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File: ■ Tea Tree (*Melaleuca alternifolia*, Myrtaceae) Oil ■ Acne

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RE: Review on Efficacy and Safety of Tea Tree Oil in Treating Acne

Hammer KA. Treatment of acne with tea tree oil (melaleuca) products: a review of efficacy, tolerability and potential modes of action. *Int J Antimicrob Agents*. 2015;45(2):106-110.

Acne, which affects mostly adolescents and young adults, is caused by a combination of factors, including excessive sebum production, inflammation, and the presence of the bacterium *Propionibacterium acnes*. Acne can cause physical discomfort, potential scarring, and emotional stress. Although some prescription medications are available, many acne sufferers self-treat with over-the-counter products, including tea tree (*Melaleuca alternifolia*, Myrtaceae) oil. The aim of this review was to examine the efficacy, safety, and tolerability of tea tree oil products for treating acne and address potential modes of action.

Tea tree oil is a monoterpene-rich, lipophilic, essential oil that exhibits broad-spectrum antimicrobial activity. It contains about 100 components, the most abundant being terpinen-4-ol, which is typically about 40% of the oil. Among the tea tree oil products for acne are face and body washes, soaps, toners, treatment gels or lotions, spot or blemish sticks, and masks. Some topical products combine tea tree oil with other acne treatment agents such as benzoyl peroxide, salicylic acid, glycolic acid, or azelaic acid.

The author's literature search, which was not described, identified seven publications that systematically evaluated the efficacy of products containing tea tree oil for treating acne. Six studies were published in full; one was published as an abstract only. All studies included patients with mild-to-moderate acne.

The earliest of the comparative studies was a double-blind study comparing the efficacy of a 5% tea tree oil water-based gel (n=58) and a 5% benzoyl peroxide water-based lotion (n=61) in treating acne.[1] Applied twice daily for eight weeks, both treatments significantly reduced inflamed lesions, with the benzoyl peroxide producing better results than the tea tree oil. Both treatments performed equally in reducing noninflamed lesions and erythema.

Darabi et al. conducted a single-blind, comparative study of 5% tea tree oil gel and 2% erythromycin gel in 60 patients.[2] After the twice-daily applications of the study products for six weeks, the tea tree oil gel proved significantly better than the erythromycin gel in reducing the number of acne lesions.

A six-week, double-blind, placebo-controlled trial, conducted by Enshaieh et al., compared the efficacy of 5% tea tree oil gel (n=30) with a placebo gel (n=30); the product was applied and left on for 20 minutes twice daily.[3] The tea tree oil gel significantly reduced the number of lesions compared with placebo gel. Compared with baseline, the tea tree oil gel resulted in a significant decrease in total lesion count and an acne severity index.

Yadav et al. studied the following three interventions in a four-week, open-label study: 5% tea tree oil gel (n=46), 5% tea tree oil gel and a polyherbal tablet (n=46), and the polyherbal tablet alone (n=48).[4] All treatments significantly improved the patients' acne; however, the investigators did not conduct analyses to compare the three treatments to determine whether they differed significantly in effectiveness.

In their double-blind, split-face study, Kwon et al. compared 5% tea tree oil with 5% *Lactobacillus*-fermented hinoki cypress (*Chamaecyparis obtusa*, Cupressaceae) extract, with 34 patients in each group.[5] The investigators report that both treatments, applied twice daily for eight weeks, significantly reduced the number of inflammatory lesions; the hinoki cypress extract was significantly more effective than the tea tree oil.

Two studies evaluated products containing tea tree oil combined with one or more plant extracts. The first study[6] compared an undescribed baseline acne intervention (control, n=27) with the same program plus an essential oil treatment containing a mixture of 3% tea tree oil and 2% lavender (*Lavandula angustifolia*, Lamiaceae) oil in jojoba (*Simmondsia chinensis*, Simmondsiaceae) oil (n=27) applied twice daily. After four weeks, the number of acne lesions was reduced by 4.8% in the control group and by 9.2% in the essential oil group. The second study, a four-week noncomparative study by Yoo et al.,[7] evaluated a cream containing 0.5% tea tree oil and 0.01% white mulberry (*Morus alba*, Moraceae) bark extract applied at an unspecified frequency to treat acne in 20 patients. Compared with baseline, the number of acne lesions decreased by 28.7%.

Adverse effects were reported with the use of tea tree oil products in five studies. The effects were typical for topically applied acne treatments and occurred at similar or lower rates than adverse effects reported with other medicated acne products. Darabi et al.[2] suggested that one or more patients withdrew because of adverse effects.

Potential modes of action for tea tree oil as an acne treatment include its antimicrobial and anti-inflammatory activities. It exhibits antibacterial activity against a range of clinically important bacteria, with most organisms inhibited at <2% (per volume).

In vitro and in vivo studies have shown that tea tree oil and its major components can suppress inflammation. Clinical studies have reported reduced inflammation following the application of tea tree oil for treating hemorrhoids, ocular demodecosis, and tinea.

Several of the studies reviewed here report tea tree oil products reduced the number of lesions in patients with mild-to-moderate acne. In the comparative trials, tea tree oil products were more effective in treating acne than placebo; their efficacy was

comparable to products containing benzoyl peroxide and erythromycin. The oil's efficacy may be attributed to its antibacterial and anti-inflammatory activities. Further studies are needed to corroborate these findings.

—*Shari Henson*

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