

Synergism and postantibiotic effect of tobramycin and *Melaleuca alternifolia* (tea tree) oil against *Staphylococcus aureus* and *Escherichia coli*.

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Abstract

The application of antimicrobial combinations may address the rising resistance to established classes of both systemic and topical agents and their clinical relevance is related to the presence of a significant postantibiotic effect (PAE). We investigated the effectiveness in vitro of the association between tobramycin and tea tree oil (TTO) against Gram-positive and Gram-negative bacteria. The minimal inhibitory concentrations, the bacterial killing and the PAE of tobramycin and TTO were determined both singly and in combination against *Escherichia coli* ATCC 25922 and *Staphylococcus aureus* ATCC 29213. A synergistic interaction was observed against both strains tested: the mean PAEs were 1.3 and 1.7h for tobramycin against *E. coli* and *S. aureus* respectively, 10.8h for tobramycin and TTO (0.05%) against *E. coli*, 10.4h and 17.4h against *S. aureus* for tobramycin and TTO (0.25 and 0.50%, respectively). Longer PASMEs were observed with *S. aureus* after TTO/tobramycin exposure. In vitro interactions can improve the antimicrobial effectiveness of the antibiotic and may contribute for the development of novel topical agents for the treatment of skin lesions including conjunctiva and respiratory infections by inhalation.