Plaque Triclosan Concentration and Antimicrobial Efficacy of a New Calcium Carbonate Toothpaste with 0.3% Triclosan Compared to a Marketed 0.3% Triclosan Toothpaste

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Abstract

• **Objective:** To compare the delivery and retention of triclosan in dental plaque, and to compare the antibacterial efficacy of a newly developed toothpaste to a marketed calcium carbonate toothpaste.

• **Methods:** Two clinical delivery/retention studies were carried out to determine the concentration of triclosan in plaque 10 minutes, and two and four hours after brushing with a new triclosan-containing toothpaste with magnesium aluminium silicate or a marketed triclosan-containing toothpaste. Both studies had a double-blind, randomized, complete cross-over design. Supragingival plaque samples (minimum 2 µg) were taken from smooth surfaces of all teeth (1–7) in all four quadrants for the 10-minute plaque measurements and in two randomly allocated quadrants at the two- and four-hour time points. Triclosan concentration was measured by HPLC. Antibacterial efficacy was evaluated *in vitro* using a biofilm formation approach. Three replicate experiments were carried out to check for repeatability and consistency of the assay. Toothpaste slurries were prepared by stirring one part by weight of each toothpaste with two parts by weight of deionized water. An overnight culture suspension of *Streptococcus mutans* (ATCC 25175) was prepared and then adjusted to give a bacterial count of approximately 10⁷ CFU/ml. Sterile HAP discs were used as substrate and treated with the toothpaste slurry before inoculation with the standardized culture suspension of *S. mutans*. Following incubation in brain heart infusion (BHI) broth containing 2% sucrose for four hours, standard Total Viable Count (TVC) procedures were carried out and colonies counted (log₁₀ values).

• **Results:** Brushing with the new calcium carbonate/triclosan toothpaste resulted in a higher triclosan concentration in plaque after 10 minutes, and two and four hours compared to a marketed triclosan toothpaste. The increase ranged from 14% to 35% and was statistically significant (p < 0.05). The antibacterial efficacy of the new calcium carbonate/triclosan toothpaste, measured four hours after application, was greater than that of a marketed toothpaste with 0.3% triclosan. The difference was statistically significant (p < 0.05).

• **Conclusion:** The new calcium carbonate toothpaste with 0.3% triclosan and magnesium aluminium silicate demonstrated significantly greater efficacy four hours post-brushing both in terms of *in vivo* delivery and *in vitro* antibacterial action compared to a marketed calcium carbonate toothpaste with 0.3% triclosan.

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