

Effect of Green Tea on *Streptococcus mutans* Metabolic Activity, Planktonic Growth, and Biofilm Activity in the Presence of Nicotine

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Streptococcus mutans is the main bacterial cause of dental caries, and it has been proven by previous research that its growth is affected by various concentrations of nicotine and other agents. The amount of *S. mutans* in the mouth is directly proportional to the number of dental cavities. Studies have shown that smokers have an increased amount of caries, much of which is due to the low concentrations of nicotine the mouth is exposed to. It is known that *S. mutans* thrives in low-moderate concentrations of nicotine, and that nicotine is a promoting agent for *S. mutans*. *S. mutans* has also been proven as a contributor to atherosclerosis, resulting from dental plaque entering the bloodstream. Green Tea is a commonly consumed beverage, which has been known to reduce the number of dental cavities. Previous research has concluded that green tea contains polyphenols, which have antimicrobial effects, including an inhibitory effect on *S. mutans*. The objective of this research is to observe how green tea affects *S. mutans* metabolic activity, as well as biofilm and planktonic growth, in the presence of nicotine. The experiments compared *S. mutans* treated with nicotine concentrations (0-8 mg/ml), and *S. mutans* treated with a 2.5 g/200 mL concentration of Sencha Jade Reserve Japanese green tea in conjunction with the various nicotine concentrations. The assays were performed in a microtiter plate; the XTT and biofilm assays measured absorbance, and the planktonic assay measured kinetic growth. The experiments conclude that green tea has an inhibitory effect on nicotine-treated *S. mutans* metabolic activity and planktonic growth, with higher concentrations of green tea inhibiting more effectively. It was also concluded that green tea increases biofilm formation. These conclusions provide evidence of the inhibitory effect green tea has on nicotine-treated *S. mutans*, and may indicate a way to reduce the incidence of caries and atherosclerosis.

Mentor:

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