Literature Review

1. Bhate K and Williams HC (2013) mentioned that the role of Propionibacterium acnes is unclear in acne vulgaris but there is a direct effect of anti-inflammatory and antibiotics drugs in its treatment. Their study reports that about 20% of young people are affected by moderate to severe acne and the severity depends on the pubertal maturity. They also mentioned that post-inflammatory hyperpigmentation have a greater effect on the black individuals. They also presented that acne persists into the 20s and 30s in around 64% and 43% of individuals, respectively. The study suggested that the heritability of acne is almost 80% in first-degree relatives, and it is more severe in those with a positive family history. [7]

2. Aguirre Jorge et al. (2013) extracted, quantified and evaluated the phenolic content in the skin of Opuntia ficus-indica for their antioxidant capacity. They concluded from the study that Opuntia ficus-indica represents a good source of natural antioxidants [22].

3. Meghwal M, Goswami TK. (2013) updated a study on Piper nigrum and Piperine. They mentioned that based on the modern cell studies, animal studies, and human studies, piperine has been found to possess anti-oxidant, immunomodulatory, anti-asthmatic, anti-inflammatory, anti-carcinogenic, anti-amoebic and anti-ulcer properties [23].

4. Gupta SC et al. (2013) reported that curcumin, which is an active polyphenol of turmeric, is used to treat acne, dermatitis, psoriasis and rash. They have also included the indications of the recent studies. It indicated that curcumin also have the potency to target newly identified signaling pathways which includes those associated with cancer stem cells, autophagy and micro RNA. Some of the preclinical and clinical studies also indicate the effectiveness of curcumin against pulmonary diseases, cancer, liver diseases, neurological diseases, autoimmune diseases, metabolic diseases, cardiovascular diseases and various other chronic diseases [24].

5. Shinkafi SA and Ndanusa H (2013) collected the samples from the individuals who were suffering from acne vulgaris by swabbing their faces, chests and backs. They collected these samples from Amanawa hospital in Sokoto, Nigeria with the help of swab stickes. They used citrus lemon juice at different concentrations of 20%, 40%, 60%, 80% and 100% on P. acnes. All these concentrations were found to be effective. They used conventional cleanser as a positive control which was found effective at
concentrations of 60%, 80% and 100% only. Minimum inhibitory concentration (MIC) of lemon was studied and absence of growth was observed at 80% and 100%. Citrus lemon showed minimum bactericidal concentration (MBC) on P. acnes at all the concentrations. Hence they concluded that lemon juice show stronger anti acne vulgaris activity as compared to the conventional cleanser[25].

6. Kasprowicz A et al., (2012) presented a study on genotypic heterogenicity of Propionibacterium acnes strains. Their results confirmed biochemical and genetic heterogeneities of P. acnes. But their observations also indicated necessity of further microbiological-molecular investigation of that bacteria group[26].

7. Felix Boon-Bin Yap (2012) studied the impact of acne vulgaris on quality of life of the population resident in Sarawak, Malaysia. He concluded that health care professionals should view acne as a psychologically disabling disease. He also states that acne affects more to the people with lower socio-economic status[27].

8. Kalpesh Patel et al., (2012) formulated an anti acne formulation and evaluated. On evaluation they concluded that natural and herbal remedies are safer as compared to synthetic products as they have fewer side effects[28].

9. Aditi Vats and Pranav Sharma (2012) studied the antibacterial activity of coriander oil against P. acnes and S. epidermidis using disc diffusion method. They also studied its minimum inhibitory concentration by agar dilution method. They developed a topical formulation and testes it for various evaluation parameters. This study concluded that coriander oil possess good potency against acne inducing bacteria[29].

10. Hanieh Azimi et al. (2012) reviewed the phytotherapy of acne vulgaris. They concluded that apart from screening the phytocompounds, development of an appropriate delivery system should be done which imparts efficacy and avoid irritation and allergy in patients with hypersensitive skin test. They also suggested the combination treatment which may be more effective with regard to synergistic effects on the pathogenesis of acne[14].

11. Hywel Williams et al. (2012) reported that oral isotretinoin is the most effective therapy, but its used is limited by teratogenicity and other side effects. They also mentioned that the use of photodynamic therapy is limited due its adverse effects and cost.[3].

12. Manpreet Kaur et al. (2012) reviewed the pharmacological actions of Opuntia ficus-indica. From their study they concluded that Opuntia ficus-indica has numerous
pharmacological activities. It also possess anti-inflammatory activity which will help in reducing the inflammation caused due to acne. Menichini F et al., (2011) studied the phytochemical profile, anti-inflammatory, antioxidant and hypoglycemic potential of hydroalcoholic extracts from Citrus medica.

14. Whitney Veith et al., (2011) studied the effect of diet on exacerbation of acne. The study concluded that environmental factors play a vital role in exacerbation of the symptoms of acne vulgaris. It also concludes that there is an association of acne with high glycemic loads, refined sugar products and some dairy products. Asima Banu et al. (2011) stated that allopathic drugs usually provide effective therapy against bacterial infections. But they also stated that there is an increasing problem of antibiotic resistance and hence there is a continuing need for new solutions. Therefore, now herbal and homeopathic drugs are preferred to allopathic drugs.

16. Marc Schumacher et al., (2011) proved by their studies that there is a neem extract have a strong effect on apoptotic cell death mechanisms and pro-inflammatory cell signaling. Cunliff WJ et al. (2009) carried out a study and concluded that 3\% of males and 5\% of females had mild acne even in the age group of 40 to 49 years. Trombetta D et al., (2006) worked on the effect of polysaccharides from Opuntia ficus-indica cladodes on the healing of dermal wounds on the rats. They concluded that the topical application of Opuntia ficus-indica extracts on skin lesions accelerates the re-epithelisation and remodelling phases.

19. Subapriya R. and Nagini S. (2005) carried out a review on medicinal properties of neem leaves. This review summarised the wide range of pharmacological activities of neem. The review suggested that neem leaf and its constituents have been demonstrated to exhibit anti-inflammatory immunomodulatory, antihyperglycaemic, antimalarial, antiulcer, antifungal, antioxidant, antimutagenic, antibacterial, antiviral and anticarcinogenic properties.

20. Gentile C et al., (2004) worked on the antioxidant property of cactus pear of Opuntia ficus-indica. They tested the impact of antioxidant properties and free radical scavenger properties of betalains from the prickly pear in an in-vitro endothelial cell model. The study concluded that the cactus pear has the capacity to protect the endothelium and also to produce an antioxidant effect.
21. Jain A. and Basal E. (2003) studied the inhibition of Propionibacterium acnes-induced mediators of inflammation by Indian herbs. To prove the anti-inflammatory effects of herbs, they treated polymorphonuclear leukocytes (PMNL) and monocytes with culture supernatant of P. acnes in the presence or absence of herbs. They found that Rubia cordifolia, Curcuma longa, Hemidesmus indicus, and Azadirachta indica caused a statistically significant suppression of ROS from PMNL. In the case of proinflammatory cytokine-induced monocytes, maximum suppression was shown by Azadirachta indica and Sphaeranthus indicus, followed by Hemidesmus indicus, Rubia cordifolia, and Curcuma longa. Thus, it can be concluded that these herbs show anti-inflammatory activity by suppressing the capacity of P. acnes-induced ROS and pro-inflammatory cytokines, the two important inflammatory mediators in acne pathogenesis [39].

22. Guy Webster (2002) says that Benzoyl Peroxide produces irritation which proves to be its major disadvantage. He also studies from previous reports that during the treatment of acne, antibiotics resistance was produced by P. acnes. Topical clindamycin and erythromycin mostly exhibits this problem. The utility of oral erythromycin has also reduced due to it resistance [1].

23. Schafer T et al., (2001) reported that 64% of age group 20-29 years and 43% of age group 30-39 years were having visible acne [6].

24. Park EH and Chun MJ (2001) prepared methanolic extract of Opuntia ficus-indica and evaluated for their wound healing activity in rats. Their study showed significant effects of the extracts [40].

25. Park EH et al., (1998) conducted an experiment to study the pharmacological effects of Opuntia ficus-indica. The ethanol extracts were prepared, which showed to inhibit the writhing syndrome induced by acetic acid. This indicated that they contain analgesic effect. Their oral administrations suppressed carrageenan-induced rat paw edema. These results suggested that the cactus extracts contain anti-inflammatory action [41].

26. Wolinsky LE et al., (1996) studied the inhibiting effect of aqueous Azadirachta indica extract upon bacterial properties influencing in-vitro plaque formation. The study concluded that Neem extract reduce the ability of some streptococci to colonize, and hence it has anti-bacterial activity [42].