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Plants used to treat skin diseases

Nahida Tabassum and Mariya Hamdani

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Abstract

Skin diseases are numerous and a frequently occurring health problem affecting all ages from the neonates to the elderly and cause harm in number of ways. Maintaining healthy skin is important for a healthy body. Many people may develop skin diseases that affect the skin, including cancer, herpes and cellulitis. Some wild plants and their parts are frequently used to treat these diseases. The use of plants is as old as the mankind. Natural treatment is cheap and claimed to be safe. It is also suitable raw material for production of new synthetic agents. A review of some plants for the treatment of skin diseases is provided that summarizes the recent technical advancements that have taken place in this area during the past 17 years.

Keywords: Ethnomedicine, herbs, medicinal plants, skin diseases

INTRODUCTION

Human skin, the outer covering of the body, is the largest organ in the body. It also constitutes the first line of defense. Skin contains many specialized cells and structures. It is divided into three main layers viz. epidermis, dermis and hypodermis. Each layer provides a distinct role in the overall function of the skin. Epidermis, the outer most layer of the skin, varies in thickness in different regions of the body. It is the thinnest on the eyelids (0.05 mm) and the thickest on the palms and soles (1.5 mm). The dermis also varies in thickness depending on the location of the skin. It is 0.3 mm on the eyelid and 3.0 mm on the back of the body. The dermis is attached to an underlying hypodermis or subcutaneous connective tissue. The subcutaneous tissue is a layer of fat and connective tissue that houses larger blood vessels and nerves. This layer is important in the regulation of temperature of the skin itself and the body. The size of this layer varies throughout the body and from person-to-person. Hair follicles, sweat glands and sebaceous glands are the main skin appendages.

The skin guards the underlying muscles, bones, ligaments and internal organs. There are two general types of skin, hairy and glabrous skin.[1] However, the skin can be dry, sensitive, pale, sagging or tired. People deficient in essential nutrients such as beta-carotene, the B complex vitamins and vitamins C and E often suffer from the drying of the skin.

FUNCTIONS OF SKIN

Because it interfaces with the environment, skin plays a key role in protecting (the body) against pathogens.[2,3] and excessive water loss.[3] Its other functions are insulation, temperature regulation, sensation, storage and synthesis of vitamin D by action of ultraviolet (UV) and the protection of vitamin B folates, absorption of oxygen and drugs[4] and water resistance.[5] Severely damaged skin will try to heal by forming scar tissue. This is often discolored and depigmented.

COMMON SKIN PROBLEMS

Skin disease is a common ailment and it affects all ages from the neonate to the elderly and cause harm in number of ways.[1] There are more than a thousand conditions that may affect the skin but most skin diseases can be categorized into nine common types.[6]

Rashes

A rash is an area of red, inflamed skin or a group of individual spots. These can be caused by irritation, allergy, infection, an underlying disease, as well as by structural defects for example, blocked pores or malfunctioning oil glands. Examples of rashes include acne, dermatitis, eczema, hives, pityriasis rosea and psorasis.

Viral infections

These occur when a virus penetrates the stratum corneum and infects the inner layers of the skin. Examples of viral skin infections include herpes simplex, shingles (herpes zoster) and warts. Some systemic viral infections, such as chicken pox and measles, may also affect the skin. Viral infections cannot be cured with antibiotics.

Bacterial infections

Such infections are caused by a variety of bacteria, the most common types being staphylococci and streptococci. Bacteria may infect the topmost layers of skin, the follicles, or the deeper layers of skin. If not treated correctly, these infections may spread throughout the body. Examples include impel folliculitis, cellulitis and lyme disease. Bacterial infections are better treated with antibiotics.

Fungal infections

Harmless fungi are always present on surface of the skin. Infection occurs when these organisms enter into the body. These infections are usually superficial, affecting the skin, hair, nails and include athlete's foot, lock itch and ringworm. However, in people with suppressed immune system or who have been taking antibiotics for long period -, the fungi may spread to deep within the body, causing more serious disease.

Parasitic infections

These infections occur after exposure to parasites such as lice and scabies.

Pigmentation disorders

The amount of pigment in the skin is determined by the amount of melanin being produced by the body. Loss of pigment (hypo pigmentation) can be caused by absence of melanocytes, malfunctioning cells, exposure to cold or chemicals, or some types of infection. An increase in pigment (hyperpigmentation) may be caused by skin irritation, hormonal changes, aging, a metabolic disorder, or any other underlying problem. Age spots, freckles and melasma are examples of hyper pigmentation. Vitiligo is an example of hypo pigmentation.

Tumors and cancers

These growths arise when skin cells begin to multiply faster than normal. Not every skin growth is cancerous. Some tumors are harmless and will not spread. Skin cancer is the most common of all the cancers, affecting 800,000 Americans each year. It is caused, in 90% of cases, by sun exposure. The three types of skin cancers are basal cell cancer (the most curable), squamous cell cancer (which may grow and spread) and malignant melanoma (the most deadly form). Prevention involves protecting the skin against damaging ultraviolet rays. Early detection helps to improve the chances of a cure. Regular self-examinations are, therefore, recommended.

Trauma

Trauma describes an injury to the skin caused by a blow, a cut, or a burn. Whenever the surface of the skin is broken, the body becomes more susceptible to infection and disease.

Other conditions

Wrinkles, rosacea, spider veins and varicose veins are among those conditions that cannot be neatly categorized. Wrinkles are caused by a breakdown of the collagen and elastin within the dermis, which results in sagging skin. Rosacea is a chronic disorder in which the skin of the face becomes red and develops pimples, lesions and more rarely enlargement of the nose. Its cause is unknown. Spider veins and varicose veins become apparent when blood vessels enlarge and become visible through the surface of the skin.

CONVENTIONAL TREATMENT OF SKIN DISEASES

The common medications for topical use include[7]:

1. Antibacterials: These medicines, like bactroban or cleocin, are often used to treat or prevent infection
2. Anthralin (drithocreme, micanol and others): Although not often used, these help to reduce inflammation and can help treat psoriasis
3. Antifungal agents: Lamisil, lotrimin and nizoral are few examples of common topical antifungal drugs used to treat skin conditions such as ringworm and athlete's foot
4. Benzoyl peroxide: Creams and other products containing benzoyl peroxide are used to treat acne
5. Coal tar: This topical treatment is available with and without a prescription, in strengths ranging from 0.5% to 5%. Coal tar is used to treat conditions including seborrheic dermatitis (usually in shampoos) or psoriasis. Currently, coal tar is seldom used because it can be slow acting and can cause severe staining of personal clothing and bedding
6. Corticosteroids: These are used to treat skin conditions including eczema and come in many forms including foams, lotions, ointments and creams
7. Retinoids: These medications (such as retin-A and tazorac) are gels or creams derived from vitamin A and are used to treat conditions including acne
8. Salicylic acid: This medication is available in the form of lotions, gels, soaps, shampoos and patches. It should be used sparingly as putting too much on one's body at once can cause toxicity. Salicylic acid is the active ingredient in many skin care products for the treatment of acne and warts.

Oral treatments for skin conditions include:

1. Antibiotics: Oral antibiotics like erythromycin, tetracycline and dicloxacillin are used to treat many skin conditions
2. Antifungal agents: Common oral antifungal drugs such as ketoconaole and diflucan can be used to treat more severe fungal infections
3. Antiviral agents: Common antiviral agents include valtrex, acyclovir and famavir. Antiviral treatments are used for skin conditions including those related to herpes
4. Corticosteroids: These medications, including prednisone can be helpful in treating skin conditions linked to autoimmune diseases including vasculitis and inflammatory diseases such as eczema and psoriasis. Dermatologists prefer topical steroids to avoid side-effects; however, short-term use of prednisone is sometimes necessary
5. Immunosuppressants: Immunosuppressants, such as azathioprine and methotrexate, can be used to treat conditions including severe cases of psoriasis and eczema
6. Biologics: These new therapies are the latest methods being utilized to treat psoriasis and other conditions. Examples of biologics include enbrel, humira, remicade, stelara and amevive.

HERBAL DRUGS FOR SKIN DISEASES

Natural drugs from the plants are gaining popularity because of several advantages such as often having fewer side-effects, better patient tolerance, being relatively less expensive and acceptable due to a long history of use. Besides herbal medicines provide rational means for the treatment of many diseases that are obstinate and incurable in other systems of medicine. For these reasons several plants have been investigated for treatment of skin diseases ranging from itching to skin cancer. So far 31 plants have been reported to be effective in various skin diseases during the past 17 years (1995-2012) of research work, which are mentioned below.

Achyranthes aspera (Common name: Prickly chaff flower, Devil's horsewhip; Family: Amaranthaceae)

Traditionally, the plant is used in boils, scabies and eruptions of skin and other skin diseases. The MeOH extract, alkaloid, non-alkaloid and saponin fractions obtained from the leaves of *A. aspera* exhibited significant inhibitory effects (concentration 100 μg) on the Epstein-Barr virus early antigen (EBV-EA) activation induced by the tumor promotor 12-O-tetradecanoylphorbol-13-acetate (TPA) in Raji cells. In this *in vitro* assay the non-alkaloid fraction containing mainly non-polar compounds showed the most significant inhibitory activity (96.9%; 60% viability). In the *in vivo* two-stage mouse skin carcinogenesis test the total methanolic extract possessed a pronounced ant carcinogenic effect (76%). The results revealed that leaf extract and the non-alkaloid fraction are valuable antitumor promotors in carcinogenesis.[8]

Allium cepa (Common name: Onion; Family: Liliacea)

A study undertaken in patients with seborrheic keratoses to evaluate the ability of onion extract gel to improve the appearance of scars following excision, has shown that this extract gel improved scar softness, redness, texture and global appearance at the excision site at study weeks 4, 6 and 10 as assessed by the blinded investigator.[9]

In another study, the antifungal activity of aqueous extracts prepared from *A. cepa* (onion; AOE) and *Allium sativum* (garlic; AGE) were evaluated against *Malassezia furfur* (25 strains), *Candida albicans* (18 strains), other *Candida* sp. (12 strains) as well as 35 strains of various dermatophyte species. The results indicated that onion and garlic might be promising in treatment of fungal-associated diseases from important pathogenic genera like *Candida*, *Malassezia* and the dermatophytes.[10]

A. sativum (Common name: Garlic; Family: Liliaceae)

In a study conducted on Swiss albino mice in whom cancer was induced by 7,12-dimethylbenz(a)anthracene (DMBA) revealed that best chemo preventive action of garlic was observed in mice in which garlic treatment was performed before and after the induction of skin carcinogenesis. Garlic ingestion delayed formation of skin papillomas in animals and simultaneously decreased the size and number of papillomas, which was also reflected in the skin histology of the treated mice. The protective effect against skin cancer elicited by garlic in mice is believed to be due at least in part to the induction of cellular defense systems.[11]

Aloe vera (Common name: Barbados aloe; Family: Xanthorrhoeaceae)

Aloe vera has shown very good results in skin diseases and it is often taken as health drink. It is also found effective in treating wrinkles, stretch marks and pigmentations. It also seems to be able to speed wound healing by improving blood circulation through the area and preventing cell death around a wound. One of the studies conducted on mice to investigate the effects of *Scutellariae radix* and *Aloe vera* gel (AV), in spontaneous atopic dermatitis (AD)-like skin lesions revealed that the group receiving only AV in a dose of 0.8 mg/kg p.o provided relief in AD due to reduction of interleukin (IL)-5 and IL-10 levels.[12]

The gel has properties that are harmful to certain types of bacteria and fungi. A cream containing 0.5% aloe for 4 weeks reduced the skin "plaques" associated with psoriasis.[13] Application of gel helped in the improvement of partial thickness burns.[14] When applied to the skin, the gel seems to help skin survive frostbite injury.[15] It might delay the appearance of skin damage during and after radiation treatment.[16]

Azadirachta indica (Common name: Neem; Family: Meliaceae)

Leaf extract is applied externally on boils and blisters.[17] In one study, skin tumors were induced in mice by topical application of DMBA (500 nmol/100 μl for 2 weeks) followed by TPA (1.7 nmol/100 μl of acetone, twice weekly) as a promoter. The test group received aqueous *Azadirachta indica* leaf extract (AAILE) orally at a dose level of 300 mg/kg body weight three times a week for 20 weeks. The results of this study revealed the chemopreventive potential of *A. indica* against murine skin carcinogenesis.[18]

Study designed to determine the modulatory effect of aqueous AAILE on cell cycle-associated proteins during two-stage skin carcinogenesis in mice in which skin tumors were induced by topical application of DMBA as a carcinogen followed by the repetitive application of TPA as a promoter. Skin tumors obtained in the DMBA/TPA group exhibited enhanced expression of proliferating cell nuclear antigen (PCNA, index of proliferation), p21 and cyclin D1, with no alterations in p53 expression in comparison to the control group. Tumors in AAILE + DMBA/TPA group exhibited low PCNA and cyclin D1 expression and enhanced expression of p53 and p21 in comparison to the DMBA/TPA group. The skin tumors obtained in the AAILE + DMBA/TPA group exhibited high lipid peroxidation levels in comparison to the tumors obtained in the DMBA/TPA group. The observations of the study suggested that AAILE behaves as a pro-oxidant in the tumors, thereby rendering them susceptible to damage, which eventually culminates into its anti-neoplastic action. Also, cell cycle regulatory proteins may be modulated by AAILE and could affect the progression of cells through the cell cycle.[19]

Another study, conducted on an anti-acne moisturizer formulated from herbal crude extracts and investigated for the physico-chemical parameters as well as antibacterial activity of the formulation, revealed that ethanol extract of *Andrographis paniculata*, *Glycyrrhiza glabra*, *Ocimum sanctum*, *A. indica* and Green tea possessed the potential for inhibiting acne. It was observed that the optimal formula of anti-acne moisturizer was satisfactorily effective to control acne inducing bacteria i.e., *Staphylococcus epidermis* and *Propionibacterium*.[20]

Bauhinia variegata (Common name: Kachanar, Orchid tree, Camel's Foot Tree, Mountain Ebony; Family: Fabaceae)

The bark is internally administered for treating skin diseases, asthma, sore throat, diarrhea and abdominal discomfort and also applied externally for skin ulcers. In the skin papilloma model, significant prevention, with delayed appearance and reduction in the cumulative number of papillomas was observed in the DMBA + Kachanar + croton oil treated group as compared to the DMBA + croton oil group. C57 Bl mice which received a 50% methanolic extract of Kachanar extract at the doses of 500 and 1000 mg/kg body weight for 30 days showed increase in life span and tumor size was significantly reduced as compared to controls. In anti-mutagenic studies, a single application of Kachanar extract at doses of 300, 600 and 900 mg/kg dry weight, 24 h prior the i.p. administration of cyclophosphamide (at 50 mg/kg) significantly prevented micronucleus formation and chromosomal aberrations in bone marrow cells of mice, in a dose dependent manner.[21]

Beta vulgaris (Common name: Beetroot; Family: Brassicaceae)

The *in vitro* inhibitory effect of beet root extract on EBV-EA induction using Raji cells revealed a high order of activity compared to capsanthin, cranberry, red onion skin and short and long red bell peppers. An *in vivo* anti-tumor promoting activity evaluation against the mice skin and lung bioassays also revealed a significant tumor inhibitory effect. The combined findings suggest that beet-root ingestion can be one of the useful means to prevent cancer.[22]

Brassica oleraceae (Common name: Red Cabbage; Family: Brassicaceae)

Significant reduction of tumors was observed in mice in whom skin cancer was induced by a single topical application of 200 nmol of the initiator DMBA to their backs, followed 1 week later by promotion with 10 nmol of TPA twice weekly for 30 weeks followed by 0.1 g/L of aqueous extract of *B. oleraceae* 1 week after administration of initiator.[23]

Calendula officinalis (Common name: Marigold; Family: Asteraceae)

The flowers of marigold have long been employed in folk therapy and more than 35 properties have been attributed to decoctions and tinctures from the flowers. The main uses are as remedies for burns (including sunburns), bruises and cutaneous and internal inflammatory diseases of several origins. Topical formulations containing marigold extract (ME), evaluated in hairless mice against UV-B irradiation-induced photo damage, revealed that application of ME in gel formulation, containing 0.21 μg/cm of narcissin and as 0.07 μg/cm of the rutin in the viable epidermis, were associated with a possible improvement in the collagen synthesis in the sub epidermal connective tissue.[24]

One of the experiments carried out in 34 patients with venous leg ulcers to determine the therapeutic efficacy of ME on the epithelialization of lower leg venous ulcers revealed significant acceleration of wound healing by producing epithelialization.[25] Research conducted on cream preparations containing seven different types of marigold and rosemary extracts, revealed that such creams are effective in experimentally induced irritant contact dermatitis when tested on healthy human volunteers.[26]

Camellia sinensis (Common name: Green tea, Chaay; Family: Theaceae)

Green tea comes from the tea plant *C. sinensis* and may play a beneficial role in treatment of skin tumours and cancer. It contains polyphenols, which act as antioxidants in the body. A specific polyphenol in Green tea called epigallocatechin gallate, according to the National Center for Complementary and Alternative Medicine, has been reported to prevent the onset of further growth of skin tumor in the body. It can rejuvenate old skin cells to start reproducing again, keeping the skin younger looking.[27]

Cannabis sativus (Common name: Charas, Ganja; Family: Cannabinaceae)

The powder of the leaves serves as a dressing for wounds and sores. Ganja is externally applied to relieve pain in itchy skin diseases. Hemp seed oil is useful for treatment of eczema and host of other skin diseases like dermatitis, seborrhoeic dermatitis/cradle cap, varicose eczema, psoriasis, lichen planus and acne roseacea. By using hemp seed oil, the skin is strengthened and made better able to resist bacterial, viral and fungal infections. Crushed leaves are rubbed on the affected areas to control scabies.[16]

Crocus sativus (Common name: Saffron; Family: Iridaceae)

Saffron is a naturally derived plant product that acts as an antispasmodic, diaphoretic, carminative, emmenagogic and sedative. The chemopreventive effect of aqueous saffron on chemically induced skin carcinogenesis using a histopathological approach was studied. Its ingestion inhibited the formation of skin papillomas in animals and simultaneously reduced their size. Saffron inhibited DMBA-induced skin carcinoma in mice when treated early. This may be due, at least in part, to the induction of cellular defense systems.[28] It has also been found useful in treatment of psoriasis.[29]

Curcuma longa (Common name: Turmeric; Family: Zingiberaceae)

A study conducted on male Swiss albino mice in whom skin cancer was induced by topical application of DMBA, revealed a significant reduction in number of tumors per mouse in the group receiving 1% curcumin obtained from rhizomes of *C. longa*.[30]

Daucus carota (Common name: Carrot; Family: Apiaceae)

A study, conducted to investigate the chemopreventive effects of oil extract of *D. carota* umbels on DMBA-induced skin cancer in mice for 20 weeks, revealed significant reduction in tumor incidence following administration via intraperitonial (0.3 ml of 2% oil) and topical (0.2 ml of 5, 50 and 100% oil) but least with gavage (0.02 ml of 100% oil).[31]

Echinacea angustifolia, Echinacea purpurea (Common name: Purple cone flower; Family: Asteraceae)

Echinacea has been applied to and used to treat skin problems such as skin boils, wounds, ulcers, burns, herpes, hemorrhoids and psoriasis. Forms of *Echinacea* include tablets, juice and tea.[27] A study conducted on patients to determine the effect of oral supplementation with a nutraceutical, containing methionine, *Echinacea*, zinc, probiotics and other antioxidant and immunostimulating compounds, on the response of cutaneous warts revealed a significant reduction of warts in such patients.[32]

The herbal extract of *E. purpurea* (Echinaforce®), readily killed a standard laboratory strain of *Propionibacterium acnes* (main cause of acne) and several clinical isolates. In cell culture models of human bronchial epithelial cells and skin fibroblasts, *P. acne* induced the secretion of substantial amounts of several pro-inflammatory cytokines, including IL-6 and IL-8 (CXCL8), as determined by means of cytokine-antibody arrays. However, the *E. purpurea* completely reversed this effect and brought the cytokine levels back to normal. Thus Echinaforce® could provide a safe two-fold benefit to acne individuals by inhibiting proliferation of the organism and reversing the bacterial-induced inflammation.[33]

Eucalyptus globulus (Common name: Blue gum, Camphor oil; Family: Myrtaceae)

In a study conducted on humans it was revealed that human facial demodicidosis when treated with freshly prepared camphor oil with or without glycerol dilutions gave complete cure with concentrations of 100%, 75% and 50% respectively.[34] Study conducted on humans revealed that camphor oil with or without glycerol dilutions completely cured zoonotic scabies with concentrations of 100%, 75% and 50% within 5-10 days.[35]

Euphorbia walachii, Euphorbia hirta, Euphorbia tirucalli (Common name: Wallich spurge; Fam. Euphorbiaceae)

Juice of *E. walachii* is used to treat warts and skin infections.[36] A study, conducted on various species of *Euphorbia*, *E. hirta*, exhibited best antioxidant activity. The plant extracts showed more activity against Gram-positive bacteria and fungi. The best antimicrobial activity was shown by *E. tirucalli*. The study supported the folkloric use of *E. hirta* and *E. tirucalli* against some skin diseases caused by oxidative stress or by microorganisms.[37]

Ficus carica, Ficus racemosa, Ficus bengaalensis (Common name: Fig; Family: Moraceae)

In some rural areas of Iran, a traditional method for the treatment of warts comprises the use of fig tree (*F. carica*) latex. A study conducted in patients with warts has revealed that this therapy of warts offers several beneficial effects including short-duration therapy, no reports of any side-effects, ease-of-use, patient compliance and a low recurrence rate. Although, exact mechanism of the antiwart activity of fig tree latex is unclear it is likely to be the result of the proteolytic activity of the latex enzymes.[38] *F. recemosa* L. bark powder is used externally in case of pimples, itches and scabies and *F. bengaalensis* L. bark powder is also used externally to cure scabies.[17]

Lavendula officinalis (Common name: Lavender; Family: Labiatae)

The effects of lavender oil (1:500, 1:100, 1:10, 1:1, 1:0) on mast cell-mediated immediate-type allergic reactions in mice and rats have been studied. It has been reported to inhibit concentration-dependently the histamine release from the peritoneal mast cells. It also inhibits immediate-type allergic reactions by inhibition of mast cell degranulation *in vivo* and *in vitro* when tested on mice and rats.[39]

Lawsonia inermis (Common name: Henna; Family: Lythraceae)

Henna is a traditionally used plant of Middle-East that is applied on hands and feet. In the traditional system of medicine, leaf paste is applied twice a day, on the affected parts to cure impetigo.[40] In a study, clinical improvement in the patients suffering from hand and foot disease due to use of capecitabine, an anti-cancer drug, with use of henna revealed anti-inflammatory, antipyretic and analgesic effects of henna.[41]

Lycopersicon esculentum (Common name: Tomato; Family: Solanaceae)

A study conducted on healthy human volunteers using tomato paste (40 g), providing approximately 16 mg/d of lycopene, ingested with 10 g of olive oil over a period of 10 weeks has revealed that it is feasible to achieve protection against UV light-induced erythema by ingestion of a commonly consumed dietary source of lycopene.[42]

Another study conducted in healthy human volunteers using 55 g of tomato paste containing 16 mg of lycopene ingested with olive oil, also revealed that tomato paste containing lycopene provides protection against acute and potentially longer-term aspects of photo damage.[43]

Mangifera indica (Common name: Mango; Family: Anacardiaceae)

The gum is used in dressings for cracked feet and for scabies. Latex is applied to cure ulcers.[17] Aqueous extract of stem-bark (MIE, 50-800 mg/kg i.p.) produced a dose-dependent and significant ($P < 0.05$-0.001) anti-inflammatory effect against fresh egg albumin-induced paw edema in rats.[44]

Matricaria chamomile, Matricaria recutita or Chamomilla recutita (Common name: Chamomile; Family: Asteraceae)

It aids in skin cell regeneration and acts as an antioxidant, fighting free radical damage on the skin. Free radicals are a dangerous oxygen by-product of cellular metabolism. There have been allergies reported and those with daisy allergies may find themselves allergic to chamomile.[27] A controlled study of 161 individuals found chamomile cream equally effective as 0.25% hydrocortisone cream for the treatment of eczema.[45] In a double-blind study, chamomile cream proved less effective for reducing inflammation of the skin than hydrocortisone cream or witch hazel cream.[46]

Finally, in a single-blind trial, 50 women receiving radiation therapy for breast cancer were treated with either chamomile or placebo. Chamomile failed to prove superior to placebo for preventing skin inflammation caused by the radiation therapy.[47]

Mirabilis jalapa (Common name: Four o'clock flower, Marvel of Peru; Family: Nctaginaceae)

M. jalapa is used traditionally in allergic skin disorders and asthma. A study, employing ethanol: acetone (1:1) extract of the roots of *M. jalapa*, revealed that the extract (0.5 mL of 100 mg mL[-1]) inhibited histamine-induced guinea pig tracheal chain contractions non-competitively. The extract (100 or 200 mg kg[-1] i.p.) inhibited milk-induced eosinophilia, albumin-induced paw edema and protected mast cells against clonidine-induced granulation justifying the folkloric use of *M. jalapa* in the treatment of allergic diseases and asthma.[48]

Momordica charantia (Common name: Bitter gourd; Family: Cucurbitaceae)

Topical application of the fruit extract of (100 μl/animal/day) during the peri-initiation stage (1 week before and 2 weeks after initiation) by DMBA and/or during the tumor promotion stage reduced the (i) tumor burden to 4.26, 3.72 and 3.11 (positive control value: 5.42); (ii) cumulative number of papillomas to 81, 67 and 53 (positive control value: 103); and (iii) percent incidence of mice bearing papillomas to 100, 94 and 94, respectively (positive control value: 100). In a comparison of the anticarcinogenic efficacy of Momordica peel, pulp, seed and whole fruit extract (100 μl/animal/day), after topical treatment during the peri-initiation and during the tumor promotion stage, revealed the modulation of the (i) tumor burden (tumors/mouse) to 3.06, 3.61, 3.17 and 3.11; (ii) cumulative number of papillomas to 49, 65, 54 and 53; and (iii) percent incidence of mice bearing papillomas to 84, 100, 94 and 94, respectively.[49]

Plumbago zeylanica (Common name: Doctor Bush; Family: Plumbaginaceae)

Whole plant is crushed with a pinch of salt and the paste is applied externally in case of ringworm.[17] A study conducted on plumbagin (5-hydroxy-2-methyl-1,4-napthoquinone), a medicinal plant-derived naphthoquinone, isolated from the roots of the *P. zeylanica* revealed that topical application of plumbagin in mice inhibited UV induced development of squamous cell carcinomas.[50]

Portulaca oleraceae (Common name: Purslane, Pigweed, Little Hogweed; Family: Portulacaceae)

The herb possesses natural cooling properties that soothe the skin, relieving it of skin inflammations and rashes during scorching heat. Burns and skin eruptions like boils and carbuncles can be treated with an effective concoction of the leaves. Topical application of the aqueous extract on to the skin is effective as antibacterial and antifungal.[51] Externally it is used to treat burns, earache, insect stings, inflammations, skin sores, ulcers, pruritis (itching skin), eczema and abscesses which are usually treated with the fresh herb as a poultice or the expressed juice is used.[51] In Ghana, the leaves are ground, mixed with oil and tied on boils.[52] Sometimes in combination the leaves are also eaten with tiger nuts (*Cyperus esculentus*) as a remedy for skin diseases and chancres. Extract of this plant was also found to be effective in treatment of AD using hairless mice.[53]

Prunus persica (Common name: Peach; Family: Rosaceae)

Ethanolic extract of the flowers (Ku-35) (50-200 μg/ml) were found to inhibit UVB and UVC induced deoxyribonucleic acid (DNA) damage by the COMET assay in the skin fibroblast cell (NIH/3T3). In addition, Ku-35 inhibited UVB-or UVC-induced lipid peroxidation, especially against UVB-induced peroxidation at higher than 10 μg/ml.[54]

Rosmarinus officinalis (Common name: Rosemary; Family: Labiatae)

Rosemary is a common household plant grown in many parts of the world. It is used for flavoring food, a beverage drink, as well as in cosmetics. The most important constituents of rosemary are caffeic acid and its derivatives such as rosmarinic acid. These compounds have antioxidant effect. Chronic UV exposure is responsible for long term clinical manifestations such as photo aging and photo-cancers. Aqueous extract of *R. officinalis* has been reported to be effective in preventing cutaneous photo damage induced by UV radiations.[55]

In another study, the antibacterial activity of rosemary essential oil against *P. acnes* was observed with atomic force microscopy (AFM). Significant changes in morphology and size of *P. acnes* were observed by AFM in response to essential oil treatment. Rosemary oil has also been seen to be effective against *P. acnes*, a bacterium causing acne.[56] Application of methanol extract of leaves of rosemary to mouse skin inhibited the covalent binding of benzo(a)pyrene [B(a)P] to epidermal DNA and inhibited tumor initiation by B(a)*P* and DMBA.[57]

Sarco asoca (Common name: Ashoka; Family: Caesalpinaceae)

Paste of the roots is useful in freckles and external inflammations, ulcers and skin diseases. It is used for itching in eczema, psoriasis, dermatitis and herpes-kushta/visarpa by rubbing the crushed flower on the skin. It is a favorite herb to relieve pruritis, scabies and *tinea pedis*. 50 g of the dried flowers of *S. asoca* and the leaves of *L. inermis* are boiled in coconut oil and the extract is externally applied twice a day to treat eczema and scabies. A study revealed that pretreatment with the flavanoid fraction of *S. asoca* caused significant reduction in the number of tumors per mouse and the percentage of tumor-bearing mice. Furthermore, the latency period for the appearance of the first tumor was delayed by *S. asoca* pretreatment. A significant reduction in the expression of ornithine decarboxylase, a key enzyme in the promotion stage of 2-stage skin cancer, in the plant-treated group was also observed suggesting the chemopreventive activity of flavonoids from *S. asoca* on 2-stage skin carcinogenesis.[58]

Thyme vulgaris (Common name: Thyme; Family: Lamiaceae)

It may relieve the symptoms of cellulitis, an infection of the skin caused by bacteria which can lead to pain, tenderness, edema, fever, chills and reddening of the skin. It may also offer anti-fungal and antibacterial benefits. However, the University of Maryland Medical Center cautions that thyme has not been proven to specifically benefit cellulitis. In addition, this herb may raise the risk of bleeding.[27]

CONCLUSION

Herbals have great potential to cure different kinds of skin diseases. More than 80% of people in India depend on traditional health care and use different plant based products for curing skin related problems. Compared with the conventional allopathic drugs, they have relatively low cost and can be of great benefit to the population of India in general and poor people in particular. Herbals are a rich source of active ingredients and can be safer and cost effective treatment for skin diseases ranging from rashes to dreadful skin cancer. More than 50% of plant species useful for treatment of skin diseases appear to be restricted to forests, so activities such as deforestation, habitat destruction, urbanization etc., may pose a serious threat to these species. Conservation of these plants with the help of local participation and carrying out of extensive research in this respect to broaden the prospects of herbal drugs in skin disease treatment is the need of the hour.

Footnotes

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