



ANTIBACTERIAL PROPERTIES OF GYPSUM-BASED CHITOSAN MATERIAL AGAINST *STREPTOCOCCUS MUTANS*

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SUMMARY

Bacteria adhesion and biofilm formation on tooth and dental restorative material surfaces are among the reasons that lead to the failure in restorative treatment. Therefore, it is critical for the restorative material to possess an antibacterial property to sterilize the underlying dentin and residual caries and prevent the marginal diffusion of bacteria. Materials such as composite resins and glass ionomer cements have been used clinically; however the main drawback is microleakage. This study is aimed to evaluate the antibacterial effect of Gypsum-based Chitosan material (Gp-CT) against *Streptococcus mutans*. The material was prepared with 4 concentrations of chitosan (10%, 5%, 2.5%, and 0% w/v CT solutions). The characterization of *S. mutans* was performed by Gram staining. The antibacterial effect was assessed by agar diffusion test (ADT) and direct contact test (DCT). After that, *S. mutans* distribution on the material surface and the biofilm formation were detected by scanning electron microscopy and multiplate reader respectively. ADT results indicated statistically higher mean of inhibition zones with 2.5%CT, 5%CT and 10%CT-containing materials compared to Gyp. Higher inhibitory effects were observed with Gyp-5%CT and Gyp-10%CT than Gyp and control in DCT. In addition, SEM images showed significant reductions of bacterial distribution on the material surface on days 4 and 7. Furthermore, less biofilm formation was detected with Gyp-2.5%CT, Gyp-5%CT, and Gyp-10%CT compared to Gyp and control. This study indicates inhibition of *S. mutans* growth, distribution and biofilm formation by the Gyp-CT; thus suggests a great promise to be used as a new material for dental restoration.

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