
Medicinal Plants for the Treatment of Acne Vulgaris: A Review of Recent Facts

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Abstract

Acne vulgaris (acne) is a cutaneous pleomorphic sickness of the pilosebaceous unit related to deformity in sebum production and is characterised with the aid of each inflammatory (papules, pustules and nodules) and non-inflammatory (comedones, open and closed) lesions and frequently scars in positive sites of predilection, namely, the face, neck, upper trunk and hands. Acne is a fashionable but grave pores and skin disease, which affects approximately 80 percentteens and young adults in 11–30 age institution. 42.5% of fellows and 50.9% of women retain to suffer from this ailment into their twenties. Propionibacterium acnes and Staphylococcus epidermidis are commonplace pus-forming microbes liable for the growth of numerous forms of pimples. There are four nicely-recognized pathological elements chargeable for acne which is also the goal for pimples therapy. This disease stays a commonplace circumstance in evolved societies, with many mainstream treatment alternatives to be had. There are many pimples products on the market, and making the perfect selection can be intimidating. Acne therapy includes prolonged use of comedolytic marketers, antibiotics and anti-inflammatory marketers which are known to cause many side effects. Moreover, the huge and enduring use of antibiotics through the years has unhappily led to emergence of resistant lines. To avoid aspect results, traditional or natural formulations are preferred. Herbs are safe, efficacious and multifunctional. Medicinal plant extracts are regarded to have good sized healing potential. Plant-based arrangements with little or no aspect results are often returning to balance dermatological therapy. They serve as safer preference or in some instances is the handiest effective remedy. It is essential to study and be alert of the modern-day literature and research concerning herbs and their actives position inside the management of acne. The present compiled work was conducted to make a top level view and correlation between antimicrobial activities of medicinal flowers towards these etiologic agents of acne vulgaris.

Keyword: *Acne vulgaris, Pilosebaceous, Propionibacterium acnes, Staphylococcus epidermidis, Medicinal plant, Antimicrobial activities.*

Introduction

Skin is possibly the most vulnerable a part of our body. Acne is one of the maximum common multifactorial persistent inflammatory illnesses of the pilosebaceous follicles involving androgen brought about sebaceous hyperplasia, altered follicular keratinisation, hormonal imbalance, immune hypersensitive reaction and bacterial (*Propionibacterium acnes*) colonisation [1, 2]. Strauss et al. [3] defined acne as a chronic inflammatory dermatosis which consists of open comedones (blackheads), closed comedones (whiteheads) and inflammatory lesions which include nodules, pustules and papules. Thiboutot et al. [4] counseled that acne need to be recognized as a continual ailment which may additionally have an effect on the patient psychologically. In current years, acne has been located in younger sufferers due to the sooner onset of puberty [5]. Adebamowo et al. [6] stated that acne is greater not unusual in girls within the age range of 12 years and younger, but it provides more in boys in the age variety of 15 years or older. In maximum instances, acne vanishes inside the patient's early twenties; however, pimples may continue into adulthood which generally occurs more frequently in girls [7]. Acne has many terrible results on younger teenagers. It reasons pain, emotional stress, disfigurement and even everlasting scarring to the skin. It may additionally cause tension, depression, anger, scorn, stigmatization and embarrassment in sufferers and may diminish the patient's physiological and social health [8, 9]. Several elements may persuade zits manufacturing or boom its severity. Some of those factors consist of genetics, the male sex, youngsters, pressure and smoking as well as comedogenic medicinal drugs consisting of androgens, halogens, corticosteroids and pore clogging cosmetics. Past research shows that genetic affect mixed with comedogenic hormones (specially androgens) produce atypical volumes of sebum which contribute to acne lesions [7, 10,11]. The individual lesions of Acne vulgaris are separable into three kinds: non inflamed lesions, inflamed lesions and scars. Even although Acne vulgaris is the most not unusual sort of acne, different kinds additionally exist like Acne vulgaris, Acne conglobata, Acne fulminans, Acne excorièe, Acne mechanica, Acne rosacea[12].

Pathogenesis of acne

Acne affects the pilosebaceous gadgets of the skin which provides with a spread of lesions at numerous inflammatory tiers, consisting of acne scars and hyperpigmentation [10, 13]. Acne lesions are maximum generally gift on the face, chest, upper returned and upper hands which might be known to have a excessive density of sebaceous glands [5]. The 4 primary pathological elements worried inside the improvement of pimples are

- ✓ Increased sebum production,
- ✓ Irregular follicular desquamation,
- ✓ *Propionibacterium acnes* proliferation
- ✓ Inflammation of area [14].

Excess sebum production

Androgen hormones (in particular testosterone) stimulate extended manufacturing and secretion of sebum. Increased sebum production directly correlates with the severity and occurrence of acne lesions and because of this it's far an important issue that need to be considered whilst dealing with patients suffering from Acne vulgaris [15, 16].

Epidermal hyper-proliferation and formation of comedones

The keratinocytes in everyday follicles are commonly shed to the lumen as single cells which might be then excreted. In patients with zits, hyper-proliferation of the keratinocytes arise and they're now not shed as they should be, which ends in the gathering of the extraordinary desquamated corneocytes within the sebaceous follicle along with different lipids and monofilaments. This phenomenon outcomes in comedogenesis [14].

Propionibacterium acnes infiltration

The micro flora present in a normal sebaceous follicle is qualitatively alike to that establish in comedones. This includes three synchronized groups of bacteria, that is

- Coagulase-negative staphylococci (*Staphylococcus epidermidis*)
- Anaerobic diphtheroids (*P. acnes* and *Propionibacterium granulosum*)
- Lipophilic yeasts (*Pityrosporum* species) [17].

P. acnes and *S. epidermidis* diverge in their potential to provoke local skin inflammation and to produce pro-inflammatory mediators. It was however determined that *S. epidermidis* is not probable to partake in the pathogenesis of inflammatory Acne vulgaris skin lesions as the antibody response to *S. epidermidis* was rather harmless compared to the antibodies generated by *P. acnes* [18]. *P. acnes* emerge to be the mainly possible organism to origin Acne vulgaris and are thus the target of oral and topical antibiotic treatments [17].

Inflammation process

The inflammatory system starts offevolved when *P. Acnes* is detected through the immune system. *P. Acnes* have a incredibly inflammatory effect which may additionally trigger the release of chemostatic factors which includes lymphocytes, neutrophils and macrophages. These elements can also cause follicular harm, rupture and leakage of bacteria, fatty acids and lipids into the encompassing epidermis. This process will give upward thrust to inflammatory lesions (pustules, nodules, cysts and papules). Inflammatory lesions are full of pus and are larger than non-inflammatory lesions [9, 13-15]. Additionally it become discovered that neutrophils generate reactive oxygen species (ROS) which partly contributes to acne inflammation by way of negative the follicular epithelium. This ends in the expulsion of the follicular content into the epidermis which therefore causes diverse inflammatory approaches [19].

Causes of acne vulgaris

- *Infectious Contribution*
- *Dietary Contribution*
- *Genetic Contribution*
- *Hormonal Changes*

➤ *Psychological Contribution*

Treatment of acne

The main aim of acne treatment is to control and treat present acne lesions, save you everlasting scarring as a ways as feasible, restriction the period of the disease and to limit morbidity. The affected person have to be informed on the aims concerned in preventing new acne lesions while allowing the existing ones to heal. Patients have to additionally be made aware that it may take 3–6 weeks until an perfection may be observed [5, 9, 20]. Individual affected person elements should be taken into consideration while determining a routine for the remedy of pimples. Some of these factors are the contemporary medical circumstance, ailment country, severity of the lesions, endocrine history and the desired remedy of the affected person (oral or topical). Acne may be handled topically or systemically (with oral capsules) as visible in Table 1. Other remedy alternatives consist of hormonal, the use of herbal products or the usage of non-drug treatments, such as for example optical therapy. However, a combination treatment that targets more than one of the mechanisms of acne pathogenesis is often successfull. The response of the affected person is recorded and the regimen may be adjusted as the clinical circumstance improves [10]. Topically used agents are benzoyl peroxide, antibiotics and retinoids. Systemically used sellers are antibiotics and isotretinoin. For decades, antibiotics and retinoids had been used and that they nevertheless remain an amazing choice for the topical and systemic treatment of Acne vulgaris. But, these capsules produce some of potential side results and development of resistance to regularly used antibiotics. This results in treatment failure with previously used successful therapy. Therefore, an alternative for the treatment of acne have been studied and developed and as a result natural processes to preventing acne and its disfiguring consequences have gained recognition. Numbers of conventional and novel natural cosmetics are useful to deal with damaged pores and skin [21-24]. The negligible unfavourable results of natural capsules in comparison with contemporary drugs will become some other vital thing in the remedy of this condition. In upcoming years herbal therapies are gaining attention of researchers, academicians, industrialist, cosmetician, dermatologist and scientist for pimples remedy. Acne may be cured by herbs either eating internally or externally or with each. Topical remedy of herbs is leading preference of purchasers as ease of utility and it surpasses the sour flavor of natural method (while taken internally). Because herbs are safe, efficacious and the delivered benefit of multifunctionality, herbs are more and more being used in mainstream beauty merchandise, including acne-fighting compositions. Although some of the herbs are scientifically explored for their efficacy in treatment of pimples however nonetheless many herbs are continue to be untouched via scientist. This review makes a speciality of the topical benefits of a few herbals extracts, gel, oil, for the treatment of Acne vulgaris.

Table 1 Different treatment options for acne.

Treatment Methods	Examples
Topical	Retinoids: adapalene, isotretinoin, motretinide, retinoyl- β -glucuronide, tazarotene, tretinoin

	Antibiotics: clindamycin, erythromycin Diverse: azelaic acid, benzoyl peroxide, chemical peels, corticosteroids, dapson, hydrogen peroxide, niacinamide, salicylic acid, sodium sulfacetamide, sulfur, triclosan
Systemic	Retinoids: isotretinoin Antibiotics: azithromycin, clindamycin, co-trimoxazole, doxycycline, erythromycin, levofloxacin, lymecycline, minocycline, roxithromycin Hormonal: contraceptives Diverse: clofazimine, corticosteroids, ibuprofen, zinc sulfate
Complementary and Alternative Medicines (CAM)	Achillea millefolium, amaranth, antimicrobial peptides, arnica, asparagus, basil oil, bay, benzoin, birch, bittersweet nightshade, black cumin, black walnut, borage, Brewer's yeast, burdock root, calendula, celandine, chamomile, chaste tree, Commiphora mukul, copaiba oil, coriander, cucumber, duckweed, Du Zhong extract, English walnut, Eucalyptus dives, fresh lemon, garlic, geranium, grapefruit seeds, green tea, jojoba oil, juniper twig, labrador tea, lemon grass, lemon, minerals, neem, oak bark, onion, orange peel, orange, Oregon grape root, patchouli, pea, petitgrain, pine, pomegranate rind extract, poplar, probiotics, pumpkin, resveratrol, rose myrtle, rhubarb, Rosa damascena, rosemary, rue, safflower oil, sandalwood, seaweed, soapwort, Sophora flavescens, specific antibodies, stinging nettle, sunflower oil, Taraxacum officinale, taurine bromamine, tea tree oil, thyme, turmeric, vinegar, vitex, witch hazel, Withania somnifera and yerba mate extract
Physical Treatment	Comedone extraction, cryoslush therapy, cryotherapy, electrocauterization, intralesional corticosteroids and optical treatments

Herbal therapy

More efficient and more secure treatment alternatives are wished for the remedy of acne [25]. Many herbal treatment options had been referred to and/or promoted to be used as acne remedy [26] and are commonly seemed as safe. Botanical healing procedures have the brought advantage of owning several modes of movement due their composition consisting out of various viable lively components [27]. It has been proposed that Complementary and Alternative Medicines (CAM) treatment plans have an impact on the androgenicity, improved sebum activity, infection, irritation and hyperkeratinization related to acne [26]. Some researchers are of the opinion that botanicals may reduce antibiotic resistance whilst used as alternatives to or in combination with antibiotics. This has to, but, nevertheless be confirmed with scientific studies [27]. The efficacy of those natural agents in acne treatment isn't handiest primarily based on antimicrobial interest however on their possessed moisturizing, soothing homes, antioxidant and anti-inflammatory houses by using which they inhibit neutrophil migration and generation of Reactive Oxygen Species. Also various herbs used in

acne due to their skin cleansing belongings and relieve some of the drying outcomes caused by the more full of life acne therapies and the erythema associated with inflammatory pimples [28, 29]. Herbal extracts or oil may be used as monotherapy or in aggregate remedy. There are positive herbal extracts together with *A. Dahurica*, *M. Alternifolia*, *A. Indica*, *R. Coptidis* and *P. Quajava* which can be proved to be extra effective than antibiotics and retinoids [30]. Below a few herbs are mentioned in details for their efficacy in pimples remedy.

Arctium lappa (Great burdock) [31, 32]

Burdock root extract has sturdy antibacterial and estrogenic impact and therefore it's miles used for remedy of different skin situations like dry, scaly pores and skin and cutaneous eruptions, eczema, psoriasis, dermatitis, boils, carbuncles, sties and persistent acne. Biological sports and pharmacological functions reported for burdock include anti-inflammatory, anticancer, antidiabetic, diuretic, antimicrobial, antiviral and free radical scavenging activities. The root consists of lignans such as arctigenin, glycoside arctiin, and matairesinol, polyacetylenes consisting of tridecadienetetraynes, tridecatrienetriynes, and sulfur containing arctic acid. It also contains amino acids including alpha guanidino-n-butyric acid, inulin, natural acids, fatty acids and phenolic acids.

Oenothera biennis (Evening primrose)

Evening primrose oil (EPO) made from the seeds of *O. Biennis* is a hard and fast oil extremely rich in important fatty acids gambling an vital function in prostaglandin synthesis of human frame. It's been used for a huge variety of skin conditions inclusive of eczema, psoriasis and acne. It is also used as a dietary source of important fatty acids and in the production of soaps and cosmetic components. EPO has demonstrated sizeable impact in remedy of other sicknesses like asthma, rheumatoid arthritis, breast troubles and metabolic disorders. Seeds from *O. Biennis* comprise 14% of EPO which usually includes 50 - 70% cis-linoleic acid (LA) and 7-10% cis-gamma-linolenic acid (GLA).

Viola tricolor (Heartsease)

It contains special training of secondary metabolites which includes Flavonoids. The amount of flavonoids within the herb *Viola tricolor* and *Viola arvensis* was discovered to be 2.1% and 1.3%, respectively eg. Violanthin, rutin, quercetin, luteolin and luteolin 7-glucoside. Other flavonoids: apigenin mono-C-glucosides: vitexin and isovitexin (saponaretin), luteolin mono-C-glucosides: orientin and isoorientin, and scoparin (3'-O-methyllyluteolin 8-Cglucoside), and few other O- or C-glycosides. Phenolic acids is about 0.18%, including trans-caffeic, p-coumaric, gentisic, protocatechuic, phydroxybenzoic, p-hydroxyphenylacetic, and vanillic acids, and 0.06% to about 0.3% salicylic acid and its derivatives, which include methyl salicylate and violutoside (violutin, glucosidoarabinoside of methyl salicylate), and monotropitoside (primveroside of methyl salicylate). It also consists of carotenoids, unstable oil, anthocyanins. Experimental preclinical information confirmed antioxidant, antibacterial and anti-inflammatory interest of heartsease in one of a kind pores and skin conditions.

Vitex agnus castus (Chaste tree)

No single constituent has been identified as being the energetic one, in truth, except for agnoside, all constituents are found in different flora. The general sum of constituents appears to generate a synergistic effect are flavonoids: castican, orientin, isovitexin, vitexin. Iridoid glycosides: agnuside, aucubin. Volatile oil (0.8-1.6%): terpenoids (cineole, sabinene, limonene, camphene), α - and β -pinene and 3-Ketosteroids, It is maximum normally used herbs for addressing hormonal troubles that get up in acne.

Hamamelis virginiana (Witch hazel)

The major characteristic constituent of *Hamamelis virginiana* is hamamelitannin. Extracts from witch hazel bark have lengthily been used in therapy of pores and skin diseases and in cosmetic formulas for pores and skin lotions, nourishing creams, pre- and after-shaves, and many others.

Eucalyptus globules

Two products from eucalyptus are in medicinal and industrial use, essential oil and dried extract, both obtained from leaves of *Eucalyptus globulus* Labill. The number one component of eucalyptus essential oil is eucalyptol (1.8-cineol). Secondary components of eucalyptus vital oil are alpha-pinene, limonene, globulol and terpinen-four-ol. The 2nd crucial product from eucalyptus is leaf dried extract. It incorporates gallic acid, ellagic acid, glucoaspects of quercetin and kaempferol, tannin dimer, oenothien B, Eucalyptol is toxic to many forms of bacteria and is one of the active components in antibacterial mouthwashes. Eucalyptols additionally have anti inflammatory and cough suppressant residences and are an element in many cough drops. There is little direct studies into the effectiveness of eucalyptus important oil within the treatment of acne.

Melaleuca alternifolia (Tea-tree)

It is the number one species for commercial production of Tea-tree oil (TTO, melaleuca oil), an vital oil with antibacterial and antifungal activity. More these days, the medical network has showed that TTO has brilliant medicinal blessings and it's far identified as an first rate natural remedy for masses of bacterial and fungal skin illnesses. Therefore it is utilized in a range of herbal medicinal drug merchandise and in beauty and toiletry products (deodorants, shampoos, soaps and lotions). TTO is composed of terpene hydrocarbons, most importantaly monoterpenes, sesquiterpenes, and their associated alcohols.

Ocimum sanctum (Holi basil)

In conventional systems of drugs, distinctive components (leaves, stem, flower, root, seeds or even complete plant) of *Ocimum sanctum* Linn used. It had been advocated for the treatment of bronchitis, bronchial asthma, malaria, diarrhea, dysentery, skin sicknesses, arthritis, painful eye diseases, continual fever, insect chew etc. The *Ocimum sanctum* has also been counseled to possess antifertility, antimost cancers, antidiabetic, antifungal, antimicrobial, hepatoprotective, cardioprotective, antiemetic, antispasmodic, analgesic, adaptogenic and diaphoretic moves. Eugenol, the energetic constituent present in *Ocimum sanctum*, has been located to be in large part liable for the healing potentials of the plant. A number of

sesquiterpenes and monoterpenes such as bornyl acetate, β -elemene, methyleugenol, neral, β -pinene, camphene, α -pinene etc. Also are present as components of the oil.

Calendula officinalis (Marigold)

A range of phytochemical research have demonstrated the presence of several instructions of chemical substances in vegetation or in different organs of marigold, the main ones being terpenoids, flavonoids, coumarines, quinones, unstable oil, carotenoids and amino acids. Marigold is considered a mainstay in opportunity medicine for the treatment of irritation, to hurry wound healing and as an antiseptic. Calendula off is likewise typically to be had in tea and liquid tinctures which can be carried out without delay to the pimples inclined areas of the skin.

Pterocarpus santalinus (Red sandal wood)

It is used as an astringent and tonic for external application in infection and it's also utilized in treating pores and skin sicknesses. It has been determined in studies that the secondary metabolites of diverse chemical kinds present inside the plant species are regarded to own antimicrobial sports. Flavonoids present in it are found to be effective antimicrobial materials towards a wide variety of microorganisms. In Kerala, it's miles ground to a paste with water or honey and implemented topically as a famous home cure for post-acne and other facial scars.

Santalum album (Sandal wood)

It is well-known for its volatile oil and useful in cutaneous irritation. Studied displays that it's been extensively used in skin care as an antiseptic and a skin softener. It acts as a prophylactic against skin sicknesses and allergic situations. Studies discovered that sandal powder paste is one of the best treatments for pimples and acne scar elimination. It relieves itching and infection of the pores and skin and acts as an antiseptic in acne. Good astringent for greasy skin and additionally gets rid of skin blemishes.

Plumbago zeylanica (Ceylon leadwort)

Chitrak is a herb that grows wild in India and has been utilized by rural and tribal humans for loads of years as a conventional system of medicine. It is rather customary all through Africa and Asia as a remedy for parasitic pores and skin illnesses. Acne vulgaris is one in all such skin sickness which can be cured by chitrak powder. Researches by using scientist shown that root incorporate plumbagin, a yellow naphthoquinone which is responsible for its antimicrobial and antibiotic interest. Research indicated that a completely dilute solution of plumbagin is deadly to a wide spectrum of bacteria.

Pisum sativum (Pea)

It has importance inside the remedy of acne. The seeds include proteins, lecithins, carbohydrates, fats and salts and are nutritive and antidermatosis. Their outcomes are clinically properly proved for plenty varieties of skin complaints, for example face mask made from beaten peas are used in instances of acne and on wrinkled skins.

Curcubita pepo (Pumpkin)

Its seeds other than as food components and dietary supplements used as powerful and cheap antibacterial agent for the treatment of bacterial infections. Linoleic, oleic, palmitic and stearic acid isolated from its seed oil were utilized in medication for their anti-inflammatory houses. The natives of Central America and India rub the oil extracted from the seeds of *Curcubita pepo* on *Acne vulgaris*. The roots are made into an infusion and used on syphilitic sores, herpes lesions, acne and blackheads.

Taraxacum officinale (Dandelion)

Among the most essential compounds in dandelion are sesquiterpene lactones believed to have anti-inflammatory results. Major sesquiterpene lactones, usually happening as glycosides (sugars), include taraxacosides, taraxacolides, dihydrolactucin, taraxinic acids and ainslioside. Its root has extended records of use for dermatological disorders together with spots, acne and pimples.

Black walnut

The bark, leaves, peel and green nut are commonly used, wherein a tincture of leaves and rind of green fruits are used for pimples, chancre and herpes. *Juglans regia* is referred to as the English walnut, where the leaves are the medicinal part used in India. The essential elements include 10% tannins ellagitannins, naphthalene derivatives juglone, flavonoids (hyperoside and quercetin).

Mugwort

The genus *Artemisia* is certainly one of the biggest in the Asteraceae family, inclusive of extra than 800 species which are tremendous over the world. Several *Artemisia* species (*A. Campestris*, *A. Absinthium* and *A. Vulgaris*) develop in Lithuania. *Artemisia vulgaris* and *Artemisia absinthum* are used historically in Philippines for pores and skin sicknesses. *Artemisia vulgaris* essential oils are used for their insecticidal, antimicrobial and anti-parasitical houses. Its dried leaves reduce into small fragments and used to set off more fast restoration of acne wounds.

Saponaria officinalis (Soapwort)

It consists of saponins (to 5%), comprising saporubin and saporubrinic acid, gums, flavonoids, vitamin C and vitexin. It has been apply topically for the remedy of certain skin conditions along with acne. The leaf, stem and root are used cosmetically, via boiling in soft water and act as surface energetic agent to facilitate cleansing of skin. Medicinally, the foundation decoction is used as a wash for acne and psoriasis.

Chamomile

Matricaria recutita, *Anthemis nobilis* and *Matricaria Chamomilla* are the members of the circle of relatives Compositae. Extracts of the plant are used inside the form of ointments, creams and inhalations supposed for nearby application. Chamomile extract, important oil and isolated components, possess antiinflammatory and analgesic results and are beneficial for treating for this reason secure treating continual pores and skin problems. Soak a piece of material in a combination of warm water and chamomile, to appease the irritated skin. This is

certainly a nice approach to treat inflamed pores and skin. Chamomile compress can also lessen acne scars and blackheads.

Pelargonium graveolens (Scented geranium)

Essential oil received through steam or water plus steam distillation of shoot biomass is notably used within the fragrance industry and in aromatherapy. Effect of geranium oil is aromatic, anti-inflammatory, antiseptic, astringent, balancing, calming, distressing, harmonizing, refreshing candy and sedative. On the skin, oil allows balancing the secretion of sebum and clears slow and oily skins, consequently so helpful with those troubles that come with greasy, over-oily skin and acne. Care need to be taken considering the fact that there's the possibility of touch dermatitis in hypersensitive people. It is a completely essential element of excessive grade perfumes because of its strong rose-like odour.

Berberis aquifolium (Oregon grape)

The root and root bark is alterative, blood tonic, cholagogue, diuretic, laxative and tonic. However, one latest observe, the usage of Mahonia topically showed this herb to lower sebum, reduce contamination and irritation. The antibacterial compounds berbamine and berberine are universally found in rhizomes of Mahonia species, on topical utility that are believed to reduce sebum manufacturing and kill bacteria present on skin. It may be externally applied within the shape of cream and gel to treat acne due to above stated properties.

Hydrastis canadensis (Golden seal)

Native Americans have used golden seal for numerous fitness situations which includes pores and skin diseases. The Indians used goldenseal for nearby inflammations and infections. The energetic elements of goldenseal consist of a set of alkaloids, hydrastine and berberine. Topically, golden seal is a powerful antibacterial, particularly due to its berberine content. Although less clinical studies had been executed to verify its use in acne, it's been noticed via natives, when utilized in mixture with Marshmallow to sooth infected pores and skin it will lessen redness and kill bacteria causing pimples contamination. Modern uses have covered as a laxative, diuretic, antiseptic and for hemorrhoids, mouth sores, eye infections, pimples and sorethroats.

Coleus forskohlii (Coleus)

It has been used for an expansion of functions, inclusive of skin disorders. In laboratory studies, coleus oil is an vital oil extracted from its roots and changed into discovered to greater successfully inhibit the increase of pores and skin pathogens which include Propionibacterium acnes associated with acne, Staphylococcus aureus a bacterial pressure determined in skin eruptions inclusive of pimples and Staphylococcus epidermidis, a bacterial strain taking place in a variety of opportunistic bacterial skin infections and in pimples. The comparative effects of coleus oil, tea tree oil and the conventional antimicrobial clindamycin towards Propionibacterium acnes. The extract turned into discovered to be safe to use in cosmetic formulations.

Kaempferia galangal (Lesser galangal)

It is commonly used as spice ingredients and medicinal herbs in South-east Asia and is valued historically for their wound healing and skin protectant motion. Extract organized by means of proprietary extraction method showed numerous fold more inhibitory activity in opposition to *Propionibacterium acnes* in comparison to conventional extract. The resultant extract has determined to be of particular composition which has antimicrobial motion and tyrosinase inhibitory functions, suggesting its multifaceted advantages in acne fighting formulations. Use of this extract in topical beauty and pharmaceutical formulations proves to be doubtlessly beneficial within the management of pimples in addition to in decreasing publish-acne scarring, pigmentation and blemishes.

Arnica montana (Arnica)

Arnica montana has these days end up famous as a topical remedy in gel or cream form to improve inflammatory skin situations and heal persistent wounds. The anti inflammatory interest of the dried flower heads of this plant is ascribed to its constituent sesquiterpene lactones inclusive of helanalin, 11 α , 13- dihydrohelenalin, chamissonolid and their ester derivatives. It seems that those additives act to lessen inflammation through inhibiting the transcription factor nuclear element- κ B and as a result beneficial inside the remedy of pimples, bruises and sprains.

Thymus vulgaris (Thyme)

Herb is wealthy in important oils and antioxidative phenolic substances. The published outcomes screen that principal unstable ingredients received from the aerial elements of the plant are geranial, linalool, Y-terpineol, carvacrol, thymol and trans-thujan-4-ol/terpinen-4-ol. Plant critical oils and extracts have been used for many hundreds of years, in particular in food upkeep, pharmaceuticals, opportunity medication and natural treatment plans. Studies have shown that it has anti-spasmodic, carminative, anti-oxidant and anti-microbial properties. Thyme is a stimulating pores and skin tonic and gentle antiseptic purifier. Ointment prepared from the leaves is useful within the treatment of cuts, burns, pimples and rashes.

Herbs used as traditional acne remedies

Garlic (*Allium sativum*), Aloe (*Aloe vera*), Amaranth (*Amaranthus spinosus*), Neem (*Azadirachta indica*), Lemon (*Citrus limon*), Coriander (*Coriandrum sativum*), Basil (*Ocimum basilicum*), Cucumber (*Cucumis sativus*), Grape (*Vitis vinifera*), Chickpea (*Cicer arietinum*), Beet (*Beta vulgaris*), Clove (*Syzygium aromaticum*), Papaya (*Carica papaya*), Turmeric (*Curcuma longa*), Onion (*Allium cepa*), Black pepper (*Piper nigrum*)

Conclusion

Acne vulgaris is a common skin affliction impacting the lives of millions. Many extraordinary treatment options are to be had for the remedy of acne. Study found out that our conventional background is hiding variety of impressive herbs which might be safe and powerful exchange to treatment pimples. Pharmaceuticals are looking a feasible alternative for determined teens and different peoples to break out from conditions ranging from

unsightly blemishes to disfiguring infection took place due to acne. Need is to involvement of sustained and non-stop research the usage of revolutionary technologies concentrated on those herbs as effective cutting-edge pores and skin care components. It is anticipated that this paper will encourage and useful resource researchers, cosmetician, academician, pharmacist, industrialist and dermatologist to utilize more exactly these herbs in topical dermato-cosmetic system so that consumers can get most benefits of natural substances.

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Table 2 List of plants used for treating the *Propionibacterium acnes* [33]

Plant and family	Plant part	Solvent used/ Preparation
<i>Albizia lebbek</i> Fabaceae	Whole plant	Pet.ether,
<i>Aloe vera</i> Liliaceae	Leaves	Water
<i>Alpinia galanga</i> Zingiberaceae	Rhizome	Ethyl acetate
<i>Apis mellifera</i> Apidae	Venom	Water
<i>Azadirachta indica</i> Meliaceae	Leaves	Ethanol
<i>Barleria lupulina</i> Acanthaceae	Whole plant	ND
<i>Cardiospermum halic acabum</i> Sapindaceae	Leaves	Ethanol
<i>Casuarina equisetifolia</i> Casuarinaceae	Fruit	Ethanol
<i>Cinnamomum zeylanicum</i> Lauraceae	ND	Essential oils
<i>Citrus hystrix</i> DC. Rutaceae	Leaf	Essential oils
<i>Citrus limon</i> Rutaceae	Fruit	Essential oils
<i>Citrus paradisi</i> Rutaceae	Grape fruit	Essential oils
<i>Coscinium fenestratum</i> Menispermaceae	Stem	Methanol
<i>Cucurbita pepo</i> L. Cucurbitaceae	Seeds	Ethanol
<i>Cynodon dactylon</i> Poaceae	Leaves	Ethanol
<i>Cymbopogon citrates</i> Stapf. Gramineae	Leaves	Methanol
<i>Eclipta alba</i> Asteraceae	Fruit	Ethanol
<i>Eucommia ulmoides</i> Eucommiaceae	Leaves	Methanol
<i>Eucalyptus globules</i> Myrtaceae	Leaves	Methanol- DCM (1:1)
<i>Eucalyptus maculate</i> Myrtaceae	Leaves	Methanol- DCM (1:1)
<i>Euphorbia hirta</i> Euphorbiaceae	Root	Ethanol
<i>Eupatorium odoratum</i> Asteraceae	Whole plant	ND
<i>Excoecaria cochinchinensis</i> Euphorbiaceae	ND	Ethanol, water

<i>Ficus religiosa</i> Moraceae	Leaves	Ethanol
<i>Garcinia mangostana</i> Guttiferae	Fruit	Ethanol
<i>Glycyrrhiza glabra</i> Leguminosae	Rhizome	Ethanol
<i>Hemidesmus indicus</i> Apocynaceae	Root	Ethanol
<i>Hibiscus sabdariffa</i> Malvaceae	Whole plant	ND
<i>Houttuynia cordata</i> Saururaceae	Whole plant	ND
<i>Jasminum grandiflora</i> Oleaceae	Flower	Essential oils
<i>Jasminum officinale</i> Oleaceae	Flower	Ethanol
<i>Jasminum sambac</i> Oleaceae	Flower, leaf	Ethanol, methanol
<i>Lavandula stoechas</i> Lamiaceae	ND	Essential oils
<i>Lawsonia inermis</i> Lythraceae	Whole plant	Pet.ether, water
<i>Llex paraguariensis</i> Aquifoliaceae	Leaves	Methanol
<i>Magnolia grandiflora</i> Magnoliaceae	Stem	ND
<i>Matricaria chamomilla</i> Compositae	ND	Essential oils
<i>Mentha piperita</i> Lamiaceae	Leaves	Ethanol
<i>Mentha spicata</i> Lamiaceae	Leaves	Essential oils
<i>Michelia alba</i> DC. Magnoliaceae	ND	Essential oils
<i>Momordica charantia</i> Cucurbitaceae	Fruit	Ethanol
<i>Ocimum sanctum</i> Lamiaceae	Leaves	Ethanol
<i>Ocimum basilicum</i> Lamiaceae	Leaves	Water
<i>Ocimum Americana</i> Lamiaceae	Whole plant	ND
<i>Piper nigrum</i> Piperaceae	Seed	Ethanol
<i>Phyllanthus niruri</i> Euphorbiaceae	Whole plants	Ethanol
<i>Pongamia pinnata</i> Fabaceae	Seeds	Ethanol
<i>Psidium guajava</i> Myrtaceae	Leaf	Water
<i>Quercus infectoria</i> Fagaceae	Whole plant	Methanol
<i>Rauwolfia serpentina</i> Apocynaceae	Root	Ethanol
<i>Rosa damascena</i> Rosaceae	Leaf	Methanol
<i>Senna alata</i> Fabaceae	Whole plant	ND
<i>Salvia officinalis</i> Lamiaceae	Leaf	Ethanol, water
<i>Senna alata</i> Fabaceae	Whole plant	ND
<i>Syzygium aromaticum</i> Myrtaceae	Flowering bud	Essential oils
<i>Symplocos racemosa</i> Symplocaceae	Bark	Ethanol
<i>Tephrosia purpurea</i> Fabaceae	Root	Ethanol
<i>Terminalia arjuna</i> Combretaceae	Bark	Acetone
<i>Thespesia populnea</i> Malvaceae	Root	Ethanol
<i>Tinospora cordyfolia</i> Menispermaceae	Root	Ethanol
<i>Thymus vulgaris</i> Lamiaceae	ND	Essential oils
<i>Zingiber officinale</i> Zingiberaceae	Rhizome	Essential oils

ND= Not Defined in articles

Table 3 Clinical trials with positive effects [34]

Medicinal Plants	Family	Used Part(s)	Active Compound	results
<i>Aloe vera</i>	Xanthorrhoeaceae	extracts	-	anti-bacterial and anti-inflammatory properties
<i>Azadirachta indica</i>	Meliaceae	extracts	-	anti-bacterial and anti-inflammatory properties
<i>Curcuma longa</i>	Zingiberaceae	extracts	-	anti-bacterial and anti-inflammatory properties
<i>Hemidesmus indicus</i>	Apocynaceae	extracts	-	anti-bacterial and anti-inflammatory properties
<i>Terminalia chebula</i>	Combretaceae	extracts	-	anti-bacterial and anti-inflammatory properties
<i>Withania somnifera</i>	Solanaceae	extracts	-	anti-bacterial and anti-inflammatory properties
<i>Butyrospermum paradoxum</i>	Sapotaceae	oil	-	anti-bacterial
<i>Camellia sinensis</i> L.	Theaceae	-	polyphenol,	anti-inflammatory, 5 α -reductase inhibitory
<i>Commiphora mukul</i>	Burseraceae	gugulipid, a standardized extract of the oleoresin	polyunsaturated fatty acid oleoresin	anti-bacterial activity
<i>Hippophae rhamnoides</i>	Elaeagnaceae	fruit extract	vitamins C and E, organic acids, macronutrients, polyunsaturated fatty acid	type 1- α reductase inhibitory activity
<i>Lens culinaris</i>	Fabaceae	powder and complex extracts	polyphenol,	Anti-oxidant, anti-inflammation, anti-androgen and anti-bacterial activates
<i>Aloe barbadensis</i>	Asphodelaceae	powder and complex	polysaccharide,	Anti-oxidant, anti-inflammation, anti-androgen

		extracts		and anti-bacterial activates
<i>Vitex negundo</i>	Verbenaceae	-	flavonoid	Anti-oxidant, anti-inflammation, anti-androgen and anti-bacterial activates
<i>Andrographis paniculata</i>	Acanthaceae	-	-	Anti-oxidant, anti-inflammation, anti-androgen and anti-bacterial activates
<i>Salmalia malabarica</i>	Malvaceae	-	-	Anti-oxidant, anti-inflammation, anti-androgen and anti-bacterial activates
<i>Melaleuca alternifolia</i>	Myrtaceae	oil	-	anti-inflammation and anti-bacterial activates