

TITLE: ACTIVITY OF ANTIMICROBIAL PHOTODYNAMIC THERAPY AGAINST CARIOGENIC MICROBIAL CONSORTIUM

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ABSTRACT:

Dental caries is a chronic disease modulated by several etiological factors including the microbiological agent. Antimicrobial photodynamic therapy demonstrates to be promising in the reduction of microorganisms related to caries. The activity of the antimicrobial photodynamic therapy was verified, *in vitro*, against the mixed biofilm produced of a Cariogenic Microbial Consortium, formed by: *Streptococcus mutans* ATCC 25175, *Lactobacillus rhamnosus* ATCC 9595 and *Candida albicans* ATCC 10231. Biofilms were formed on membranes (N = 28) of cellulose acetate and cellulose nitrate with 0.22µm and 13 mm diameter, from $\sim 10^5$ colony forming units (CFU) of Cariogenic Microbial Consortium per membrane, on BHI agar. After 24h/37°C, the biofilm formed was treated by FS: photosensitizing agent (0.01% methylene blue solution) for 5 minutes and/or, L: Irradiated with low-level laser therapy by using Indium gallium aluminum phosphorus (InGaAlP) with 660nm and 100mW in two protocols (1J, 10 seconds) or (4J, 40 seconds). The groups consisted of: G1: FS+L 1J; G2: FS+L 4J; G3: L 1J; G4: L 4J; G5: FS; G6: chlorhexidine / 1 min (positive control) and G7: without treatment (negative control). The experiment was performed in the same way four times. After the treatment the number of CFU/biofilm was G1- 2.84×10^8 ; G2- 1.39×10^8 ; G3- 7.28×10^8 ; G4- 6×10^8 ; G5- 4.83×10^8 ; G6- 2.07×10^8 and G7- 8.5×10^8 . The reduction in the number of CFU / biofilms after treatments compared to G7 was: G1- 66.6%; G2- 83.6%; G3- 14.5%; G4- 29.5%; G5- 43.3% e G6- 75.7%, being the significant reduction ($p < 0,05$) only for G2 in comparison to the control group. Antimicrobial photodynamic therapy presented by photosensitizing agent for 5 minutes and irradiated with diode laser with 4J protocol (G2) represents a potentially useful tool in complementary anti-cariogenic treatment.

Keywords: antimicrobial photodynamic therapy, biofilm, in vitro techniques, microbiology

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