

INHIBITION OF BIOFILM FORMATION AND ANTIBACTERIAL EFFECT OF THE SYNTHETIC PEPTIDE KR-MOD AGAINST THREE DIFFERENT STRAINS OF *Streptococcus mutans*.

Silva, B.R.¹, Alencar, M.F.¹, Vasconcelos, M.A.¹, Arruda, F.V.S.¹, Lopes, J.C.¹, Conrado, A.J.S.¹, Cilli, E.M.², Teixeira, E.H.¹.

¹ Laboratório Integrado de Biomoléculas (LIBS), Departamento de Patologia e Medicina Legal, Universidade Federal do Ceará, Fortaleza, CE, Brasil (Rua: Monsenhor Furtado, S/N, Rodolfo Teófilo 60441-750), ² Instituto de Química de Araraquara, Departamento de Bioquímica e Tecnologia Química, Universidade Estadual Paulista Júlio de Mesquita Filho, Araraquara, SP, Brasil (Rua Professor Francisco Degni, 55, Jardim Quitandinha, 14800-060)

Dental caries is defined as an infectious, chronic and multifactorial disease, in which there is a progressive demineralization of tooth structure with consequent pain and dental loss. It is considered a major public health problem worldwide because its high incidence, besides its oral and systemic consequences. Thus, new methods of microbial control have been investigated to reduce the number of cases. Antimicrobial peptides are molecules present in many living beings and have a high biocidal activity against several microorganisms. The peptide Kr-12 modified (KR-MOD) is a synthetic derivative of the peptide KR-12, the smallest active segment of LL-37, a peptide derived from the C-terminal domain of human cathelicidin antimicrobial peptide (CAMP). The objective of this study was to evaluate the antimicrobial activity of the synthetic peptide KR-MOD on planktonic cultures and biofilm formation of three different strains of the cariogenic bacteria, *Streptococcus mutans*. The antimicrobial activity of KR-MOD on planktonic cultures was determined by minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) using the microdilution methodology. Biofilm formation was characterized by quantification of biomass, through crystal violet staining, and number of viable cells, expressed as log CFU.mL⁻¹. The microorganisms *S. mutans* ATCC 25175, *S. mutans* UA130 and *S. mutans* UA159 were grown in Brain Heart Infusion broth supplemented with 1% sucrose (BHIs) at 37 °C under atmospheric pressure with 5% CO₂. The peptide was solubilized in 0.1% acetic acid (v/v) at various concentrations (250 to 3.8 µg.mL⁻¹). The peptide demonstrated a remarkable antimicrobial effect, inhibiting the planktonic and biofilm growth of all strains tested, even at low concentrations. KR-MOD showed bactericidal activity in concentration of 15.6 µg.mL⁻¹ (*S. mutans* UA130), 31.25 µg.mL⁻¹ (*S. mutans* UA159) and 62.5 µg.mL⁻¹ (*S. mutans* ATCC25175). Referring to biofilm formation, it was found that at the concentration of 15.6 µg.mL⁻¹ the reduction of biomass was extremely significant for all strains, with complete inhibition of biofilm formation at the concentrations of 31.25 µg.mL⁻¹ (*S. mutans* UA130 and *S. mutans* UA159) and 62.5 µg.mL⁻¹ (*S. mutans* ATCC25175). Thus, this study suggests the peptide KR-MOD as a promising antimicrobial agent, especially in the prevention of microbial biofilm formation, which is one of the most important factors in cariogenic processes.

Keywords: Antimicrobial peptide. Biofilms. *Streptococcus mutans*. Dental caries.

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