



Received on 08 November 2019; received in revised form, 06 October 2020; accepted, 19 October 2020; published 01 November 2020

A REVIEW ON THE ROLE OF NATURAL REMEDIES IN PSORIASIS THERAPY

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Keywords:

Psoriasis, Natural remedies, Alternative medicine, Physical trauma, Stress

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ABSTRACT: Psoriasis is a chronic inflammatory disease that affects about 1-2% population. It is caused by different factors, the most common cause being genetic predisposition. Other causes or factors that can trigger psoriasis include infection, physical trauma to the skin, stress and certain medication, for example, beta-blockers and antimalarials. People suffering from psoriasis are at a greater risk of developing psoriatic arthritis, anxiety, depression, and cardiovascular diseases. Psoriasis can affect the quality of life of the patients and can result in financial problems as repeated treatment is required. Nowadays, people now opt to make use of natural remedies alone or in conjunction with conventional therapy to improve their condition. In this review article, natural remedies that have proved to have antipsoriatic activity have been summarized. These natural sources can be a source of bioactive compounds that have a potential to treat and manage psoriasis.

INTRODUCTION: Psoriasis is a chronic inflammatory disease that is characterized by plaques of thickened, scaling skin. The dry flakes of skin scales result from the excessively rapid proliferation of skin cells. It is a T-lymphocyte mediated systemic inflammatory condition that occurs as a result of genetic and environmental influences¹. It affects a population of about 1-2%². The average onset of the condition is the third decade, and prevalence increases with age³. In India, the incidence of psoriasis is 1.02%, and the prevalence of this is more prone in North India than on the south side of India.

They are different types of psoriasis, which include: plaque psoriasis, guttate psoriasis, pustular psoriasis (which can be localized or generalized) and erythrodermic psoriasis⁴. Over 70 % of the patients have a genetic history indicating a hereditary factor of genetic predisposition. Other causes or precipitating factors include physical trauma to skin (for example sunburns and lacerations), infections (streptococcal pharyngitis and HIV infections, stress, and medication.

Psoriasis immune-mediated disease initiated with the burst of neutrophils and cytokines Like Interleukin -1 as well as IL-1 α , IL-1 β , and IL-36. Stress, smoking, trauma, microorganism, and drugs are the other causes of psoriasis other than genetic factors. They are other comorbidities that are associated with psoriasis, which are psoriatic arthritis, diabetes, metabolic syndromes, multiple sclerosis, immune-mediated conditions like Crohn's

QUICK RESPONSE CODE 	DOI: 10.13040/IJPSR.0975-8232.11(11).5417-24
	This article can be accessed online on www.ijpsr.com
DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.11(11).5417-24	

disease, and psychologic conditions such as anxiety and depression.

Treatment of psoriasis involves the management of the symptoms. Pharmacological treatment for psoriasis includes topical agents, phototherapy, and systemic therapy. Topical agents available include topical corticosteroids, emollients, keratolytic agents, for example, salicylic acid, Vitamin D analogs like calcipotriol, coal tar products, and anthralin. Phototherapy involves the use of either broadband or narrowband-UVB and also PUVA- (Psoralen Plus Ultraviolet Light Therapy), which a combination of ultraviolet A (UVA) light therapy and a psoralen medication. Systemic agents include systemic corticosteroids, biologic agents (e.g., infliximab and adalimumab), oral retinoids (e.g., Acitretin), and cytotoxic drugs (e.g., methotrexate and hydroxycarbamide). However, these are

associated with a lot of side effects and compliance issues. For example, phototherapy may increase the risk of long term cutaneous malignancy, and also some systemic therapy are associated with cumulative toxicity methotrexate cause hepatotoxicity and ciclosporin cause nephrotoxicity. Thus, the need for natural remedies with fewer side effects ⁵.

Natural remedies have played a role in the treatment and prevention of diseases. Natural medicines are obtained from different sources, which include: terrestrial plants, terrestrial microorganism, marine organisms, and terrestrial vertebrates, and invertebrates ⁶. Natural remedies have potential as an alternative treatment for psoriasis; therefore, this article reviews natural medicines with either preclinical or clinical data for the management of psoriasis.

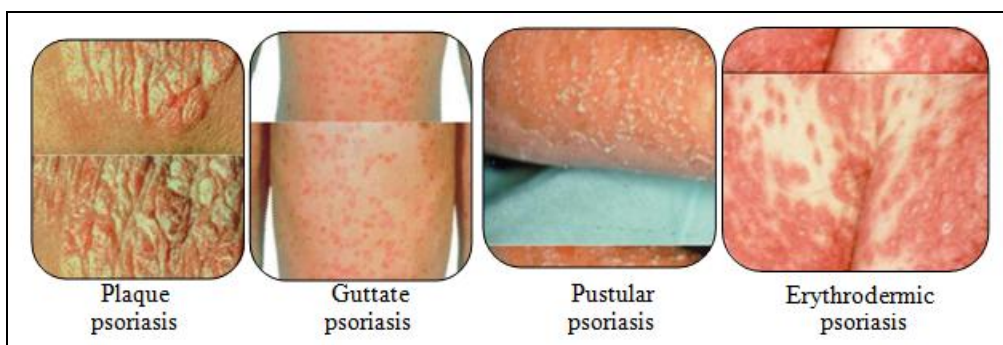


FIG. 1: PICTURE SHOWING THE DIFFERENT TYPES OF PSORIASIS

Natural Remedies in Psoriasis: Medicinal plants are an essential part of traditional medicines. Plants are important as they provide a rich source for natural drug research and development ⁷. In developing countries a large number of people depend on traditional herbal medicine. Medicinal plants have different effects when used as which are: preventative and support to the official medicine and synergistic ⁸. These medicinal plants have a role in treatment of psoriasis as shown from the results of the studies that have been carried out.

1. Aloe vera Linnaeus: *Aloe vera* Linnaeus is a plant that belongs to the Liliaceae family. It is called *Aloe barbadensis* Miller. *Aloe vera* has been used in the treatment of different disorders of the skin for more than 2000 years. Choonhakam *et al.*, compared the efficacy of topical *Aloe vera* and 0.1% triamcinolone acetonide in patients with mild to moderate plaque psoriasis.



FIG. 2: PICTURE OF ALOE VERA PLANT

The study was a randomized, comparative double-blind clinical trial involving 80 patients. The patients were randomly assigned to receive either *Aloe vera* cream or 0.1% Triamcinolone acetonide cream. After 8 weeks of receiving treatment, the mean Psoriasis Area Severity Index (PASI) score was reduced from 11.6 to 3.9 in the *Aloe vera* cream group and 10.9 to 4.3 in the Triamcinolone acetonide cream group.

The Dermatology Life Quality Index (DLQI) score decreased from 8.6 to 2.5 in the *Aloe vera* cream group and 8.1 to 2.3 in the Triamcinolone acetonide cream group. The study concluded that *Aloe vera* cream might be more effective than 0.1% Triamcinolone acetonide cream in ameliorating clinical symptoms of psoriasis⁹.

2. *Andrographis nallamalayana*: *Andrographis nallamalayana* belongs to the family Acanthaceae. The plant has antimicrobial activity and also possesses phytochemicals, which include flavonoids, phenols, steroids, triterpenoids, and alkaloids¹⁰. The author evaluated the antipsoriatic effects of *Andrographis nallamalayana* in imiquimoid induced psoriasis in BALB/c mice. The extract was formulated into an emulsion and then tested in disease-induced animals. Topical application alleviated psoriasis symptoms from day four with the significant reduction being noticed on day six. Animals treated with test drugs when compared to the untreated animals had reduced IL-22 by greater than 59%, while Betamethasone treated showed only 47% reduction in IL-22. The study concluded that the plant *Andrographis nallamalayana* has antipsoriatic activity¹¹.



FIG. 3: PICTURE OF ANDROGRAPHIS NALLAMALAYANA PLANT

3. *Caesalpinia bonduc* Leaves: *Caesalpinia bonduc* is a plant that belongs to the family Caesalpiaceae that possess phytochemicals such as alkaloids, tannins, saponins, glycosides and triterpenoids. They assess antipsoriatic activity of *Caesalpinia bonduc* leaves hydroalcoholic extract using the mouse tail method. Parameters like epidermal thickness and percentage orthokeratosis values were evaluated¹². Epidermal thickness was reduced in mice treated with the retinol butanol fraction, water fraction and *Caesalpinia bonduc* decoction when compared to the control which was

treated with normal saline. *In-vitro* antiproliferant assay performed on HaCaT cells with hydroalcoholic extract had IC₅₀ value of 77.5±12.7 µg/ml with the positive standard Asiaticoside exhibiting IC₅₀ value of 20.13 µg/ml. The water fraction of *Caesalpinia bonduc* hydroalcoholic extract showed good activity in the mouse tail test and antiproliferant activity in HaCaT cells. The study showed that *Caesalpinia bondu* cleaves have a potential role in the treatment of psoriasis¹³.



FIG. 4: PICTURE OF CAESALPINIA BONDOC PLANT

4. Curcumin: Curcumin is a naturally occurring phytochemical in *Curcuma longa* (Zingiberaceae). It is commonly known as turmeric and used in the management of diseases which includes cancer, diabetes, cough, microbial infection, hepatic disorders, and inflammations¹⁴ and evaluated the effects of curcumin on inflammatory factor secretion in T cells and psoriasis developed in keratin (K) 14-vascular endothelial growth factor transgenic mouse model. Curcumin inhibited the secretion of inflammatory factors *in-vitro* by 30-60%.¹⁵ *In-vivo* psoriasis index and symptoms were improved in animals receiving oral curcumin as compared to the untreated animals.



FIG. 5: PICTURE OF CURCUMA LONGA RHIZOME

Levels of IL-22, IL-17, IL-2, IL-3, INF-alpha, and TNF-alpha had decreased in animals receiving

curcumin and also cyclosporine. In another study, the author evaluated curcumin for its activity against imiquimod induced psoriasis in BALB/c mice. The levels of cytokines were analyzed using Real time-PCR. The study showed that levels of IL-17A, IL-17F, IL-22, IL-1B, IL-6, and TNF-alpha cytokines had decreased. The study concluded that curcumin could, therefore, be used in the treatment of psoriasis¹⁶.

5. *Dillenia indica*: Species from *Dillenia* genus have been used in traditional medicine to treat diabetes mellitus, fever, cough, cancer, and diarrhea¹⁷. They evaluated the healing effect of *Dillenia indica* fruit extract standardized to betulinic acid on induced psoriasis like wounds on rats. Wound induction was done by irradiating the upper part of the tail. The aqueous ethanolic extract and ethyl acetate extract applied topically to the wounds. Clobetasol was used as the positive control, and the negative control was treated with ethanol and water topically. Complete healing occurred in the wound after 16 days for aqueous ethanolic extract group, 14 days for ethyl acetate extract group, and 12 days for clobetasol group. Para-keratosis was reduced by 25% in the group treated with aqueous ethanolic extract, 45% in the group receiving ethyl acetate extract, and 55% in the clobetasol treated group¹⁸.



FIG. 6: PICTURE OF *DILLENIA INDICA* TREE

6. *Kigelia Africana*: *Kigelia africana* known as the sausage tree is used in medicinal folklore to treat diseases like diarrhoea, stomach ailments, rheumatism and psoriasis and¹⁹ assessed the antipsoriatic activity of *Kigelia africana*. Antipsoriatic activity of the hexane and methanolic extract of stem, bark, leaves and fruit was evaluated using modified mouse tail method. Ointments were prepared with the extracts and tested. The extract showed antipsoriatic activity in dose dependant

manner with the *K. africana* stem extract showing greater activity²⁰.



FIG. 7: PICTURE OF *KIGELIA AFRICANA* TREE WITH FRUITS

7. *Magnolia officinalis*: *Magnolia* has bioactive agents that include: honokiol, magnolol, and 4-methylhonokil. It has been reported to have anti-cancer, anti-stress, anti-anxiety, anti-inflammatory and anti-oxidant and studied the effects of Honokiol isolated from *Magnolia officinalis* to evaluate its antipsoriatic effects in K14-VEGF transgenic mice²¹. The study found that the morphological and histological features were improved by the treatment with Honokiol (HK) cream. The creams showed good therapeutic efficacy in a dose-dependent manner, with HK 0.5% and 1.0% having better efficacy than the standard Tretinoin 0.025%. The expression of TNF-alpha and INF-alpha was reduced in a dose-dependent manner. The study concluded that Honokiol could be used in the treatment of psoriasis²².



FIG. 8: PICTURE OF *MAGNIFOLIA OFFICINALIS* PLANT

8. *Musa mysore* (Poovan Banana): The antipsoriatic activity of *Poovan banana* peel extract using human keratinocyte cell lines was studied. The MTT assay was performed using the ethyl extract of *Poovan banana* peel. The result of the study showed that the extract was capable of reducing cell viability of selected psoriatic cell

lines and possessed significant inhibitory activity on the proliferation of HaCaT cell lines. Therefore the study concluded that *Poovan banana* peel can be a potential source of antipsoriatic bioactive compounds²³.



FIG. 9: PICTURE OF POOVAN BANANA

9. *Nigella sativa*: *Nigella sativa* belongs to the Ranunculaceae family and is commonly known as the black seed. The seeds and oil are used in the treatment of rheumatoid arthritis, asthma, inflammatory diseases, digestive diseases and diabetes²⁴. The antipsoriatic activity of *Nigella sativa* seeds by using mouse tail model for psoriasis and SRB assay using HaCaT human keratinocytes cell lines. The results of the *in-vitro* study using HaCaT cells showed that the ethanolic extract of *Nigella sativa* had an IC_{50} value of 239 $\mu\text{g/ml}$ with good antiproliferant activity as compared to Asiatic side positive control with IC_{50} value of 20.13 $\mu\text{g/ml}$. In the mouse tail model, the ethanolic extract of *Nigella sativa* resulted in a significant epidermal differentiation with a degree of orthokeratosis of $(71.36 \pm 2.6\%)$, which was comparable to the standard 0.1% Tazarotene gel, which had $(90.03 \pm 2.00\%)$. The negative control had a degree of orthokeratosis of $17.03 \pm 4.09\%$.²⁵



FIG. 10: PICTURE OF NIGELLA SATIVA SEEDS

10. *Pongamia pinnata*: *Pongamia pinnata* plant has a lot of traditional uses. The fruits and sprouts

are used in the treatment of abdominal tumors; seeds are used in skin ailments, oil for treatment of rheumatism as a liniment, and juice of the leaves for colds, flatulence, and cough²⁶. The author studied whether the presence of aqueous extract of bark of *P. pinnata* in a commercial SUEX gel has an additional benefit in the treatment of psoriasis over a similar preparation by the manufacturer without the extract. It was evaluated in rats using the ultraviolet ray photo-dermatitis model. The irradiated skin was then treated with SUEX gel containing the aqueous extract of the bark of *P. pinnata* and also other animals were treated with SUEX gel that did not have *P. pinnata*. The animals treated with suex gel that contained *P. pinnata* showed a significant decrease in total epidermal thickness, no movement of neutrophils, and retention of the stratum granulosum. This study concluded that the presence of aqueous bark extract of *P. pinnata* improved the efficacy of SUEX gel²⁷.



FIG. 11: PICTURE OF PONGAMIA PINNATA TREE

11. *Psoralea corylifolia*: *Psoralea corylifolia* has been widely used in the treatment of skin diseases such as leprosy, psoriasis, and leukoderma. The plant has pharmacological activity such as anti-inflammatory, antioxidant, and antimicrobial. The antipsoriatic activity of ethanolic extract of *Psoralea corylifolia* seeds²⁸. The antipsoriatic activity was studied by mouse tail method and sulphonamide B assay using HaCaT human keratinocyte cell lines. Tazarotene gel 0.1% was used as a standard in the mouse tail model of psoriasis. In the mouse tail method of *Psoralea corylifolia* seeds showed an overall antipsoriatic activity of 78.87%, which was comparable to the standard, which had 87.94%. Ethanolic extract was found to have antiproliferant activity of IC_{50} value of 255 $\mu\text{g/ml}$ as compared to Asiaticoside (positive control) with IC_{50} value of 20.13 $\mu\text{g/ml}$ ²⁹.



FIG. 12: PICTURE OF PSORALEA CORYLIFONIA PLANT

12. Radix paeonia: *Radix paeonia* was found to contain flavonoids, glycosides, terpenoids, tannins, and resins. Paeoniflorin, which is a monoterpene glucoside and is the main ingredient from plant *Radix paeoniarubra* and *Radix paeoniaealba*. Paeoniflorin was assessed for its antipsoriatic activity³⁰. It was evaluated for antipsoriatic activity in IMQ induced animals and compared to standard methotrexate. Mice treated with paeoniflorin exhibited decreased erythema, scarscally features, smooth skin, and reduced thickening which comparable to the methorexate treated animal. Paeoniflorin also reduced levels of mRNA level of Th 17 cytokines and IL-17.



FIG. 13: PICTURE OF RADIX PAEONIA PLANT AND INSERT OF ROOT

13. Smilax: Vijayalakshmi *et al.*,³¹ assessed the antipsoriatic activity of *Smilax china* Linn. rhizome using the mouse tail method. Methanolic and ethyl acetate extract of *S. china* was administered at a dose of 100 and 200 mg/kg body weight and compared with the standard which was receiving Retinol-A 0.05% and the normal group which was receiving saline. The percentage orthokeratotic value was calculated. *In-vitro* antiproliferant activity on HaCaT cell lines was also determined. The *S. china* rhizome extract had increased percentage orthokeratosis when compared to

normal. *In-vitro* antiproliferant activity of ethylacetate fraction was found to be more potent than that of methanol extract with IC₅₀ values of 68.75 µg/ml and 102.5 µg/ml, respectively. The study concluded that the rhizome *S. china* has anti-psoriatic activity. The effect of alstibin, which is a flavonoid extracted from the rhizome of *Smilax glabra* was studied. Psoriasis was induced in animals by imiquimod. The animals were administered alstibin orally and compared to the standard drug methotrexate. Alstibin was found to reduce TNF-alpha expression and decrease levels of interleukins: IL-17 and IL-10³².



FIG. 14: PICTURE OF SMILAX RHIZOME

14. Thespesia populnea: *Thespesia populnea* family Malvaceae bark, leaves, stem, root, and fruit have medicinal activity. The leaves have anti-inflammatory, astringent, and antipyretic properties. The fruits have anticancer, antitumour, antiviral, and antimalarial properties³³ and evaluated the antipsoriatic activity of *Thespesia populnea* bark using Perry's scientific mouse tail method. Different extracts and isolated compounds (TpF-1, TpF-2, and TpS-2) of *Thespesia populnea* bark were applied topically as a cream.



FIG. 15: PICTURE OF THESPESIA POPULNEA TREE

The pet-ether extract showed maximum antipsoriatic activity as it had increased

orthokeratotic region by 25% followed by butanolic extract, which had increased orthokeratotic region by 15%. Amongst the isolated compounds tested TpF-2 showed 38% increase in orthokeratotic region followed by TpF-1, which had 33%, and TpS-2 which had 30%. The study concluded that the plant has potential antipsoriatic activity³⁴.

15. *Wrightia tinctoria*: The antipsoriatic activity of *Wrightia tinctoria* by mouse tail test was studied³⁵. The mice were divided into 3 groups. The normal group received water, the positive control group received Isotretinoic acid, and the extract-treated group received 200 mg/kg body weight. The degree of orthokeratosis was evaluated. The extract produced a significant degree of orthokeratosis, which was $70.18 \pm 1.92\%$, standard 57.43 ± 5.13 , and control $17.30 \pm 4.09\%$. Drug activity was assessed, and the extract had a drug activity of 63.94% as compared to Isotretinoic acid, which had 48.52%. The study concluded that the plant could be used in the treatment of psoriasis³⁵.



FIG. 16: PICTURE OF WRIGHTIA TINCTORIA PLANT

Probiotics: Probiotics are living organisms that have health benefits when administered to the host in a sufficient amount. Various bacterial and fungal strains are most commonly used in probiotic preparations.

Bacterial Strains used Includes: *Lactobacillus*, *Bifidobacterium*, *Escheria*, *Bacillus*, and *Streptococcus*. *Saccharomyces* is an example of a fungal strain used³⁶.

***Lactobacillus pentosus*:** The *in-vivo* effect of probiotic strain *Lactobacillus pentosus* GMNL-77 in IMQ induced psoriasis-like skin inflammation in BALB/c mice was studied. One group of the animals received *L. pentosus* GMNL-77 orally, and the control group received the vehicle control (distilled water). Oral administration of *L. pentosus*

GMNL-77 reduced erythematous scaling lesions and spleen weight. It also decreased the levels of pro-inflammatory cytokines like TNF-alpha, IL-6, IL-17A, IL-17F, IL-23, and IL-22³⁷. Thus the study demonstrated that the oral administration of *L. pentosus* GMNL-77 is an effective remedy for treating psoriasis.

TABLE 1: ALL THE PLANTS HAVING ANTIPSORIATIC ROLE WERE HIGHLIGHTED IN THIS TABLE

S. no.	Name of the plant	Active constituents have antipsoriasis activity
1	<i>Aloe vera</i> Linnaeus	Anthraglycosides
2	<i>Andrographis nallamalayana</i>	Triterpenoids
3	<i>Caesalpinia bonduc</i>	alkaloids, tannins, saponins, glycosides and triterpenoids
4	<i>Curcumin longa</i>	curmin
5	<i>Dillenia indica</i>	Triterpenoid
6	<i>Kigelia africana</i>	Tannins
7	<i>Magnolia officinalis</i>	Glycosides
8	<i>Musa mysore</i>	Steroids and triterpenoids
9	<i>Nigella sativa</i>	Flavanoids
10	<i>Pongamia pinnata</i>	Flavanoids and fixed oils
11	<i>Psoralia corylifolia</i>	Flavanoids
12	<i>Radix paeonia</i>	Flavanoids
13	<i>Smilax china</i>	Flavanoids
14	<i>Wrightia tinctoria</i>	Glucoside

CONCLUSION: This review article will sure provide the key of the medicinal plants having psoriatic activity and also will encourage the researchers and clinicians working on Psoriasis to concentrate on the phytoconstituents responsible for combating this disease and reemergent health aid.

ACKNOWLEDGEMENT: Nil

CONFLICTS OF INTEREST: Nil

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How to cite this article:

Derera P and Sumithra M: A review on the role of natural remedies in psoriasis therapy. Int J Pharm Sci & Res 2020; 11(11): 5417-24. doi: 10.13040/IJPSR.0975-8232.11(11).5417-24.

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