inflammatory properties, and wound healing and thus justifying consideration of Aloe Vera as an effective remedy for the treatment of psoriasis [12]. The leaves are fleshy and thick, green to grey-green, with some varieties showing white flecks on their upper and lower stem surfaces. The margin of the

leaf is serrated and has small white teeth. The aloe group showed significantly higher rates of clearing the psoriatic plaques in almost all patients. Anthraquinone and acemannan are the main active compounds in Aloe Vera, have antibacterial activity against Staphylococcus and Streptococcus species and may provide a rationale for their therapeutic efficacy in psoriasis.

Annona squamosal

The leaves are thin, oblong while the flowers are greenish - yellow. Unripe fruits made in to paste applied externally. Chanachai et al reported the plant *Alpiniagalanga*, *Curcuma longa* and *Annona squamosal* were used for their anti-psoriatic effect [11].

Andrographisnallamalayanna

The plant is being used in folklore system of medicine to treat mouth ulcers, leucorrhoea and sterility [13].

Azadirachta indica

The alternate leaves are 20-40cm long, with 20-31 medium to dark green leaflets about 3-8cm long. The stem bark is burnt and ash is applied topically on boils. Decoction of leaves is used to bath for the treatment of body infection. Its decoction is also taken orally for the treatment of the same. The seed oil is used externally to kill lice and to treat dandruff [14].

Capsicum annum

Capsicum annum is a large perennial shrub; the stem is densely branched while the single flowers are an off-white color. The fruit are berries that may be yellow, green or red when ripe. The herb contains a substance known as capsaicin, which relieves pain and itching associated with psoriasis. Paste of dry leaves applied externally effective in plaque Psoriasis [15].

Calendula officinalis

Calendula officinalis are some of the very common Indian herb having various medicinal properties for the treatment of different kind of disease, viz. antifungal, wound healing and anti diabetic agents respectively [16]. *Calendula officinalis* are short-lived aromatic herbaceous perennial, the leaves are oblong-lanceolate, 5-17cm long, and hairy on both sides and with margins entire or occasionally wavy or weakly toothed. These herb has been reported for their usefulness in the form of decoctions, infusions and tinctures in traditional system of medicines for treating skin diseases like psoriasis, leprosy etc [17].

Cassia fistula

Cassia fistula has showy racemes, up to 2" long, with bright, yellow, fragrant flowers. It has been used in folkloric medicine in Vietnam for the treatment of skin related autoimmune disease such as leprosy. To date, the clinical efficacy of *Cassia fistula* has just been investigated for anti-inflammatory, antioxidant, antibacterial and immune modulatory activities [18].

Cassia tora

It has pinnate leaves, which are about 10 cm long. Each leaf has three pairs of leaflets that are opposite, ovate, oblong and oblique at the base. *Cassia tora* L. (Fabaceae), also known as *Charota*, Chakunda and Sickle senna locally, has been traditionally used for the treatment of psoriasis and other skin diseases [4]. *Cassia tora* leaves enrich in glycosides and also contain aloemodin, which may be beneficial for the skin diseases [19].

Curcuma longa

Curcuma longa commonly known as Turmeric, It is a rhizomatous herb. The plant grows to a height of 3-5 ft. It has oblong, pointed leaves and bears funnel shaped yellow flowers, peeping out of large bracts. The rhizome is the portion of the plant used medicinally. It is also reported decreased PhK activity in the curcumin and calcipotriol treated groups corresponded to severity of parakeratosis, decreases in keratinocyte transferring receptor expression and density of epidermal CD8+T cells [20].

Centellaasiatica

It is effective in improving treatment of small wounds, hypertrophic wounds as well as burns, psoriasis and scleroderma [21].

Givotia rottleriformis

Givotia rottleriformis is a White Catamaran Tree with moderate-sized. Leaves are heart-shaped, alternate, and rounded. The bark and seeds of the tree are used in indigenous medicine in the treatment of rheumatism, dandruff and psoriasis. The bark and seeds of the tree are used in indigenous medicine in the treatment of inflammatory diseases such as rheumatism, psoriasis and dandruff [22].

Leucas aspera

It is an erect and diffusely branched annual herb. Leaves are linear or oblong, 2.5 to 7.5cm long with blunt tips and scalloped margins. Whorls are terminal, large and axillary, about 2.5cm in diameter and crowded with white bell shaped flowers. Calyx is variable, with an upper lip and short, triangular teeth [23].

Matricariae recutita

Matricariae recutita locally known as *M chamomilla*. *M chamomilla* has an erect, branched, and smooth stem, the long and narrow leaves are bipinnate or tripinnate. There is evidence for it to supporting the role of increased LTB4 formation in psoriatic plaques; therefore, inhibition results in disease improvement [24]. It is also known as Chamomile. The chamomile flowers have a long therapeutic tradition in treating gastrointestinal ailments. The rationale for its use in psoriasis is that chamazulene, a byproduct of the non-volatile oil extract, matricin, known to have anti-inflammatory activity by inhibition of lipoxygenase and as a result, leukotriene B4 (LTB4) formation. Chamomile oil has antimicrobial activity against skin pathogens,

Staphylococcus and Candida. The flavonoids, quercetin and apigenin, are also active compounds of the flower. Quercetin is reported to be a potent inhibitor of lipoxygenase and to a lesser degree, cyclooxygenase. Quercetin also shows good skin penetration property.

Momordi cacharantia

Momordi cacharantia locally known as *Bitter Gourd*. It is an herbaceous, tendril-bearing vine, growing up to 5 m. It bears simple, 3-7 deeply separated lobes, with alternate leaves of 4-12cm across. It is used in the form of decoctions and infusions to treat bacterial infections and also claimed to be an effective against variety of skin conditions like psoriasis, acne, wounds [17]. It is very common Indian herb having various medicinal properties for the treatment of different kind of disease; viz. wound healing, antifungal and anti diabetic agents respectively [16]. These herbs has been reported for their usefulness in the form of decoctions, infusions and tinctures in traditional system of medicines for treating skin diseases like psoriasis, leprosyetc [17,25].

Nigella sativa

Nigella sativa is popularly known as black cumin. It is an annual herb of the *Ranunculaceae* family. The *Nigella sativa* seeds contain ingredients, including nutritional components such as fats, vitamins, carbohydrates, mineral elements, and proteins, including eight of the nine Essential amino acids [26]. Pharmacological investigations of the seed extract reveal a wide spectrum of activities including antibacterial, antifungal, anti-inflammatory and anti-helminthic [27]. The seeds are externally applied for eruptions of skin. The seeds are used traditionally for psoriasis tropicus with general pain and eruption of patches [28].

Psoraleacorylifolia

Psoraliacorylifolia is an annual herb belong to *Fabaceae* family. It is an erect with broadly elliptic leaves, yellowish or bluish purple flowers and dark chocolate to almost black colored, compressed and mucronate seeds. Traditionally in China and India, *Psoralia corylifolia* has been used for the treatment of anthelmintic, diuretic, vitiligo, deobstruent, stomachic and also certain skin diseases, such as leucoderma, leprosy and psoriasis [29]. *Psoraliacorylifolia* contains psoralens which are capable of absorbing radiant energy. In ultraviolet range Photoactivation by Psoralens with (200–320nm) is known to ameliorate various skin disorders such as psoriasis, vitiligo and mycosis fungicides in humans [30]. *Psoraliacorylifolia* has been used traditionally as an anti-psoriatic agent. A compound ointment of the powered seeds of *Psoraleacorylifolia* and *Cassia tora* with lime juice was tried in cases of ringworm with marked beneficial results [31].

Pongamiapinnata

Pongamiapinnata is a medium sized glabrous semi-evergreen tree growing up to 18m or higher, spreading crown

with greyish green or brown bark, with a short bole. Leaves are alternate, imparipinnate, leaflets 5 to 7, ovate and opposite. *Pongamiapinnata* belong to *Leguminosae* family, this tree is popularly known as Karanja in Hindi, Indian Beech and Derris indica in English respectively. *Pongamiapinnata* occurs all over India in the bank of rivers and streams and planted as avenue tree in gardens [32], useful for the treatment of skin diseases. Powered seedsof *Pongamiapinnata* are used for treatment of leucoderma, Pongamia Seed oil is also used as insecticidal, bactericidal and nemacidal [33]. In the traditional systems of medicines, such as Ayurveda and Unani, *Pongamiapinnata* is used for anti-inflammatory, anti-plasmodial, anti-nonciceptive, anti-hyperglycaemics, anti-lipidoxidative, anti-diarrhoeal, anti-ulcer, anti-hyperammonic and anti-oxidant. Its oil is used as a source of biodiesel. It has also alternative source of energy, which is renewable, safe and non-pollutant.

Rubiaccordifolia

Rubiaccordifolia is a perennial climbing herb and it can grow to 1.5m in height. Leaves are entire pointed, 3-9 palmately veined, ovate- heart shaped, rarely rounded, heart-shaped at base, upper surface mostly rough and hairless. The extracts of plant are used for treating different skin infections; it may be a useful plant in the treatment and management of psoriasis [34].

Smilax china

Smilax china used in various diseases such as rheumatism, chronic nervous diseases, epilepsy, gout, skin diseases, dyspepsia, constipation, helminthiasis, syphilis, flatulence, colic, neuralgia, psoriasis and seminal weakness [35,36]. They isolated the flavonoid quercetin from the methanolic extract of the rhizome. They performed anti-psoriatic effect on HaCaT cell lines. They reported a significant reduction of epidermal thickness, with reduction of leucocyte migration.

Silibummarianum

Silibummarianum commonly known as *Milk thistle* or *vishnukranti*. The leaves are either lobate or pinnate, with spiny edges. They are oblong to lanceolate, hairless, shiny green, with milk-white veins. Triggers an outbreak of psoriasis, as in certain cases of guttate psoriasis. *Silibummarianum* has been shown to inhibit human T-cell activation, which occurs in psoriasis [37].

Tribulusterristris

Tribulusterristris commonly known as Puncture Vine, it has a long history of uses throughout the world. It has been used in China for more than four decades years to treat conditions such as premature ejaculation, psoriasis, liver disease and eczema [38]. Other ancient Eastern cultures used *Tribulusterristris* for its diuretic properties and to treat infections.

Thespesiapopulnea

Botanical name of Indian tulip tree Puvarasuis is *thespesiapopulnea*. It belong to Malvaceae family, traditionally

claimed to be useful in the treatment of cutaneous affections such as scabies, ringworm, guineaworm, eczema psoriasis and herpetic diseases. Oil prepared by boiling the ground bark in coconut oil is applied externally in psoriasis and scabies [39]. *Thespesiapopulnea* bark extract on Perry's Scientific Mouse tail model. They reported a 25% increased orthokeratosis. Plant has been reported to contain carbohydrates, glycosides, tannins, flavonoids, triterpenoids, phytosterols, proteins and lipid/fixed oil.

Wrightiatinctoria

Wrightiatinctoria leaves extract contains hydroalcoholic extract, which showed significant anti-psoriatic effect on mouse tail test model, as compared to isotretinoic acid as standard. It is found the extract to produce significant orthokeratosis, prominent antioxidant activity in DPPH, Nitric oxide and hydrogen peroxide scavenging assay [40].

Conclusion

Psoriasis is a very common chronic, disfiguring, inflammatory condition of skin. People not only disturbed mentally and physically due to Psoriasis, but also expand lot of money for their cure when these are at chronic stage. If these diseases are cured at initial stage then we can save lot of money. The synthetic drugs used to treat it are having side effects and it has been seen that some the synthetic drugs have psoriasis as adverse effect. Consequently an attempt made to incorporate chemical constituents isolated from different plants responsible for anti-psoriatic activity and their possible mechanism of actions. Most of the modern medicines are directly or indirectly derived from plant sources. Thousands of texts and monograph on phytomedicines remedies exists. But most of the information's are outside current databases and remains unavailable. The scientific validation is good and the record of clinical use is even better. Different scientific literature exists on the use of phytomedicines in medical systems throughout the universe. Basic research into characterizing these plant products and compounds in terms of standardized content and potential toxicity is needed to allow safe and replicable research to document clinical efficacy. Preliminary anti-psoriatic activity studies should be carried out on crude extracts of traditionally used and medicinally promising plants. Before comprehensive research is developed several key issues must be addressed, including the following the loss of knowledge about traditional healing of Psoriasis in nature.

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