

The comparative evaluation of the antimicrobial effect of grape seed extract mouthwash with chlorhexidine against *Porphyromonas gingivalis*: an in vitro study

Abstract

Introduction: The use of mouthwashes is recommended as a complement to mechanical methods to prevent periodontal disease. Chlorhexidine Mouthwash is considered as the gold standard anti plaque agent, but its cytotoxic properties and side effects such as tooth and tongue discoloration directing toward using natural therapeutic agents for preventing periodontal diseases. The study of natural compounds due to less side effects is increasing. Grape seed extract (GSE) contains high concentration of Polyphenol compounds especially Proanthocyanidin and shows various biological effects, such as antimicrobial effect that can be useful against a broad spectrum of pathogens. *Porphyromonas gingivalis* (Pg), a Gram-negative anaerobic bacteria, plays an important role in the pathogenesis of periodontal disease. Therefore, the purpose of this study is to compare the antimicrobial effect of GSE mouthwash with chlorhexidine against *Porphyromonas gingivalis* in vitro.

Materials and methods: In this study, GSE mouthwash and chlorhexidine were used in concentrations of 0.05, 0.1, 0.2 and 0.4%. *Porphyromonas gingivalis* was taken from Tehran University and was cultured in Brucella agar medium enriched with sheep blood, vitamin K1 and hemin. Then, bacterial suspension equivalent to 0/5 McFarland was prepared. The minimum inhibitory concentration (MIC) and the minimum bactericidal concentration (MBC) were determined through microbroth dilution method and the diameter of the growth inhibition zone (DIZ) was determined by the disk agar diffusion method. All experiments were repeated 6 times for verification. Two-way ANOVA was used for analyzing data.

Results: According to this study, MIC and MBC of chlorhexidine for Pg were 0/1 and 0/2 respectively. Also MIC and MBC of GSE mouthwash were determined 0/2 and 0/4 respectively. The average DIZ for chlorhexidine 0/4% is 23 and for GSE 0/4% is 18/8. As the concentration of both substances increases, the DIZ increases.

Conclusion: There is a significant difference in the DIZ of chlorhexidine mouthwash and GSE against the Pg ($P < 0/05$). The DIZ for chlorhexidine mouthwash was greater than the mouthwash containing GSE. Also the results showed that the concentration of GSE and chlorhexidine mouthwash has a significant effect on the DIZ and In both groups as the concentration increases, DIZ increases significantly ($P < 0/05$). Generally the results suggested that the GSE mouthwash has a good antimicrobial effect on Pg.

Keywords: Mouthwashes, Chlorhexidine, Grape seed extract, Periodontal disease