



Received: June 30, 2025
Revised: July 30, 2025
Accepted: September 18, 2025

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In Vitro Effects of Different Probiotic Mouthwash Formulations on the Growth of Oral Pathogens

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Abstract

Objectives: To investigate the effect of various probiotic mouthwash formulations on the quantity of oral pathogenic microorganisms.

Methods: This was a laboratory-based study testing four different mouthwash formulations: (1) 10% probiotic supernatant mouthwash, (2) 10% probiotic supernatant / 5% propolis mouthwash, (3) 10% probiotic supernatant / 1% cannabidiol mouthwash, and (4) 10% probiotic supernatant / 5% propolis / 1% cannabidiol mouthwash. A positive control (chlorhexidine mouthwash) and a negative control (0.9% saline solution) were also included. The inhibitory efficacy of these formulations was tested against two microorganisms: *Candida albicans* and *Streptococcus mutans*. Quantitative data were collected by counting colonies before and after treatment (CFU/mL). Descriptive statistics and One way ANOVA test were used for analysis ($p < 0.05$).

Results: The results showed that each mouthwash formulation could inhibit both pathogenic microorganisms to varying degrees, with a greater effect observed on *Streptococcus mutans* than on *Candida albicans*. When the quantitative data from colony counts were subjected to statistical analysis, no statistically significant differences were found among the mouthwash formulations ($p > 0.05$) in inhibiting both types of microorganisms. Notably, the mouthwash containing 10% probiotic supernatant, 5% propolis and 1% cannabidiol demonstrated a statistically significant inhibitory effect on *Streptococcus mutans* ($p < 0.05$).

Conclusions: All four mouthwash formulations showed a tendency to inhibit both pathogenic microorganisms, although this was not statistically significant in all cases. The formulation containing 10% probiotic supernatant, 5% propolis, and 1% cannabidiol had the most favorable effect in inhibiting the cariogenic bacterium *Streptococcus mutans*.

Keywords: mouthwash, oral bacteria, probiotic