

Natural Treatment Alternative for Psoriasis: A Review on Herbal Resources

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ARTICLE INFO

Article history:

Received on: 08/09/2014
Revised on: 23/09/2014
Accepted on: 16/10/2014
Available online: 27/11/2014

Key words:

Psoriasis, Inflammation,
Herbal drugs, T-Cell
Activation, proliferation.

ABSTRACT

Psoriasis is an immune mediated inflammatory disease, which is having no permanent cure. Though, there are several treatment methods to treat psoriasis, no particular medication claims a satisfactory and complete remedy. A wide range of synthetic therapeutic agents have also been reported to cause psoriasis as their adverse effect. Herbal drugs by virtue of their safe nature and easy availability may lend themselves as potential anti-psoriatic moieties. Before developing a herbal drug candidate the key players of psoriasis to develop should be thoroughly understood, which includes T-cell activation, T-cell trafficking, Cytokinase inhibition. The paper aims to explore the proliferation and activation mechanism of psoriasis, psoriasis caused by certain drugs and different plant resources known to have anti-psoriatic potential. A more scientific investigation on these herbal resources must be performed to develop a potent, safe and reliable therapy.

INTRODUCTION

Inflammation is a part of the body's immune response and is the end result of oxidative stress in any body part. Among the various inflammatory diseases psoriasis is found to be more severe in form, though it is not infectious. The mostly affected parts in psoriasis are the skin, nails and joints. It comes under papulo-squamous disorders. Here, the outer layer of skin i.e. the epidermis moves towards the surface and then continually shed from skin. The skin formation touches a dramatically higher turnover rate. The name psoriasis is from the Greek language, meaning "roughly itching condition" (psora: "itch", sis: "action"). Psoriasis is an immune mediated disorder, where a normal skin cell mistakes for a pathogen, and sends a faulty signal that causes over production of new skin cell. It is also a hereditary condition but the way it inherits is still not predictable. It is a typically lifelong condition, which is not having a permanent cure, but various treatments can be implemented for controlling the severity of symptoms produced by it.

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The available therapies are topicals as emollients, moisturizers, tars, anthralins, topical corticosteroids, vitamin A analogs and vitamin D analogs, systemic treatments involves corticosteroids, methotrexate, cyclosporine, etretinate, immunomodulators, hydroxyurea. Phototherapy and photo-chemotherapy are recently developed methods for treating this disorder (Traub *et al.*, 2007, Bell *et al.*, 2002).

The immune mediated model of psoriasis suggests that immunosuppressant medication can cure psoriasis, but the role of immune system is not fully understood. A therapeutic paradox arises for researchers where, traditional therapies improve the psoriasis by decreasing the T-cell, but in HIV patients the decrease in T-Cell count worsen the psoriasis in other hand. This fact is supported by some researches in animal model, that psoriasis can be triggered in mice lacking T-Cells. Epidermal hyperproliferation, abnormal keratinocytes differentiation, angiogenesis with blood vessel dilatation and excess Th-1 and Th-17 are some histopathological conditions associated with psoriasis. Active psoriatic lesions are generally characterized by intraepidermal penetration of activated polymorphonuclear leukocytes, which causes uncontrolled production of reactive oxygen species, which leads to peroxidative damage to membrane of the skin and the reactive oxygen species

may also activate the Phospholipase A₂ and thus increase the release of mediators of Arachidonic acid. PGE₂ production results in dilating the blood vessel of dermis which leads to leucocyte infiltration and stimulate keratinocyte cell growth (Ben-Arye *et al.*, 2003, Leung *et al.*, 1993, Naukkarinen *et al.*, 1989). The relationship between human, plant and plant derived products is very old. Plants have been therapeutically used by human in diverse physiological disorders starting from inflammation to life threatening diseases like cancer. In recent time, WHO is also promoting the herbal drugs because of their therapeutic benefits along with safety. This review deals with a precise discussion about psoriasis and the available plant derived medication for its treatment along with the future of herbal medication in this field.

Psoriasis

Types and Symptoms

There are five main types of psoriasis, namely; Plaque psoriasis, Guttate psoriasis, Inverse (Flexural) psoriasis, Pustular psoriasis and Erythrodermic psoriasis. Apart from these nail psoriasis is there, which is localized to the nails only and psoriatic arthritis is limited to joint and connective tissue inflammation. The main symptoms are irritation, red and flaky patches of skin. Patches are most often seen on the elbows, knees and middle of the body, but can appear on scalp and elsewhere in the body. The skin may be itchy, dry and covered with raised thick silvery flaky skin pink red in color. Other symptoms include genital sores, joint pain, thickening and browning of nail and severe dandruff on the scalp. The disorder is so severe that it often needs lifelong treatment. Apart from the various predicted reasons for psoriasis to induce the drug induced psoriasis are more common and is explored next to this (Jobling *et al.*, 2007).

A FOCUS ON DRUG INDUCED PSORIASIS

Some factors known to trigger psoriasis include smoking, alcohol consumption, body mass index (BMI), trauma, infection, endocrine disorder, drug and acute withdrawal of natural and systemic or potent topical corticosteroids. Drugs have several ways in which they can affect the diathesis of psoriasis: like *de novo* in predisposed and non predisposed individuals, Pre-existing psoriatic lesion exacerbation, induction of lesion in clinically normal skin in patient with psoriasis, treatment resistant psoriasis. The mechanism of this type involves the immunological and non-immunological pathways. Drug provoked psoriasis can be divided into Drug induced psoriasis and drug aggravated psoriasis. The later occurs after discontinuation of drug and they mimic pustular variant of psoriasis but no nail are affected or no associated arthritis. The aggravated psoriasis occurs with a history of psoriasis or any genetic recombination of the disease (Gelfand *et al.*, 2005, Heng *et al.*, 2000).

Understanding mechanisms of Drug provoked psoriasis

A variety of class of drugs have been reported for their adverse effect as psoriasis or psoriasiform drug eruption. Psoriasiform drug eruption is a broad term referring to a heterogeneous group of disorders that clinically and histologically simulate psoriasis. A psoriasiform drug eruption used to describe the presence of cellular infiltration, papillomatosis and epidermal hyperplasia with elongation of red ridges. This type of eruption can also be seen with seborrheic, dermatitis, pityriasis rubra, pilaris, secondary syphilis, pityriasis roseate etc (Grace *et al.*, 2010, Lionel *et al.*, 2007). The drug provoked psoriasis by different class of drug is highlighted below.

β -blockers

It is a very popular class of drug to treat cardiovascular diseases like Arrhythmias, hypertension, ischemic heart disease, heart failure, hyperthyroidism, glaucoma and anxiety. Their action is exerted by blocking the beta receptor or non selective β_2 receptor, mainly found in the keratinocyte and on the surface of the macrophages. A delayed type hypersensitivity reaction, immunological mechanism impaired lymphocyte transformation or alteration in cyclic adenosine monophosphate (AMP) pathway is observed. In many researches it is found that the psoriasiform is occurred by the discontinuation of drug. The treatment of erythroderma is done by decreasing the transdermal fluid loss and β -blocker therapy (Assem *et al.*, 1973, Halevy *et al.*, 1991, Raftery *et al.*, 1973).

Lithium

Lithium is used for the treatment of manic depressive disorder. In 1972, the first lithium induced psoriasis was reported. There are several therapies purported to explain the pathogenesis of lithium provoked psoriasis. A decrease in cAMP level in the body, causes low intracellular level of calcium which leads to a increased proliferation of keratinocyte, decreased contraction of muscle. Study shows that the short term lithium used cause decrease cAMP level but long term lithium treatment causes the reverse. Current studies revealed that lithium causes depletion of inositol monophosphate resulting in calcium homeostasis and seretonergic function. The anti-TNF- α , such as, etanercept is used in the treatment of severe lithium psoriasis. The lithium induced psoriasis can also be treated with corticosteroid, keratinolytics, vitamin D analogues, oral retinoid, UVA therapy and methotrexate etc (Carter, 1972, Voorhees *et al.*, 1975, Bloomfield *et al.*, 1983, Di Giovanna *et al.*, 1981).

Antimalarial Drugs

The most commonly used anti-malarial drugs are chloroquine and hydroxychloroquine. The mechanism of causing psoriasis is through inhibition of transglutaminase enzyme in skin. It is also reported that antimalarial drugs had exacerbation of

their psoriasis in 31% of cases. The treatment of this type of psoriasis is done by use of corticosteroid, vitamin D, glucocorticoid (Slagel *et al.*, 1985, Baker, 1966, Friedman, 1987).

Angiotensin converting enzyme inhibitors (ACEI)

ACEI are widely used to control hypertension and are used as a common choice drug for diabetic patients. ACEI are associated with psoriasis in patients more than five decades ago. But no casual relationship has been investigated till date. Recently research predictions are more focused on the fact that ACEI provoked psoriasis may have a genetic origin (Grau, 2008, Cohen *et al.*, 2005).

Antibiotics

Tetracycline and Penicillin

Use of systemic antibiotics and induction of psoriasis are controversial from the beginning. Tetracyclines may provoke psoriasis through reduction of intracellular cAMP and by the interaction with arachidonic acid and its metabolites. It has been theorized that tetracyclines accumulate in higher concentrations in psoriatic lesions compared to uninvolved skin. Some tetracyclines may cause photosensitization, which may result in predisposed patients with psoriasis to experience exacerbation through the Koebner phenomenon secondary to phototoxicity (Counis *et al.*, 1973, Forster *et al.*, 1983). It has also been suggested that tetracyclines should be avoided in patients with clinical evidence of psoriasis, as well as in healthy individuals with a genetic predisposition for psoriasis. Psoriasis exacerbation by penicillin derivatives is rare and may actually represent acute generalized exanthematous pustulosis and not true drug-provoked psoriasis (Wright *et al.*, 1988, Katz *et al.*, 1987).

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)

NSAIDs are a class of drugs used for treatment of pain and arthritis. NSAIDs are frequently used by patients who have psoriasis as well as psoriatic arthritis. NSAIDs inhibit the metabolism of arachidonic acid by the cyclooxygenase (COX) pathway leading to accumulation of leukotrienes, which has been postulated to aggravate psoriasis. According to one study, both topical and systemic NSAIDs were the most common cause of both exacerbation and induction of psoriasis. Naproxen and Indomethacin being the main culprits, have been reported in separate trials. In case-controlled and case-crossover studies, there have been adverse effects of NSAIDs reported in patients with psoriasis, particularly with propionic acid derivatives. The effects of NSAIDs have a latency period of 1.6 weeks on average. Considering that patients with psoriasis can have associated arthropathies, it is important for clinicians to recognize NSAIDs as potential exacerbators of psoriasis (Powles *et al.*, 1990, Ellis *et al.*, 1983). Some other drug provoked psoriasis has been mentioned in **Table 1**.

Table 1: Other drug provoked psoriasis.

Drug	Area of lesion
Interferon, Terbinafine, Benzodiazepines	All body skin
Phenylbutazone	Hand, feet
Digoxin, Clonidine, Amiodarone	All body skin
Quinidine, Gold, TNF-A Inhibitor	All body skin
Imiquimad, Thioxetine, Cimetidine, Gemfibrozil	All body skin

DRUGS FOR TREATMENT OF PSORIASIS

During 18th & 19th centuries some flower solutions containing poisonous and carcinogenic arsenic compound was used by dermatologist as a treatment for psoriasis. Grenz ray (ultra soft x-ray) was popular treatment for psoriasis during middle age of 20th century. Undecylenic acid was investigated and used for psoriasis some 40 year ago. In 2010, two new oral JAK inhibitor drug viz. Roxelitinib and Tofacitinid, has shown rapid and promising efficacy in phase I and II clinical trial with patient showing significant skin clearing within one week of treatment. Briakinumab is human anti-IL- 12 / IL- 23 monoclonal anti – body directed again the shared p⁴⁰ subunit of IL – 12 / IL - 23. The briakinumab is developed by the abbot laboratory in conjugation with Cambridge AB technology for treatment of multiple autoimmune inflammatory diseases including psoriasis. **Table 2** contains some semisynthetic drugs used in psoriasis treatment.

Table 2: Some semi-synthetic drugs used in psoriasis.

Drugs and Category	Trade Name
Acitretin (Retinoid)	Acerate (10mg), Acetec (25mg), Zerotem (25mg)
Alefacept (Immunosuppressant)	Acnethro (50mg), Aloederm - B, Aloederm - D (250gm)
Allantoin (Topical agent)	Ointment anomex clenchin - 3
Anthalin (Anti - miotic)	Cozen (15mg , 20mg)
Hydroxy urea (Antineoplastic)	Cytodrox - D urea, Hondria, Niodria
Infliximab (Monoclonal Antibody)	Remicade

ALTERNATIVE NATURAL TREATMENTS FOR PSORIASIS

The herbal medicines not have more side effects as compared to synthetic drugs. The herbal medicine is easily available and easy to use in treatment. Now a day, herbal resources play a very important role in the management of the skin and inflammatory diseases. Some studies suggest that psoriasis symptoms can be relieved by change in diet and life style. Fasting food period, low energy diet and vegetarian diets have improved psoriasis symptoms. In some treatments supplemented with fish oil shows a beneficial effect due to the presence of omega - 3 Fatty Acids and Vitamin E. Cannabis is also suggested for treating psoriasis due to Anti - inflammatory properties of its cannabinoids and their regulatory effect on immune system (Bhuchar *et al.*, 2012, Brown *et al.*, 1998, Brown *et al.*, 2004; Farber *et al.*, 1986; Koo *et al.*, 1998, Mantle *et al.*, 2001; Deng *et al.*, 2013). Some herbal alternatives for natural psoriasis treatment and the possible rationale of their

anti-psoriatic activity have been discussed below briefly on the basis of reports of some researches.

Capsicum annuum/ Capsicum frutescens

It is commonly known as Cayenne, its chief component being capsaicin. One hypothesis on the pathogenesis of psoriasis suggests a neurogenic inflammatory etiology mediated through substance - P (SP). SP activates inflammatory cells and ultimately perpetuates vasodilatation, angiogenesis and keratinocyte hyperproliferation. In accordance, psoriatic lesions are known to be more densely innervated with higher SP content than control or uninvolved psoriatic skin. Capsaicin stimulates the release of SP by binding to the vanilloid receptor on slow - conducting, unmyelinated type C neurons and ultimately leads to its depletion (Joe *et al.*, 1997, Bernstein *et al.*, 1986, Iis *et al.*, 1993).

Aloe vera

Aloe vera is a popular plant used in cosmetic care and first aid products in case of thermal injuries. Aloe contains anthraquinones, steroids, saponins, mucopolysaccharides and salicylic acid. Syed and colleagues (1996) conducted a double - blind, placebo – controlled study on 60 patients with psoriasis with slight to moderate plaque type psoriasis and an average 8.5 year duration of their disease. Patients self - administered topical *Aloe vera* extract cream or vehicle placebo three times a day without occlusion for 4 weeks to their psoriatic plaques. The aloe group showed significantly higher rates of clearing the psoriatic plaques in almost all patients. Anthraquinone and acemannan, 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. In addition, salicylic acid, a component of *Aloe vera*, is a keratolytic and would contribute to its reported efficacy in the desquamation of psoriatic plaques (Syed *et al.*, 1996, Klein *et al.*, 1988, Robson *et al.*, 1982, Choonhakarn *et al.*, 2010, Paulsen *et al.*, 2005, Dhanabal *et al.*, 2012).

Silybum marianum

It is commonly known as Milk Thistle. This plant is very well known for its hepatoprotective activity. Numerous changes have been detected in the liver of patients with psoriasis, including steatosis, periportal inflammation, fibrosis, necrosis and cirrhosis. A multifactorial etiology of liver disease in patients with psoriasis includes changes due to alcohol use, nutritional factors, anti – psoriatic medications and a direct effect of the psoriasis itself. Abnormally high levels of cAMP and leukotrienes have been observed in psoriatic patients and normalization of these levels may improve the condition. The importance of silymarin in the treatment of psoriasis may be due to its ability to improve endotoxin removal by the liver, inhibit cAMP phosphodiesterase and inhibit leukotriene synthesis. (Sabir *et al.*, 2014).

Angelica sinensis

It is commonly known as Dong quay. This Chinese herbal medicine extracts contain potent furcoumarin 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. Koo & Arain, 1998 studied patients with psoriasis, two-thirds patients got complete relief from their disease after oral treatment with this plant extract. Another herb used in treating psoriasis hogweed (*Heracleum sphondylium*), also contains a psoralen but the efficacy and side effects are not available (Bhuchar *et al.*, 2012, Koo *et al.*, 1998).

Matricaria recutita

It is commonly 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 by-product 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. There is evidence supporting the role of increased LTB4 formation in psoriatic plaques; therefore, inhibition results in disease improvement. 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 (Murti *et al.*, 2012, Safayhi *et al.*, 1994).

Melaleuca alternifolia

It is traditionally known as Tea Tree Oil and is popular for its wound healing property. The oil contains terpin – 4-ol, alpha - terpineol and alpha – pinene which confer antimicrobial activity against *Propionibacterium acnes* and *Staphylococcus epidermidis*. No studies have investigated the use of tea tree oil in psoriasis; however, its role in urticarial reactions and control of wheal and flare has been reported. Hence, study can be made to evaluate its anti – psoriatic efficacy. Although there is reported efficacy in the treatment of acne, dandruff and cold sores, tea tree oil can produce allergic dermatitis in individuals sensitized to the sesquiterpenoid fractions. Oral ingestion can lead to the detrimental effects of cognitive disorientation, systemic contact dermatitis and coma (Carson *et al.*, 2001, Carson *et al.*, 1998, Koh *et al.*, 2002, May *et al.*, 2000).

Gaultheria procumbens

It is commonly known as Wintergreen. Wintergreen is a plant native to the Eastern United States and historically was used by Native Americans as an analgesic. It contains

methyl salicylate, which is having anti-inflammatory properties. Although used topically for psoriasis, wintergreen can cause systemic effects like tinnitus, vomiting, tachypnea and acid-base disturbances. Patients using aspirin or a prescribed salicylic acid compound in conjunction with a salicylate herbal (for example, wintergreen, aloe vera, or red clover) are more susceptible for systemic toxicities. Additionally, oil of wintergreen can increase prothrombin time and international normalized ratio (INR) of clotting, creating problems for patients on warfarin. There are no investigations on its effectiveness in psoriasis, but have potential anti-inflammatory effect and needs further scientific investigations for its use in psoriasis (Sahu *et al.*, 2011).

Ulmus rubra

It is commonly known as Slippery elm, named so for its mucilage component, derived from the inner bark of the elm. Historically, Native Americans used this extract as a poultice for boils and wounds. It is currently marketed as a treatment for irritable bowel syndrome, reflux and cystitis. Brown and colleagues (2004) evaluated a study group of five patients with chronic plaque-type psoriasis on a home based six month medical nutritional therapeutic regimen. They assessed psoriasis symptoms and bowel permeability over the experimentation period and reported an improvement in all studied parameters. Psoriasis area and Severity Index averaged post test scores showed significant improvement (Buchar *et al.*, 2012, Brown *et al.*, 2004).

Curcuma longa/ Curcuma domestica

Turmeric has a long history of being used for infections and kidney stones. The use in psoriasis is a relatively new adjunct. The anti-inflammatory components are thought to be contained in the curcuminoids and volatile oils which function through selective inhibition of phosphorylase kinase (PhK). PhK is an enzyme found in the epidermis. Significantly higher levels have been noted to correlate with clinical activity of psoriasis. It is also reported decreased PhK activity in the curcumin and calcipotriol treated groups corresponded to severity of parakeratosis, decreases in keratinocyte transferrin receptor expression and density of epidermal CD8 + T cells. The study did not report any adverse effects, although contact dermatitis is a reported adverse effect (Joe *et al.*, 1997).

Mahonia aquifolium

It is a very popular plant used in skin disorders, especially in psoriatic plaques. Muller *et al* (Muller *et al.*, 1994), reported the effect of bark extract of *Mahonia aquifolium* and its main constituents (berberine, berbamine, oxyacanthine) on 5-lipoxygenase and lipid peroxidation. He also reported the extract of bark of *Mahonia aquifolium* is an inhibitor of keratinocytes growth. The benzyloquinoline alkaloid berbamine and oxyacanthine were more potent

inhibitors (Muller *et al.*, 1994, Misik *et al.*, 1995, Gulliver *et al.*, 2005, Galle *et al.*, 1994).

Alpinia galangal and Annona squamosa

Chanachai *et al* (2009) reported the plant *Alpinia galanga*, *Curcuma longa* and *Annona squamosa* for their anti-psoriatic effect. They reported the molecular role of the extracts in suppressing psoriasis via regulation of NF-kB signaling biomarkers. They used semi-quantitative RT-PCR and reported gene assay in ten different genes of NF-kB signaling network in HaCaT cells (Saelee *et al.*, 2011).

Thespesia populnea

Shrivastava *et al* (2009) reported anti-psoriatic effect of *Thespesia populnea* 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/fixated oil (Shrivastava *et al.*, 2009).

Smilax china

Vijayalakshmi *et al* (2012), reported the anti-psoriatic activity of *Smilax china*. 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. This was the first report of flavonoid quercetin to have an anti-psoriatic activity (Vijayalakshmi *et al.*, 2012).

Nigella sativa

Dwarampudi *et al* (2012) reported the 95% of ethanolic extract of *Nigella sativa* Linn (Ranunculaceae) seeds, commonly known as Black cumin, produced a significant epidermal differentiation, from its degree of orthokeratosis. This was equivalent to the effect of the standard positive control, tazarotene (0.1%) gel. 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. They worked on screening of antipsoriatic activity of 95% of ethanolic extract of *Nigella sativa* seeds by using mouse tail model for psoriasis and in vitro antipsoriatic activity was carried out by SRB Assay using HaCaT human keratinocyte cell lines (Dwarampudi *et al.*, 2012).

Wrightia tinctoria

Dhanabal *et al.*, (2012) reported the hydroalcoholic extract of *Wrightia tinctoria* leaves showed significant anti-psoriatic effect on mouse tail test model, as compared to isotretinoin acid as standard. They found the extract to produce significant orthokeratosis, prominent antioxidant activity in DPPH, Nitric oxide and hydrogen peroxide scavenging assay (Dhanabal *et al.*, 2012).

Some other traditionally known plants for Anti-psoriatic activity

Subbaiah *et al* (2012), reported some traditional local medicinal plants of Kurnool district of Andhra Pradesh (India) for their potential anti-psoriatic affect. The documented plants include *Olox scandens*, *Petalium murex*, *Phyllanthus reticulatus*, *Rhinacanthus nasutus*, *Rhus mysorensis*, *Solanum pubescens*, *Camptotheca accuminata*, *Indigo naturalis* etc. These plants need more focus for investigations of their Anti-psoriatic activity (Subbaiah *et al.*, 2012, Lin *et al.*, 2007, Wang *et al.*, 1998, Lin *et al.*, 2009, Sampson *et al.*, 2001, Lin *et al.*, 1996).

FUTURE CHALLENGES FOR HERBAL REMEDY FOR PSORIASIS TREATMENT

The herbal sources are currently getting more reliability due to their safety and easy availability. For herbal remedy and screening of plant extracts for anti-psoriatic activity the main targets to consider is the T-cell activation, T-cell trafficking, Cytokine inhibition and Counter offensive strategies. Anti-inflammatory and next generation immunosuppressant ideally would be able to treat psoriasis effectively. Future challenges are several folds and include the caring and monitoring of patient and biologic monitoring of the historical background, chronic inflammatory mediators. The specific trigger identified for initial production of TNF- α cytokines may also impact TNF- α production include HMG-B1, IL-15 and IL-23. Elucidation of the basic mechanism by which the disease is transmitted from one generation to another is another facet of the research which must be investigated to explore some more herbal drugs for the treatment of psoriasis.

CONCLUSION

Psoriasis is a complex multifunctional inflammatory skin disease characterized by T-cell activation, local vascular changes, abnormal keratinocyte proliferation and neutrophil activation. 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. In that case, the herbal natural remedy is the obvious alternative, which is safe and equally effective as the synthetic drug. Several plant sources have been highlighted in this article on the basis of traditional knowledge and reports of different researchers. The investigative parameters which are the major aspects for herbal drug screening has also been mentioned somewhere in the paper, which will hopefully help the researchers working in this area.

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How to cite this article:

Kamlesh Kumar Singh, Surendra Tripathy. Natural Treatment Alternative for Psoriasis: A Review on Herbal Resources. *J App Pharm Sci*, 2014; 4 (11): 114-121.