

Irritation Profile of Benzoyl Peroxide Acne Washes: Impact of Formulation

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Benzoyl peroxide (BPO) is highly effective against acne and a mainstay of acne treatment. It also has the potential to irritate the skin, a risk that is generally considered dose dependent. Because compliance is poor with skin products found to be irritating, there is a need for gentle BPO products. Microsponge formulations which provide a gradual release of the active ingredient over time and thus may be less irritating could be a potential solution to this problem. The purpose of this study was to assess the irritancy of a prescription BPO wash 7% with microsponge delivery system relative to 3 other prescription washes—branded BPO creamy wash 4%, generic BPO creamy wash 4%, and BPO foaming cloths 3%—and 1 over-the-counter (OTC) product, OTC branded BPO wash 2.5%, as well as a negative control (no product) using a standard 21-day patch test protocol. Thirty-two participants were enrolled. Branded BPO creamy wash 4% was found to be the most irritating of the washes tested. Benzoyl peroxide wash 7% with microsponge delivery system—the prescription wash with the highest BPO concentration—and OTC branded BPO wash 2.5% were proven the least irritating. This study suggests that microsponge technology is effective in reducing the skin irritation associated with BPO.

Benzoyl peroxide (BPO) is a mainstay of topical acne treatment in dermatology. Acne treatment guidelines put forth by the Global Alliance to Improve Outcomes in Acne position BPO as an essential part of the acne treatment armamentarium, both for its anti-acne activity and its ability to reduce the risk of the bacterial resistance that arises when antibiotics are used over the long term. The guidelines recommend BPO for treatment of moderate acne and as a combination therapy whenever an antibiotic is used to treat acne.¹

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Although highly effective, BPO also can irritate the skin surface. A member of the organic peroxide family, BPO consists of 2 benzoyl groups joined by a peroxide group. It is prepared by reacting sodium peroxide with benzoyl chloride to yield BPO and sodium chloride. Originally developed in 1917 as an ingredient to bleach flour, BPO was first used medically in the 1960s to treat leg ulcers and adapted for the treatment of acne in the 1970s.

Benzoyl peroxide is effective in the treatment of acne due to its antibacterial, anti-inflammatory, and comedolytic effects.² On contact with skin, BPO breaks down into benzoic acid and oxygen, neither of which is problematic. Its antimicrobial properties against *Propionibacterium acnes* are demonstrated by a 2- \log_{10} decrease in *P acnes* concentration after 2 days of topical BPO 5% application.³ This same mean 2- \log_{10} decrease in organisms also was

