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Evaluation of antibacterial activity of nano-bioactive glass 45S5 on Oral Pathogens- *In vitro*

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Introduction: Bioactive glass 45S5 (BAG45S5) is a surface reactive glass-ceramic biomaterial which have been used widely in dental implants. Micron size BAG45S5 has the ability of bone regeneration, antibacterial effect, repairs and replaces diseased or damaged bone.

Objective: In the current study, antibacterial activity of nano-BAG45S5 on important pathogens of oral cavity was evaluated.

Methods and Materials: *In vitro* Antibacterial effect of Nano-BAG45S5, with particle size of 20-60 nm, was evaluated on oral pathogens including Streptococcus sanguis, Staphylococcus aureous and Enterococcus faecalis. Antibacterial potency was calculated through MIC and MBC assays. Broth dilution and colony count methods were used in order to determine MIC and MBC values, respectively. In addition, disc diffusion method was utilized to evaluate the stability of the antibacterial activity. Inhibition zones were measured after 1, 2 and 3 days of incubation.

Results: MIC and MBC values for S. sanguis were 50 ppm and 50 ppm, respectively. For S. aureous, MIC value was 100 ppm and MBC value was 100 ppm respectively. MIC and MBC values obtained for E. faecalis were respectively 25 and 50 ppm respectively. As regard with disc diffusion test, results showed no statistical difference between the inhibition zones diameters measured at specific time points.

Discussion: Previous study conducted by the same group showed that amorphous form of nano-BAG45S5 had bacteriostatic effect on S. mutans, the bacterium responsible for dental carries. Therefore, this research was carried out to evaluate the antibacterial properties and estimate the potency of nano-BAG45S5 on major oral pathogens. Obtained results indicated that nano-BAG45S5 was bactericidal against S. sanguis, S aureous and E. faecalis whereas it previously had shown bacteriostatic activity against S. mutans. Furthermore, its antibacterial activity was dose-dependent and remained stable during 3-day exposure to the examined micro-organisms.

Biography

Mona Behnami was graduated from Shahed University of Medical Sciences and Health Services with DDS degree. She found her interest in oral pathology and dental materials as a student. She worked on nano-scaled dental materials for her thesis and published papers in reputed domestic journals. Now, she works as a dentist in Iran.

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