



A COMPREHENSIVE REVIEW OF ACNE VULGARIS THERAPIES: FROM TOPICALS TO SYSTEMICS

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ABSTRACT

Acne vulgaris is most common worldwide skin disease for teenagers. The skin disease caused by gram positive *P.acne* bacteria. Acne is triggered by hormonal changes, certain medication, stress and also life style changes. Therefore life style modification is necessary for better therapeutic outcome. Acne can be treated by pharmacological, Cosmeceutical and herbal ingredients. Each therapy have had unique merits and demerits. The review article discussed various treatment option for eradication of acne vulgaris. The review also discussed on the life style modification to suppress acne vulgaris

Key words: *Acne vulgaris*, Pharmacological, Cosmeceutical, Herbals Treatment

INTRODUCTION

Acne is a common, usually self-limiting disease caused by a bacterium *Acne vulgaris*. It produces inflammation in the sebaceous follicles of the face and upper trunk. The disease affecting nearly 80 percent persons between the age of 11 and 30 years. It affects almost everyone in life in general^{1,2}. The major classes of therapeutic agents are topical and systemic retinoids, Antimicrobials agents, and systemic hormonal agents and combination therapy with a topical retinoids. The distribution of acne corresponds to the increase in density of the sebaceous units (face, neck, upper chest, shoulders and back). Nodules and cysts comprise severe nodulocystic acne³.

The disease is treated by various approaches such as pharmacological, cosmeceutical, and herbals. According to recent dermatological guidelines, current first-line treatments for acne are conventional drug therapies such as antibiotics, retinoids, hormonal agents, and benzoyl peroxide⁵.

Even though pharmacological treatment is standard therapy currently, cosmeceutical formulation is wildly used because of the less regulatory system with multiple cosmetic effects. Cosmeceuticals are cosmetic products that containing active pharmaceutical ingredients. A cosmeceutical product improve beautification, enhance attractiveness or change appearance with therapeutic benefit⁴.

Over the past decade, interest in herbal medicines has grown steadily in the face of increasing resistance to existing antimicrobials, side effects, and sometimes high treatment costs. The anti-acne effects of these herbal medicine involve four mechanisms, namely antibacterial, anti-inflammatory, antioxidant and anti-androgenic activities⁶.

Pathogenesis of acne

Acne is a disease of the follicular unit. It involves pathological overproduction of serum, abnormal follicular keratinization, formation bacterial bio-films and colonies, and eventual release of pro-inflammatory mediators in the skin. Although the formation of micro-comedones is the first symptom of acne, the exact reason why this reaction is triggered is unknown^{7,8}.

Clinical manifestation

Acne is usually confined to the parts of the body that have the largest and most abundant oil glands: the face, neck, chest, upper back, and upper arms. The skin may have an oily texture and appearance, indicating increased sebum production. Non-inflammatory acne lesions include open and closed comedones⁹.

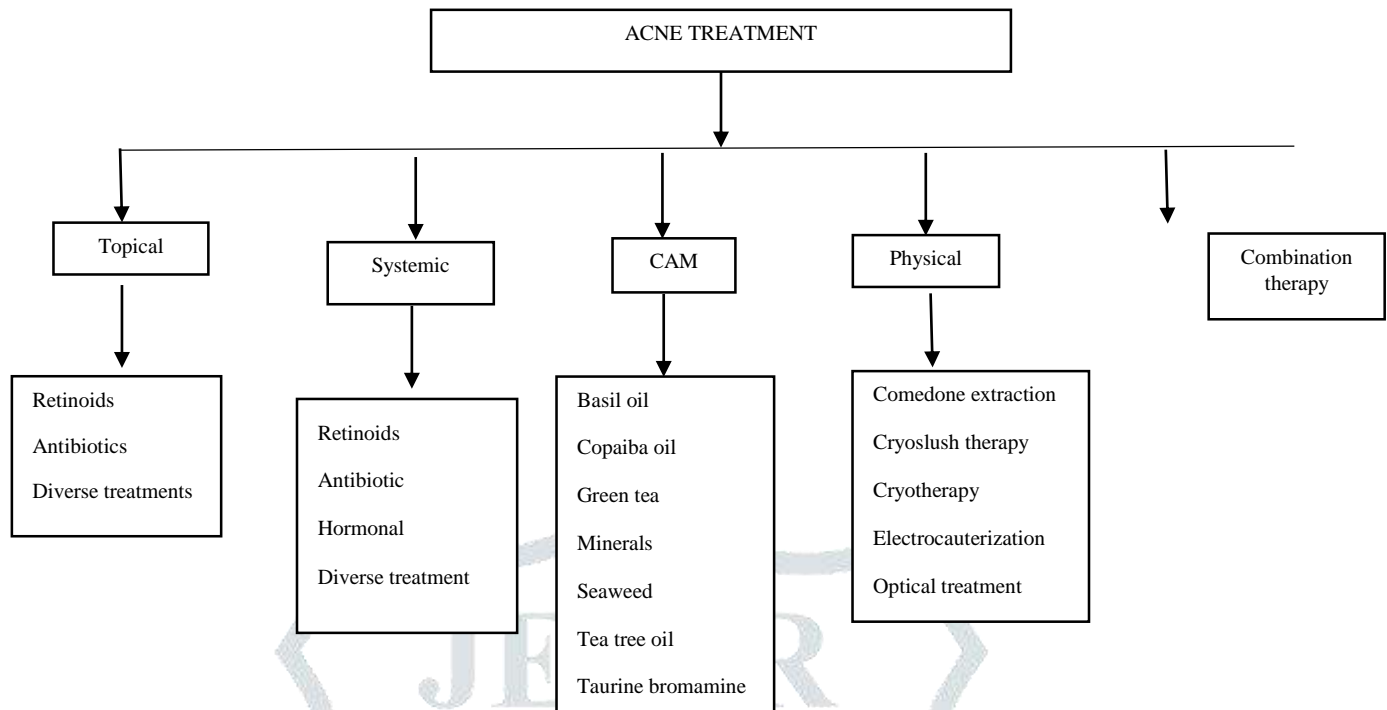


Fig 1: Acne infection on the face

Pharmacotherapy of Treatment of Acne

There are several factors to consider when choosing medications to treat a patient with acne. These include the clinical type of acne, severity, size of lesions, and degree of inflammation, oily skin, menstrual history and signs of hyper androgenism in women etc¹⁰.

Types of Acne Treatments



Pharmacological Treatment

Severe condition of Acne, topical retinoid, benzoyl peroxide or azelaic acid are used in case of mild to moderate acne fixed cure combination of adapalene and benzoyl peroxide or topical clindamycin and benzoyl peroxide is first choice of remedy. The main side goods of topical retinoids are original skin vexation, burning, itching, and blankness^{11, 12}.

Topical Antibiotics

Topical operation of antibiotics are clinical effectiveness for mild to moderate seditious acne, specifically when they're combined with zinc, tretinoin or benzoyl peroxide, while they showed mild influence on acne¹³.

Oral Antibiotics

Tetracycline: Among oral antibiotics used to treat acne, tetracycline has the longest history. The remedial effect of tetra cyclones is by reduction in neutrophil chemo- taxis and inhibition of proinflammatory cytokines and matrix meta- alloproteinases¹⁴.

Minocycline: Another Tetracycline outgrowth, minocycline was FDA approved after doxycycline, and continues to be a popular treatment option for moderate to severe acne¹⁵.

Doxycycline: Relative to its parent tetracycline, doxycycline is more lipophilic, making it optimal for piercing and accumulating in the sebaceous gland¹⁶.

Topical combination remedy

Combination curatives are preferred to avoid skin sensitization and antibiotic resistance and to ameliorate treatment issues¹⁵. The topical expression available in a stable single- tube expression, the gel combination of 1% clindamycin and 5% benzoyl peroxide is effective and well- permitted¹⁶.

Combination remedy

The combination remedy may be Antibacterial- retinoid, Antibacterial- benzoyl peroxide, Adapalene (retinoid) benzoyl peroxide and Clindamycin/ erythromycin and benzoyl peroxide

Table 1: Drugs used to treat acne

Type of Acne	Treatment	Drugs used	Major Adverse effects
Comedonal	Topical retinoid and other agent	Isotretinoin Tretinoin Adapalene Azelaic acid	Skin irritation Skin irritation Skin irritation Local irritation
Papuloposular	Topical retinoid and/or benzoyl peroxide	Benzoyl peroxide	Dryness, bleaching of hair
Papulopostular	Oral antibiotics and topical retinoids/benzoyl peroxide or oral isotretinoin	Oxytetracycline Minocycline Doxycycline Erythromycin Azithromycin	Gastrointestinal upset Vertigo Photosensitive Gastrointestinal upset Gastrointestinal upset
Nodular	Oral antibiotic and a topical retinoid /benzoyl peroxide or oral iso-tretinoin	Oral tretinoin	Teratogenicity
Severe acne	Oral iso-tretinoin or hormonal or high dose oral antibiotics and topical retinoids and benzoyl peroxide	Spironolactone Oral contraceptive Corticosteroids	Menstrual irregularities Vascular thrombosis Adrenal suppression

Cosmeceutical Treatment of Acne

A cosmeceutical is an ornamental product whose active component is said to have a positive physiological effect due to an increased pharmacological effect compared to an inert dress¹⁷. Bridging the gap between particular care products and medicinal, these cosmeceuticals are specifically designed for their medicinal and ornamental benefits^{18, 19}.

Cosmeceutical constituents for treating acne^{20,21}

Cosmeceutical expression may contain chemical medicines as well as natural constituents. These are Vitamin C, tea tree oil painting, niacinamide, green tea excerpt, resveratrol, salicylic acid- nascence hydroxy acids and antibiotics and also it has ornamental constituents. Anti acne serum (Biocule), Rivela (Cipla), Bellavita ,Mama earth, Rosehip and Retinoid (Dr Sheths) are fewer popular cosmeceutical brands in Indian market.

Phytochemical Treatment for Acne²²⁻³¹

Phytochemical approach are including herbals and herbal based drug products. Herbal based drug products are popular in Ayurveda, and siddha. Although pure phytochemicals are also used for treatment of acne. Some of the herbs are given below.

Achyranthesaspera

This medicinal factory is traditionally used for the treatment of *Acne vulgaris*, eruptions of the skin, boils, scabies and other skin conditions:

Allium cepa (Onion)

Onion excerpt gel has shown the capability to ameliorate the appearance of scars in cases with seborrheic keratosis. This excerpt gel has been shown to ameliorate the scar's appearance by perfecting its greenishness, wimpiness and texture

Azadirachta indica

A study, conducted on anti-acne expression prepared from herbal excerpts, it was revealed that ethanol excerpt of *Azadirachta indica*, *G. glabra*, *Andrographis paniculata*, *Ocimum sanctum*, and green tea held the eventuality for inhibiting acne.

Cannabis sativus

The seed oil painting of *Cannabis sativus* is useful for the treatment of acne rosacea, seborrheic dermatitis, eczema, dermatitis, psoriasis and lichen planus. The leaves greasepaint of this factory is veritably useful as a crack and sore dressing

Echinacea purpurea

The excerpt of *Echinacea purpurea* has been shown to readily kill *P. acnes*, which is the main reason of acne vulgaris.

Rosmarinus officinalis

it's used as a libation drink, spicing food, as well as in cosmetics. *Rosmarinus officinalis* oil painting is effective against *acne vulgaris*

Melaleuca alternifolia

Melaleuca alternifolia or tea- tree is a tree or altitudinous shrub in the factory genus *Melaleuca*. Topical use of low attention of tea tree oil painting has anti acne exertion with low side goods.

Eucalyptus globulus

Extraction of *Eucalyptus globulus*, *E. maculata* and *E. viminalis* were suitable to inhibit the growth of *P. Acnes*

Jojoba oil painting

Jojoba oil painting is a natural, moldable substance uprooted from the seeds of the jojoba shrub. The waxy substances in jojoba oil painting may help repair damaged skin, which may also help speed up crack mending and acne lesions.

Aloe Vera

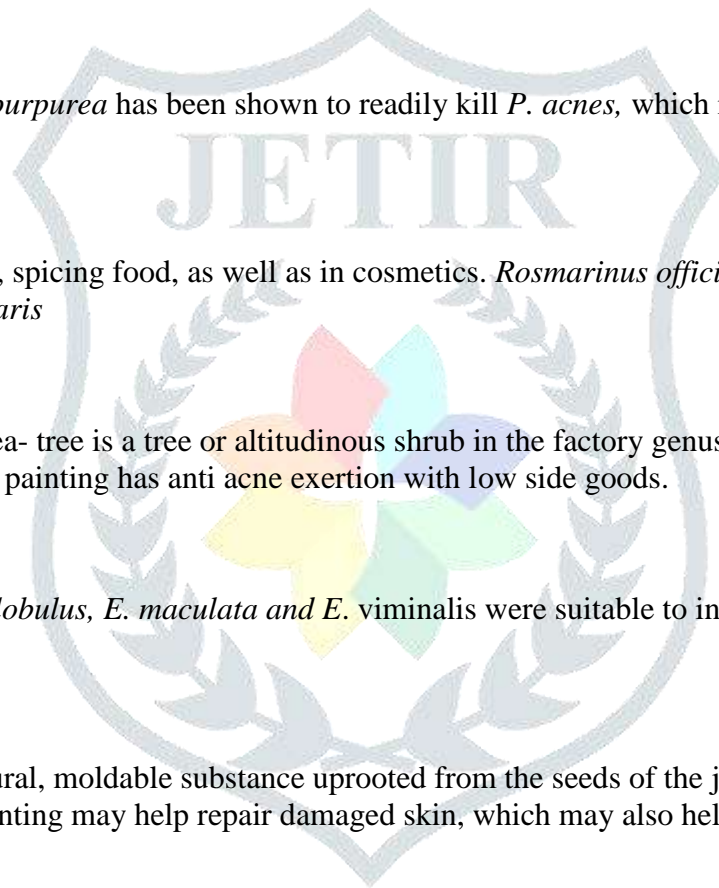
Aloe Vera is a natural antibacterial and anti-inflammatory, meaning it may reduce the appearance of acne and help acne flights.

Honey

Honey contains numerous antioxidants that can help to clear clogged pores. still, while there's substantiation that honey has specific antimicrobial goods

Zinc

With its anti-inflammatory parcels, zinc is frequently touted as a system to reduce acne lesions and greenishness.



Green tea

herbage tea contains high attention of a group of polyphenol antioxidants called catechens. Antioxidants help the body break down chemicals and waste products that can damage healthy cells:

Echinacea

Echinacea also known as grandiloquent coneflower, may contain composites that help destroy contagions and bacteria, including *P. acnes*.

Purified Freak venom

Purified freak venom contains antibacterial parcels. In a study people who applied a gel containing purified freak venom to their face for 6 weeks saw a reduction of mild to moderate acne lesions.

Coconut oil painting

Coconut oil painting contains anti-inflammatory and antibacterial composites. These parcels mean that coconut oil painting may help annihilate acne- causing bacteria and reduce the greenishness and lump of pustules. Due to its smoothing and moisturizing effect²⁸.

Tannins

Tannins have natural tangy property they can be produced by boiling an admixture of 5 to 10 grams of excerpt of dinghy from similar trees as witch hazel, white oak, or English walnut in one mug of water

Fruit acids

Include citric, gluconic, guconate, glycolic, malic and tartaric acids, these have natural parcels that help them remove skin.

Ayurvedic Treatment

The ancient wisdom of Ayurveda and Siddha has answers to every skin problem, including acne. Various ayurvedic products recommended for treatment of acne.³²

ManjishthadiKwath

It's a herbal decoction that helps treat skin conditions like acne from within by purifying the blood and barring free revolutionaries from the system.

Kumkumadi Oil

The “kantivardhaka” or skin cheering sauces used in this face oil painting, illuminate skin. Kumkumadi oil painting nourishes and exfoliates skin to help acne conformation.³²

Mahathikthaka Ghritham

Mahathikthaka ghritham is a blood cleaner that improves skin health. Consuming Mahathikthaka Ghritham with hot water every day can help treat inflamed, painful acne with pus discharge³³.

Herbal Treatment

Amla (Indian gooseberry), Tulsi (holy basil), neem, Aloe Vera³³.

Life Style Revision for Acne Treatment³¹⁻³²***Avoid touching pustules***

Touching acne blisters will irritate the skin, may make the papule worse, and can spread pustules to other areas

Cleaner

Mild Cleaners, rinses, and wetlands to reduce the threat of acne flare- ups.

Sun exposure

Exposure to the sun is essential for people's good as this is how we absorb vitamin D which helps strengthen our bones. And just 15 twinkles of sun exposure a day could help treat the symptoms of acne by drying out the sebum²⁹.

Drink lots of water

Water is essential for all of your fleshly functions and this includes the liver which controls hormone product. Thus plenitude of water input helpful for maintaining hormone balance.

Quality sleep

Quality sleep will give rest to your mind and body, and that improve the chance to heal acne. And also remove all makeup off before go to bed.

Reducing the stress

Stress causes situations of the hormone androgen to increase. Androgen stimulates hair follicles and oil painting glands in pores, adding the threat of acne

Antipathetic acne

Presently, there's no substantiation that disinclinations beget acne. Still, there's a strong connection between the two. Some Foods that may beget inflammation and stress to the gut are most likely to induce an acne rout.

Dairy

Dairy products are known to increase insulin situations, stimulating the product of IGF- 1 which can worsen acne, particularly in women

Refined Grains

The body will produce further insulin and the blood sugar increases which, in turn, can beget a hormonal response and spark an acne rout.

Added Sugar

Sugars, like meliorated grains, increase your blood sugar situations which causes your insulin to shaft and eventually leads to inflammation and acne.

Food Complements

These are being used in the foods to ameliorate delectability, textures, and shelf life. And it may be contributing to inflammation and acne. Fast food also contributes to acne.

Physical approach for Treatment of Acne

Physical treatments for acne include comedo birth, chemical peels, high- intensity narrow- band photodynamic blue light remedy, injectable paddings and ray treatment still, there's little substantiation in the peer- reviewed literature to support similar treatments. But the approach also utilized to cure the acne³³⁻³⁵.

Types of physical treatment

Comedone birth, cryoslush remedy, cryotherapy, electrocauterization, intralesional corticosteroids, and optic Treatments are popular physical treatment for acne³⁶.

CONCLUSION

In this review, the colorful remedies for treating acne vulgaris have been bandied. Changing the diet and life is still considered essential to any natural approach to acne. Herbal drugs and cosmeceutical phrasings are presently more conclude for the treatment of acne. But the severe cases still now standard medicine remedy is ideal for the cases.

REFERENCES

1. Avinash V, Umashankar MS, Damodharan N. Niosomes: A more promising tool to load poorly penetrating drug through skin for the treatment of Acne vulgaris. *Research Journal of Pharmacy and Technology*. 2020; 13(6):3035-40.
2. Azimi H, Fallah-Tafti M, Khakshur AA, Abdollahi M. A review of phytotherapy of acne vulgaris: Perspective of new pharmacological treatments. *Fitoterapia*. 2012; 83(8):1306-1317
3. Williams HC, Dellavalle RP, Garner S. Acne vulgaris. *The Lancet*. 2012; 379(9813):361-372
4. Barros BS, Zaenglein AL. The use of cosmeceuticals in acne: help or hoax? *American journal of clinical dermatology*. 2017; 18(2):159-163.
5. De Vries FM, Meulendijks, AM, Driessen RJ, The efficacy and safety of non-pharmacological therapies for the treatment of acne vulgaris: A systematic review and best-evidence synthesis. *Journal of the European Academy of Dermatology and Venereology*. 2018; 32(7):1195-1203.
6. Azimi H, Fallah-Tafti M, Khakshur AA, Abdollahi M. A review of phytotherapy of *Acne vulgaris*: Perspective of new pharmacological treatments. *Fitoterapia*. 2012; 83(8):1306-1317
7. Brown SK, Shalita AR. Acne vulgaris. *The Lancet*. 1998; 351(9119):1871-1876.
8. Nicholas Benner; Dawn Sammons_Overview of the treatment of acne vulgaris. *Osteopathic family physician* 2013; 5(5):185-190
9. Kerkemeyer K. Acne vulgaris. *Plastic Surgical Nursing*. 2005; 25(1):31-5.
10. Verma S, Utreja P, Kumar L. Nanotechnological carriers for treatment of acne. *Recent patents on anti-infective drug discovery*. 2018; 13(2):105-26.
11. Degitz K, Ochsendorf F. Pharmacotherapy of acne. *Expert Opinion on Pharmacotherapy*. 2008; 9(6):955-971.
12. Gollnick HP, Krautheim A. Topical treatment in acne: current status and future aspects. *Dermatology*. 2003;206 (1):29-36.
13. Shivane P, Sridevi G, Gopkumar P, Pillai S. Formulation and evaluation of sustain release microsphere of Tretinoin for the treatment of Acne vulgarise. *Asian Journal of Research in Chemistry*. 2013; 6(10):1089
14. Simonart T, Dramaix M. Treatment of acne with topical antibiotics: lessons from clinical studies. *British journal of dermatology*. 2005; 153(2):395-403.
15. Barbieri JS, Bhate K, Hartnett KP, Fleming-Dutra KE, Margolis DJ. Trends in oral antibiotic prescription in dermatology, 2008 to 2016. *JAMA dermatology*. 2019; 155(3):290-297.
16. Baldwin H. Oral antibiotic treatment options for acne vulgaris. *The Journal of Clinical and Aesthetic Dermatology*. 2020; 13(9):26-29
17. Sacchidanand SA, Lahiri K, Godse K, Patwardhan NG. Synchronizing pharmacotherapy in acne with review of clinical care. *Indian journal of dermatology*. 2017; 62(4):341-357
18. Del Rosso JQ. Combination topical therapy in the treatment of acne. *Cutis*. 2006; 78 (2):5-12.
19. Kligman D. Cosmeceuticals. *Dermatologic clinics*. 2000; 18(4):609-615.
20. Dureja H, Kaushik D, Gupta M, Kumar V, Lather V. Cosmeceuticals: An emerging concept. *Indian Journal of Pharmacology*. 2005; 37(3):155
21. Zeichner JA. Cosmeceuticals for the treatment of acne vulgaris. *Cosmeceuticals and Cosmetic Practice*. 2013 27:209-217
22. Kanlayavattanakul M, Lourith N. Therapeutic agents and herbs in topical application for acne treatment. *International journal of cosmetic science*. 2011; 33(4):289-297.
23. Yarnell E, Abascal K. Herbal medicine for acne vulgaris. *Alternative & Complementary Therapies*. 2006; 12(6):303-309.
24. Nasri H, Bahmani M, Shahinfard N. Medicinal plants for the treatment of acne vulgaris: a review of recent evidences. *Jundishapur journal of microbiology*. 2015; 8(11):1-9

25. Kumar A, Baboota S, Agarwal SP, Ali J, Ahuja A. Treatment of acne with special emphasis on herbal remedies. *Expert Review of Dermatology*. 2008; 3(1):111-122.
26. Reddy DM, Jain V. An overview on medicinal plants for the treatment of acne. *Journal of Critical Reviews*. 2019; 6(6):7-14.
27. Chauhan SB. Formulation and Evaluation of Emulgel for the treatment of Acne. *Evaluation*. 2020 Aug 12; 100(100):100.
28. Lambrechts IA, de Canha MN. Exploiting medicinal plants as possible treatments for acne vulgaris. In *Medicinal Plants for Holistic Health and Well-Being 2018* (pp. 117-143). Academic Press.
29. Pratibha N, Sushma D, Rajinder G. Screening for antioxidant and antibacterial potential of common medicinal plants in the treatment of acne. *Int J Drug Dev Res*. 2012; 4(1):65-71.
30. Home remedies for acne Medically reviewed by Reemapatel, MPA, PA-C- Written by Jennifer Huizen - Updated on June 16, 2022 [1,2]
30. Leyden JJ. Therapy for *Acne vulgaris*. *New England Journal of Medicine*. 1997; 336(16):1156-1162.
31. V.K Ghosh, D.H Nagore, Different approaches of alternative medicines in acne vulgaris treatment. *orient pharm exp med*. 2011; 11(1) :1-9
32. Jain A, Basal E. Inhibition of Propionibacterium acnes-induced mediators of inflammation by Indian herbs. *Phytomedicine*. 2003; 10(1):34-8.
33. Veraldi S, Brena M, Barbareschi M. Allergic contact dermatitis caused by topical ant acne drugs. *Expert review of clinical pharmacology*. 2015; 8(4):377-81.
34. Meena V. Mugdha Rasa an ayurvedic proprietary medicine to treat acne vulgaris. *International Journal of Green Pharmacy (IJGP)*. 2017; 11(04).
35. Priani SE, Nurhasanah E, Suparman A. Development of Antiacne Nanogel containing Cinnamon Bark Oil (*Cinnamomum burmannii* Nees ex Bl.) and Olive Oil (*Olea europaea* L.). *Research Journal of Pharmacy and Technology*. 2022; 15(1):143-7.
36. Fox L, Csongradi C, Aucamp M, Du Plessis J, Gerber M. Treatment modalities for acne. *Molecules*. 2016; 21(8):1063

