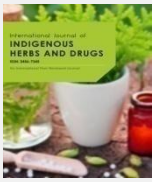
Review Article

International Journal of Indigenous Herbs and Drugs
Content Available at www.saap.org.in ISSN: 2456-7345



PREVENTION AND CURE OF DERMATOLOGY DISORDERS USING HERBAL MEDICATIONS: SUMMARY

Aditya Srivastav[1], Yash Srivastav[2*], Abdul Hameed[3], Mohd. Imtiyaz Ahmad[4]
[1234]Azad Institute of Pharmacy & Research, Lucknow, U.P, India.

Article Info

Article History
Received on: 25-12-2023
Revised on: 19-01-2024
Accepted on: 23-02-2024

Abstract

The use of isolated plant components and herbal extracts in the treatment of wounds and skin conditions is growing. In recent years, numerous new herbal medications, pharmaceuticals, and cosmetics have been produced to address a variety of skin disorders. We concentrate on herbal medications that underwent testing in well-controlled clinical trials or reliable preclinical investigations in this systematic review. Herbal biomedicines are designed to treat a variety of conditions, including atopic dermatitis (using St. John's wort, licorice, tormentil, bitter substances, and evening primrose), psoriasis (using araroba tree, lace flower, barberry bark, indigo, turmeric, olibanum, and St. John's wort), actinic keratosis (using birch bark and petty spurge), herpes simplex (using lemon balm, sage, and rhubarb), rosacea (using green tea, licorice, tormentil, and acne vulgaris) and acne vulgaris (using tea tree oil, green tea, and hop), or to enhance photoprotection (using green tea, Dyer's weed, cocoa tree, carotinoids, and licorice), aesthetic dermatology (using licorice, pine bark, and gotu kola), and wound healing (using birch bark and onion).

Keywords: Skin disorders, Herbal medications, Treatments.

***Corresponding Author**
Yash Srivastav

DOI: https://doi.org/10.46956/ijihd.v9i1.568

Production and Hosted By
www.saap.org.in

Introduction

Skin conditions are common all around the world and makeup approximately 34% of occupational illnesses. All age groups are impacted, from young children to elderly adults. Skin illnesses have very low death rates, but they have a substantial impact on quality of life, are frequently persistent, and are challenging to cure. It has been discovered that traditional medicinal plant resources are essential for treating skin conditions. In many nations around the world, where they greatly contribute to the primary healthcare of the populace, they have been used by individuals of different ethnic backgrounds to cure skin conditions. The largest organ in the human body is the skin, which covers the exterior of the body. It serves as the initial line of defence as well [1,2].Numerous specialized cells and structures can be found in the skin. The epidermis, dermis, and hypodermis are its three primary layers. Every layer contributes differently to the skin's overall functionality. The thickness of the epidermis, the skin's outermost layer, varies depending on the body part. It is thickest on the palms and soles (1.5 mm) and thinnest on the eyelids (0.05 mm) [3,4]. The location of the skin affects the thickness of the dermis as well. The measurements are 3.0 mm on the back of the torso and 0.3 mm on the eyelid. The subcutaneous connective tissue, or hypodermis, is connected to the dermis. Larger blood arteries and nerves are housed in the subcutaneous tissue, which is a layer of fat and connective tissue. This layer is crucial for controlling the body's and the skin's internal temperature. This layer is different in size in different parts of the body and different people. The primary skin appendages are sebaceous glands, sweat glands, and hair follicles [4].

The way that drugs are absorbed through the skin

Advanced drug delivery techniques like transdermal drug delivery (TDD) offer the ability to overcome many of the inherent constraints of conventional medicine delivery routes. TDD is a painless way to apply a medication formulation to healthy, unbroken skin to administer the medicine systemically. To treat skin conditions, the medicine is released from the dosage form and travels through the dermis according to a set of instructions. Therapeutic phytoconstituents penetrate the epidermal layer and then partition and diffuse into the dermis [5,6]. The phytoconstituent enters the systemic circulation, which is utilized to treat skin conditions; Fig. shows a graphic depiction of technique.

SOUTH ASIAN ACADEMIC PUBLICATIONS

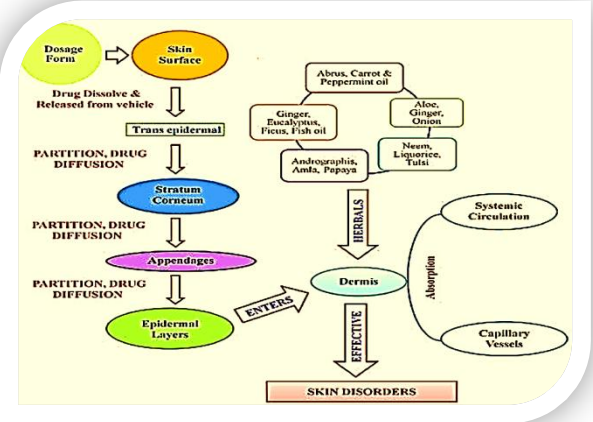


Figure 1-Drug Absorption Process via the Skin Mechanism. Common Skin Problems

Skin diseases are prevalent medical conditions that can injure people in a variety of ways and impact people of all ages, from newborns to the elderly. Although the skin can be affected by over a thousand illnesses, the majority of skin diseases fall into one of the following basic categories.

Rashes

A region of red, irritated skin or a collection of little spots is called a rash. These can be brought on by structural flaws such as clogged pores or dysfunctional oil glands, as well as by irritation, allergies, infections, and underlying diseases. Acne, dermatitis, eczema, hives, pityriasis rosea, and psoriasis are a few conditions that can cause rashes [7].

Viral infections

These happen when a virus enters the skin's inner layers through the stratum corneum. Warts, shingles (herpes zoster), and herpes simplex are a few examples of viral skin infections. Skin infections can also result from some systemic viral illnesses, like measles and chicken pox. Antibiotics cannot treat viral illnesses [8,9].

Bacterial infections

Many bacteria can cause these illnesses, but the most prevalent kinds are streptococci and staphylococci. The outermost layers of skin, the follicles, or the deeper layers of skin can all become infected by bacteria. These infections have the potential to spread throughout the body if improperly managed. Lyme illness, cellulitis, and impel folliculitis are a few examples. Antibiotics are a superior way to treat bacterial infections [10].

Fungal infections

The skin's surface is always covered in harmless fungus. When these germs get inside the body, infection happens. These diseases, which typically affect the skin, hair, and nails, include ringworm, athlete's foot, and lock itch. However, the fungus may spread deep within the body to cause more serious disease in persons whose immune systems are inhibited or who have taken antibiotics for an extended period [11].

Parasitic infections

Following exposure to parasites like lice and scabies, these illnesses develop.

Pigmentation disorders

The amount of melanin that the body produces determines how much pigment is in the skin. Hypopigmentation, or loss of pigment, can be brought on by infections, malfunctioning cells, exposure to chemicals or the cold, or the absence of melanocytes. Hyperpigmentation, or an increase in pigment, can result from a variety of underlying issues, including ageing, metabolic disorders, hormonal changes, and skin irritation. Melasma, freckles, and age spots are a few manifestations of hyperpigmentation. One instance of hypopigmentation is vitiligo [12,13].

Tumors and cancers

These growths appear when skin cells start to proliferate more quickly than usual. Not every growth on the skin is malignant. Certain cancers are benign and do not metastasize. Of all the diseases, skin cancer affects 800,000 Americans annually, making it the most frequent type. In ninety per cent of cases, sun exposure is the reason. There are three types of skin cancer: malignant melanoma (the most fatal form), squamous cell cancer (which can grow and spread), and basal cell cancer (which is the most treatable). Preventive care entails shielding the skin from harmful UV radiation. The likelihood of a cure is increased with early discovery. For this reason, it is advised to regularly examine oneself [14].

Trauma

An injury to the skin brought on by a blow, cut, or burn is referred to as trauma. The body is vulnerable to infection and illness whenever the skin's surface is breached.

Psoriasis

Psoriasis is a long-term inflammatory skin condition that was once thought to resemble leprosy. A patient's mental health and quality of life may suffer from a psoriasis infection on their skin. It may be brought on by a genetic predisposition or by an excessive skin growth. There are three varieties of psoriasis: skin psoriasis, which manifests as small blisters on the skin and yellow pus; nail psoriasis, which causes pitting and yellowing of the nails along with severe hyperkeratosis; and psoriatic arthritis, which causes bone erosion near the joints (14).

Scabies

Tiny mites that burrow into the skin are the source of the contagious skin condition known as scabies. The two main symptoms are a rash of tiny red spots and itching that gets worse at night [15].

Vitiligo

Vitiligo is a disorder that generates light-coloured, white spots on the skin that can appear anywhere on the body and vary in size. They are more noticeable in areas that are exposed to sunlight, such as the hands and face. In addition, if you have vitiligo on your scalp, your hair may turn white on skin that is dark or tanned [16].

Acne Vulgarise

Acne is the most common skin condition in the US. Although acne is typically linked to youth, more and more adults are experiencing acne-related problems. Many people believe that acne is harmless and that they shouldn't worry about it. For a very small percentage of people, perhaps, but not for the vast majority, this is accurate [17].

Other conditions

Spider veins, varicose veins, rosacea, and wrinkles are a few of the disorders that are difficult to classify. Skin that is drooping due to wrinkles is caused by a breakdown of

collagen and elastin within the dermis. Rosacea is a chronic condition that causes redness on the face, pimples, lesions, and, in rare cases, nose enlargement. We don't know what caused it. Varicose and spider veins are evident when blood vessels expand and protrude through the skin's surface [18].

Allopathic Approaches for Skin Disorders

Herbal medicines can reduce the adverse effects of allopathic treatment for skin problems. The expense of treatment, skin reaction, injection site pain, diarrhea, skin irritation, and allergy are among the side effects of allopathic medications. Immunosuppressants can weaken the immune system, induce skin malignancies, and cause an appetite loss [19].

Conventional Treatment of Skin Diseases

A. The common medications for topical use include

Antibacterials: These drugs, which include cleocin and Bactroban, are frequently used to treat or prevent infections. Anthralin (e.g., methanol): These can be used to treat psoriasis and help reduce inflammation, though they are not frequently utilized. Antifungal agents: A few common topical antifungal medications used to treat skin disorders like ringworm and athlete's foot are Lamisil, Lotrimin, and Nizoral. Benzoyl peroxide: Acne is treated with creams and other treatments that include this ingredient. Coal tar: This topical remedy comes in dosages ranging from 0.5% to 5% and can be purchased with or without a prescription. Conditions including psoriasis and seborrheic dermatitis are treated with coal tar (often in shampoos). Because coal tar can be slow-acting and severely stain bedding and personal apparel, it is hardly used today [7]. Corticosteroids: Available in a variety of forms such as foams, lotions, ointments, and creams, these are used to treat skin disorders such as eczema. Retinoids: These vitamin A-derived gels or creams, which include retin-A and Tazorac, are used to treat a variety of illnesses, including acne. Salicylic acid: This drug comes in the form of patches, creams, gels, soaps, and shampoos. It should only be applied sparingly because applying too much at once to the body can be hazardous. The active component of many skin care treatments for the treatment of warts and acne is salicylic acid [20].

B. Oral treatments for skin conditions include:

Antibiotics: Many skin disorders are treated with oral antibiotics such as dicloxacillin, tetracycline, and erythromycin. Antifungal agents: Severe fungal infections can be treated with common oral antifungal medications like Diflucan and ketoconazole. Antiviral drugs: Valtrex, acyclovir, and famavir are examples of common antiviral drugs. Herpes-related skin problems are treated with antiviral medications [21]. Corticosteroids: These drugs, which include prednisone, are used to treat inflammatory and autoimmune illnesses of the skin, such as psoriasis and eczema, as well as autoimmune diseases like vasculitis. To prevent adverse effects, dermatologists prefer topical steroids, yet occasionally short-term prednisone use is required. Immunosuppressants: Severe instances of psoriasis and eczema can be treated with immunosuppressants such as methotrexate and azathioprine. Biologics: The newest approaches to treating psoriasis and other ailments are these novel therapeutics. Biologics include, among others, amevi, stelara, Humira, Remicade, and Enbrel [22].

Role of Herbal Phytomedicines for Skin Infections

Natural remedies are used and produced in the herbal industries to screen newer medicines that promote human health because they are effective against a variety of infectious disorders, including fungal infections, skin infections, cancers, respiratory tract infections, and cardiovascular diseases.

Azadirachta indica

The leaves of Azadirachta indica, also known as neem, belong to the Meliaceae family. Since ancient times, its extract has been used for its potential benefits against a variety of skin conditions, including scabies and acne, as well as its cardio-protective and cholesterol-lowering properties. Neem bark functions as an antiviral against chickenpox and aids in dental care by promoting better oral cleanliness and healthy gums. Because of its bitter tonic properties, the bark of the neem plant has strong contraceptive properties that are beneficial in the treatment of neurological diseases and the management of diabetic patients by reducing overeating [23,24]. The descriptions have shed light on the advantages of using an A. indica herbal paste as a poultice or decoction topically to treat scabies and eczema. It was discovered that the oil extracted from leaves was useful against psoriasis, ringworm infection, and scrofula during tuberculosis. According to a different scientist, applying neem and turmeric lotion at night can cure scabies, eczema, and other dermatological issues without having any negative effects on the mucous membranes of the skin. Neem oil treatments for skin conditions including acne and eczema serve as cosmeceuticals for skin rejuvenation and beautification, demonstrating Neem's exceptional herbal potential in reducing a variety of skin allergens [25].

Fig2:*Azadirachta indica*

Glycyrrhiza glabra

The plant Glycyrrhiza glabra, also known as liquorice, belongs to the Fabaceae family. Its ethnopharmacological properties have been studied all over the world. Glycyrrhizin, its active metabolite, has a variety of applications, including those as an expectorant, demulcent, mild laxative, antidiabetic, antiviral, antitussive, antioxidant, and skin-whitening agent. These applications open up new avenues for investigation and the identification of the plant's powerful effects. Because the primary component of G. galabra, glabridin, inhibits melanoma

cell tyrosine B16, it can be utilized to successfully lighten pigment. Another important component, fluidity, disperses melanin from its active site and has skin-lightening and antioxidant properties. This is why the herbal extract is utilized as a cosmetic in skin depigmentation and UV protection [26,27]. According to the experts, the herbal extracts from the roots can be used to formulate oily creams that contain coconut oil, beeswax, surfactant, glycerin, and water. This combination of ingredients helps to reduce skin pigmentation and give a protective and emollient effect against melanin. Patients with a family history of asthma and hay fever have been seen to benefit from the administration of licorice gel for the treatment of atopic dermatitis. To lessen facial itching, a mixture of liquorice gel, methylparaben, carbopol 940, polyethene glycol 200, 300, and 400, and triethanolamine is applied overnight. Since melanin causes skin tan, other research have shown that licorice extract can reduce skin pigmentation in black mollyfish by blocking tyrosine owing to melanin dispersing from its site [28,29].

Fig 3: *Glycyrrhiza glabra*

Ocimum sanctum

Ocimum sanctum, also known as tulsi, belongs to the Lamiaceae family of medicines and is a popular and affordable herbal remedy for heart disease, headaches, stomach issues, nervine tonic, cardiotonic, cough, cold, bronchitis, malaria, and heart disease. It also has antioxidant, anti-acne, and anti-ageing qualities. Sacred basil has been shown to have antiseptic properties against rashes, insects, skin conditions, and snakebites; leukoderma was successfully treated with the basil. Basil herbal extracts are also helpful in lessening acne, pimple, and scar itching. Another study found that using herbal extracts as strong, safe, antiviral, antibacterial, and antifungal medications could treat chickenpox, wound infections, and roundworm infections by altering the patient's lifestyle. Sacred basil has demonstrated promising herbal treatment potential for a range of skin conditions [30,31].

Fig 4: *Ocimum sanctum*

Andrographis paniculate

Many diseases have been treated for decades on the Indian subcontinent using the aerial parts, roots, leaves, and entire plants of Andrographis paniculate, common name: chiretta, family: Acanthaceae. Aerial parts have been given for pyrexia, dyspepsia, malaria, colic pains, dysentery, and diarrhoea by modern practitioners. A. paniculata is used in prenatal and postnatal care, wounds, cuts, and primary skin illnesses such as eczema and leukoderma in tribal communities. The plant is combined with oils and used as a paste for skin lesions, treating infected wounds once a day for 40 days, indicating a great herbal potential [32].

Fig 5:*Andrographis paniculate*

Embillica officinalis

It's an Indian herb that has been utilized for ages; it's also called Indian gooseberry. It is recommended by a doctor to revitalize the body, build strength, encourage well-being, and strengthen immunity. It is referred to as "Rasayan" for its ability to enhance the anti-ageing effect. This fruit, which is high in vitamin C and has antiviral, antibacterial, and antifungal properties, is an effective antioxidant. Numerous studies demonstrate the efficacy of using herbal remedies such as a liver tonic, hair tonic, treatment for warts, and infections on the skin, and prevention of premature ageing. Studies on the effects of amla fruit have included blood glucose regulation, wound healing against infections, scabies treatment, and scabies itching reduction [33]. It is the safest Ayurvedic formulation, with the main ingredient being chayawanprash, which can be used to treat menstrual bleeding, prevent hair greying, and stimulate hair growth when combined with coconut oil. It is a strong herbal treatment that can be used at home to cure a variety of illnesses. According to a scientist, oral lingonberry and amla fruit herbal extracts help enhance girls' skin disorders in the 35–50 age range. According to studies, consuming amla fruit extract for 12 weeks increases the suppleness of the skin and minimizes wrinkles, suggesting that amla fruit is a promising option for weight control and anti-ageing [34].

Fig 6: *Embillica officinalis*

Aloe vera

Aloe vera (A. vera) is a native of India and a member of the Liliaceae family. One of the richest and oldest herbs in the world, aloe vera is utilized in traditional medical systems all over the world as a powerful skin healer for wounds, cuts, sunburns, bug bites, infections, and swelling. In addition to functioning as a herbal gel, it is a skin purifier and detoxifier that delays the ageing process, minimizes wrinkles, and restores damaged skin cells. Vera gel has significant herbal potential for treating eczema in cases of dry skin. This herbal treatment possesses laxative, chemoprotective, ulcer-preventive, antioxidant, and cardioprotective properties. It is a powerful skin protector that can be combined with sap to apply moisturizer, sunscreen lotion, and herbal shampoos to the skin to prevent dandruff and scabies (35,36). Herbal extract works wonders as an emollient, repairing minor cuts and wounds, sunburns, and skin disorders with strong antibacterial, antiseptic, and anti-cancerous properties. The key function of the herbal extract is to reduce wrinkles, cure acne, lessen pimples, and promote a glowing complexion. This makes it an excellent source for extensive research into the many aspects of herbal formulations of A. vera for a range of health issues by extending life expectancy. According to a different characterization, the effective use of A. vera for burn and wound healing speeds up the rate at which the skin's surface heals because of cell multiplication (19,37).

Fig 7: *Aloe vera*

Carica papaya

The Carica papaya, also known as Papeete and belonging to the Caricaceae family, is a powerful source of all the vital nutrients required for promoting growth, health benefits, and medicinal characteristics. It is an important tropical fruit with roots, pulp, bark, seeds, and peels that are used to treat a variety of illnesses because it has a lot of vitamins and the proteolytic enzymes papain and chymotrypsin, which have antiviral, antifungal, and antioxidant properties. Among the safest and most popular nutraceuticals, it is used to treat a wide range of illnesses, including eczema, warts, heart difficulties, mouth ulcers, dental issues, digestive disorders, cholesterol reduction, colon tumours, and autoimmune diseases. As a poultice, the herbal extract of papaya has strong wound-healing capabilities that reduce inflammation at the application site, hence lessening arthritis patients' pain (38,39). Papaya peel is combined with honey to provide calming, hydrating, and skin-lightening properties as a DIY herbal cure for cosmetics like sunscreen. Papaya peel can be combined with lemon juice and applied 20 minutes prior to shampooing to treat dandruff. It can also be combined with essential oils, such as orange and lavender, to have a muscle-relaxing effect (19).

Fig 8: *Carica papaya*

Jathrophacurcus

The Euphorbiaceae family includes Jathrophacurcus (J. curcus), which has abortifacient, purgative, and anti-helminthic properties. Utilizing a wound healing model to examine the pro-wound healing impact, it is also helpful in treating gout and managing basic skin lesions as a herbal ointment. The seeds' oil is used to treat primary parasite skin infections, diuresis, pyrexia, arthritis, and cardioprotection. This mechanism supports the potential role of J. curcus in the identification of herbal phytoconstituents that minimize skin infections by accelerating wound healing and providing strong antibacterial and anti-inflammatory benefits to wound care (40,41).

Fig 9:*Jathrophacurcus*

Zingiber officinalis

The common name Zingiber officinalis is adarak; family Zingiberaceae Ginger is a common spice used in the diets of South Asians. Its advantageous effect is in preventing common ailments such as anti-inflammatory diseases, gastrointestinal issues, and arthritis. Ginger root has been investigated in traditional medicine for its potential to treat skin issues, ulcers, and malignancies of the prostate and colon. Human health naturally deteriorates with age, and this process is accelerated by some rising ailments, including diabetes mellitus and

hypertension. Topical steroids suppress the creation of collagen, but ginger herbal extracts work as a transport medium to improve skin conditions and structure, hence reducing the likelihood of wound healing (42). An active metabolite of ginger called gingerol promotes the growth of new blood vessels at the site of skin damage, aids in the regeneration of abraded skin cells without irritating the skin, and lessens infection-related pain for patients while also improving patient compliance. To improve wound healing in experimental rats without causing skin irritations, it is mixed with curcumin. Ginger extract has anti-inflammatory properties and inhibits nitric acid and cytokinin cyclooxygenase in mice's ear oedema caused by Croton oil. These outcomes for the restoration of injured skin cells through a wound-healing mechanism have also been replicated in humans (43).

Fig 10:*Zingiber officinalis*

Table 1. Applications of Herbal Phytomedicines in Skin Disorders.

Botanical Name and Family	Part used	Skin Infections	Other Uses
***Azadirachta indica,* Meliaceae**	Leaves, Barks	The paste of leaves useful in Acne, eczema, Scabies, Skin allergies, Psoriasis	Barks have cardio-protective effects, Lower cholesterol, Blood clotting. Used for Dental care
***Glycyrrhiza glabra,* Leguminosae**	Root	Skin lightening, Depigmentaion, Allergic dermatitis, Atopic dermatitis	Used as an Antiviral, Antitussive, Anti-diabetic, Antifungal, expectorant, Demulcent, Mild laxative, Antioxidant
***Ocimum santhum,* Labia tae**	Leaves	Allergy, rashes, insect bite, scars, Leucoderma, Blisters, chickenpox, round worm infections	Used for Stomach disorders, Nervine tonic, Cardiotonic, Cough and Cold, Bronchitis, Malaria, Heart disease, and as an Antioxidant
***Andrographis paniculata,* Acanthaceae**	Aerial Parts, Roots, Leaves	Eczema, Leucoderma, cuts and wounds	Pyrexia, Dyspepsia, Malaria, Colic pains, Dysentery and Diarrhea
***Embillica officinalis,* Euphorbiaceae**	Fruit	Treating warts, skin infections and preventing premature aging , scabies and reducing itching, reducing wrinkles	Antioxidant, Antiviral, Antibacterial and Antifungal effects,Hair tonic, Liver tonic, Controls nose bleeding, Regulates blood glucose
***Aloe vera,* Lilaceae**	Leaves	Sunburns, insect bites, wound infections, cuts, itching and swelling, scabies, dandruff woundhealing burns	Antioxidant, nutritive
***Carica papaya,* Caricaceae**	Roots, Pulp, Bark, Seeds, Peels	Eczema, warts	Antifungal, Antiviral, Antioxidant, Cardiac disorders, Mouthulcers, Dental problems, Digestive disorders, Cholesterol-lowering, Colon tumor
***Jathrophacurcus,* Euphor biaceae**	Fruits, Seeds, Roots	Major skin lesions, wound healing	Purgative, anti-helminthic,abortifacient effects, gout
***Zingiber officinalis,* Zingiberaceae**	Root and Rhizome	Skin problems [27]	Arthritis, gastric problems, Antiinflammatorydisorders,colon and prostate cancers, ulcers
***Eucalyptus globulus,* Myrtaceae**	Leaves	Skin problems, wound healing, fungal infection	Food additive, Antioxidant

***Euphorbia hirta,* Euphorbiaceae**	Root	Major wounds, boils and swelling, acne	Reproductive disorders, UTI, Gonorrhoea, Respiratory ailments, Anticancer, Digestive problems
***Ficus carica,* Moraceae**	Fruits	Hyperpigmentation, acne,wrinkles, itching and irritation. Eczema, skin ulcers	Epileptic seizures, Pyrexia, Bronchial asthma
Fatty acid	Liver	Acne, dermatitis, photoaging,Various skin cancers, allergy	Alzheimer's, Asthma, Coronary heart disease, Diabetes mellitus and Cardiovascular disorders.
***Allium cepa,* Amaryllidaceae**	Bulbs	Skin allergy, anti-ageing, scars, stimulates blood circulation	Stomach cancers, CVS disorders, Lowering of blood pressure and Hyperglycaemia, Warts and healing major surgical wounds
***Abrus precatorius,* Fabaceae**	Leaves	Leucoderma, preventing greying of hairs, wound healing	Reducing fever, Cough and Cold, and Worm infections
***Daudus carota,* Apiaceae**	Seeds	Moisturizer for skin and hair, eczema, warts	Antiseptic, Detoxifies the body, Treats jaundice, Acute bronchitis
***Menthapiperata,* Labitae**	Seeds	Reduces dandruff and lice	Prevents hair loss

Eucalyptus

The subtropical region of Australia is home to eucalyptus trees, from which over 600 species have been identified. The leaves of these trees are used as herbal derivatives, as well as an important dietary ingredient, an antioxidant, and a remedy for fungal infections and wound healing. It has been discovered that the herbal extracts of Eucalyptus globulus, E. maculate, and E. viminalis, members of the Myrtaceae family, are effective against skin infections, scabies, and acne. Their cooling impact on large cuts and wounds reduces inflammation at the site of application, and they have counterirritant, analgesic, and stimulating properties (44).

Fig 11:*Eucalyptus*

Euphorbia hirta

Euphorbia hirta is a perennial herb of the Euphorbiaceae family. One of the earliest Ayurvedic herbal remedies, it works well for respiratory conditions, diabetes, acne, gonorrhoea, reproductive issues, and anticancer. Strong antioxidant and anti-inflammatory properties of the aqueous extracts containing the active metabolite quercetin are demonstrated against large wounds, boils, and swelling. A poultice is applied as a result of combining the extract with warm coconut oil and turmeric to lessen boil and sore discomfort. The roots of E. hirta have strong sedative properties that make them an effective dietary supplement for nursing moms and babies, as well as a useful treatment for urinary tract infections and snakebites (45,46).

Fig 12:*Euphorbia hirta*

Table 2. Mechanism of action of Herbal Phytomedicines and their biological activity.

Herbal Phytomedicine	Potent Phytoconstituents	Biological activity	Mechanism of action
Azadirachta indica	Nimibidin, Azadirachtin	Anti-inflammatory and Anti-arthritis	Suppresses macrophages and neutrophils
		Dentistry (Dental care)	Neem leaves, oils remove aerobic and anaerobic pathogens in the oral cavity
		Viral disease: Chicken pox (prevention)	Neem extracts absorb virus, prevent their spreading to unaffected cells
		Anti-fungal	Inhibits trichophyton and microsporum, prevents superficial infections
		Neuroprotective	Increases lipid peroxidation and Vitamin C containing ascorbic acid in the brain
		Wound healing (Skin diseases)-acne, psoriasis, scabies	Contains essential fatty acid, adds moisture and texture to the skin during healing by inhibition of inflammatory cells
		Liver protectant, Antioxidant	Prevents liver, cleans the blood by stabilizing serum marker level and boosting antioxidant C, E thereby preventing generation of free radicals
Glycyrrhiza glabra	Glabridin, Liquiritin	Depigmentation of skin, Skin tan, Atopic dermatitis	Inhibition of tyrosine B16 of melanoma cells, dispersed melanin from the active site
Ocimum santhum	Fixed oils, Linolenic acid, Eugenol	Anti-inflammatory	Blocks cylcoxygenase lipoxygenase pathways of arachidonic acid metabolism
		Antiviral, Antifungal, Antibacterial	Enhances immune response
Andrographis paniculata	Androgapholide	Anti-inflammatory	Inhibits inflammatory mediators nitrous oxide (NO), prostaglandin E2(PGE2), interleukin (IL) inhibits macrophages
Embillica officinalis	Gallic acid, Tannic acid, Emblicanin A and B	Antibacterial, Antiviral	Inhibits microbial adhesion, inactivates enzymes, suppresses influenza A virus and prevents viral absorption, treats HIV by inhibiting HIV-RT
		Colon cancer	Suppresses p53 tumour gene
Aloe vera	Vitamins, Minerals, Aminoacids, Enzymes	Burn, wound healing	Proliferation of skin cell, blood cells
		Anti-aging	Enhances collagen and elastin synthesis
		Skin cancer	Suppresses immune cells of the skin
		Skin moistening	Self hydrates the skin, removes dead cells due to penetration
Carica papapya	Papain	Anticoagulant, wounds, burns, ulcers	Increases prothrombin, removes necrotic tissues
Jatropha curcus	Glycosides, Tannins, Steroidal Saponins	Wound healing	By bacterial phagocytosis, cytokine releases causing divi- sion and migration of cells in the proliferative phase
Gingiber officinalis	Gingerol	Wound healing	Inhibition of cytokinin cyclooxygenase and nitric acid
		Tumour suppression	Inhibits nuclear factor kappa B (NF-kB) cells
Eucalyptus	Trichlosan	Antibacterial	Trichlosan interacts with enzymes of the fatty acid pathway and inhibits gram-negative and gram-positive bacteria
Euphorbia hirta	Flavonoids, Tannins, Phenolic compounds, Rutin, Gallic acid,	Diabetes	Alloxan induced mice showed reduction in serum cholesterol, triglycerides, urea, due to antioxidant and free radical scavenger

	Quercitin, Quercitrin	Anti-asthmatic	Relaxation of bronchial muscles
		Anti-diarrhoeal	Treats castor oil and prostaglandin E2 (PG-E2) induceddiarrhea in mice at 50mg/kg
Ficus carica	Catechin, Gallic acid	Skin depigmentation	Inhibits tyrosine, reduces melanin content
Fatty acid	Canola, Sesame, Sunflower,Soybean oil	Anti-aging	Inhibits cyclooxygenase-2
		Skin cancers	Salmon fish inhibits cancer cell growth and induces cell death
Aliumcepa	Quercetin, Diallytrisulphide(DATS)	Woundhealing,scarprevention	Actsonthe fibroblastcell line.
		SAShuman oralcancer cells	Inhibitsnuclearfactor kappaB(NFkB)and matrixmetallo-proteinases(MMPs-2/9)
	Apigenin	Anti-inflammatory,allergy	Inhibits free radical scavenger
		TreatsBurning Of superficial Skin layers	Inhibits ultraviolet B (UV-B)
	Pyruvicacid	Flavorenhancement	
Abrus percatorius	Abruquinonesa,b,c,d	Anti-allergic	Inhibits superoxides
	Gums,Mucilage	Wound healing	Elevated hydroxyproline enhanced collagen synthesis
Carrot oil	Carotene,VitaminA	Maintainsskin tone,anti-wrinkle,rashes,dermatitis	Actsonepidermalcells
Pepperminoil	Menthol	Treats Dandruff,antimicrobial	Improves blood circulation of the scalp

Ficus carica

A vital vitamin for the treatment of diabetes, pyrexia, epileptic convulsions, eczema, bronchial asthma, fig fruit, acne, dry skin, and anti-ageing effects. Using non-invasive techniques, an herbal cream made from ficus fruit was given to human cheeks to examine the effects of sebum, melanin, and trans-epidermal oedema. Following eight weeks of topical administration, the results showed that the oily herbal cream effectively reduced wrinkles, acne, and hyperpigmentation on the face skin while producing minimal discomfort and itching. As an herbal extract, ficus fruit may one day provide scientific breakthroughs against a range of skincare consequences (47,48).

Fig 13: *Ficus carica*

Fatty acid

Animal and plant species both contain fatty acids. When it comes to animal species, fish oil is said to be the most necessary. Owing to the scarcity of fish oil resulting from pollution, pollutants such as dioxins and mercury, bad taste, and smell, and increased expense, the focus of study has shifted to plant-based fatty acids. Essential PUFAs such as omega-6 and omega-3 generated from gamma-linolenic acid (GLA) and alpha-linolenic acid (ALA) are found in the lipids contained in plant-based fatty acids. Canola, soybean, sesame, sunflower, palm, coconut, and primrose oil, as well as beans without desaturation enzymes, are examples of plant-based fatty acids. Applying evening primrose oil, which has a high concentration of GLA and linolenic acid (LA), to chapped skin helps to reinforce the epidermal barrier, reduce irritation, and make the skin smoother and more hydrated (49,50).The majority of skin conditions, including allergies, dermatitis, wounds, photoaging, and different types of skin cancer, can be treated with plant-based fatty acids as a supplement. This opens up new possibilities for the development of effective herbal cosmetics for dermatology. Consuming fish oils in the diet has been demonstrated to be an effective nutraceutical that can significantly alleviate several ailments, including cardiovascular problems, diabetes mellitus, Alzheimer's, asthma, and coronary heart disease. According to the experts, photoaging results from repeated exposure to UV light, which damages the skin by producing reactive oxygen species and inflammatory mediators like cyclooxygenase-2. Consuming fish oils rich in omega-3 FAs reduces the synthesis of proinflammatory mediators, which gives skin a photoprotective healing mechanism (51).

Allium cepa

Allium cepa, commonly known as onions and members of the Liliaceae family, has been used historically in the Ayurvedic medical system to treat major ailments such as ulcer healing, scar prevention, stomach cancer, CVS disorders, and hyperglycemia while promoting powerful nutritional and aromatic properties. It functions as a folk remedy to lessen prostate cancer. Onion juice is applied topically to minimize skin scarring and to have an insect-repelling effect. Pyruvic acid and quercetin, which are found in fruits and bulbs and can be used to treat skin allergies and ageing, respectively, are found in onions. The creation of newer herbal dermatological products is aided by the antioxidant activity of Allium species (52,53). According to a different study, utilizing onions as a skin irritant is enhanced by their ability to stimulate blood circulation. Because it produces heat, it is used as an herbal poultice to treat warts, boils, and large surgical wounds. This research raises awareness about how beneficial Allium species are as herbal remedies for skin conditions (54).

Fig 14:*Allium cepa*

Table 3. Current Therapeutic Applications of Herbal phytomedicines for Skin Infections.

Herbal Formulation	Skin diseases	Other effects	Manufacturer
Puriderma Acne spot treatment	Acne, Cystic acne	Reduces skin irritation, spots on skin, promotes healthy skin	Puriderma
Aloe extract	Cystic acne	Heals, repairs and renews skin	Acne Treatment Inc, Natural
Flucos Lotion	Dandruff	Reduces burning, irritation, redness	Oaknet Healthcare Pvt. Ltd
Aloe cream	Acne	Reduces redness, pain and provides soothing effect	Pretty Cream
Kilonji Herbal cream	Acne, Pimples	Cleanses, relieves pain	Indian Marketing Company
Uptan turmeric cream	Acne, Antiageing	Dead skin removal, blackhead removal, skin lightening	English
Bio cucumber	Acne	Pore tightening toner, skin purifier	Biotique Advanced Ayurveda
Rejuvina herb complex	Sunburns, Depigmentation	Moisturizing, skin rejuvenation	Lotus Herbals
Camwell hand to heal cream	Skin cancers Management	Soothes hand and foot syndrome, Xeloda feet, reduces pain in hands and feet	Unitech Medical
Suplimax herbal cream	Skin cancer management, Sunburn	Skin lesions, scratches	Fabu Pharm
Diana's bulbinelladespatch cream	Skin cancer, Eczema, Psoriasis, Shingles	Reduces allergies	Uitenhage
Karela swaras	Cancer, Skin problems	Diabetes, asthma, antioxidant, indigestion, weightloss	Vedic
Orange herbal extract capsules 650mg	Skin problems	Improves Digestion, Improves Immune System, Lowers Risk of developing Kidney Stones, pre vents Diabetes, treats Scurvy, Cancers	Shubhanta Herbal
Neem herbal extract capsules	Skin problem	Blood purifier	Shubhanta Herbal
Charmrogari	Skin problems	Relieves pain	Baidyanath
Eczema Malam	Eczema, Skin diseases, Psoriasis,	Relieves pain	Baidyanath

	Scabies		
Sorvex cream	Skin scaling, Itching, Skin irritation	Reduce redness and pain	Poly Care Herbals
Neem extract capsules	Skin infection, Antibacterial and Fun gal infection	Blood purifier	Herbkure
Probelle	Fungal infections	Foot and body cleansers	All Naturals
Aactaril soap	Bacterial and Fungal infections	Moisturizing	Himalaya
Wonder balm	Skin infection, Fungal infection of nails, Skin rashes	Antiseptic for face, reduces itching in groin and feet area	Puriya

Sativum

Sativum, also known as garlic, belongs to the Liliaceae family. When 7,12 dimethylbenz(a)anthracene (DMBA)--infected Swiss albino mice were studied, the mice treated with garlic both before and following the onset of skin carcinogenesis showed the greatest chemopreventive efficacy of garlic. Consuming garlic slowed down the development of skin papillomas in animals and concurrently decreased their size and quantity, as demonstrated by the mice's skin histology. It is believed that garlic stimulates cellular defence systems, which helps prevent mice from skin cancer, at least in part (55,56).

Fig 15:*Sativum*

Beta vulgaris

Beetroot, or Beta vulgaris, belongs to the Brassicaceae family. A high degree of activity was seen in the in vitro inhibitory effect of beetroot extract on EBV-EA induction using Raji cells when compared to capsanthin, cranberries, red onion peel, and short and long red bell peppers. A significant tumor-inhibiting effect was also shown in an in vivo investigation of anti-tumor-promoting activity in mice's skin and lung bioassays. According to the research, eating beetroot may be one of the best strategies to prevent cancer (7,57).

Fig 16: *Beta vulgaris*

Camellia sinensis

The tea plant C. sinensis, which is used to make green tea, may help treat tumours and skin cancer. It contains polyphenols, which function in the body as antioxidants. Green tea contains a polyphenol called epigallocatechin gallate, which has been demonstrated by the National Centre for Complementary and Alternative Medicine to postpone the body's initial skin tumour growth. It keeps the skin looking younger by having the power to repair ageing skin cells and enable them to start multiplying once more (58,59).

Fig 17: *Camellia sinensis*

Crocus sativus

Natural plant saffron has sedative, emmenagogic, carminative, diaphoretic, and antispasmodic effects. The chemopreventive effect of aqueous saffron on chemically induced skin carcinogenesis was examined using a histological approach. Animals that consumed it saw a decrease in size and no development of cutaneous papillomas. Saffron administered early protected mice from developing skin cancer caused by DMBA. This may be partially or entirely related to the activation of cellular defence mechanisms. It's also reportedly beneficial for psoriasis treatment (7,60).

Fig 18:*Crocus sativus*

Benefits of Herbal Medicine

Similar to mainstream treatment, herbal remedies have been used for thousands of years. The basis of contemporary medicine is herbal therapy. Additionally, this drug has comparatively little side effects that are natural. Unfortunately, herbal medicine often gets overlooked when it comes to medical applications. Compared with conventional pharmaceutical treatment, this is regrettable because herbal remedies are quite beneficial. There are many positive health effects. Nowadays, a wide range of

illnesses are treated with herbal medication. more economical than conventional medical care. It is far more accessible than prescription medications. The metabolism and hormones are stabilized. natural medicine strengthening of the immune system. Less adverse effects are present. Economical (61).

Ethical Statement

An excellent pharmacist offers patients compassion and understanding in addition to the appropriate drugs.

Acknowledgement

The authors would like to thank, Azad Institute of Pharmacy & Research, Lucknow, Uttar Pradesh, India for extending their facilities.

Conflict of Interest

The authors attest that they are free of any known financial or personal conflicts of interest that would taint the findings of this study.

Informed Consent

Using websites, review articles, and other sources to produce research content.

Conclusion

The Indian medical system's foundations are firmly anchored in the practice of using herbs for therapeutic purposes. People all over the world rely heavily on the herbal remedial healing system for their main health care due to the development of science, technology, and modern medicine. Because of its widespread use in nature, reduced cost, negligible adverse effects, and appeal, herbal phytomedicine is becoming more and more reliable every day. Nature helps to provide necessary medications for human survival on the globe in an endeavour to meet the demands of a growing human population and deteriorating health. The herbal medicines offer direct therapeutic alternatives for a variety of skin-related illnesses. Numerous studies on herbal extracts have revealed their therapeutic efficacy against a range of skin conditions, including rashes, eczema, acne, psoriasis, fungal and bacterial infections, skin pigmentation, anti-cancer, and small cuts and wounds. I summarized the systemic methods of herbal remedies that are useful in treating skin conditions in this review paper. These include Tulsi, Neem, Aloe, Ficus, Papaya, Jatropha, Onion, Liquorice, Amla, and Euphorbia. The success of many natural medicines encourages broad screening for the development of newer, more effective, and useful targets for the herbal industry, which works in tandem with the pharmaceutical industry to manage health care. The advantages of herbal phytomedicines drive scientists studying the prevention of skin infections to filter out more innovative lead compounds and methods, advancing the field of drug discovery.

Reference

1. Hay R, Bendeck SE, Chen S, et al. Skin Diseases. In: Jamison DT, Breman JG, Measham AR, et al., editors. Disease Control Priorities in Developing Countries. 2nd edition. Washington (DC): The International Bank for Reconstruction and Development / The Worl. Vasc Embolotherapy. 2006;(Dc):107–18.
2. Joseph N, Kumar G, Nelliyanil M. Skin diseases and conditions among students of a medical college in southern India. Indian Dermatol Online J. 2014;5(1):19.
3. Yousef H, Alhajj M, Sharma S. Anatomy, Skin (Integument), Epidermis. [Updated 2022 Nov 14]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK470464/. 2024;470464.
4. Lopez-Ojeda W, Pandey A, Alhajj M, et al. Anatomy, Skin (Integument) [Updated 2022 Oct 17]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK441980. 2024;441980.
5. Alkilani AZ, McCrudden MTC, Donnelly RF. Transdermal drug delivery: Innovative pharmaceutical developments based on disruption of the barrier properties of the stratum corneum. Pharmaceutics. 2015;7(4):438–70.
6. Rabiei M, Kashanian S, Samavati SS, Jamasb S, McInnes SJP. Nanomaterial and advanced technologies in transdermal drug delivery. J Drug Target [Internet]. 2020;28(4):356–67. Available from: https://doi.org/10.1080/1061186X.2019.1693579
7. Tabassum N, Hamdani M. Plants used to treat skin diseases. Pharmacogn Rev. 2014;8(15):52–60.
8. Nair PA, Patel BC. Herpes Zoster. [Updated 2023 Sep 4]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK441824/. 2024;441824.
9. Lei V, Petty AJ, Atwater AR, Wolfe SA, MacLeod AS. Skin Viral Infections: Host Antiviral Innate Immunity and Viral Immune Evasion. Front Immunol. 2020;11(November).
10. Aly R. Microbial Infections of Skin and Nails. In: Baron S, editor. Medical Microbiology. 4th edition. Galveston (TX): University of Texas Medical Branch at Galveston; 1996. Chapter 98. Available from: https://www.ncbi.nlm.nih.gov/books/NBK8301/. 1996;8301.
11. Moskaluk AE, VandeWoude S. Current Topics in Dermatophyte Classification and Clinical Diagnosis. Pathogens. 2022;11(9).
12. Thawabteh AM, Jibreen A, Karaman D, Thawabteh A, Karaman R. Skin Pigmentation Types, Causes and Treatment—A Review. Molecules. 2023;28(12).
13. Brenner M, Hearing JV. The protective role of melanin against UV. Photochem Photobiol. 2008;84(3):539–49.
14. Cooper GM. The Cell: A Molecular Approach. 2nd edition. Sunderland (MA): Sinauer Associates; 2000. The Development and Causes of Cancer. Available from: https://www.ncbi.nlm.nih.gov/books/NBK9963. 2000;9963.
15. Elgart ML. Scabies: diagnosis and treatment. Dermatology Nurs / Dermatology Nurses" Assoc.

1993;5(6):464–7.
16. Mahmoud B, Hamzavi I. Overview of vitiligo. Handb Vitiligo Basic Sci Clin Manag. 2016;1–1.
17. Durai PCT, Nair DG. Acne vulgaris and quality of life among young adults in South India. Indian J Dermatol. 2015;60(1):33–40.
18. Sandean DP, Winters R. Spider Veins. [Updated 2023 Jul 4]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK563218/. 2024;563218.
19. Ahuja A, Gupta J, Gupta R. Miracles of Herbal Phytomedicines in Treatment of Skin Disorders: Natural Healthcare Perspective. Infect Disord - Drug Targets. 2020;21(3):328–38.
20. Gabros S, Nessel TA, Zito PM. Topical Corticosteroids. [Updated 2023 Jul 10]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK532940/. 2024;532940.
21. Gupta AK, Foley KA. Antifungal treatment for pityriasis versicolor. J Fungi. 2015;1(1):13–29.
22. Caramori G, Mumby S, Girbino G, Chung KF, Adcock IM. Corticosteroids. 2019;
23. Alzohairy MA. Therapeutics role of azadirachta indica (Neem) and their active constituents in diseases prevention and treatment. Evidence-based Complement Altern Med. 2016;2016.
24. Hemdan BA, Mostafa A, Elbatanony MM, El-Feky AM, Paunova-Krasteva T, Stoitsova S, et al. Bioactive Azadirachta indica and Melia azedarach leaves extracts with anti-SARS-CoV-2 and antibacterial activities. PLoS One [Internet]. 2023;18(3 March):1–16. Available from: http://dx.doi.org/10.1371/journal.pone.0282729
25. Singab ANB, Mostafa NM, Fawzy IM, Bhatia D, Suryawanshi PT, Kabra A. Herbal Arsenal against Skin Ailments: A Review Supported by In Silico Molecular Docking Studies. Molecules. 2022;27(19):1–38.
26. 26. Pastorino G, Cornara L, Soares S, Rodrigues F, Oliveira MBPP. Liquorice (Glycyrrhiza glabra): A phytochemical and pharmacological review. Phyther Res. 2018;32(12):2323–39.
27. Sharma V, Katiyar A, Agrawal RC. Glycyrrhiza glabra: Chemistry and Pharmacological Activity. Ref Ser Phytochem. 2018;87–100.
28. Alobaidi AH, Hamad ES, Kudair KA, Alsamarai AM. Formulation of Hypopigmentation Cream and Evaluation of its Effect on Skin Pigment. Part I: Formulation of the Product. Our Dermatology Online. 2014;5(1):9–13.
29. Moldovan M, Lahmar A, Bogdan C, Parauan S, Tomuţă I, Crişan M. Formulation and evaluation of a water-in-oil cream containing herbal active ingredients and ferulic acid. Clujul Med. 2017;90(2):212–9.
30. Cohen MM. Tulsi - Ocimum sanctum: A herb for all reasons. J Ayurveda Integr Med. 2014;5(4):251–9.
31. Pattanayak P, Behera P, Das D, Panda S. Ocimum sanctum Linn. A reservoir plant for therapeutic applications: An overview. Pharmacogn Rev. 2010;4(7):95–105.
32. Hossain S, Urbi Z, Karuniawati H, Mohiuddin RB, Qrimida AM, Allzrag AMM, et al. Andrographis paniculata (Burm. f.) wall. ex nees: An updated review of phytochemistry, antimicrobial pharmacology, and clinical safety and efficacy. Life. 2021;11(4):1–39.
33. Shukla SD, Bhatnagar M, Khurana S. Critical evaluation of ayurvedic plants for stimulating intrinsic antioxidant response. Front Neurosci. 2012;6(JULY):1–12.
34. Sharma R, Martins N, Kuca K, Chaudhary A, Kabra A, Rao MM, et al. Chyawanprash: A traditional indian bioactive health supplement. Biomolecules. 2019;9(5):1–24.
35. Rajeswari R, , M. Umadevi CSR, , S. Selvavenkadesh, K. P. Sampath Kumar DB. Aloe vera: The Miracle Plant Its Medicinal and Traditional Uses in India. J Pharmacogn Phytochem [Internet]. 2012;1(4):118–24. Available from: http://www.phytojournal.com/vol1Issue4/Issue_nov_2012/17.1.pdf
36. 36. Sánchez M, González-Burgos E, Iglesias I, Gómez-Serranillos MP. Pharmacological update properties of aloe vera and its major active constituents. Molecules. 2020;25(6):1–37.
37. Kulawik-pióro A, Goździcka WJ. Plant and Herbal Extracts as Ingredients of Topical Agents in the Prevention and Treatment Radiodermatitis: A Systematic Literature Review. Cosmetics. 2022;9(3).
38. Koul B, Pudhuvai B, Sharma C, Kumar A, Sharma V, Yadav D, et al. Carica papaya L.: A Tropical Fruit with Benefits beyond the Tropics. Diversity. 2022;14(8).
39. Lidiani F. Santana 1 ACI 1, , Bruna Larissa Spontoni do Espirito Santo 1, Wander F. O. Filiú 2, Arnildo Pott 3 FMA 3, , Rita de Cássia A. Guimarães 1, Karine de Cássia Freitas 1 * and Priscila A. Hiane 1, 1. Nutraceutical Potential of Carica papaya in Metabolic Syndrome. Nutrients. 2014;59(3):267–86.
40. Salim MN, Masyitha D, Harris A, Balqis U, Iskandar CD, Hambal M, et al. Anti-inflammatory activity of Jatropha curcas Linn. latex in cream formulation on CD68 expression in mice skin wound. Vet World. 2018;11(2):99–103.
41. Oskoueian E, Abdullah N, Ahmad S, Saad WZ, Omar AR, Ho YW. Bioactive compounds and biological activities of Jatropha curcas L. kernel meal extract. Int J Mol Sci. 2011;12(9):5955–70.
42. Benzie IFF, Wachtel-Galor S. Biomolecular and clinical aspects 2nd edition. In: Bode AM, Dong Z, editors. The Amazing and Mighty Ginger. chapter 7 the amazing and mighty ginger; CRC Press/Taylor & Francis. Herb Med. 2011;(ISBN 9781439807132.):92775.
43. Mao QQ, Xu XY, Cao SY, Gan RY, Corke H, Beta T, et al. Bioactive compounds and bioactivities of ginger (zingiber officinale roscoe). Foods. 2019;8(6):1–21.
44. Zhou L, Li J, Kong Q, Luo S, Wang J, Feng S, et al. Chemical composition, antioxidant, antimicrobial, and phytotoxic potential of Eucalyptus grandis × E. urophylla leaves essential oils. Molecules. 2021;26(5).

45. Kumar S, Malhotra R, Kumar D. Euphorbia hirta: Its chemistry, traditional and medicinal uses, and pharmacological activities. Pharmacogn Rev. 2010;4(7):58–61.
46. Kumar S, Malhotra R, Kumar D. IJPhS-72-533. 2010;(August):533–7.
47. Application I. Industrial Application and Health Prospective of Fig (Ficus carica) By-Products. 2023;
48. 48. Khan H, Akhtar N, Ali A. Effects of Cream Containing Ficus carica L . Fruit Extract on Skin Parameters : In vivo Evaluation. 2014;(December):560–4.
49. Hong MY, Lumibao J, Mistry P, Saleh R, Hoh E. Fish Oil Contaminated with Persistent Organic Pollutants Reduces Antioxidant Capacity and Induces Oxidative Stress without Affecting Its Capacity to Lower Lipid Concentrations and Systemic Inflammation in Rats 1 – 3. 2015;939–44.
50. Khan WA, Chun-mei H, Khan N, Iqbal A, Lyu S wu, Shah F. Bioengineered Plants Can Be a Useful Source of Omega-3 Fatty Acids. 2017;2017.
51. Amirah N, Zaid M, Gan SH, Lum PT, Najihah N, Mat I. Promising Natural Products in New Drug Design , Development , and Therapy for Skin Disorders : An Overview of Scientific Evidence and Understanding Their Mechanism of Action. 2022;(August 2021).
52. Chakraborty AJ, Uddin TM, Zidan BMRM, Mitra S, Das R, Nainu F, et al. Allium cepa : A Treasure of Bioactive Phytochemicals with Prospective Health Benefits. 2022;2022.
53. Kianian F, Marefati N, Boskabady M, Zahra S. Pharmacological Properties of Allium cepa , Preclinical and Clinical Evidences ; A Review. 2021;20(March 2020):107–34.
54. Coyago-cruz E, Moya M, Gabriela M, Villac M, Rojas-silva P, Corell M, et al. Exploring Plants with Flowers : From Therapeutic Nutritional Benefits to Innovative Sustainable Uses. 2023;
55. Omar SH. Organosulfur compounds and possible mechanism of garlic in cancer. Saudi Pharm J [Internet]. 2010;18(1):51–8. Available from: http://dx.doi.org/10.1016/j.jsps.2009.12.007
56. Khataibeh MH, Abu-samak M, Banu N. Biochemical Investigation of the Effect of Garlic (Allium sativum) on 7 , 12- dimethylbenz [a] anthracene (DMBA) Induced Mammary Cancer in Female Albino Rats. 2006;(March).
57. Babarykin D, Smirnova G, Pundinsh I, Vasiljeva S, Krumina G, Agejchenko V. Red Beet (Beta vulgaris) Impact on Human Health. 2019;61–79.
58. Resistance S. A Review of the Role of Green Tea (Camellia sinensis) in Antiphotoaging, Stress Resistance, Neuroprotection, and Autophagy. 2019;
59. Chacko SM, Thambi PT, Kuttan R, Nishigaki I. Beneficial effects of green tea : A literature review. 2010;1–9.
60. Hosseinzadeh H, Noraei NB. Anxiolytic and Hypnotic Effect of Crocus sativus Aqueous Extract and its Constituents , Crocin and Safranal , in Mice. 2009;774(January):768–74.
61. Herbal versus synthetic drugs; beliefs and facts Ali Karimi1 , Maedeh Majlesi2, Mahmoud Rafieian-Kopaei1* 1Medical Plants Research Center, Shahrekord University of Medical Sciences, Shahrekord, Iran 2Faculty of Nursery and Midwifery, Iran University of Me. 2015;4(1):27–30.