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Bioactive Polymers for S. mutans Biofilm Inhibition

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Abstract

The development of biofilms on dental restorations may lead to the formation of secondary caries. The purpose of this study was to determine the efficacy of bioactive small molecules (G43 & G43TEG) to disrupt/inhibit biofilm formation of bacterial species contributing to caries causing biofilm dysbiosis. G43 and G43TEG were synthesized and minimum inhibitory concentration (MIC) against S. mutans were established. The MIC was determined to be 25-50μM for both G43 and G43TEG a slight reduction of viable biofilm cells (Fig. 1) with a visual disruption of the biofilm. Polymerizations of dental resins were slightly affected by 4% G43 or G43TEG (Fig. 1), however cured ≥70% DC for both cases. Analysis of leachates showed no detectible G43 or G43TEG (<11 μM). This study demonstrated that bioactive molecules in the G43 family affect S. mutans biofilm viability (25-50 μM). Further, G43 and G43TEG were tolerable for polymerization kinetics, retaining relatively high final DCs.