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A REVIEW: NATURAL REMEDIES FOR ANTI-ACNE THERAPY

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ABSTRACT

The body's most delicate organ is the skin. It is well fact that daily skin exposure causes a variety of issues, including pigmentation, acne, pimples, and sunburn markings. These days, acne is the most prevalent skin condition. Acne is a follicular skin disorder characterized by inflammatory and non-inflammatory lesions and scarring that mostly affects the Pilosebaceous unit of the face, neck, and trunk. Approximately 80–95% of people in their pubertal years, 20–45% of adults, and less than 25% of women experienced skin disorders including acne, black spots, etc. Adult female acne can affect women even after they turn 25. For a very long time, there have been a lot of topical and systematic treatments for Acne vulgaris that use synthetic components. Because synthetic medications have a high risk of side effects and can be used in both internal and exterior therapy, Natural treatments are thought to be a safer and more effective option for treating acne vulgaris. The use of phytochemicals and medicinal plants to treat skin conditions, such as acne vulgaris, has grown in popularity during the last few decades. A relevant approach is the use of natural medicine as an alternative and supplemental therapy. This study's primary goal was to systematically evaluate the safety and effectiveness of natural medicinal herbs and phytochemicals in the

management of acne vulgaris.

KEYWORDS: *Acne Vulgaris*, Natural Medicinal Plants, Natural remedies, Skin Diseases, Acne Therapy.

1] Introduction to Acne

Acne vulgaris or simply known as acne is a human skin disease characterised by skin with scaly redskin (seborrheas), blackheads and whiteheads (comedones), pinheads (papule), large papule (nodules), pimples and scarring.[1] Acne affects skin having dense sebaceous follicles in areas including face, chest and back.[2] Acne may be of inflammatory or non-inflammatory forms.[3] Acne is usually caused by increase in androgens level like testosterone mainly during puberty in both male and female.[4]

1.1] Etiology of Acne: Acne develops due to blockage of follicles, hyperkeratinization and keratin plug formation and sebum (microcomedo). With increased androgen production, sebaceous glands are enlarged and sebum production is increased. The microcomedo may enlarge to form an open comedo (blackhead) or closed comedo. Comedones occur as a result of clogging of sebaceous glands with sebum, naturally occurring oil and dead skin cells[5,7] the naturally occurring commensal bacterium Propionibacterium acnes can cause inflammation and inflammatory lesions like infected pustules or nodules and papules in the dermis around the microcomedo or comedone resulting in redness, scarring or hyperpigmentation.[6,7]

Causes of acne: Acne is a multifactorial disease: genetic factors,[8] stress,[9] androgens,[10] anexcess sweating all influence its development and/or severity.[11] Corticosteroids, oral contraceptives, iodides, bromides, lithium, and chemicals such as dioxins are known to induce acne eruptions, as are endocrine disorders such as Cushing's syndrome and polycystic ovary syndrome.[12]

1.2] Treatment of Acne

According to the European guidelines, the treatment of acne vulgaris is based on the type and severity of acne, considering the patient's comorbidities and preferences.[13,14] For mild to moderate comedogenic acne, the administration of topical agents is recommended, particularly retinoids, benzoyl peroxide, and azelaic acid.[13] Topical mono therapy treatment is usually sufficient to control the symptoms of mild acne.[15] For mild to

moderate papulopustular acne, the administration of fixed combinations of benzoyl peroxide with adapalene or benzoyl peroxide with clindamycin is strongly recommended. In more severe cases, topical retinoids, namely, adapalene, can be associated with systemic antibiotics.[13] For severe papulopustular acne or moderate to severe nodular acne, treatment with oral isotretinoin mono therapy is recommended. In women, the administration of anti androgenic hormonal therapy associated with systemic antibiotics and/or topical treatments other than antibiotics can also be considered.[13,16]

2] Plants useful in Acne

2.1] Aloe vera

Synonym: Aloe, musabbar, kumari.

Biological source: Aloe is the dried juice of the leaves of *Aloe barbadensis* miller

Family: Asphodelaceae (Liliaceae*)*

Chemical constituents: anthraquinones/anthrones, carbohydrates, inorganic compounds, Proteins (Lectins, lectin-likesubstance), Saccharides (Mannose, glucose, L-rhamnose, aldopentose) Vitamins (Vitamin A, B12, C, E, choline and folic acid), Hormones (Auxins and gibberellins)

Uses: aloe vera gel is an active ingredient in hundred of skin lotion, cosmetics, healing properties, immunostimulant, anti-inflammatory, antimicrobial, healing from deep scrapes, frostbite, burns of the conjunctiva, and even canker sores, anti-diabetic effects, anti- wrinkle properties.[17,18,19]

Fig. 1: Aloe vera.[20]

2.2] Orchid tree

Synonym: orchid tree, camel's foot tree, kachnar and mountain-ebony.

Biological source: *Bauhinia variegata* is a species of flowering plant in the legume.

Family: Fabaceae.

Chemical constituents: terpenoids, flavonoids, and tannins, saponins, reducing sugars, steroidsand cardiac glycosides.

Uses: treating skin diseases, asthma, sore throat, abdominal discomfort, skin ulcers, bleeding hemorrhoids, cough, dysentery, heartburn, hematuria, indigestion, malaria.[21]

Fig. 2: Orchid.[22]

2.3] Sweet gale

Synonym: bog-myrtle, sweet gale

Biological source: *Myrica gale* is a species of flowering plant

Family: Myricaceae

Chemical constituents: myrcene (23.18–12.14%), limonene (11.20–6.75%), *α*-phellandrene(9.90–6.49%) and *β*-caryophyllene (9.31–10.97%).

Uses: reduce skin redness and swelling (inflammation), treat skin infections and wounds due to itsantimicrobial and antiviral properties.[23]

2.4] Lemon grass

Synonym: malabar grass

Biological source: Lemon grass (*Cymbopogan flexuosus)* is a native aromatic tall sedge

Family: poaceae.

Chemical constituents: citral-a (33.1 %), citral-b (30.0 %), geranyl acetate (12.0 %) and linalool **Uses:** The plant is used as a fragrance and flavoring agent and in folk medicine as an antispasmodic, hypotensive, anticonvulsant, analgesic, antiemetic, antitussive, anti rheumatic,antiseptic and treatment for nervous and gastrointestinal disorder.[25]

Fig. 3: Sweet gale.[24]

Fig. 4: lemongrass.[26]

2.5] Chamomile

Synonym: German chamomile, Hungarian chamomile (kamilla), wild chamomile, blue chamomile, or scented mayweed.

Biological source: Chamomile (*Matricaria chamomilla* L.) is a well-known medicinal plant species.

Family: Asteraceae.

Chemical constituents: flavonoids, coumarins, volatile oils, terpenes, organic acids, polysaccharides.

Uses: anticancer, anti-infective, anti-inflammatory, antithrombotic, antioxidant, hypolipidaemic, hypoglycaemic, antihypertensive, antidepressant, neuroprotective activities.[27]

Fig. 5: Chamomile.[28]

2.6] Coffee

Synonyms: coffee bean coffee seed.

Biological source: it is the dried ripe seed of coffee *arabica Linn.*

Family: Rubiaceae

Chemical constituents: Caffeine, alkaloids, phenolic acids, flavonoids, terpenoids

Uses: Antioxidant Activity, Lipid-Lowering Effect, Lowering Blood Sugar, Neuroprotection.[29,30]

2.7] Dandelion

Synonym: blowball, cankerwort, doon-head-clock, witch's gowan, milk witch, lion's-tooth, yellow-gowan, Irish daisy, monks-head, priest's-crown, and puff-ball.

Biological source: Dandelion (*Taraxacum officinale L. syn. Taraxacum vulgare L.)*

Family: Asteraceae.

Fig. 6: Coffee.[31]

Chemical constituents: sesquiterpenoids, phenolic compounds, essential oils, saccharides,flavonoids, sphingolipids, triterpenoids, sterols, coumarins.

Uses: diuretics, antioxidants, bile agents, anti-inflammatory, analgesic, and anti-cancer

agents.[32]

2.8] Elderberry

Synonym: elder, elderberry, black elder, European elder, European elderberry, and European blackelderberry.

Biological source: *Sambucus* is a genus of flowering plants in the family Adoxaceae. The variousspecies are commonly referred to as elderflower or elderberry.

Fig. 7: Dandelion.[33]

Family: *Adoxaceae.*

Chemical constituents: carbohydrates, proteins, fats, fatty acids, organic acids, minerals, vitaminsand essential oils.

Uses: antioxidant, antipyretic and diuretic agent, antibacterial, antiviral antidepressant and anti-tumour and hypo glycemic properties, and to reduce body fat and lipid concentration.[34]

2.9] Guggul

Synonym: Scented bdellium, Gum guggul.

Biological Source: Guggul is an oleo-gum resin which exudes out as a result of injury from the bark of *Commiphora wightii* (Arnott) Bhandari [syn. *Commiphora Mukul* (Hook. Ex Stocks) Engl; *Balsamodendron Mukul* (Hook. Ex Stocks)]

Family: Burseraceae.

Fig. 8: Elderberry.[35]

Chemical constituents: volatile oil, terpenoidal constituents such as mono terpenoids, sesquiterpenoids, diterpenoids, and triterpenoids; steroids; flavonoids; guggultetrols; lignans; sugars; and amino acids.

Uses: Hypolipidaemic activity, Anti-inflammatory and Anti arthritic activity, Anti atherosclerotic activity, Cardioprotective activity, Cytotoxic activity, Skin diseases, Anti fertility activity, anti- hyperglycaemic activity, Anti microbial activity.[36,37]

2.10] Scarlet jungle flame

Synonym: *Ixora Coccinea* plant

Biological Source: *Ixora Coccinea* is a species of flowering plant

Family: Rubiaceae.

Chemical constituents: triterpenes (62.60%), mono terpenes (31.73%), sesquiterpenes (3.35%), ester (2.29%). Major constituents of triterpenes were unsolicited acid, oleanolic, lupeol.

Fig. 9: Guggul.[38]

Uses: skin disease, chronic ulcer, menstrual irregularities, hypertension, sprain.[39]

Fig. 10: Scarlet jungle flame.[40]

2.11] Juniper

Common name: Juniperus communis.

Biological source: Juniperus are coniferous trees and shrubs in the genus Juniperus of the cypress.

Family: Cupressaceae.

Chemical constituents: Flavonoids, Volatile Oil, Coumarins, Bicyclic Diterpenes.

Uses: Antioxidant Activity, Anti-Inflammatory Activity, Hepatoprotective Activity, Anti diabetic and Anti hyperlipidemic Activity, Analgesic Activity, Antibacterial Activity, Antimicrobial Activity, Anti fungal Activity, Antimalarial Activity, Anti hypercholesterolemic Activity, Neuroprotective Activity.[41]

Fig. 11: Juniper.[42]

2.12] Miracle leaf

Synonym: cathedral bells, air plant, life plant, miracle leaf, Goethe plant

Biological Source: The genus *Kalanchoe* encompasses succulent perennial plants.

Family: Crassulaceae

Chemical constituents: triterpenes, steroids, alkaloid, diterpenoidal lactones, glycosides,

phenolics, aliphatic compounds.

Uses: antioxidant, anti diabetic, anti neoplastic, immunomodulation, anti lipidemic, anti allergic.[43]

Fig. 12: Miracle leaf.[44]

2.13] Lemon

Synonym: *Citrus limon*

Biological source: Lemon (*Citrus limon*) is a flowing plant.

Family: Rutaceae

Chemical constituents: flavonoids, vitamin-c, phenolic acids.

Uses: Anti-inflammatory activity, Anticancer activity, Anti-inflammatory activity, Antibacterial activity, Anti fungal activity, Antiviral activity, Anti-allergic activity, Hepatoregenerative activity, Anti-obesity activity, Effects on the cardiovascular system, Effects on the nervous system, Effects on the respiratory system, Treatment of menstrual disorders.[45]

FIG.13: Lemon.[46]

2.14] Lavender

Synonym: English lavender, French lavender, and true lavender.

Biological source: Lavender (*Lavandula anguvstifolia*) is a shrub of the family Lamiaceae
Family: Lamiaceae.

Chemical constituents: linalool, linalyl acetate, β-ocimene, terpinen-4-ol, lavandulyl acetate
Uses: Antioxidant activity, Antibacterial activity, Anti fungal activity, Anti parasitic activity, Anti proliferative activity, Anti-inflammatory activity, Pain relief effect, Wound healing effect, flavouring agent in perfumery and cosmetics.[47,48]

2.15] Karanj

Synonym: Indian beech, pongame oil tree, karanj
Biological Source: *Milletia pinnata* is a species of small tree belonging to the *pea (Fabaceae)*

Fig. 14*:* Lavender.[49]

Family: Fabaceae.

Chemical Constituents: alkaloids, triterpenoids, coumarin, flavonoids, isoflavonoids, phenols,phytosterols.

Uses: Wound healing, skin disorders, cough, rheumatoid pain, ulcers, menstrual disorder, inflammation, bronchitis, toothache, muscle ache, tuberculosis, hepatitis and bruises.[39]

Fig.15: Karanj.[50]

2.16] Neem

Synonym: Nimba tree, Indian lilac, miracle tree

Biological source: Neem consist of the fresh or dried leaves and seed oil of *Azadirachta indica J.* Juss *(Melia Indica or M. azadirachta* Linn.*)*

Family: Meliaceae.

Chemical constituents: azadirachtin, imbolinin, nimbin, nimbidin, nimbidol, sodium nimbinate, gedunin, salannin, and quercetin, ascorbic acid.

Uses: Antioxidant Activity, Antioxidant Activity, Antioxidant Activity, Hepatoprotective Effect,Wound Healing Effect, Anti diabetic Activity, Antimicrobial Effect, Antiviral Activity.[51,52,53]

Fig.16: Neem.[54]

2.17] Oregon grape

Synonym: Oregon hollygrape, tall Oregon grape, holly leaved barberry, and creeping barberry **Biological source:** *Mahonia aquifolium, t*he Oregon grape or holly-leaved barberry, is a species offlowering plant.

Family: Berberidaceae

Chemical constituents: berberine, berbamine, oxyacanthine,

Uses: treatment of acne vulgaris, anti-inflammatory, Psoriasis and Atopic Dermatitis.[55]

Fig. 17: Oregon grape.[56]

2.18] olive

Synonym: Olea europaea

Biological source: Olive oil is a fixed oil obtained by expression of the ripe fruits of *Olea europaeaLinn.* or Indian olive *(O.ferruginea*), belonging to family *Oleaceae*.

Family: Oleaceae

Chemical Constituents: Oleic acid, Palmitoleic acid, Lignoceric acid, Caffeic acid, Hydroxytyrosol, Vanillic acid.

Fig.18: Olive.[58]

2.19] Pomegranate

Synonym: Pomegranate, Anar

Biological source: *Punica granatum Linne* (pomegranate)

Family: Punicaceae

Chemical constituents: Icosanoic, Linolenic (Conjugated, Linolenic (Alpha, Oleic, Palmitic, Punicic, Stearic acid. citric acid, Malic acid was the second most abundant. Phenolic compoundslike gallic acid, protocatechuic acid, chlorogenic acid, caffeic acid, ferulic acid, o – and p -coumaricacids, catechin, phloridzin and quercetin.

Uses: Treatment for Cancer, Osteoarthritis and Other Diseases. The pomegranate has been used in natural and holistic medicine to treat sore throats, coughs, urinary infections, digestive disorders, skin disorders, arthritis, and to expel tapeworms.[59]

Fig. 19: Pomegranate.[60]

2.20] Papaya

Synonym: Carica posoposa, Carica carica, Carica peltat

Biological source: Papain is the dried and purified latex of the green fruits and leaves of *Caricapapaya L*.,

Family: Caricaceae

Chemical constituents: Carpaine, nictoflorin, Methyl gallate, Campesterol,Papain, alkaloids,glycosides, tannins, saponins, flavonoids and glycosides.

Uses: Antioxidant, Inflammation, skin aging, chronic diseases and cancers, Wound healing, Periodontal disease, Alzheimer's disease, Diabetes.[61,62]

Fig. 20: Papaya.[63]

2.21] Red clover

Synonym: *Trifolium pratense*

Biological Source: *Trifolium pratense*, red clover, is a herbaceous species of flowering plant

Family: Fabaceae

Chemical constituents: phenolic compound, isoflavonoids, phenolic acids, clovamides, and saponins.

Uses: antioxidant, antimicrobial, anti-inflammatory, antiallergenic, and antitumor activities nutraceuticals, cosmetics, medicine, and food additives, or used in the agri-food industry.[64]

Fig. 21: Red clover.[65]

2.22] Palm tree

Synonym: American Dwarf Palm Tree, Baies du Palmier Scie, Cabbage Palm, Chou Palmiste, Ju-Zhong, Palma Enana Americana, Palmier Nain, Palmier Scie, Sabal, Serenoa.

Biological source: *Saw palmetto (Sabal serrulata) i*s a palm-like plant with berries from the thepalm family.

Family: Arecaceae.

Chemical constituents: fatty acids, plant sterols, and flavonoids, polysaccharides (sugars)
Uses: Acne, prostatic hyperplasia or BPH, chronic pelvic pain, migraine, hair loss.[66]

Fig. 22: Palm tree.[67]

2.23] Tea tree

Synonym: Tea

Biological source: it contains the prepared leaves and leaf buds of *Thea sinensis.*

Family: Theaceae

Chemical constituents: flavonoids (Thearubigins (TRs) and theaflavins (TFs) and catechin), amino acids (L.theanine), vitamins (A, C, K), phenolic acids (caffeic acid (CA), gallic acid

(GA), chlorogenic acids (CGA) and cauramic acid), lipids, proteins, volatile compounds carbohydrates, β- carotene and fluoride.

Uses: preventing diarrhea, high BP, tooth decay poor blood circulation digestive problems, high- density lipoprotein (HDL) cholesterol at low-concentration levels, and antioxidant etc.[68,69]

Fig. 23: Tea tree.[70]

2.24] Turmeric

Synonyms: Indian saffron, curcuma

Biological Source: Turmeric consists of dried, as well as, fresh rhizomes of the plant known as *Curcuma longa Linn.*

Family: Zingiberaceae.

Chemical Constituents: Curcuminoids, chief component of curcuminoids is curcumin (50-60%),volatile oil, resin, camphene, zingiberene etc.

Uses: antiinflammatory, anti arthritic, condiment or spice, colouring agent, anti acne, anti aging.[71,72,73,74]

Fig.24: Turmeric.[75]

2.25] Nirgundi

Synonym: Chinese chaste tree, five leaved chaste tree, horseshoe vitex, nisinda, Nirgundi.

Biological source: Vitex negundo Linn, belonging to family *verbenaceae* Is an aromatic shrubdistributed throughout India.

Famiily: verbenaceae

Chemical constituents: polyphenolic compounds, terpenoids, glycosidic iridoids, alkaloids.

Uses: antiinflammatory, antioxidant, anti diabetic, anti cancer, antimicrobial.[39,76]

Fig. 25: Nirgundi.[77]

3] Marketed Formulation Of Plants For Anti-Acne

Table 1: Marketed Formulation of plants for Anti-Acne.

Sr. no.	Plant	Marketed product	Manufactured by
1	Turmeric	Plum turmeric & whiteclay acne action facewash	Pureplay skin sciencespvt.ltd
2	Neem	Himalaya purifyingneem facewash	Himalaya wellness company
3	Coffee	mCaffeine Anti AcneCappuccino CoffeeFace mask	Ultra beauty carepvt. ltd.
4	Alovera	Mamaearth aloe veragel	Honasa consumer pvt.ltd.
5	Lemon	Clean & Clear lemonfresh face wash	johnson & johnsonpvt.ltd
6	Pomegranate	Have a pomegranatecleansing foam Remove impurities & all skin type.	It's Hanbul
7	Lemon grass	Soulflower lemongrasshaldi soap	PT Invent india pvt.ltd.
8	Tea	Mamaearth Tea Tree spot gel pimple removal face cream with tea tree & salicylic acid for acne & pimples	Honasa consumer pvt.ltd.
9	Olive	Fresh olive vit-E nigntgel	Nat Habit
10	Papaya	GEMBULE Biocarepapaya scrub	AV Cosmo Lifestyle

CONCLUSION

Millions of individuals suffer from the common skin disorder known as acne vulgaris. Numerous traditional plants and herbs are used to cure acne because they have antibacterial, antiviral, and antifungal properties that aid in the treatment of acne. Herbal and natural medicinal plants are widely used and have little to no evidence of adverse effects. These plants are a dependable source for creating novel medications. Certain plants have demonstrated antibacterial and anti-inflammatory properties. For the treatment of acne, medicinal plants and herbs offer a wide range of therapy alternatives. Numerous research have shown that many magical herbs that are an efficient and secure remedy to treating acne have been kept in our ancient heritage. Pharmaceutical companies are looking for new alternatives to help desperate teenagers and others escape from acne-related diseases ranging from undesirable blemishes to transforming inflammation. The use of cutting-edge technologies in long-term, ongoing research to identify these botanicals as potent, modern skincare products is crucial. In order to maximise the benefits of natural substances for customers, it is anticipated that this study would inspire researchers, cosmeticians, academics, chemists, industrialists, and dermatologists to use these herbs more precisely in topical dermato-cosmetic formulations.

REFERENCES

1. Adityan B, Kumari R, Thappa DM. Scoring systems in acne vulgaris. Indian J Dermatol venereol Leprol, 2009; 75(3): 323-6. doi: 10.4103/0378-6323.51258, PMID 19439902.
2. Benner N, Sammons D. Overview of the treatment of acne vulgaris, osteopath family physic, 2013; 5(5): 185-90.
3. Harper JC. Acne vulgaris. eMedicine, 2009.
4. James WD. Clinical practice. Acne. N Engl J Med, 2005; 352(14): 1463-72. doi: 10.1056/NEJMcp033487, PMID 15814882.
5. Benner N, Sammons D. Overview of the treatment of acne vulgaris, osteopath family physic, 2013; 5(5): 185-90.
6. Simpson NB, Cunliffe WJ. Disorders of the Sebaceous Glands, In Burns, Tony; Breathnach, Stephen; Cox, Neil; Griffiths, Christopher. Rook's Textbook of Dermatology, (7th Ed.). Malden, Mass.: Blackwell Science, 2004; 43: 1–75.
7. Manoj A Suva, Ankita M. Patel, Neeraj Sharma, Chandrayee Bhattacharya, Ravi K. Mangi. A Brief Review on Acne Vulgaris: Pathogenesis, Diagnosis and Treatment. Research & Reviews: Journal of pharmacology, 4.

8. Bataille V, Snieder H, MacGregor AJ, Sasieni P, Spector TD. The influence of genetic and environmental factors in the pathogenesis of acne: a twin study of acne in women. J Investig Dermatol 20021191317–1322. 2002; 119(6): 1317-22. doi: 10.1046/j.1523-1747.2002.19621.x, PMID 12485434.
9. Chiu A, Chon SY, Kimball AB. The response of skin to stress. Arch Dermatol, 2003; 139: 897-900.
10. Cunliffe WJ, Gollnick HPM. Acne diagnosis and management. London: Martin Dunitz, 2001.
11. Shalita AR. Acne revisited. Arch Dermatol, 1994; 130(3): 363-4. doi: 10.1001/archderm.1994.01690030095016, PMID 8129417.
12. Ayer J, Burrows N. Acne: more than skin deep. Postgrad Med J., 2006 Aug; 82(970): 500-6. doi: 10.1136/pgmj.2006.045377, PMID 16891439.
13. Nast A, Dréno B, Bettoli V, Bukvic Mokos Z, Degitz K, Dressler C, et al. European evidence-based (S3) guideline for the treatment of acne – update 2016 – short version. J Eur Acad Dermatol Venereol. short version, 2016; 30(8): 1261-8. doi: 10.1111/jdv.13776, PMID 27514932.
14. Fox L, Csongradi C, Aucamp M, Plessis JD, Gerber M. Treatment modalities for acne. Molecules, 2016; 21(8): 1063. doi: 10.3390/molecules21081063. (PMC Free article). PMID 27529209.
15. Kosmadaki M, Katsambas A. Topical treatments for acne. Clin Dermatol, 2017; 35(2): 173-8. doi: 10.1016/j.clindermatol.2016.10.010, PMID 28274355.
16. Proença AC, Luís Â, Duarte AP. The Role of Herbal Medicine in the Treatment of Acne Vulgaris: A Systematic Review of Clinical Trials. Evid Based Complement Alternat Med. 2022 Jun 15; 2022: 2011945. doi: 10.1155/2022/2011945. PMID: 35754694; PMCID: PMC9217581.
17. Grindlay D, Reynolds T. The Aloe vera phenomenon: a review of the properties and modern uses ofthe leaf parenchyma gel. J Ethnopharmacol, 1986; 16(2-3): 117-51. doi: 10.1016/0378-8741(86)90085-1.
18. Sharrif Moghaddasi M, Sandeep Kumar Verma Aloe vera their chemicals composition and applications: A review. International Journal of Biological & Medical Research Int J Biol Med Res., 2011; 2(1): 466-471.
19. Kokate C, Purohit AP, Gokhale SB. Pharmacognosy. Maharashtra, India: Nirali Prakashan; Thirty Eight Edition, July, 2007; :8.23-8.29.
20. Available from: https://images.app.goo.gl/RA75Qg7gjeTv6mLP8

21. Plants used to treat skin diseases Nahida Tabassum, Mariya Hamdani Department of Pharmaceutical Sciences, Pharmacology Division, University of Kashmir, Hazaratbal, Srinagar, Jammu and Kashmir, India.
22. Available from: https://i.etsystatic.com/6728015/r/il/d35ff6/818433824 /il_fullxfull.8184 3 3824_g5ib.jpg.
23. L.M. Sylvestre, J. Legault, D. Dufour, A. Pichette Chemical composition and anticancer activity of leaf essential oil of Myrica gale May 2005 Phytomedicine, 12(4): 299-304. DOI:10.1016/j.phymed.2003.12.0041.
24. Available from: https://www.google.com/url?sa=i&url=https%3A%2F%2 Fwww.flickr.com%2Fphotos% 2F155066003%40N02%2F43755379684&psig=AOv Vaw0EFCCZ_bHuke_z4hnQ8Ft8&ust=1697092480320000&source=images&cd=vfe&o pi=89978449&ved=0CA8QjRxqFwoTCJDN6qqw7YEDFQAAAAAdAAAAABAD
25. Shah G, Shri R, Panchal V, Sharma N, Singh B, Mann AS. Scientific basis for the therapeutic use of Cymbopogon citratus, stapf (Lemon grass). J Adv Pharm Technol Res., 2011 Jan; 2(1): 3-8. doi: 10.4103/2231-4040.79796. PMID: 22171285; PMCID: PMC3217679.
26. Available from: https://images.app.goo.gl/JCFnJ1oMAYT3uZXy8 Dai YL, Li Y, Wang Q, Niu FJ, Li KW, Wang YY, Wang J, Zhou CZ, Gao LN. Chamomile: A Review of Its Traditional Uses, Chemical Constituents, Pharmacological Activities and Quality Control Studies. Molecules, 2022 Dec 23; 28(1): 133. doi: 10.3390/molecules28010133. PMID: 36615326; PMCID: PMC9822300.
27. Available from: https://images.app.goo.gl/UL6MPrabFPh8ey2F6
28. Saud S, Salamatullah AM. Relationship between the Chemical Composition and the Biological Functions of Coffee. Molecules, 2021 Dec 16; 26(24): 7634. doi: 10.3390/molecules26247634. PMID: 34946716; PMCID: PMC8704863.
29. Kokate C, Purohit AP, Gokhale SB. Pharmacognosy. Maharashtra, India: Nirali Prakashan Thirty Eight Edition July, 2007; 524- 525.
30. Available from: https://images.app.goo.gl/QFLuAFTz5mLuNrsv
31. Fan M, Zhang X, Song H, Zhang Y. Dandelion (*Taraxacum* Genus): A Review of Chemical Constituents and Pharmacological Effects. Molecules. 2023 Jun 27; 28(13): 5022. doi: 10.3390/molecules28135022. PMID: 37446683; PMCID: PMC10343869.
32. Available from: https://images.app.goo.gl/Ke8oywG6KZar3PsV7.
33. Młynarczyk K, Walkowiak-Tomczak D, Łysiak GP. Bioactive properties of *Sambucus nigra* L. as a functional ingredient for food and pharmaceutical industry. J Funct Foods,

2018 Jan; 40: 377-390. doi: 10.1016/j.jff.2017.11.025. Epub 2017 Dec 22. PMID: 32362939; PMCID: PMC7185606.

34. Available from: https://images.app.goo.gl/7Mmmy1bfHWAy5GZX8
35. Kokate C, Purohit AP, Gokhale SB. Pharmacognosy. Maharashtra, India: Nirali Prakashan; Thirty Eight Edition July, 2007; 435-437.
36. Sarup P, Bala S, Kamboj S. Pharmacology and Phytochemistry of Oleo-Gum Resin of Commiphora wightii (Guggulu). Scientifica (Cairo), 2015; 2015: 138039. doi:10.1155/2015/138039. Epub 2015 Oct 26. PMID: 26587309; PMCID: PMC4637499.
37. Available from: https://images.app.goo.gl/VrzGcGpbTQhbLGSD7.
38. Vani Mamillapalli, Mounika Katamaneni, Vamsi Meghana Tiyyagura1, Praneetha Kanajam, Aslesha Padmavathi Namagiri, Haripriya Thondepu1, Bhavani Appikatla, Bhavana Devangam, Padmalatha Khantamneni Formulation, Phytochemical, Physical, Biological Evaluation of Polyherbal Vanishing Cream, and Facewash DOI: 10.5958/0975-4377.2020.00024.5.
39. Available from: https://images.app.goo.gl/JFLGQ9FhEKZNZT82.
40. Bais S, Gill NS, Rana N, Shandil S. A Phytopharmacological Review on a Medicinal Plant: Juniperus communis. Int Sch Res Notices, 2014 Nov 11; 2014: 634723. doi: 10.1155/2014/634723. PMID: 27419205; PMCID: PMC4897106.
41. Available from: https://images.app.goo.gl/6DZgEQgBN8rork5c8
42. Aejazuddin, Dr Quazi Majaz & Tatiya, A & Khurshid, Molvi & Nazim, Sayyed & Siraj, Shaikh. The miracle plant (Kalanchoe pinnata): A phytochemical and pharmacological review. International Journal of Research in Ayurveda and Pharmacy, 2011.
43. Available from: https://images.app.goo.gl/3gwkviEGouTvGTdg8
44. Klimek-Szczykutowicz M, Szopa A, Ekiert H. *Citrus limon* (Lemon) Phenomenon-A Review of the Chemistry, Pharmacological Properties, Applications in the Modern Pharmaceutical, Food, and Cosmetics Industries, and Biotechnological Studies. Plants (Basel), 2020 Jan 17; 9(1): 119. doi: 10.3390/plants9010119. PMID: 31963590; PMCID: PMC7020168.
45. Available from: https://images.app.goo.gl/UXAJMAbghbnxPBTr5
46. Mahmood, Zainab & Sami, Sumayah & Ahmed, Dunya. Reviews A Review about Lavender Importance. Russian Journal of Biological Research, 2020; 7: 14-20. 10.13187/ejbr.2020.1.14.
47. Kokate C, Purohit AP, Gokhale SB. Pharmacognosy. Maharashtra, India: Nirali

Prakashan; Thirty Eight Edition July, 2007; 372-373.

48. Available from: https://flowermag.com/wp-content/uploads/2016/07/lavender-1507499_1920-1000x597.jpg
49. Available from: https://images.app.goo.gl/oYshPKXzZxoeEqRu6
50. Ali A. Textbook of pharmacognosy. New Delhi, India: publication and information directorate, 1993.
51. Kokate C, Purohit AP, Gokhale SB. Pharmacognosy. Maharashtra, India: Nirali Prakashan, 2010.
52. Alzohairy MA. Therapeutics Role of Azadirachta indica (Neem) and Their Active Constituents in Diseases Prevention and Treatment. Evid Based Complement Alternat Med, 2016; 2016: 7382506. doi: 10.1155/2016/7382506. Epub 2016 Mar 1. PMID: 27034694; PMCID: PMC4791507.
53. Available from: https://images.app.goo.gl/zcnfLiJ1jjGWuepw5.
54. Janeczek M, Moy L, Lake EP, Swan J. Review of the Efficacy and Safety of Topical *Mahonia aquifolium* for the Treatment of Psoriasis and Atopic Dermatitis. J Clin Aesthet Dermatol, 2018 Dec; 11(12): 42-47. Epub 2018 Dec 1. PMID: 30666279; PMCID: PMC6334833.
55. Available from: https://images.app.goo.gl/ejm1FF3KwArzqzx56
56. Melguizo-Rodríguez, Lucía & González-Acedo, Anabel & Illescas Montes, Rebeca & García-Recio, Enrique & Ramos Torrecillas, Javier & Costela, Víctor & García-Martínez, Olga. Biological properties of olive tree and its derivatives on the skin. Food & Function. 13. 10.1039/D2FO01945K, 2022.
57. Available from: https://images.app.goo.gl/9MZUp45UqEpY91zi7
58. Bhowmik, Debjit & Gopinath, Harish & Kumar, B. & S, Duraivel & Aravind, G. & Kumar, K.P. Medicinal Uses of Punica Granatum And Its Health Benefits. J Pharmacog Phytochem, 2013; 1: 28-35.
59. Available from: https://images.app.goo.gl/AVG2pP9fSRjoLhz5A
60. Kong YR, Jong YX, Balakrishnan M, Bok ZK, Weng JKK, Tay KC, Goh BH, Ong YS, Chan KG, Lee LH, Khaw KY. Beneficial Role of *Carica papaya* Extracts and Phytochemicals on Oxidative Stress and Related Diseases: A Mini Review. Biology (Basel), 2021 Apr 1; 10(4): 287. doi: 10.3390/biology10040287. PMID: 33916114; PMCID: PMC8066973.
61. Kokate C, Purohit AP, Gokhale SB. Pharmacognosy. Maharashtra, India: Nirali Prakashan; Thirty Eight Edition July, 2007; 450.

62. Available from: https://images.app.goo.gl/bapZWB7KqSCRcz5u9
63. Kazlauskaite JA, Ivanauskas L, Marksa M, Bernatoniene J. The Effect of Traditional and Cyclodextrin-Assisted Extraction Methods on *Trifolium pratense* L. (Red Clover) Extracts Antioxidant Potential. Antioxidants (Basel), 2022 Feb 21; 11(2): 435. doi:10.3390/antiox11020435. PMID: 35204317; PMCID: PMC8868588.
64. Available from: https://images.app.goo.gl/EntxhvduUXYoU1SF8.
65. Reddy, Varshini & Bubna, AdityaKumar & Mahalakshmi, Veeraraghavan & Rangarajan, Sudha. Saw palmetto extract: A dermatologist's perspective. Indian Journal of Drugs in Dermatology, 2017; 3: 11. 10.4103/ijdd.ijdd_45_16.
66. Available from: https://images.app.goo.gl/Cq5HSdhH1VYZGRdZ8
67. Kokate C, Purohit AP, Gokhale SB. Pharmacognosy. Maharashtra, India: Nirali Prakashan; Thirty Eight Edition July, 2007; 525-526.
68. Naveed M, BiBi J, Kamboh AA, Suheryani I, Kakar I, Fazlani SA, FangFang X, Kalhoro SA, Yunjuan L, Kakar MU, Abd El-Hack ME, Noreldin AE, Zhixiang S, LiXia C, XiaoHui Z. Pharmacological values and therapeutic properties of black tea (Camellia sinensis): A comprehensive overview. Biomed Pharmacother, 2018 Apr; 100: 521-531. doi: 10.1016/j.biopha.2018.02.048. Epub 2018 Feb 23. PMID: 29482046.
69. Available from: https://images.app.goo.gl/n8xvepAVABQinpJ58.
70. Vaughn AR, Branum A, Sivamani RK. Effects of Turmeric (Curcuma longa) on Skin Health: A Systematic Review of the Clinical Evidence. Phytother Res, 2016 Aug; 30(8): 1243-64. doi: 10.1002/ptr.5640. Epub 2016 May 23. PMID: 27213821.
71. Vollono L, Falconi M, Gaziano R, Iacovelli F, Dika E, Terracciano C, Bianchi L, Campione E. Potential of Curcumin in Skin Disorders. Nutrients, 2019 Sep 10; 11(9): 2169. doi: 10.3390/nu11092169. PMID: 31509968; PMCID: PMC6770633.
72. Farzaei MH, Zobeiri M, Parvizi F, El-Senduny FF, Marmouzi I, Coy-Barrera E et al. Curcumin in liver diseases: A systematic review of the cellular mechanisms o f oxidative stress and clinical perspective. Nutrients, 2018; 10(7): 855. doi: 10.3390/nu10070855. PMID 29966389.
73. Kokate C, Purohit AP, Gokhale SB. Pharmacognosy. Maharashtra, India: Nirali Prakashan; Thirty Eight Edition July, 2007; 413-415.
74. Available from: https://images.app.goo.gl/Vty3vLBXFeghVYUV6
75. Kulkarni RR, Virkar AD, D'mello P. Antioxidant and Antiinflammatory Activity of Vitex negundo. Indian J Pharm Sci., 2008 Nov; 70(6): 838-40. doi: 10.4103/0250-474X.49140. PMID: 21369459; PMCID: PMC3040892.

76. Available from: https://images.app.goo.gl/sDNoxymGrvg4ENDt.