IJBPAS, September, 2020, 9(9): 2435-2463

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

HERBAL AND ALTERNATIVE THERAPY; A PROMISING FUTURE FOR TREATING PSORIASIS: A REVIEW

BANSAL R*, SHARMA RB AND AGARWAL S

Department of pharmaceutics, L.R Institute of pharmacy Solan Himachal Pradesh, India

***Corresponding Author: Bansal R: E Mail: richikabansal12@gmail.com**

Received 29th Jan. 2020; Revised 28th Feb. 2020; Accepted 6th April 2020; Available online 1st Sept. 2020

https://doi.org/10.31032/IJBPAS/2020/9.9.5198

ABSTRACT

Psoriasis is a chronic, recurrent autoimmune inflammatory skin disorders. Although there is evidence of various remedies for treating psoriasis, no specific remedy allows satisfactory treatment. There are various types of therapies available to treat psoriasis but they have several side effects. As an alternative to synthetic drugs, herbal therapy has been used. Therefore we can use herbal medicines to treat psoriasis as an alternative therapy of synthetic drugs. These have a greater beneficial rate and have lesser side effects. Herbal drug delivery has a huge potential to boost the therapeutic action. Different types of herbal formulations are available in the market. The present review is therefore, an effort to give a detailed study on Indian herbal drugs used in the treatment of psoriasis which can be delivered for a long duration of time with lesser side effects.

Keywords: Psoriasis; Psoriasis vulgaris; Topical agents; Biological agents; Traditional medicine; Systemic therapy

INTRODUCTION

Psoriasis is a dermatitis disease that is dignified by heavy proliferation, thick inflammatory cell infiltrates, originates of current blood vessels, alternation in the lymphatic system and harmed differentiation of epidermis layer. It is an autoimmune disease where environment and genetic components have a primary function **[1, 2]**.

Psora means 'irritation', 'rash', 'flake'. Psoriasis is also called the irritation

condition. It affects 2.5% of the universe and 30% of patients suffering from arthritis psoriasis that affect the conjoint. It is identified in the west area as a chronic inflammatory autoimmune disorder generated by hereditary, immune system and enviromental factors **[3, 4, 5]**.

It is a non-contagious infection and terrible dermatitis disorder, which can include full body of person **[6]**. It is usually genetic and generally classified by distinctly marginated rusted, erythematous plaques that enlarge in a approximately same distribution. The majority areas are the scalp, finger, toes, palms, soles, umbilicus, gluteus, breasts, genitals, elbows, knees, shins and sacrum **[7]**. It can also cause inflammation in joint, which can be recognized as psoriatic arthritis. Maximum scientific research states that psoriasis vulgaris, which influence about 85-90% of all suffering patients with this disease **[8]**. The possible factors triggering psoriasis include mental stress, skin surface illness and virus disorder and abdominal troubled. Various types of psoriasis have been reported like plaque psoriasis, psoriatic arthritis, scalp psoriasis, flexural psoriasis, guttate psoriasis, pustular psoriasis, nail psoriasis, erythroderma which can be diagnosed by strong outcome like skin surgery etc **[9]**. The etiology of this particular disease was survivor unclear, although there is a symbol for genetic predilection **[10]**. It is earlier harmful disorders from ancient times; hence we need to find a good and effective antidote to treat psoriasis **[11]**. This review is, therefore an effort to provide the detailed study report on psoriasis and synthetic, herbal and combined therapy.

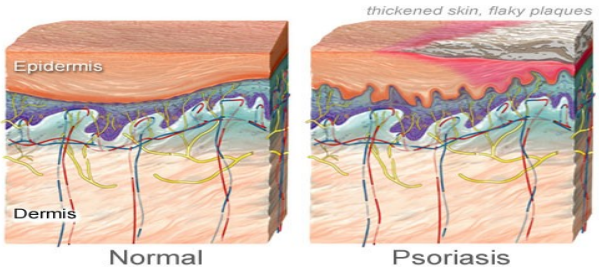

Figure 1: Anatomy of Normal and Psoriatic Skin

TYPES OF PSORIASIS:

1. Plaque Psoriasis:

This disease is very common and it affects 80-90% of patients of the world population **[12]**. Active cell growth creates a silvery scale, on the top of unsystematic shaped spots of red. Usually occurs on the scalp, knees, elbows and lower back that may create crack and bleed **[13]**.

Almost 80% of the people who are affected with psoriasis have mild to moderate disorder, with 20% having moderate to severe psoriasis affected more than 5% of the body surface area or affected imperative body spheres such as the hand, feet, face or sexual organs **[12]**.

Treatment:

Topical treatment, phototherapy and changes to diet are applied in the affected ares which can treat plaque psoriasis.

OVER THE COUNTER TREATMENT:

a) Salicylic acid: It is an over the counter treatment it works to peel the scales, if therapy is left on the skin for a longer period of time it may cause irritation and hair loss.

b) Tar soaps: It is used to reduce the skin cells active growth. Only 0.5-5 % is safe **[14]**.

c) Pleasant, fabricated moisturizers have been found effective and are applied after warmish showers or after washing hands.

D) Volatile oil, oatmeal sachets, bitter salts, Dead Sea salts to a bath can assuage itching and remove scales **[14]**.

NON- STEROIDAL MEDICATION:

a) Dovonex (calcipotriene): It is a fabricated form of VD3, used to slow down the active production of skin cells.

b) Tazorec (tazarotene): It may cause the affected area to become very red before assuage of scales and is obtained from vitamin A.

c) Vertical (calcitriol): It is a natural form of VD3. This type of medication also slows down the skin cell construction **[15]**.

Figure 2: Plaque Psoriasis

2. Inverse Psoriasis:

This type of psoriasis occur on ridge and skin folds on the body, there is little to no scale and is soft, yet still inflamed and red **[16]**.

Treatment:

The treatment of inverse psoriasis is same to plaque but one is to head more caution because the area that inverse mostly shows up on are thin, topical steroid gel are devour more simply and can build syndrome that would not affect thicker skin.

To conflict inverse psoriasis topically, analysis shows that anthralin/coal tar soaps can be used as well as phototherapy **[16]**. Phototherapy uses UVB light to lower inflammation by repressing the immune system **[17]**.

Figure 3: inverse psoriasis

3. Pustular Psoriasis:

A non-contagious, non-infection type of pustules with inflammation. It can cover the full areas of the body or mini part. There is a

cause for pustular psoriasis listed on the National Psoriasis Foundation Webpage:

Inner therapeutic agents

Irritating topical agents

Overuse to UV light

Pregnancy

Cardiac glycoside/ steroid alcohol

Infections

Anxiety **[18]**.

There are three types of Pustular Psoriasis:

1) Von Zumbusch is most rare in children, but when started on an infant it is generally the initial flare up for the infant and has improved results than adults. But when occurs in adults it must be treated instantly. It has associations of coolness, anemia, weakens and serious irritation.

2) Palmoplantar pustulosis is most appear pustules on the underfoot and palm of the hand.

3) Acropustulosis is very common in all ages and can occur due to an injury to the skin surface or an infection, mostly on the tips of finger/thumb and toes.

Treatment:

Revive the skin chemical balance and prohibit the infection through several choices for topical medication as well as the photochemotherapy. The maximum variation of pustular psoriasis is said to be crucial to treat especially with the use of steroid ointment. Therapy may depend upon the proper remedy. Maximum physician will try applying topical medication and then try light therapy **[18]**.

Figure 4: Pustular Psoriasis

4. Guttate Psoriasis:

This type of psoriasis develops on limbs and head **[12]** in the form of lots of red scratches which are similar to varicella-zoster virus. This scratch may be begun on the scalp, face surface, ears. Generally this type will coincide with plaque psoriasis **[19]** or it can be a result of an increase of long term plaque psoriasis. Known triggers of these diseases include:

Upper respiratory tract infection

Sore throat

Palatine uvula

Nervous tension

Damage to the skin

Treatment:

Modern ointment/gels, light therapy, and systematic medication are the most common treatment for psoriasis **[19]**.

Figure 5: Guttate Psoriasis

5. Erythrodermic Psoriasis:

Erythrodermic psoriasis maybe an out come from a chronic case of plaque psoriasis **[12]**. It affects the maximum area of the body and redness of longer areas of the body with pustules. This scheme of psoriasis can be endangering life **[20]**.

Known triggers:

• Abrupt withdrawal of systemic treatment
• Sunburn
• Use of systemic steroids (cortisone)
• Infection
• Emotional stress
• Alcohol addiction **[20]**.

Figure 6: Erythrodermic Psoriasis

6. Psoriatic Onychodystrophy:

It is also called nail disease which involved in 50% of the fingernails and 35% in toenails **[12]**. This type of psoriasis is genetic **[21]**.

Known triggers include:

Stress

Injury to skin

Infection **[21]**.

Figure 7: Nail Psoriasis

Pathophysiology of Psoriasis:

Fast division of keratinocytes appears in psoriatic patient and their transition from the stratum basale to the upper layer of epidermis appears in 4 days. Hard dry patches or plaque form as the skin does not scatter the cells quickly **[22]**. In some people moderate psoriasis occur which cannot be imagined as a skin disease. In others has very serious psoriasis where almost full body has been covered by scaly, red skin. Psoriasis appears in all age group, i.e., paediatrics to geriatrics; generally it is diagnosed in adolescence of a person. The other causative factors for psoriasis are hereditary, permutation, climate, psychic, anxiety and virus **[23, 24]**.

The major pathological phenomenon's associated with psoriasis are:

T cells are activated.

T cells are stimulated & then moved into the skin.

And, then T cells are regenerate in dermis and epidermis **[25]**.

Mechanism:

Psoriasis is described by an abnormally excessive and active growth of the epidermal layer of the skin **[26]**. Abnormal production of skin cells and an overabundance of skin cells result from the continuity of therapeutic action in psoriasis **[27]**. Usually skin cells are replaced every 28-30 days but in psoriasis, these are replaced every 3-5 days **[28]**. These changes are considered to stem from the immature infection of keratinocytes induced by an inflammatory cascade in the dermis which involves dendritic cells, macrophages, and t-cells **[29, 30]**. These immune cells move from the dermis to the epidermis and secrete inflammatory chemical signals such as interleukin-36γ, tumor necrosis factor-α, interleukin-1β, interleukin-6, and interleukin-22 **[31, 32]**. These secreted inflammatory signals are believed to stimulate keratinocytes to proliferate. One assumption is that psoriasis affects an injury in regulatory T cells and cytokine interleukin-10 **[31]**.

Gene mutations of proteins elaborate in the skin's ability to act as a barrier has been identified as markers of susceptibility for the buildup of psoriasis **[33, 34]**.

DNA discharge from dying cells acts as irritation stimulation in psoriasis **[35]** and stimulates the receptors on dendritic cells, which produces the cytokine interferon- α **[35]**. In response of this chemical information from dendritic cells and T cells, keratinocytes also secrete cytokines such as interleukin-1, interleukin-6 and tumor necrosis factor-α, which signal downstream inflammatory cells to reach and prompt the inflammation **[31]**.

Dendritic cells link the innate or adaptive immune system. They are raised in psoriatic lesions **[26]** and cause the proliferation of T cells and type 1 helper T cells. Targeted immunotherapy as well as psoralen and PUVA therapy can decrease the number of dendritic cells and support a Th2 cell cytokine secretion pattern over a Th1/Th17 cell cytokine profile **[31, 36]**. Psoriatic T cells move from the dermis into the epidermis and secrete interferon-γ and interleukin-17 **[37]**. Interleukin-23 has known to cause the production of interleukin-17 and interleukin-22 **[31, 37]**. Interleukin-22 works in combination with interleukin-17 to

cause the keratinocytes to secrete neutrophil-attracting cytokines **[37]**.

Diagnosis:

The Diagnosis of psoriasis commonly depends on the appearance of the skin. Skin characteristics typical for psoriasis are scabby, erythematous plaques, inflammation, or stretch of skin that may be dreadful and itch **[38]**. No specific blood tests or diagnosis practices are generally needed to make the diagnosis **[39, 40]**.

The differential Diagnosis of psoriasis includes dermatological situation which are same in appearance such as microbial eczema, seborrheic eczema, pityriasis rosea nail fungus or cutaneous T cell lymphoma **[41]**. Dermatologic manifestations of system sickness such as the rash of secondary venereal diseases (AIDS, STD, HIV) may also be a puzzled with psoriasis **[41]**.

If the scientific diagnosis is unclear, a skin surgery or scraping may be performed to forbid other diseases and to verify the diagnosis. Skin from a biopsy will show pummel epidermal step that interlinks with dermis on microscope. Epidermal swelling is a other characteristics of finding psoriasis lesions **[39, 40]**. The stratum layer of the epidermis is generally disappeared or reduced in psoriasis scrape; the skin cell from the most superficial layer of skin are also anomalous as they never fully mature. Unlike their mature counterparts, these superficial cells carry their nucleus **[39]**. Inflammatory infiltrates can be view on microscopy when checking out skin tissue or joint tissue damaged by psoriasis. Epidermal skin surface tissue is damaged by psoriatic irritation usually has several CD8+T cells while a predominance of CD4+T cells makes up the inflammatory infiltrates of the dermal layer of the skin and the joints **[43]**.

HERBAL AND ALTERNATIVE TREATMENT OF PSORIASIS:

At present, different therapies are used to treat psoriasis. That is herbal therapy, alternative therapy, and phototherapy. These therapies can be used as single or combined with each other.

AYURVEDIC PERSPECTIVE:

Psoriasis is a type of kushtha (skin disorders according to Charaka the term for skin disorders is the same for worms, microbes, germs, infection disease) **[44]**. According to the Indian Materia Medica, Kushtha is a name of a plant, and its roots used as a medicinal remedy. Kushtha has strong antiseptic (germ destroying) and disinfectant properties especially opposed to streptococcus and staphylococcus **[45]**. Multiple Ayurvedic texts, review articles and research articles classified psoriasis which

depends on their types. Ekakushta is also a type of kushta **[46]**, and having another 17 types **[47]**. In the Indian Materia Medica, psoriasis is classified as Ticharchika which is used to describe eczema **[48]**.

HERBAL THERAPY FOR TREATMENT OF PSORIASIS:

Plants and its ingredient are used in herbal medicine which has fewer side effects than synthetic drugs. Today, herbal sources perform an essential role in the management of the skin and inflaming diseases **[49]**.

Advantages:

· boost therapeutic value by lower noxious and side effects.

· convenient

· More effective

Disadvantages:

· expensive

· struggle in scaling up

· Have harmful and stability issues **[49]**

There are many herbal plants which show antipsoriatic effect:

1) Angelica Sinensis:

It is a Chinese herb and is commonly known as dong quai, belonging to family Apiaceae. Angelica borne on leaf stalks of height about 2-3 feet, forms a basal clump of large three-sectioned leaves. Koo & Arain reported that two-thirds of patients received complete cure from psoriasis after oral remedy with this plant extract. Its extract has furocoumarin i.e psoralen. Psoralens has dynamic photosensitizers in the presence of UVA. When exposed to UVA psoralen causes epidermal DNA cross-linking **[50]**.

2) Alpinia galangal:

It also called the Thai ginger belonging to family Zingiberaceae. Its leaves are long and height is about 5 feet. Its rhizomes are used as an herb to treat skin disorder like psoriasis. Chanachai et al reported that the plant Alpinia galangal has a beneficial remedy for the anti-psoriatic effect **[51]**.

3) Aloe vera:

Its scientific name is *Aloe barbadensis* belonging to family Liliaceae. It is stemless and height is about 60-100 cm. The leaves are thick, fleshy, greenish. The active constituents of aloe vera show anti-itching, analgesic, anti-inflammatory properties and also shows wound healing action against psoriasis. Aloe vera is an effective medicine for the treatment of psoriasis. The aloe group produces a powerful effect to treat psoriatic plaques in all patients. Anthraquinone and acemannan are the main active constituents in Aloe vera, having antibacterial activity against staphylococcus and streptococcus species and shows their therapeutic effect to treat psoriasis **[52]**.

4) Annona squamosal:

It is also called the sugar apple belonging to family Annonaceae. The leaves are thin, oblong and flowers are greenish. Its height is about 5 cm. Chanachai et al reported that Annona squamosal has shown its anti-psoriatic effect **[51]**.

5) Andrographis nallamalayanna:

It is commonly known as green chireta belonging to family Acanthaceae. It is an herb. Stems are dark green and leaves have hairless blades. Height is about 30-110 cm. This plant is used as a traditional medicine to treat mouth ulcers, leucorrhoea, sterility and psoriasis **[53]**.

6) Azadirachta indica:

It is also called neem and belongs to family Meliaceae. It is an evergreen tree having a height 12-20 meters. Neem leaves have been used to treat various skin disorders like eczema, psoriasis etc **[54, 55]**.

7) Capsicum annum:

It is also called the bell peppers belonging to family Solanaceae. It is a shrub and stems are highly branched. Fruits are berries which are yellow in colour. It consists of a substance known as capsaicin which is used to treat various pain and inflammation of psoriasis. Dry paste of leave is an effective remedy in plaque pdoriasis **[56]**.

8) Calendula officinalis:

It is also called pot marigold and scotch marigold belonging to family Asteraceae. It is short-lived aromatic herbaceous perennial and leaves are oblong-lanceolate. Height is about 5-17 cm. It is an Indian herb used to treat various diseases like antifungal, wound healing and anti-diabetic agents **[57]**. These herbs have been reported to treat various skin diseases like psoriasis and leprosy **[58]**.

9) Cassia fistula:

It is also called golden shower and Indian laburnum belonging to family Fabaceae. It is a herb and its flowers are bright, yellow in colour. Height is about 2 cm. It used to treat various skin diseases like leprosy, psoriasis, etc **[59]**. The pharmacological activities includes anti-inflammatory, antioxidant, antifungal, antimicrobial and anti-psoriatic activity **[60]**.

10) Cassia tora:

It is also called Senna Tora belonging to family Caesalpinioideae. It has pinnate leaves having height 10 cm. It has been used to treat psoriasis **[61]**. Its leaves are rich in glycoside and also contains aloe-emodin here property to treat various skin disorder **[62]**.

11) Curcuma longa:

It is also known as turmeric belonging to family Zingiberaceae. It is a rhizomatous herb. It has oblong, pointed leaves and bears yellow flowers and height is about 3-5 feet.

Its active agent curcumin is used to treat various skin diseases like leprosy, psoriasis. It is also reported that decreased Phosphorylase Kinase activity in the curcumin and calcipotriol treated groups corresponded to the severity of parakeratosis. It also decreases keratinocyte transferrin receptor expression and density of epidermal CD8+T cells **[63-66]**.

12) Centella Asiatica:

It is also called Gotu Kola belonging to family Apiaceae. It is a perennial, herbaceous and medicinal herb having height is 2 cm. It is used to treat various diseases like sunburn, psoriasis, wound healing **[67]**.

13) Givotia rottleriformis:

It is also known as white Catamaran. Leaves are heart-shaped and rounded. The bark and seed have been used to treat various skin disorders like rheumatism, psoriasis **[68]**.

14) Leucas Aspera:

It is also called Thumbe belonging to family Lamiaceae. It is an erect and branched annual herb. Leaves are linear or oblong having height 2.5-7.5 cm. Its leaves have been used to treat various diseases like chronic rheumatism, psoriasis, respiratory tract disorder **[69]**.

15) Matricaria recutita:

It is known as chamomile belonging to family Asteraceae. It is erect, branched and smooth stem. Leaves are long, bipinnate and tripinnate. It is used to treat psoriatic plaques and gastrointestinal disorder **[70]**.

16) Momordica charantia:

It is also called bitter apple and bitter gourd belonging to family Cucurbitaceae. It is herbaceous having height is about 5 m. It is used to treat various skin diseases like acne, wound, psoriasis. These sherbs have been reported for their usefulness in the form of decoctions, infusions, and tinctures in the traditional system of medicines for treating skin diseases like psoriasis, leprosyetc **[58, 57, 71]**.

17) Nigella sativa:

It is also called black cumin belonging to family Ranunculaceae. It is a biennial herb. Its seed contains fats, vitamins, carbohydrates, mineral elements **[72]**. Pharmacological research of the seed extract shows a broad chromatic of action including antibacterial, antifungal, anti-inflammatory and anti-helminthic **[73]**. The seeds are applied for eruption of the skin. The seeds are used as an acceptable remedy for psoriasis, topically with general pain and the burst of patches **[74]**.

18) Psoralea corylifolia:

It is a biennial herb belonging to family Fabaceae. It is erect with elliptic leaves. Flowers are short, condensed and yellowish.

It has been used for the treatment of anthelmintic, diuretic and various skin diseases like leprosy, psoriasis **[75]**. 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 **[76]**. Psoraliacorylifolia has been used traditionally as an anti-psoriatic agent. A compound ointment of the powdered seeds of Psoralea corylifolia and Cassia tora with lime juice was tried in cases of ringworm with marked beneficial results **[77]**.

19) Pongamia pinnata:

It is also called Karanja belonging to family Leguminosae. It is semi-evergreen tree having height is 18 m or above. Leaves are alternate, imparipinnate and 5-7 leaflets are present. It occurs in all parts of India and grows near edges of river. It is also a source of energy which is safe and non-pollutant. Pongamia oil is very useful for the treatment of psoriasis **[78, 79]**.

20) Rubia cordifolia:

It is also known as common madder and Indian madder belonging to family Rubiaceae. It is an annual climbing herb having height 1.5 m. Leaves here 3-9 veined, heart-shaped and are hairless. The extract of these plants is used to treat psoriasis and is useful plant for the treatment and management of psoriasis **[80]**.

21) Smilax china:

It is known as china root. It is an annual herb. It is used to treat various diseases like rheumatism, chronic nervous diseases, epilepsy, gout, skin diseases, dyspepsia, constipation, helminthiasis, syphilis, flatulence, colic, neuralgia, psoriasis, and seminal weakness. They demonstrated anti-psoriatic action on HaCaT cell lines **[81, 82]**.

22) Tribulus Terrestris:

It is also known as Puncture Vine belonging to family Zygophyllaceae. It is an annual plant that grows in summer. It is used in china to treat skin diseases like psoriasis, eczema and liver disease **[83]**.

23) Thespesia populnea:

It is also known as Indian tulip belonging to family Malvaceae. It is used to treat scabies, ringworm, guinea worm, eczema, psoriasis, and herpetic diseases. Oil prepared by boiling the ground bark in coconut oil is applied externally in psoriasis and scabies **[84]**.

24) Wrightia tinctoria:

Leaves of Wrightia tinctoria contains hydroalcoholic extract which showed significant anti-psoriatic effect on the mouse tail test model as compared to isotretinoin acid as standard. Its extract is found to

produce significant orthokeratosis, prominent antioxidant activity in DPPH, Nitric oxide and hydrogen peroxide scavenging assay **[85, 86]**.

25). Olive oil:

Olive oil is an effective medication for moderate cases of plaque psoriasis. It can be massaged straight on a damaged area of the skin to lower dryness and inflammation as well as to promote repair. It has been noted to have antioxidant properties (vitamin E) which has been used to cure psoriasis since free radicals have been linked to psoriasis outbreaks **[87, 88]**.

26). Milk thistle:

It is also known as silymarin. It is a herb used to treat blood purification, protect the liver. It is a useful remedy for psoriasis **[87, 88]**.

27). Oleum horwathiensis formula:

It contains many herbal ingredients that showed anti-psoriatic activity. It is a herb used to be applied locally to treat psoriasis with different severity. The result showed a rising response against psoriasis after 12 weeks **[89]**.

28). Furocoumarins formula:

It is a class of organic chemical compounds produced by various herbal plants. This formula contains many active agents obtained from different herbal plants including Ammi majus.

Its anti-psoriatic activity mainly depends on the photo-activation of furocoumarins by ultraviolet when tested locally or in oral form. The action primarily depends upon the activation of skin cell apoptosis by DNA linkage and fragmentation. Therefore, degradation in overexposed of inflammatory and protein has been reported within psoriatic lesions **[90]**. These actions have been more examined with standard therapy. The data obtained from analysis showed minimum side effects **[91, 92]**.

29). Green tea potential benefits for psoriasis:

It is a type of tea that is obtained from Camelia Sinesis leaves. Tea is considered the second global beverage next to water. It has been reported that green tea is the most essential agent of targeting human health **[93]**. The maximum investigation indicated that green tea has been used in the medications used as antioxidant, antimicrobial, anti-tumor, anti-inflammatory, and thermogenic agents **[94, 95]**. The variable action of green tea elements along with its photo suppressing action endorses dermatologists to use it as a current remedy for skin diseases, especially for psoriasis **[96-99]**.

The therapy of skin with green tea extracts save the skin from developing skin cancer

through harmful DNA via photochemical action of ultraviolet a radiation **[100]**. It was reported that green tea or its natural elements when tested on psoriatic skin, boosts the production of skin cell apoptosis via triggering of certain biological enzyme **[101-106]**. Finally, the activity of green tea against psoriasis summarized in activation of a set of apoptotic genes which endorse epidermal differentiation and skin barrier formation along with enhancement of the healing process **[107-111]**.

30). Coleus:

It is also known as Plectranthus barbatus and its vernacular name is forskhohili. It is an ayurvedic herb. It has been used in herbal remedies of psoriasis. It is beneficial in treating skin disease like psoriasis due to its capacity to improve regular cell analysis **[87, 88]**.

31). Crotalaria juncea:

It is also known as sunn hump, brown hump and Indian hump. It is a tropical Asian plant belonging to family Fabaceae. It is grown in the tropics and subtropics regions of India, Nepal, Sri Lanka and South Africa. It is used as a blood purifier, abortifacient, astringent, demulcent, emetic, purgative and in the treatment of anemia, impetigo, menorrhagia and psoriasis **[112-115]**.

ALTERNATIVE THERAPY FOR PSORIASIS:

Alternative therapy is used by 60% of the world's population. This therapy has been used by backward areas for their Central health care but also used in the country where current medicines dominate **[116]**. The Indian continent has a huge stockroom of medicines plants that has been used in traditional medicine therapy. The alternative therapy in the traditional schemes is acquired from herbs, native rock, and unprocessed materials while for the preparation of herbal drug only medicinal plants have been used.

The National Center for Alternative Medicine has been introduced as the United States Federal Government's lead agency for scientific research in this arena of medicine. Its mission is to search alternative improved systems in the context of precise science, support experience researchers, train researchers, circulate instruction to the public on the technique that works and describe the scientific reason underlying discoveries. The center is devoted to search and endowment all therapies for which there is enough elementary data, fascinating social health needs and ethical justification **[117, 118]**.

There are many alternative therapies for the treatment of psoriasis:

Narrowband UVB therapy:

Narrowband UVB is the most prevalent type of phototherapy. It is the latest treatment for psoriasis and is more efficient than other therapy. It commonly administered 2 or 3 times a week until skin recovers, only weekly periods are required for maintenance. It emits wavelengths of light between 311-313 nm. It has been used to treat plaque or guttate psoriasis **[119-123]**.

Goeckerman therapy:

It is a form of light therapy. It is a procedure for treatment of moderate to serious plaque psoriasis using a combination of crude coal tar and artificially ultraviolet radiation which contains polycyclic aromatic hydrocarbon, a carcinogen, that's why this therapy is considered as safe to use **[124, 125]**.

Photochemotherapy:

It contains light sensitive therapy (psoralen) being exposed to UVA light. UVA light invades deeper into the skin than UVB and psoralen makes the skin more responsive to UVA exposure. It has been used to treat psoriasis **[126]**.

Excimer laser:

It is a form of light therapy used for treating psoriasis. A controlled beam of UVB light of a definite wavelength is directed to the psoriasis plaques to cure scaling and irritation. Its wavelength is about 308 nm **[127, 128]**.

Pulsed dye laser:

In recent years, it has been used by researchers to treat skin disorders like acne vulgaris, scar, plaque and nail psoriasis **[129, 130]**.

LASER THERAPY;

It is also called cold therapy. It has been used to treat various skin disorders like psoriasis, eczema. Inflammation and chronic pain of plaque psoriasis is also treated by this therapy **[131, 132, 133]**.

PHOTODYNAMIC THERAPY

In recent years, photodynamic therapy has been used to treat various skin disorders like psoriasis, acne, rosacea. It is non toxic light to treat psoriasis **[134, 135]**.

Phototherapy

SUNLIGHT:

These rays consist of UVA and UVB rays. UVB rays have been more effective to treating psoriasis because they slower the skin growth and shedding. When UV light penetrates into the skin, it represses the process leading to disease, causing activated T cells in the skin to die. This process reduces inflammation and slows the turnover of skin cells that causes scaling. Hence, exposing damaged skin to sunlight is one of the initiative therapies for the disease.

Ultraviolet B (UVB) phototherapy:

UVB is a light with a small wavelength that is absorbed in skin's epidermis layer. UVB phototherapy may be used for a treatment of psoriasis. Controlled doses of UVB light from an artificial light source may improve mild to moderate psoriasis.

Psoralen and ultraviolet phototherapy (PUVA):

This therapy consist of oral or topical medication called psoralen alongwith exposure to ultraviolet A light. UVA has longer wavelength that penetrates deep into the skin than UVB. The skin has been made more sensitive to this light by psoralen. PUVA has been commonly used when more than 10% of skin is affected and has little side effects. It is ultraviolet light therapy used to treat eczema, plaque psoriasis **[136-140]**.

Nutritional Therapy:

To decrease effects of psoriasis, more water should be consumed. Numerous green vegetable should be taken to reduce the intensity of skin condition. Few foods can cause the disease to be avoided. E.g. coke, junk food, oily food meat, acidic food etc. Psoriasis affected those people who followed poor diet. Furmaric acid, fish oil, vit-D, folic acid have been found effective against psoriasis **[141, 142, 143]**.

Hydro therapy/ physical therapy

Hydro or water therapy has been used as alternative therapy for psoriasis in which the skin is supplied with humidity, heat and minerals. The use of warm water for bathing enhanced blood circulation. Water rich in sulphur and minerals has been used for bathing. To improve water therapy treating psoriasis, the patient were made to bathe in Dead Sea which is rich in salt and minerals and due to presence of ultraviolet light radiation, this was said to be perfect for sunbathing **[144]**.

Role of Nanotechnology in treating Psoriasis:

These are nano or sub nano structures which consists of synthetic or semi-synthetic polymers. Size of nano particles vary between 10-1000 nm. Nanotechnology has been used for initial stage or moderate stage of psoriasis. Different nanotechnology colloidal carriers like liposomes, niosomes, ethosomes, microspheres, micelles has been used for treating psoriasis **[145, 146]**.

Mind-Body Therapies

Meditation and Guided imagery

The role of stress as a trigger in psoriasis has been identified. This has get some researchers to figure out that decrease in stress by meditation, clinical therapy, relief techniques using guided imagery training

programs and hypnosis has decrease the natural and sensitive expression of the psoriasis **[147]**.

Methotrexate:

This is a popular anti-metabolite which is effective agent used in treating several types of psoriasis. It can be given orally, subcutaneously or intramuscularly. It represses the cells of immune system that because the psoriasis rashes, inflammation, pain, scales etc.

Cyclosporine:

It is a cyclic peptide and commonly used in organ transplantation as an immunoreppressant. It shows prohibit effect on t-cells and act on psoriasis. It should be limited for patients with severe psoriasis. When Cyclosporine is administered to psoriatic patients for more then 12-16 weeks, they showed rapid improvement. It should be given to that patient who is affected by plaque psoriasis, pustule psoriasis and nail psoriasis.

Acitretin:

It is an oral retinoid which acts by its anti-inflammatory action. It demonstrates good effect on combining with topical agents or light therapy in the treatment of pustular and erythrodermic type of psoriasis. It is the safest treatment for psoriasis **[148, 149, 150]**.

FUTURE CHALLENGES FOR HERBAL THERAPY FOR TREATMENT OF PSORIASIS:

The herbal sources are presently getting more reliable because of their safety and convenience. The major purpose of treating psoriasis is the activation of T-cell, negotiating of T-cells, anti cytokines and anti-irritating scheme. Anti-inflammatory and immunosuppressant effect has been capable to treat psoriasis. There are numerous future challenges which consist of the protecting and supervising of patient and biologic supervised of the ancient tradition, incurable irritation mediators. The specific cause identified for the initial production of TNF-α (Tumor necrosis factor-alpha) cytokines may also impact TNF-α production include HMG- B1 (High mobility group box 1), IL-15 (Interleukin 15) and IL-23 (Interleukin 23). Explanation of the main structure by which the disease is transferred from one generation to another is another facet of the analysis that must be researched to examine some more herbal drugs for the treatment of psoriasis.

CONCLUSION

Psoriasis is a chronic, recurrent autoimmune inflammatory skin disorders. Current understanding of this complicated disorder of skin has catalyzed the development of targeted biological analysis. This review maintains an understanding of

pathophysiology and scientific problem of psoriasis as well as treatments. Herbal or alternative therapy gives an option for boosting safety and capability in the management of psoriasis. This review will clearly confirm to be an exposure to the patients suffering from psoriasis as well as the medical practitioners, pharmacists, nurses and other persons related to giving and taking the treatment and the management of psoriasis and help them to identify the infection in a preferred way to take safe and beneficial treatment.

CONFLICT OF INTEREST: The authors have no conflicts of interests

REFERENCES

[1] Abdelbary AA, AbouGhaly MH. Design and optimization of topical methotrexate loaded niosomes for enhanced management of psoriasis: Application of Box-Behnken design, in-vitro evaluation and in-vivo skin deposition study. Int J Pharm. 2015; 485: 235- 43.

[2] Satyapal Singh, Rajendra Prasad, J. S. Tripathi and N.P. Rai, "Psoriasis an overview" Journal of Pharmaceutical Science (July 2015)

[3] Jain S. Dermatology: Illustrated Study Guide and Comprehensive Board Review. 2nd ed. Chicago. Springer: 2017.

[4] Menter A, Gottlieb A, Feldman SR, Van Voorhees AS, Leonardi CL, Gordon KB, *et al*., Guidelines of Care for the Management of Psoriasis and Psoriatic Arthritis: Section 1. Overview of Psoriasis and Guidelines of Care for the Treatment of Psoriasis with Biologics. Journal of the American Academy of Dermatology. 2008; 58: 826-50.

[5] Christophers E. Psoriasis- Epidemiology and Clinical Spectrum. Clinical and Experimental Dermatology. 2001; 26: 314-20.

[6] Shrivastav S, Sindhu R, Kumar S, Kumar P. Anti-Psoriatic and Phytochemical Evaluation of Thespesia Populnea Bark Extracts. International Journal of Pharmacy and Pharmaceutical Science. 2009; 1: 176-85.

[7] Lo K, Ho L. In Psoriasis: Handbook of Dermatology and Venereology. HongKong: Social Hygiene Service, Department of Health. 1997.

[8] Griffiths CE, Barker JN. Pathogenesis and Clinical Features of Psoriasis. The Lancet. 2007; 370: 263-71.

[9] Kuchekar AB, Pujari RR, Kuchekar SB, Dhole SN, Mule PM. Psoriasis: A Comprehensive Review. International Journal of Pharmacy & Life Sciences. 2011; 2: 857-887.

[10] Zhou Y, Wu H, Zhao M, Chang C, Lu Q. The Bach Family of Transcription Factors: A Comprehensive Review. Clinical Reviews in Allergy & Immunology. 2016; 50: 345-56.

[11] Walter LF GS. Histopathology of the skin. 3rd Ed. Massachusetts (NY): Lippincott Williams & Wilkins; 1981.

[12] Journal of the american academy of psoriasis, Alan Menter, MD, Chair , Alice Gottlieb, MD, PhD , Steven R. Feldman, MD, PhD , Abby S. Van Voorhees, MD , Craig L. Leonardi, MD, Kenneth B. Gordon, MD , Mark Lebwohl, MD , John Y.M. Koo, MD , Craig A. Elmets, MD , Neil J. Korman, MD, PhD , Karl R. Beutner, MD, PhD , Reva Bhushan, PhD,Guidelines of care for the management of psoriasis and psoriatic arthritis. http://www.jaad.org/article/S0190-9622%2808%2900273-9/fulltext#sec6

[13] National Psoriasis Foundation,NPF Staff, Psoriasis. https://www.psoriasis.org/about-psoriasis

[14] National Psoriasis Foundation, NPF Staff, Over the counter treatments. https://www.psoriasis.org/about-psoriasis/treatments/topicals/over-the-counter

[15] National Psoriasis Foundation, NPF Staff, Non-steroid treatments. https://www.psoriasis.org/ about-psoriasis/treatments/topicals/non-steroid

[16] National Psoriasis Foundation, NPF Staff, Inverse psoriasis. https://www.psoriasis.org/about-psoriasis/types/inverse

[17] Skinsight, Ramsey Markus, MD and Blanca Ochoa, MD http://www.skinsight.com/cosmetics/ phototherapy.htm?Imiw9cApl

[18] National Psoriasis Foundation, NPF Staff, Pustular. https://www.psoriasis.org/about-psoriasis/ types/pustular

[19] National Psoriasis Foundation, NPF Staff, Guttate. https://www.psoriasis.org/about-psoriasis/ types/guttate

[20] National Psoriasis Foundation, NPF Staff, Erythodermic.https://www.psoriasis.org /about- psoriasis/types/erythrodermic

[21] National Psoriasis Foundation, NPF Staff, Psoriasis causes. https://www.psoriasis.org/about-psoriasis/causes

[22] Ortonne J P. Recent Developments in the understanding of the pathogenesis of psoriasis. Br. J. Dermatol. 1999; 140 (54):1-7.

[23] Gordon-Elliott JS, Muskin PR. Managing the patient with psychiatric issues in dermatologic practice. Clin Dermatol. 2013; 31: 3– 10.

[24] Fraga NA, DE Oliveira Mde F, Follador I, Rocha Bde O, Rego VR. Psoriasis and uveitis: a literature review. An Bras Dermatol. 2012; 87: 877–83.

[25] Tarun Garg, Goutham Rath, Amit K. Goyal. Nanotechnological approaches

for the effective management of psoriasis. Artif Cells Nanomed Biotechnol. 2015; 1-9.

[26] Ouyang W (December 2010). "Distinct roles of IL-22 in human psoriasis and inflammatory bowel disease". Cytokine & Growth Factor Reviews. 21 (6): 435–41. doi:10.1016/j.cytogfr.2010.10.007. PMID 21106435.

[27] Parrish L. (2012). "Psoriasis: symptoms, treatments and its impact on quality of life". British Journal of Community Nursing. 17 (11): 524–528. *doi*:10.12968/bjcn.2012.17.11.524. PMID 23124421.

[28] Raychaudhuri SK, Maverakis E, Raychaudhuri SP (January 2014). "Diagnosis and classification of psoriasis". Autoimmunity Reviews. 13 (4–5): 490–5. *doi*:*10.1016/j.autrev.2014.01.008*. *PMID 24434359*.

[29] Palfreeman AC, McNamee KE, McCann FE (March 2013). *"New developments in the management of psoriasis and psoriatic arthritis: a focus on apremilast"*. Drug Design, Development and Therapy. 7: 201–210. *doi*:*10.2147/DDDT.S32713*. *PMC 3615921*. *PMID 23569359*.

[30] Cedeno-Laurent F, Gómez-Flores M, Mendez N, et al. (January 2011). "New insights into HIV-1-primary skin disorders". Journal of the International AIDS Society. 14 (5): 5. *doi*:*10.1186/1758-2652-14-5*. *PMC 3037296*. *PMID 21261982*.

[31] Nestle FO, Kaplan DH, Barker J (2009). "Psoriasis". New England Journal of Medicine. 361 (5): 496–509. doi:10.1056/NEJMra0804595. PMID 19641206

[32] Baliwag, Jaymie; Barnes, Drew H.; Johnston, Andrew (1 June 2015). *"Cytokines in psoriasis"*. Cytokine. Skin Disease, Immune Response and Cytokines. 73 (2): 342–350. *doi*:*10.1016/j.cyto.2014.12.014*. *PMC 4437803*. *PMID 25585875*.

[33] Roberson ED, Bowcock AM (September 2010). "Psoriasis genetics: breaking the barrier". *Trends in Genetics. 26 (9): 415–23.* doi:10.1016/j.tig.2010.06.006. PMC 2957827. PMID 20692714.

[34] Ramos-e-Silva M; Jacques Cd (May–June 2012). "Epidermal barrier function and systemic diseases". Clinics in Dermatology. 30 (3): 277–9. *doi*:*10.1016/j.clindermatol.2011.08.025* PMID *22507041*.

[35] Dombrowski Y, Schauber J (May 2012). "Cathelicidin LL-37: a defense molecule with a potential role in psoriasis pathogenesis". Experimental Dermatology. 21 (5): 327–30. *doi*:*10.1111/j.1600-625.2012.01459.x*. PMID *22509827*.

[36] Wong T, Hsu L, Liao W (January–February 2013). "Phototherapy in psoriasis: a review of mechanisms of action". Journal of Cutaneous Medicine and Surgery. 17 (1): 6–12. *doi*:*10.2310/7750.2012.11124*. *PMC 3736829*. *PMID 23364144*.

[37] Mudigonda P, Mudigonda T, Feneran AN, et al. (October 2012). "Interleukin-23 and interleukin-17: importance in pathogenesis and therapy of psoriasis". Dermatology Online Journal. 18 (10): 1. *PMID 23122008*. *Archived* from the original on 31 March 2016

[38] Weigle N, McBane S (May 2013). *"Psoriasis"*. American Family Physician. 87 (9): 626–33. *PMID 23668525*.

[39] Raychaudhuri SK, Maverakis E, Raychaudhuri SP (January 2014). "Diagnosis and classification of psoriasis". Autoimmunity Reviews. 13 (4–5): 490–5. *doi*:*10.1016/j.autrev.2014.01.008*. *PMID 24434359*.

[40] Johnson MA, Armstrong AW (2012). "Clinical and Histologic Diagnostic Guidelines for Psoriasis: A Critical Review". Clinical Reviews in Allergy & Immunology. 44 (2): 166–72. *doi*:*10.1007/s12016-012-8305-3*. *PMID 22278173*.

[41] Weller R, John AA Hunter, John S, Mark D. (2008). Clinical dermatology (4th ed.). Malden, MA: Blackwell. pp. 54–70. *ISBN 978-1-4443-0009-3*.

[42] Raychaudhuri SK, Maverakis E, Raychaudhuri SP (January 2014). "Diagnosis and classification of psoriasis". Autoimmunity Reviews. 13 (4–5): 490–5. *doi*:*10.1016/j.autrev.2014.01.008*. *PMID 24434359*.

[43] Kunz M, Ibrahim SM (2009). "Cytokines and cytokine profiles in human autoimmune diseases and animal models of autoimmunity". Mediators of Inflammation. 2009: 1–20. *doi*:*10.1155/2009/979258*. *PMC 2768824*. *PMID 19884985*.

[44] Charaka samhita Volume 2:Chapter 7(Chowkhamba Sanskrit Series January 1, 2009) 125

[45] A.K Nadkarni, Indian Materia Medica Volume One: Saussurea Lappa(Popular Prakashan 1976) 1108

[46] M Ashvini Kumar and Pujar Muralidhar, "CRITICAL APPRAISAL OF VIRECHANA KARMA IN PSORIASIS" International Journal of Research in Ayurveda and Pharmacy (October 2013). http://www.ijrap.net/admin/php/uploads/1070_pdf.pdf

[47] Charaka Samhita Volume 2:Chapter 7(Chowkhamba Sanskrit Series January 1, 2009) 126

[48] A.K Nadkarni, Indian Materia Medica Volume Two:Appendices(Popular Prakashan 1976)381

[49] Ashwin B. Kuchekar, Rohini R. Pujari, Shantanu B. Kuchekar, et al. Int.J of Pharm Life sci. 2011; 2(6): 857-77.

[50] Koo J, Arain S (1998) Traditional Chinese medicine for the treatment of dermatologic disorders. Arch Dermatol 1341388-1393.

[51] Saelee C, Thongrakard V, Pencomnao T (2011) Effects of high medicinal herb extract with anti-psoriatic activity on the expression of NF-KB signaling biomarkers in HaCaT keratinocytes. Molecules 16(5): 3908- 3932.

[52] Choonhakarn C, Busaracome P, Sripanidkulchai B, Sarakarn P (2010) A prospective, randomized clinical trial comparing topical Aloe vera with 0.1% triamcinolone acetonide in mild to moderate plaque psoriasis. J EurAcadDermatol Venereal 24(2): 168-172.

[53] Thiele JJ, Ekanayake-Mudiyanselage S.2007.Vitamin E in human skin: organ-specific physiology and considerations for its use in dermatology. Mol Aspects Med. 28:646-667.

[54] "Neem Baigen" Jiva Ayruveda. Archived from the original on 9 July 2014.

[55] S. Zillur Rahman and M. shamim Jairajpuri. Neem in Unani Medicine. Neem Research and Development Society of Pesticide Science, India, New Delhi, February 1993, p. 208-219. Edited by N.S. Randhawa and B.S. Parmar. 2nd revised edition (chapter21), 1996.

[56] Bernstein JE, Parish LC, Rapaport M, Rosenbaum MM, Roenigk HH (1986) Effects of topically applied capsaicin on moderate and severe psoriasis vulgaris. J Am Acad Dermatol . 15(3): 504-507.

[57] Brown DJ, Dattner AM (1998) Medical journal article on herbs for common skin conditions. Arch dermatol 134:1401-1404.

[58] Roopashree TS, Dang R, Shobha Rani RH, Narendra C (2008) Antibacterial activity of anti-psoriatic herbs: Cassia tora, Momordicacharantia and Calendula officinalis. International Journal of Applied Research in Natural Products 1(3): 20-28.

[59] Mohd. Danish, Pradeep Singh, Garima Mishra, Shruti Srivastava, K.K. Jha, R.L. Khosa. Cassia fistula Linn. (Amulthus)- An Important Medicinal Plant: A Review of its Traditional Uses, Photochemistry and Pharmacological Properties J. Nat. Prod. Plant Resour, 2011; 1(1): 101-118.

[60] Muhammad asif hanif, Haq Nawaz Bhatti, Raziya Nadeen, Khalid

mahamood zia, Muhammad asif Ali. Cassia Fistula (golden shower): A multipurpose ornamental tree. Floriculture and ornamental biotechnology, 2007;1(1): 20-26.

[61] Menter A, Gottlieb A, Feldman SR, Van Voorhees AS, Leonardi CL, et al. (2008) Guidelines of care for the management of psoriasis and psoriatic arthritis: Section 1. Overview of psoriasis and guidelines of care for the treatment of psoriasis with biologics, J Am Acad Dermatol 58(5); 826-850.

[62] Singhal M, NirajKansara N (2012) Cassia tora L Creams Inhibit Psoriasis in Mouse Tail Model Pharmaceutical Crops. 3: 1-6.

[63] Barygina V, Becatti M, Soldi G, et al. Altered redox status in the blood of psoriatic patients:involvement of NADPH oxidase and role of anti-TNF-αtherapy. Redox Rep. 2013; 18(3): 100–6. https://doi.org/10.1179/1351000213Y.0000000045 PMid: 23601139. [PMC free article] [PubMed] [Google Scholar]

[64] 64. Reddy S, Aggarwal BB. Curcumin is a non - ompetitive and selective inhibitor of phosphorylase kinase. FEBS Lett. 1994; 341(1): 19–22. https://doi.org/10.1016/0014-5793 (94) 80232-7. [PubMed] [Google Scholar]

[65] Heng MC, Song MK, Harker J, et al. Drug-induced suppression of phosphorylase kinase activity correlates with resolution of psoriasis as assessed by clinical, histological and immunohistochemical parameters. Br J Dermatol. 2000; 143(5): 937–49. https://doi.org/10.1046/j.1365-2133.2000.03767.x PMid:11069500. [PubMed] [Google Scholar]

[66] Varma SR, Sivaprakasam TO, Mishra A, et al. Imiquimod-induced psoriasis-like inflammation in differentiated Human keratinocytes:Its evaluation using curcumin. Eyr J Pharmacol. 2017; 813: 33–41. https://doi.org/10.1016/j.ejphar.2017.07.040 PMID: 28736282. [PubMed] [Google Scholar]

[67] Sampson JH, Raman A, Karlsen G, Navsaria H, Leigh IM (2001) In vitro keratinocyte antiproliferant effect of Centellaasiatica extract and triterpenoid saponins. Phytomedicine 8(3): 230-235.

[68] Vijayalakshmi A, Ravichandiran V, Masilamani K (2014) Anti-Psoriatic Activity of Flavonoids from the Bark of Givotiarottleriformis, Iranian journal of Pharmaceutical Sciences 10 (3): 81-94.

[69] Kirtikar KR, Basu BD In: Indian Medicinal Plants, Vol. 111, Deharadun: Lalit Mohan Basu, p: 2019.1991.

[70] Murti K, Panchal MA, Gajera V, Solanki J (2012) Pharmacological properties of Matricariarecutita: A review. Pharmacologia 3: 348-351.

[71] Roopashree TS, Dang R, Shobha Rani RH, Narendra C (2008) Antibacterial activity of anti-psoriatic herbs: Cassia tora, Momordicacharantia and Calendula officinalis. International Journal of Applied Research in Natural Products 1 (3): 20-28

[72] Brown DJ, Dattner AM (1998) Medical journal article on herbs for common skin conditions. Arch dermatol 134: 1401-1404.

[73] Zahra A, Mohammed A, Mohammed HK (2000) Evaluation of immunomodulatory effects of five herbal plants. J Ethanopharmacol 72 (1-2): 167-172.

[74] Chun H, Shin DH, Hong BS, Cho WD, Cho HY, et al. (2002) Biochemical properties of polysaccharides from black pepper. Biol Pharm Bull 25(9): 1203-1208.

[75] Ghosheh OA, Houdi AA, Crooks PA (1999) High performance liquid chromatographic analysis of the pharmacologically active quinones and related compounds in the oil of the black seed (*Nigella sativa L.*). J Pharm Biomed Anal 19(5): 757-762.

[76] Dwarampudi LP, Palaniswamy D, Nithyanantham M, Raghu PS (2012) Anti-psoriatic activity and cytotoxicity of ethanolic extract of Nigella sativa seed. Pharmacogn Mag 8(32): 268-272.

[77] Kotiyal JP, Sharma D (1992) Phytochemical studies of Psoralea species. Bulletin of Medico-Ethnobotanical Research 13: 209-223.

[78] Ashish M and Sunitha P. Anticonvulsant study of Pongamia pinnata Linn against pentylenetetrazole induced convulsion in rats. Int J Pharma and Biosciences. 2010; 1(2): 1-4.

[79] Ghosh A, Mandal S, Banerji A, Kar M, Hazra K, Benerji J. A novel biflavonyloxymethoane from Pongamia pinnata and its radical quenching activity. Punmed. 2011; 6(5): 635-6.

[80] Srinivasan K, Muruganandan S, Lal J, Chandra S, Tandan SK, *et al*. (2001) Evaluation of anti-inflammatory activity of Pongamiapinnata leaves in rats. J Ethnopharmacol 78(2-3): 151–157.

[81] Chopade VV, Tankar AN, Pande VV, Tekade AR, Gowekar NM, et al. (2008) Pongamiapinnata: Phytochemical constituents, traditional uses and pharmacological properties: A review. Int J Green Pharm 2(2): 72- 75.

[82] Karodi R, Jadhav M, Rub R, Bafna A (2009) Evaluation of the wound healing activity of a crude extract of Rubia cordifolia L. (Indian madder) in mice in Mice. International Journal of Applied Research in Natural Products. 2(2): 12-18.

[83] Vijayalakshmi A, Ravichandiran V, Malarkodi V, Nirmala S, Anusha M, et al. (2013) Anti-Psoriatic Activity of Smilax china Linn. Rhizome, Ind J Pharm Edu Res 47(1): 82-89.

[84] Sabir S, Arsshad M, Asif S, Chaudhari SK (2014) An insight into medicinal and therapeutic potential of Silybummarianum (L.) Gaertn. Int J Biosci 4(11): 104-115.

[85] Anusharaj, Chandrashekar R, Prabhakar Adake, SN Rao, Santanusaha. Wrightia tinctoria; an overview. Journal of Drug Delivery & Therapeutic, 2013; 3(2): 196-198.

[86] A. John De Britto and Steena Roshan Sebastian. Phytochemical evaluation and invitro antibacterial screening of *Wrightia tinctoria* (roxb.) R. Br. Against enteric pathogens. IJPCBS, 2013; 3(2): 210-214.

[87] Shaikh G, Ali S, Talmale S, Surwase US (2012) Alternative Medicine For Psoriasis –Natural Herbal Ayurvedic Treatment – A Review. Int J Ayu Herb Med 2: 455-463. Link: http://bit.ly/2CAPbhI

[88] Kumar A (2016) Fight Psoriasis Naturally Through Ayurveda. 6: 2231-6876. Link: http://bit.ly/34XxpBe

[89] Duke JA. CRC Handbook of Medicinal Herbs. Boca Raton, FL: CRC Press 1985; 31-32.

[90] Surh YJ, Han SS, Keum YS, Seo HJ, Lee SS. Inhibitory effects of curcumin and capsaicin on phorbol ester-induced activation of eukaryotic transcription factors, NF-KappaB and AP-1. Biofactors.2000;12:107-112. [PubMed]

[91] Bernstein JE, Parish LC, Rapaport M, Rosenbaum MM, Roenigk HH. Effects of topically applied capsaicin on moderate and secere psoriasis vulgaris. J Am Acad Dermatol. 1986;15:504-507. [PubMed]

[92] Ellis CN, Berberian B, Sulica VI, Dodd WA, Jarratt MT, Katz HI, Prawer S, Krueger G, Rex IH, Wolf JE. A double-blind evaluation of topical capsaicin in pruritic psoriasis. *J Am Acad Dermatol*. 1993;29:438-442. [PubMed] [DOI]

[93] Ichihashi M, Ahmed NU, Budiyanto A, Wu A, Bito T, Ueda M, Osawa T. Preventive effect of antioxidant on ultraviolet- induced skin cancer in mice. J Dermatol Sci. 2000;23 Suppl 1:S45-S50.

[94] Balasubramanian S, Efimova T, Eckert RL. Green tea polyphenol stimulates a Ras, MEKK1, MEK3, and p38 cascade to increase activator protein 1 factor-dependent involucrin gene expression in normal human keratinocytes. J Biol Chem. 2002;277: 1828-1836.

[95] Bikle DD, Ng D, Tu CL, Oda Y, Xie Z. Calcium- and vitamin D-regulated

keratinocyte differentiation. *Mol Cell Endocrinol*. 2001;**177**:161-171. [PubMed] [DOI]

[96] Bollinger Bollag W, Bollag RJ. 1,25-Dihydroxyvitamin D(3), phospholipase D and protein kinase C in keratinocyte differentiation. *Mol Cell Endocrinol*. 2001; **177**: 173-182. [PubMed] [DOI]

[97] Nickoloff BJ, Qin JZ, Chaturvedi V, Bacon P, Panella J, Denning MF. Life and death signaling pathways contributing to skin cancer. *J Investig Dermatol Symp Proc*. 2002;**7**:27-35. [PubMed] [DOI]

[98] Lippens S, Kockx M, Knaapen M, Mortier L, Polakowska R, Verheyen A, Garmyn M, Zwijsen A, Formstecher P, Huylebroeck D. Epidermal differentiation does not involve the pro-apoptotic executioner caspases, but is associated with caspase-14 induction and processing. *Cell Death Differ*. 2000; **7**: 1218-1224. [PubMed]

[99] Madison KC. Barrier function of the skin: "la raison d'être" of the epidermis. *J Invest Dermatol*. 2003; **121**: 231-241. [PubMed] [DOI]

[100] Zhao JF, Zhang YJ, Jin XH, Athar M, Santella RM, Bickers DR, Wang ZY. Green tea protects against psoralen plus ultraviolet A-induced photochemical damage to skin. *J Invest Dermatol*. 1999; **113**: 1070-1075. [PubMed]

[101] Ahmad M, Srinivasula SM, Hegde R, Mukattash R, Fernandes-Alnemri T, Alnemri ES. Identification and characterization of murine caspase-14, a new member of the caspase family. *Cancer Res*. 1998; **58**: 5201-5205. [PubMed]

[102] Pistritto G, Jost M, Srinivasula SM, Baffa R, Poyet JL, Kari C, Lazebnik Y, Rodeck U, Alnemri ES. Expression and transcriptional regulation of caspase-14 in simple and complex epithelia. *Cell Death Differ*. 2002; **9**: 995-1006. [PubMed] [DOI]

[103] Eckhart L, Ban J, Fischer H, Tschachler E. Caspase-14: analysis of gene structure and mRNA expression during keratinocyte differentiation. *Biochem Biophys Res Commun*. 2000; **277**: 655-659. [PubMed] [DOI]

[104] Rendl M, Ban J, Mrass P, Mayer C, Lengauer B, Eckhart L, Declerq W, Tschachler E. Caspase-14 expression by epidermal keratinocytes is regulated by retinoids in a differentiation-associated manner. *J Invest Dermatol*. 2002; **119**: 1150-1155. [PubMed] [DOI]

[105] Lippens S, Vanden Broecke C, Van Damme E, Tschachler E, Vandenabeele

P, Declercq W. Caspase-14 is expressed in the epidermis, the choroid plexus, the retinal pigment epithelium and thymic Hassall's bodies. *Cell Death Differ*. 2003; **10**: 257-259. [PubMed] [DOI]

[106] Hsu S, Yamamoto T, Borke J, Walsh DS, Singh B, Rao S, Takaaki K, Nah-Do N, Lapp C, Lapp D. Green tea polyphenol - induced epidermal keratinocyte differentiation is associated with coordinated expression of p57 / KIP2 and caspase 14. *J Pharmacol Exp Ther*. 2005; **312**: 884-890. [PubMed] [DOI]

[107] Walsh DS, Borke JL, Singh BB, Do NN, Hsu SD, Balagon MV, Abalos RM. Psoriasis is characterized by altered epidermal expression of caspase 14, a novel regulator of keratinocyte terminal differentiation and barrier formation. *J Dermatol Sci*. 2005; **37**: 61-63. [PubMed] [DOI]

[108] Hsu S, Lewis JB, Borke JL, Singh B, Dickinson DP, Caughman GB, Athar M, Drake L, Aiken AC, Huynh CT. Chemopreventive effects of green tea polyphenols correlate with reversible induction of p57 expression. *Anticancer Res*. 2003; **21**: 3743-3748. [PubMed]

[109] Hsu S, Bollag WB, Lewis J, Huang Q, Singh B, Sharawy M, Yamamoto T, Schuster G. Green tea polyphenols induce differentiation and proliferation in epidermal keratinocytes. *J Pharmacol Exp Ther*. 2003; **306**: 29-34. [PubMed] [DOI]

[110] Wei H, Zhang X, Zhao JF, Wang ZY, BickersD, LebwohlM. Scavengin g of hydrogen peroxide and inhibition of ultraviolet light-induced oxidative DNA damage by aqueous extracts from green and black teas. *Free Radic Biol Med*. 1999; **26**: 1427-1435. [PubMed] [DOI]

[111] Proniuk S, Liederer BM, Blanchard J. Preformulation study of epigallocatechin gallate, a promising antioxidant for topical skin cancer prevention. *J Pharm Sci*. 2002; **91**: 111-116. [PubMed] [DOI]

[112] Chopra RN, Naayar SL, Chopra IC Glossary of Indian Medicinal Plants. New Delhi, India: Council of Scientific and Industrial Research. 1956.

[113] Kirtikar KR, Basu BD Indian Medicinal Plants. Allahabad, India: Lalit Mohan Basu Publication, 1935.

[114] Sharma HK, Chhangte L, Dolui AK (2001). Traditional medicinal plants in Mizoram, India. Fitoterapia, 72: 146-161.

[115] Sushil K. Chouhan HS, Sahu AN, Narayan G.Singh (2015)Assessment

of in vitro antipsoriatic activity of selected Indian medicinal plants Pharmaceutical Biology Volume 53, Issue 9, pages 1295-1301.

[116] V. Subhose. Srinivas, and A. Narayana, "Basic principles of pharmaceutical science in Ayurveda,'' Bulletin of the Indian Institute of History of Medicine, vol.35, no.2, pp. 83-92, 2005.

[117] E. L. Cooper, "CAM, eCAM, bioprospecting: the 21st century pyramid," Evidence based Complementary and Alternative Medicine, vol.2, no. 2, pp. 125-127, 2005.

[118] H. Gavaghan, "Koop may set up new centre for alternative medicine," Nature, vol.370, no. 6491, p.591, 1994.

[119] Van Weelden H, De La Faille HB, Young E, Van der Leun IC (1988) A new development in UVB phototherapy of psoriasis. Br J Dermatol 119: 11-19.

[120] Green C, Ferguson J, Lakshmipathi T, Johnson BE (1988) 311? nm UVB phototherapy—an effective treatment for psoriasis. Br J Dermatol 119: 691–696PubMedCrossRefGoogle Scholar

[121] Picot E, Meunier L, Picot-Debeze MC, Peyron JL, Meynadier J (1992) Treatment of psoriasis with a 311-nm UVB lamp. Br J Dermatol 127: 509–512PubMedCrossRefGoogle Scholar

[122] Van Weelden H, Baart de la Faille H, Young E, Van der Leun JC (1990) Comparison of narrow-band UV-B phototherapy and PUVA photochemotherapy in the treatment of psoriasis. Acta Derm Venereol 70: 212–215PubMedGoogle Scholar

[123] Tanew A, Radakovic-Fijan S, Schemper M, Hönigsmann H (1999) Paired comparison study on narrow-band (TL-01) UVB phototherapy versus photochemotherapy (PUVA) in the treatment of chronic plaque type psoriasis. Arch Dermatol 135: 519–524, PubMedCrossRefGoogle Scholar

[124] Goeckerman, W.H. (1925). "The treatment of psoriasis". Northwest Med. 24: 229-231.

[125] Menter, Alan; Cram, David L. (July 1983). "The Goeckerman regimen in two psoriasis day care centers". Journal of the American Academy of Dermatology. 9(1): 59-65.

[126] Hönigsmann H, Szeimies RF, Knobler R *et al* (1999) Photo-chemotherapy and photodynamic therapy. In: Freedberg IM, Eisen AZ, Wolff K, Austen KF, Goldsmith LA, Katz SI (eds) Fitzpatrick's dermatology in general medicine, 5th

edn. McGraw-Hill, New York, pp 2880–2900, Google Scholar

[127] Beggs S, Short J, Rengifo-Pardo M, Ehrlich A. Applications of the excimer laser: a review. Dermatol Surg. 2015; 41(11): 1201-1211. [PubMed] [Google Scholar]

[128] Mehraban S, Feily A. 308 nm excimer laser in dermatology. J Lasers Med Sci. 2014; 5:8-12. [PMC free article] [PubMed] [Google Scholar]

[129] Karsai S, Roos S, Hammes S, Raulin C (2007) Pulsed dye laser: what's new in non vascular lesions? J Eur Acad Dermatol Venereol 21 (7): 877-890.

[130] Erceg A, de Jong EM, van de Kerkhof PC, Seyger MM(2013) The efficacy of pulsed dye laser treatment for inflammatory skin diseases: a systematic review. J Am Acad Dermatol 69(4): 609-615.

[131] Chung H, Dai T, Sharma SK, Huang YL, Carroll JD, Hamblin MR (2012) The nuts and bolts of low-level laser (light) therapy. Ann Biomed Eng 40(2): 516-533.

[132] Avci P, Gupta A, Sadasivam M, Vecchio MR (2013) Low-Level Laser (light) therapy (LLLT) in skin: stimulating, healing, restoring. SeminCutan Med Surg 32(1): 41-52.

[133] Pfaff S, Liebmann J, Born M, Merk HF, von Felbert V (2015) Prospective randomized long-term study on the efficacy and safety of UV- free blue light for treating mild psoriasis vulgaris. Dermatology 231(1): 24-34.

[134] Keyal U, Bhatta AK, Wang XL (2016) Photodyamic therapy for the treatment of different severity of acne: a systematic review. Photodiagn Photodyn ther 14: 191-199.

[135] Kim M, Jung HY, Park HJ (2015) Topical PDT in treatment of benign skin diseases: principles and new applications. Int J Mol Sci 16(10): 23259-23278.

[136] Shaikh G, Ali S, Talmale S, Surwase US (2012) Alternative Medicine For Psoriasis –Natural Herbal Ayurvedic Treatment – A Review. Int J Ayu Herb Med 2: 455-463. Link: http://bit.ly/2CAPbhI

[137] Gopalani V (2004) Psoriasis Websites. Indian J Dermatol Venereol Leprol 70: 57- 58.

[138] Rai R, Srinivas CR (2007) Phototherapy: An Indian perceptive, Indian J Dermatol 52: 69-175.

[139] Chavan RG, Joshi R, Khopkar SU, Phadke AV, Wadhwa SL (1998) Photochemotherapy for Widespread Psoriasis. Indian J Dermatol 43: 105-107. Link: http://bit.ly/2q7HkFF

[140] Sharma RP, Keshari M, Sahay S (2005) Topical Therapies in Plaque Psoriasis: A Randomized Comparative

Study, Indian J Dermatol 50: 68-71. Link: http://bit.ly/34VxN3i

[141] Ashwin B. Kuchekar, Rohini R. Pujari, Shantanu B. Kuchekar, *et al*. Int.J of Pharm Life sci. 2011; 2(6): 857-77.

[142] Calder PC. n-3 polyunsaturated fatty acids, inflammation, and inflammatory diseases. Am J Clin Nutr. 2006; 83(6): 1505S-1519S.

[143] Calder P C. Polynsaturated fatty acids, inflammation and immunity. Lipids. 2001; 36:1007-1024.

[144] Gazi Shaikh, Sadath Ali, S Y Talmale, Ulhas.S.Surwase, Kadam Bhalchandra, Shaikh Luqman. Alternative Medicine for Psoriasis – Natural Herbal Ayurvedic Treatment-A Review. IJAHM. 2012; 2(3): 455-63

[145] 145. Garg T. 2014. Current nanotechnogical approaches for an effective delivery of bio- active drug molecules in the treatments of acne. Artif Cells Nanomed Biotechnol. 1-8. [Google Scholar]

[146] Garg T. Goyal AK. 2012. Iontrophoresis: Drug Delivery System by Applying an Electrical Potential Across the skin. Drug deliv Lett. 2: 270-280. [Crossref], [Google Scholar]

[147] Farber EM, Nall L. Psoriasis: a stress-related disease.Cutis. 1993; 51(5): 322-326.

[148] Fraga NA, DE Oliveira Mde F, Follador I, Rocha Bde O, Rego VR. Psoriasis and uveitis: a literature review. An Bras Dermatol. 2012; 87: 877–83.

[149] Ashwin B. Kuchekar, Rohini R. Pujari, Shantanu B. Kuchekar, et al. Int.J of Pharm Life sci. 2011; 2(6): 857-77.

[150] Hwang GC, Lin AY, Chen W, Sharpe RJ. Development and optimization of a methotrexate topical formulation. Drug Dev Ind Pharm. 1995; 21: 1941–52.