ANTI-PSORIATIC POTENTIAL OF SYNTHETIC AND HERBAL ANALOGUES WITH SPECIAL REFERENCE TO BLACK CUMIN

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Abstract
Histologically, the skin condition known as psoriasis is characterized by aberrant differentiation and hyperproliferation of epidermal keratinocytes. Psoriasis is a condition that has some known conventional medical therapies, including phototherapy, systemic medications, and various combinations of those. The bulk of these therapies do, however, have some efficacies as well as possible drawbacks, which restrict their long-term use. Skin atrophy, organ toxicity, carcinogenicity, and broad-spectrum immunosuppression are some of these adverse consequences. Therefore, using herbal products as a psoriasis alternative treatment that has fewer side effects would be better. The goal of the current study is to consolidate the available information on synthetic, herbal, and polyherbal medications for the treatment of psoriasis including a special emphasis on Black cumin. Incorporating phytocomponents extracted from various plants that exhibit anti-psoriatic activity has been attempted in this review. To fully utilize these plants as prospective anti-psoriatic medications, a comprehensive exploration of these plants is required to extract anti-psoriatic ingredients and assess their potential mechanisms of action. Finally, we provide a comprehensive examination of popular, well-known synthetic and therapeutic plants and known anti-psoriatic activities of black cumin. Additionally, this enables various studies to examine the efficacy of different herbal remedies for the management of skin diseases like psoriasis.

Keywords: Psoriasis, Pathophysiology, Herbal treatment, Polyherbal treatment, Black cumin.

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1 Introduction

Skin erythema, thickened silver scaly plaques, hyperkeratosis, vascular angiogenesis, unusual differentiation, as well as hyperplasia of epidermal keratinocytes are all symptoms of psoriasis, an immune-mediated, chronic, non-contagious disease of the skin (1,2). Additionally, different immune cells are infiltrated at the affected site. Itching, irritability, stinging, and discomfort are symptoms. It affects both sexes equally and has a bimodal age of onset (16 to 22 and 57 to 60 years) (3).

D. Turner describes psoriasis instances that were treated with infusions of an ointment containing ammoniated mercury (Hydrargyri amidochlorati) or a soup made from cooked vipers in a very realistic manner (4). According to hospital-based research, the global rate of psoriasis is believed to be between two and three percent globally, with a range between 0.44 and 2.8 percent among adults in India and a significantly lower incidence in children (5). It is unclear what causes this persistent disease. The most frequent etiological cause for psoriasis is stress, and those who have chronic illnesses like Crohn's disease are more prone to get it (6,7) Beta-blockers, lithium, synthetic antimalarials, nonsteroidal anti-inflammatory medications (NSAIDs), and tetracyclines all seem to have a significant causative association with psoriasis (8).

The synthetic medications relieve symptoms, but they also have a number of negative effects that might jeopardise the patient's safety & adherence to treatment. Long-term use of corticosteroids can cause stomach ulcers, thinning of the skin and bones, and early cataract development. Topical vitamin D use can irritate the skin. Long-term employ of salicylic acid on the scalp may cause hair loss. Coal tar products can dry out the skin and make it more sensitive to sunlight (9).

Due to its relatively mild side effects as compared to chemical treatments, the use of medicinal plants has seen a revival recently. The regulatory agency that oversees the clinical research, pre-clinical safety assessment, and quality control of herbal medicine in India is called AYUSH. The safety of herbal medicine is governed by the official "General Regulations for Drug Development of Ayurveda Formulations" rules. A great deal of study is being done to look into novel herbals and their ingredients in order to attain safety and increase efficacy. The benefits of herbal medication include fewer side effects, low cost, and several modes of action (3,10).

2 Pathogenesis

The pathogenesis of psoriasis may be thought of as having two stages: an initiation phase that may be triggered by trauma (the Koebner phenomenon), an infection, or medicine. A dysregulated immune response (including DC, T cells, and KCs) develops in persons with the disease who are genetically predisposed to it and who contain one or more psoriasis susceptibility genes after exposure to specific environmental triggers shown in (Figure 1) and a maintenance phase that is distinguished by a chronic clinical progression (11).

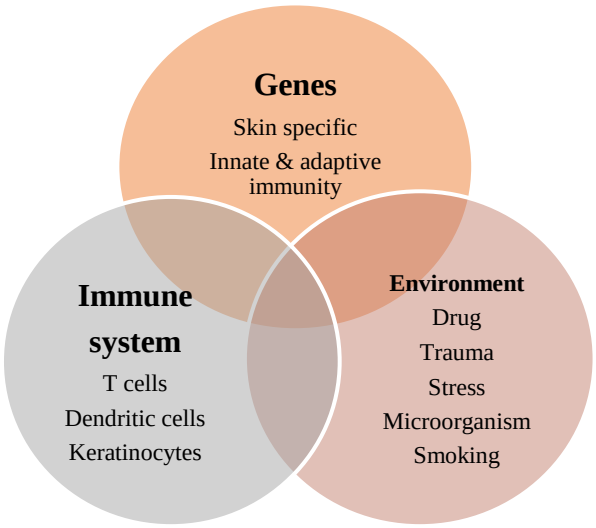

Fig 1. Psoriasis etiopathogenesis

It is well known that dendritic cells play a crucial role in the initial phases of disease. Dendritic cells are professional antigen-presenting cells. However, it is unknown how they become active in psoriasis. One of the proposed processes involves antimicrobial peptides (AMPs), which are generated by damaged keratinocytes and are frequently overexpressed in psoriatic skin. Some of the most well studied psoriasis-associated AMPs are the LL37, -defensins, and S100 proteins (12). Cathelicidin, commonly known as LL37, has been connected to psoriasis. It is ejected by damaged keratinocytes, where it mixes with self-genetic data from other wounded cells to form complexes. Plasmacytoid dendritic cells (pDCs) activate TLR 9 when LL37 is linked to DNA. (13). The stimulation of pDC, which is necessary for the beginning of the psoriatic plaque, is signalled by the production of type I IFN (IFN- & IFN-). Type I IFN signalling, which has also been connected to Th1 and Th17 differentiation or function, involving the production of IFN- & interleukin (IL)-17, respectively, aids in the phenotypic development of myeloid dendritic cells (mDC) (14–16). TLR7

is activated by LL37 coupled to RNA, but TLR9 is activated by LL37-DNA complexes. Furthermore, LL37-RNA complexes have an impact on mDCs via TLR8. Activated mDCs produce TNF, IL-23, and IL-12 when they enter draining lymph nodes, where the latter two control differentiation and proliferation of the Th17 and Th1 cell subsets, respectively. Additionally, slan+ monocytes, which are important pro-inflammatory cells present in psoriasis skin lesions, release a lot of TNF-, IL-12, and IL-23 when LL37-RNA is activated (17). Multiple T cell subsets that are activated by the immune system's adaptive response contribute to the continuous phase of psoriasis inflammation (15). The Th17 cytokines IL-17, IL-21, and IL-22 promote keratinocyte development in the epidermis. The inflammatory environment promotes keratinocyte development via TNF-, IL-17, and IFN-. Keratinocytes are also significantly activated by LL37 with DNA to create type 1 IFNs.

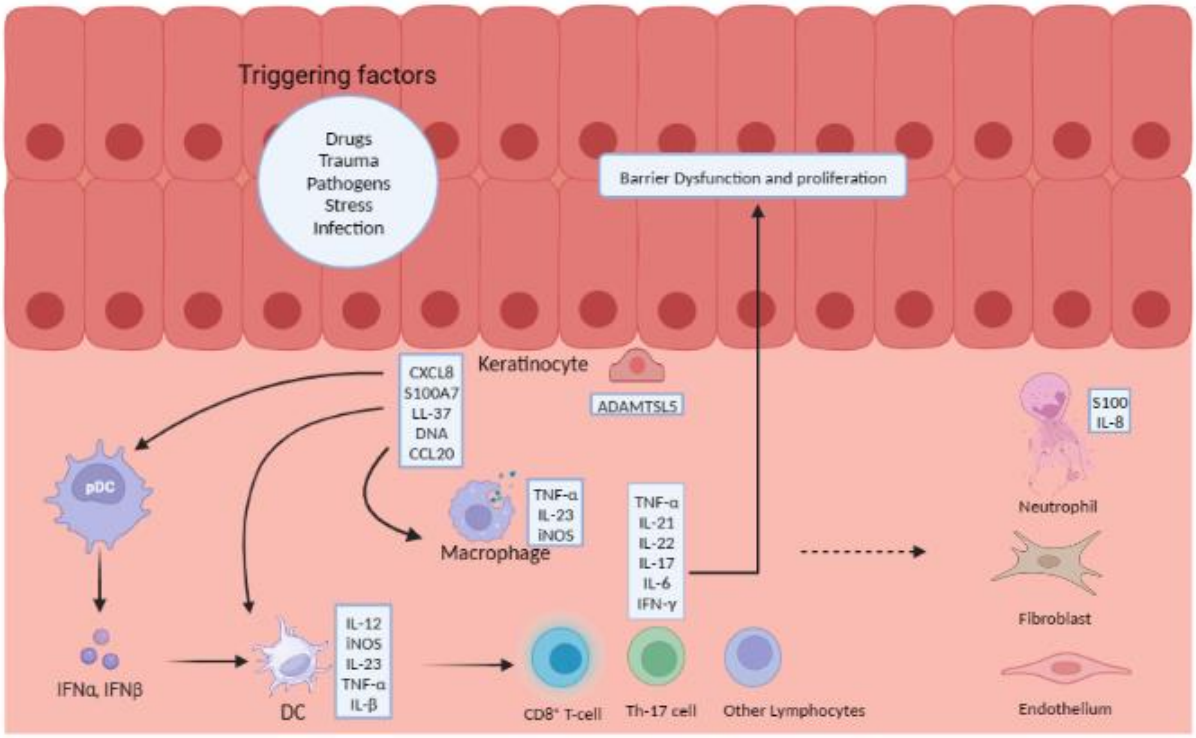

Fig 2. The pathogenesis of psoriasis

3 Assessment of Severity

The most widely used method for determining the severity of psoriasis & psoriatic arthritis is the Psoriasis Activity & Severity Index (PASI). Both at baseline and following therapy, scoring is conducted. The PASI calculates an overall score from 0 (no psoriasis) to 72 (severe psoriasis) by quantifying the amount of body surface affected & the severity of desquamation, erythema, & plaque induration (thickness) in each location (18). A 75% decrease in PASI from baseline is referred to as PASI 75.

4 Available therapeutic regimens

After warts and acne, psoriasis is the third most frequent reason for dermatologist consultations. According to estimates, 1.5 million people with psoriasis visit hospitals or offices each year; 80% go to dermatologists and 20% to doctors with different specialties. Many of the medications that are now regarded to be conventional treatment choices were first justified by empirical data, without a clear knowledge of how they fit into the context of T-cell pathogenesis. The kind and severity of the disease determine the course of therapy for treating psoriasis. The basic goal of standard medical care is to suppress the illness to levels that can be controlled. Their mode of action entails concentrating on various immune response stages and/or keratinocyte growth. These conventional treatments may be grouped into three broad groups according to the mode of delivery:

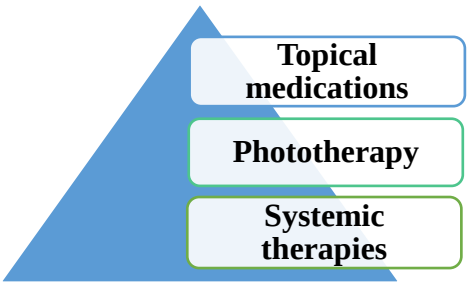

Fig 3. Synthetic treatments for psoriasis

4.1 Synthetic treatments

Table. 1. List of the conventional treatments for psoriasis.

Topical treatment		**References**
Tars	• Coal tar 2%, when administered in a unique foam carrier successfully treated psoriasis even on difficult body parts including the scalp, intertriginous regions, and the palms and soles. • It also suppresses the hyperplastic skin that occurs in several proliferative illnesses.	(19,20)
Salicylic acid	Microemulsion gel used for the treatment of psoriasis produced persistent and effective anti-inflammatory action by combining salicylic acid and betamethasone dipropionate.	(21)
Corticosteroids	It reduced redness ,scaling, swelling, itch and cleared scalp psoriasis. Clinical trial data show that the best course of treatment for most people with scalp psoriasis is a strong topically corticosteroid in a short-contact formulation.	(22)
Vitamin D analogues	It significantly reduced the expression of AMP in cultured keratinocytes and lesional psoriatic skin.	(23)
Dithranol	Dithranol-loaded nanostructured lipid carrier-based gel reduced the severity of psoriasis in a mouse model of imiquimod-induced psoriatic plaque.	(24)
Retinoids	Oral retinoids shows promising results in pustular & erythrodermic psoriasis.	(25)
Systemic treatment		
➢ **Methotrexate and antimetabolites**		
Methotrexate	While treating psoriasis, it appears to have preventive antioxidant qualities.	(26)
Hydroxyurea	It is second-line treatment for psoriasis and resulted to be efficient and relatively safe.	(27)
➢ **Cyclosporin and calcineurin antagonists**		
Tacrolimus	A randomised controlled open label research including 21 individuals with nail psoriasis showed encouraging treatment outcomes for tacrolimus 0.1% ointment.	(28)
➢ **Systemic retinoids**		
Etretinate	It was approved by FDA for treatment of severe psoriasis but due to liver problems, oral etretinate (TigasonR) (30 mg/day) was stopped.	(29)
Acitretin	Successfully treated individuals with moderate to severe psoriasis.	(30)
Isotretinoin	Used to treat generalised pustular psoriasis.	(31)
Liarozole	Used in the treatment for palmoplantar pustular psoriasis.	(32)
➢ **Others**		
6-Thioguanine	In a trial of 81 psoriasis patients, 50% were kept in remission for an average of thirty-three months with 6-thioguanine. Unfortunately, bone marrow suppression occurred in 50% of the individuals. Since it seems to be less harmful to the liver than methotrexate, it could be helpful in treating alcoholic people with severe psoriasis.	(33,34)
Mycophenolate mofetil	In a recent trial, 2 g of MMF was given orally to eleven individuals with severe psoriasis. After 3 weeks of therapy, the PASI was lowered in 7 patients by 40-70%, in 3 patients by 25-39%, and in 1 patient by less than 25%.	(35)
Azathioprine	In a study of 19 to 29 people receiving daily doses of 100–300 mg showed improvement in the treatment of psoriasis.	(36)
Sulfasalazine	32 individuals with persistent plaque psoriasis who were given 3-4 g of sulfasalazine per day was found that 41% had moderate improvements & 41% had noticeable improvement.	(37)
Fumaric acid & esters	In a random placebo-controlled trial comparing Fumaderm to a placebo in 99 patients, the mean PASI decreased by 50% in the group receiving active treatment over the course of 16 weeks, and 57% of patients had a drop in PASI of at least 70%. In the placebo group, just 10% of patients shown a comparable reaction.	(38,39)
Biologics		
➢ **T-cells Targeting**		
Denileukin diftitox	In a recent dose-escalation research, 35 individuals with severe psoriasis received intravenous denileukin diftitox for three consecutive days every other week for 8 weeks. 47% of those receiving the larger dosage had a 50% decrease in PASI. However, 15% of the group receiving the higher doses stopped owing to side effects.	(40)
Daclizumab	Daclizumab was administered five times over the course of 12 weeks to 19 individuals with medium serious chronic plaque psoriasis in an open trial. 11 individuals saw an improvement in their PASI, 3 patients saw no change, and 4 patients saw a decline.	(41)

Basiliximab	After a preliminary double-blind, placebo-controlled research including 28 patients with moderate to severe psoriasis, a non-responders open retreatment stage was conducted. After the first double-blind phase, PASI fell by 17% in 8 patients receiving high-dose (750 mg) medication and by 11% in the placebo group.	(42)
Alefacept	The mean reduction in PASI in the treatment groups in a multicentre, placebo-controlled, double-blind, dose-escalation trial involving 229 subjects with psoriasis that was severe enough to require prior treatment with phototherapy or systemic therapy was 50%. Up to thirty-three percent of patients in one therapy group had their PASI reduced by 75%.	(43)
Siplizumab	39 individuals with psoriasis underwent 12week injections under the skin of siplizumab in the stage 1/2 open-label, dose-escalation research. PASI specifically improved with increasing dosages.	(44)
BMS 188667	A total of 43 individuals with medium to severe chronic plaque psoriasis who participated in the phase 1 open label, dose-escalation research got 4 infusions of BMS 188667 on day 1, 3, and 29. The Physicians Global Assessment (PGA) of severity improved by 50% or more in 19 (44%) of the cases.	(45)
• Cytokines Antagonist		
rIL-10	• For 7 weeks, 10 psoriasis patients received subcutaneous IL-10 therapy in a small open label research. In 9 out of 10 participants, the psoriasis improved, with a mean PASI reduction of 49%. • Seventeen individuals with psoriasis in remission received thrice-weekly subcutaneous IL-10 treatment, whereas ten patients received a placebo. During the observational period, 9 people in the placebo group relapsed, compared to 2 people in the therapy group (P=0.02).	(46)
Interleukin-4	During an open-label, dose-escalation research, IL-4 was administered to 22 psoriasis patients over the course of six weeks. PASI increased by 60–80% in 18 of the 20 participants who finished the research, with the higher dosage groups seeing the greatest improvement.	(46)
Infliximab	When getting infliximab for Crohn's disease in 2000, an individual who had both diseases found some improvement in her psoriasis. The effectiveness of 3 infusions of infliximab 5 mg/kg (n = 11), infliximab 10 mg/kg (n = 11), or placebo (n = 11) was compared in a subsequent small randomised, double-blind, placebo-controlled experiment. 80 percent of the patients in the 5 mg/kg group had their PASI reduced by 75 percent.	(47)
Etenercept	A 12-week random placebo-controlled study of twice-weekly subcutaneous injections in sixty patients showed the therapeutic effectiveness in psoriatic arthritis. Measures of cutaneous psoriasis severity were also seen to improve. As opposed to 8.7 percent in the placebo group, the therapy group's median PASI decrease was 46%. While nobody in the placebo group met this main end aim, 26% in the active group saw a 75% drop in PASI.	(48)
Phototherapy		
Ultraviolet B	UVB administered at sub-erythema genic doses 3 times per week as an outpatient therapy, which ultimately results in lower proliferation in keratinocytes. As a result, the TL-01 UVB fluorescent tube was created, with 83% of the UV emission occurring at 311 2 nm. UVB eradicated psoriasis in 63% of the people with psoriasis in a trial compared TL-01 UVB with PUVA, and it took 25 days for the treatment to take effect.	(49,50)
Psoralen plus ultraviolet A therapy	• Psoriasis normally clears up after 20 treatments, which are typically given twice a week. Patients use UVA-opaque glasses on the day of therapy to reduce the risk of PUVA-induced cataract. A long-term follow-up investigation involving 33 patients who had at least 8% of their body surface area impacted discovered that 42% of the patients were still in remission after a year after 90% of the patients had originally cleared. • In comparison to the general population, the incidence of SCC was shown to be five times higher in males and three times higher in women in a large Scandinavian retrospective analysis of 4799 patients undergoing PUVA over a 16-year period.	(51)
Excimer laser	In a recent open study with 124 participants who had mildly to moderate plaque psoriasis to a certain extent, twice-weekly therapy with 2 to 3 times the MED resulted in a 75 percent decrease in the extent of the addressed plaque in 72% of the participants who accomplished the study after a mean of 6.2 therapies, and 45% of the participants experienced blistering in the treated area.	(52)

4.2 Herbal treatments

Various herbal treatments for psoriasis are available on the market all over the world. Since medicinal plants have several benefits over other medications, such as a variety of adverse effects, ease of access at a cheaper cost, and patient compliance, they play a crucial role in pharmaceutical research and drug development. Therefore, in order to replace synthetic medications in the treatment of psoriasis, experts are looking for promising herbal solutions. Below is lists of some of the plants that are used to treat psoriasis alongside their active ingredients and modes of action (Table 2).

Table. 2. List of some anti-psoriatic herbs and their treatments.

Plants	Treatments	References
Aloe vera (*Aloe barbadensis Miller*)	Using a mouse tail model, a 95% ethanolic extract from aloe vera leaf gel has been evaluated as a potential psoriasis therapy. According to its degree of orthokeratosis (85.07± 3.36%), which was practically identical to the impact of 0.1 percent tazarotene gel, which was utilised as a standard positive control, the formulation demonstrated substantial differentiation in the epidermis.	(53)
Jiaogulan (*Gynstemma pentaphyllum Makino*)	Using cultivated HaCat cells as a psoriasis-relevant experimental model, a polysaccharide was isolated from *Gynstemma pentaphyllum Makino*. Its antipsoriatic efficacy and in vitro mechanism of action were examined. They concluded that water-soluble polysaccharide (GP-I) has the potential to be a useful antipsoriatic drug in clinical use.	(54)
Turmeric (Curcuma longa)	Both curcumin monotherapy & combination treatment improved PASI scores among patients when compared to controls, according to a meta-analysis of clinical studies. Preclinical research revealed that it performed better than controls to enhance the phenotype of psoriatic dermatitis mice, including the overall PASI score, ear thickness and the production of inflammatory cytokines like interleukin-17, tumour necrosis factor (TNF)-, IL-17F, and IL-22. In experiments on cells, it reduced inflammatory cytokines IL-6 as well as IL-8 levels while inhibiting cell growth and the cell cycle.	(55)
St Johns wort (*Hypericum perforatum*)	In a case study, 10 patients with plaque psoriasis who were treated with ointment saw significant anti-psoriatic action within 4 weeks as they noticed that the altered psoriasis area severity index (PASI) score had been significantly reduced where the ointment was applied.	(56)
Licorice (*Glycyrrhiza glabra*)	The effects of glabridin (Glab) were studied in IMQ-induced mice with respect to proinflammatory cytokines, oxidative/antioxidative indices, histopathological changes, and PASI scores. It was found that the levels of NF-B subunit p65, nitric oxide (NO), interleukin (IL)-6, and IL-1 were significantly suppressed. Additionally, they noticed that HaCat cells activated by TNF- showed lower production of IL-17A, IL-22, and IL-23. The findings showed that Glab was effective in treating psoriasis, and it was determined that the improvement in antioxidant status and the suppression of pro-inflammatory cytokines were the underlying mechanisms.	(57)
Sicklepod (*Senna tora*)	Cassia tora leaf extract may be utilised as a natural antioxidant and has important anti-psoriatic benefits on ultraviolet-B-induced psoriasis in rats. In order to construct a regulated medication delivery system, a herbal cream containing this extract was developed.	(58)
Isatis (*Isatis tinctoria*)	In order to assess the safety and therapeutic effectiveness of indirubin in the Lindi oil ointment at various concentrations for the treatment of chronic plaque psoriasis, a double-blinded, randomised, and dosage-controlled trial research was conducted. Adult patients with plaque psoriasis for over a year received lindi oil ointment containing 200, 100, 50, or 10 g g-1 of indirubin twice daily for 8 weeks. Within that time, 75% to 90% decreases in PASI scores were seen. The authors came to the conclusion that the most effective concentration for treating psoriasis topically was 200 g/g of indirubin with lindi oil ointment.	(59)
Wild Eggs Plant (*Solanum Xanthocarpum*)	After being treated for 15 days using both oral and topical formulations of *Solanum xanthocarpum* stem, the anti-psoriatic effectiveness was further validated in Imiquimod-induced psoriatic mice model. They measured the psoriasis area severity index (PASI) and the levels of TNF-, IL-1, IL-6, and IL17 in the animal tissues. It was concluded that topical formulations have demonstrated superior anti-psoriatic effectiveness over oral formulations.	(60)

4.3 Polyherbal treatments

Table 3. List of the polyherbal treatments for psoriasis.

Polyherbal combination	Treatment	References
Lawsonia inermis, Acacia concinna, Piper nigrum, Syzygiuma romaticum, Phyllanthus emblica, Salvador apersica, Juglans regia, Sapindus mukorossi, Ociumum tenuiflorum, Trigonella foenum-graecum, Curcuma longa, Aloe vera and Withania somnifera	Study showed that the polyherbal combination of formulated cream and lotions shows good antimicrobial activity and may be applied topically against scalp psoriasis.	(61)
Azadirachta indica, Lawsonia	The antipsoriatic activity of the produced cream formulation	(62)

inermis and *Mallotus philippensis*	was tested using a topical cream formulation including the nanostructured lipid carriers of *Azadirachta indica* leaves extract (*AE*), *Lawsonia inermis* leaves extract (*LE*), and *Mallotus philippensis* fruit extract (*ME*).	
Adhatoda vasica Nees, *Solanum xanthocarpum* Schard & Wendl, *Tinospora cordifolia* Willd, *Trichosanthes dioica* Roxb, *Azadirachta indica* A Juss, *Curcuma longa* Linn, *Acacia catechu* (Linn) Willd, *Plumbago zeylanica* Linn, *Wrightia tinctoria* R.Br *and* Kaishor guggulu	Organoleptic and physico-chemical characteristics, among other quality and purity criteria, were all fulfilled by Cutisora Tablet and all its constituents. The quantitative presence of source materials in the product was verified by HPTLC fingerprinting. The polyherbal formulation's quality control tests showed that it complied with Indian Pharmacopoeia tablet dosage criteria.	(63)
Azadirachta Indica L. (seed), *Curcuma amada* (Rhizome), *Foeniculum vulgare mill* (fruit), *Psoralea corylifolia L.* (seeds), *Uncaria gambir* (extract), *Mentha piperita* (leave), *Punica granatum L.* (seeds with pulp).	Hectasor ointment, consisting of these herbs used against Psoriasis. The topical dosage form was prepared with tar obtained from these culinary herbs in the emollient base	(64)
Sivanar vembu kuzhi thailam, karbogi mathirai and *Raktha suddhi mathirai*	Three months of oral administration of *Sivanar vembu kuzhi thailam* (three times daily), karbogi mathirai (twice daily), and *Raktha suddhi mathirai* (twice daily) were completed. In three months of therapy, the lesions gradually lessened and vanished entirely without any negative side effects. *Agasthyar kuzhampu* was administered for one day, during which time diarrhoea, nausea, and fatigue were noted.	(65)
Lonicera japonica +Rheum palmatum L.+ Rehmannia glutinosa L.	Three herbs were combined to create the poly herbal aqueous formulation (SIRB-001), which displayed effective anti-psoriatic actions at the cellular level via many arms (anti-inflammatory, antiproliferative, proapoptotic, anti-angiogenic). They concluded that SIRB-001 had effective in vitro antipsoriatic capabilities in keratinocytes, immune cells, and cell-free enzymatic tests.	(66)

5 Nigella Sativa

Nigella sativa, also known as "Habba Al-Sauda" or black cumin and black seed in English, is a plant belonging to the Ranunculaceae family. It is commonly found in Eastern Europe, Middle East &Western Asia. It has green leaves that taper off & produces white & purplish rosaceous flowers. The mature Nigella sativa contains small and black seeds. Throughout history, seeds and oil of Nigella sativa have been extensively used in ancient remedies, including in Asian countries and the Middle East, as part of traditional medicinal practices such as Unani, Ayurveda, Chinese, and Arabic medicine(67).

Research studies have demonstrated that Nigella sativa and its components possess a broad spectrum of pharmacological effects. These include immune-stimulatory, diuretic, diaphoretic (promoting sweating), anti-inflammatory, hypo-glycemic (lowering blood sugar), antihypertensive (lowering blood pressure), spasmolytic (relaxing muscle spasms), bronchodilatory (widening of airways), hepatoprotective (protecting the liver), antimicrobial, antiparasitic, antioxidant, anticancer, anti-diabetic, antiviral, antifungal, wound healing, and beneficial effects in conditions such as psoriasis, acne vulgaris, and vitiligo.(68)

5.1 Morphology of plant

Nigella sativa is an annual flowering plant has height of 20 to 90 cm. It has leaf segments that are narrow and linear, resembling threads. The flowers of Nigella sativa are delicate and can come in various colours such as white, yellow, pink, pale blue, or pale purple. They typically have 5 to 10 petals. The fruit of the plant is a large and inflated capsule, which is formed by the fusion of 3-7 united follicles. Inside the fruit, numerous seeds can be found(69).

Fig 4. *Nigella sativa* (whole plant, flower and seeds)

5.2 *Nigella sativa* in treating psoriasis

➢ In a study 30 male albino rats were divided into three groups: group I, control group; group II, psoriasis-induced group receiving daily topical applications of IMQ cream (5%) on the shaved back skin for 10 consecutive days; and group III, black seed oil group receiving a daily topical dose of black seed oil 5 mg/kg body weight for 10 days after induction of psoriasis. Complete inhibition and alleviation of all plaque psoriasis lesions was observed after 10 days of topical *Nigella sativa* oil in rat models. It was concluded that topical use of black seed oil strongly inhibited IMQ-induced psoriasis-like inflammation and alleviated all epidermal and dermal changes observed after IMQ application, so it can be used as an adjuvant topical therapy for treating psoriasis. complete inhibition and alleviation of all plaque psoriasis lesions was observed after 10 days of topical *Nigella sativa* oil in rat models(70).

➢ Another study was made to compare asiaticoside and the ethanolic extract of *N. sativa* to see the antipsoriatic effect. *N. sativa* oil was applied in two dosage forms, as an ointment and oral dosage form. They had IC_{50} value of 23.9 μg/ml, which is about the IC_{50} value for asiaticoside (20.13 μg/ml). In conclusion, *Nigella sativa* oil had better effect as antiproliferative activity than the compared treatment. It is concluded based on many researches that *Nigella sativa* has antipsoriatic effect with the best effect obtained with the combination of ointment and the oral dosage form (71-76).

➢ Study conducted for twenty-four patients in which group A (18 patients), a significantly reduction of the thickness and fissuring of the skin of the affected part was observed which become very soft after 3 months of therapy. The response of patients to treatment was good in 50%, moderate in 27.8% and mild response in 22.2%. The satisfaction of patients with treatment was full in 61.1%, partial in 27.8%, and no satisfaction in 11.1%. In group B (6 patients), the lesions showed no significant reduction after 3 months and the response of patients to treatment was good in 16.6%, moderate in 33.4%, and mild response in 50%. The satisfaction of patients with treatment in this group was full in 16.6%, partial in 50%, and no satisfaction in 33.4%. The difference in outcome after 12 weeks between the 2 study groups was statistically significant. It was concluded that ointment of the black cumin is considered as a very good remedy for the palmoplantar psoriasis. This remedy is considered to be very safe, cheap and easy to prepare with no serious side effects as compared to the previous ointments for this type of psoriasis(77-81).

➢ The ethanolic extract of *Nigella sativa* seeds also showed increase in relative epidermal thickness when compared to control group by confirming its traditional use in psoriasis treatment. The *Nigella sativa* seeds extract produced a significant epidermal differentiation, from its degree of orthokeratosis (71.36±2.64) when compared to the negative control (17.30±4.09%). This was equivalent to the effect of the standard positive control, tazarotene (0.1%) gel, which showed a (90.03±2.00%) degree of orthokeratosis. The 95% ethanolic extract of *Nigella sativa* shown IC50 239 µg/ml, with good anti-proliferant activity compared to Asiaticoside as positive control which showed potent activity with IC50 value of 20.13 µg/ml(82-85).

6 Future perspectives for the treatment of psoriasis by herbal products

The analysis of the literature reveals that during the past 20 years, there has been a significant increase in interest around the globe in the potential of herbal medicines to cure psoriasis. Along with numerous synthetic medications used topically (corticosteroids, vitamin D analogues, retinoids), systemically (methotrexate, retinoids, cyclosporin), or targeted (biological) therapies (e.g., alefacept, efalizumab, etanercept), herbal products are also important therapeutic agents for the management of psoriasis (86-89). It is not enough to regard herbal remedies as effective and secure medications despite their lengthy history of usage in the treatment of numerous ailments. Numerous studies must be conducted to prove their efficacy as a novel, potential alternative agent for the treatment of psoriasis. Studies demonstrating the antiproliferative properties of herbal remedies as well as their capacity to control cell differentiation in HaCaT cell lines do not give enough proof that these remedies will be successful in the treatment of psoriasis (90-94). Additionally, encouraging findings from animal research are not always in line with those from clinical trials. Therefore, the effectiveness and safety of herbal medications in the treatment of psoriasis can only be demonstrated via carefully monitored double-blind clinical trials and toxicological research. In general, several challenges related to the standardisation of plant materials, quality of herbal products, and evaluation of the efficacy and safety of herbal medicines have led to the approval of only a small

number of herbal pharmaceuticals for use in clinical settings up to this point. Unfortunately, there are currently no natural medications that have been authorised specifically for the treatment of psoriasis. But in my opinion, the significant advancements in herbal medicine should make it feasible for the first herbal medication created specifically for the treatment of psoriasis to be made accessible on the global market in the not-too-distant future. By offering unique chemical structures and/or multidirectional modes of action that are uncommon in synthetic molecules, herbal items can significantly contribute to therapeutic innovation. The advancement of topical medication delivery technologies makes it easier for plant extracts to penetrate the skin and improves the medicinal benefits of herbal items used to treat psoriasis. Additionally, if interest in natural medicine rises, pharmaceutical corporations may be compelled to fund substantial preclinical and carefully monitored randomised clinical trials to demonstrate the security and effectiveness of herbal medications (95-97). Additionally, emerging biological science disciplines like pharmacogenomic, metabolomic, and microarray methodologies as well as analytical chemistry methods like HPLC and GC/MS are anticipated to advance our understanding of the pharmacological properties and safety of herbal products. All of these enable the development of global standards that clearly lay out the conditions for research on the use of herbal medicine. It would appear desirable and important to develop international regulatory frameworks for the sale of herbal medicines.

7 Conclusion

For the treatment of psoriasis, both artificial and herbal/polyherbal medicines have been tried. Healthcare providers administer synthetic medications such as corticosteroids, immunosuppressants, and biologics because they have been shown to be successful. There are safety issues since herbal remedies are not subject to the same regulations as modern drugs. It is advisable to speak with a healthcare provider before using herbal medicines because they might have negative effects or interfere with prescription medications. Although the evidence for synthetic medicines is more robust, further study may reveal the promise of natural cures. The research also offers a thorough analysis of both well-known synthetic drugs and medicinal plants, with an emphasis on black cumin's well-known anti-psoriatic properties. This information can serve as a foundation for further research and clinical studies to evaluate the efficacy of different herbal remedies in managing skin diseases like psoriasis. By harnessing the potential of natural compounds found in various plants, including black cumin, it may be possible to develop novel and targeted interventions for psoriasis management. Continued research in this field will contribute to the advancement of alternative and complementary therapies for psoriasis and other skin conditions. This knowledge can act as a starting point for more investigation and clinical tests to determine the effectiveness of various herbal treatments for treating skin conditions like psoriasis. It may be feasible to create new and focused treatments for the treatment of psoriasis by using the natural chemicals present in many plants, including black cumin. Continued study in this area will develop complementary and alternative treatments for psoriasis and other skin disorders.

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