TITLE: PHOTODYNAMIC THERAPY WITH ROSE BENGAL IN NANOFORMULATION WITH ALPHA-CYCLODEXTRIN AGAINST SUSPENSIONS OF *STREPTOCOCCUS MUTANS*

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ABSTRACT:
Considering that dental caries is a biofilm-sugar-dependent disease and that *S. mutans* is considered the most cariogenic microorganism present in the oral biofilm, photodynamic therapy (PDT) has been proposed to supress cariogenic specie. The aim of this study was to assess the efficacy of PDT using blue light (BL) and the photosensitizer (PS) rose bengal (RB), containing nanoparticulated-α-cyclodextrin (RBNP) against suspensions of *S. mutans* in planktonic suspension model. *S. mutans* suspensions were divided into groups, as follows: absence of PS and BL, with BL and without PS, absence of PS and presence of BL and presence of BL and PS. Four different concentrations of RB and RBNP (0.031, 0.062, 1 and 2 μM) and three energy densities of studied light source (3.35; 6.70 and 10.05 $J.cm^{-2}$) were tested. Treatments were applied after bacteria being suspended in tryptone soy broth (TSB) or 0.89% NaCl (saline). Aliquots of each studied group was plated in BHI agar and submitted to colony forming units counting (CFU/mL) and the data transformed into logarithmical scale. BL did not cause cell death in the absence of RB or RBNP, regardless of planktonic suspension model tested. For RB group, dark cytotoxicity was not observed. For RBNP, cell death occurred in the absence of light with 2 μM concentration. In groups where PDT was applied, for RB, microbial reduction was found from the concentration 1 μM and 3.35 $J.cm^{-2}$. For higher both PS concentrations and energy densities, bacterial growth was not observed after treatments. For RBNP group, microbial reduction was detected for both 0.031 μM and 0.062 μM concentrations in all tested energy densities. Photodynamic therapy performed with RB or RBNP was effective in reducting microbial load in *S. mutans* suspensions. The addition of nanoparticles favored the RB antimicrobial effect, however, further studies are needed to investigate the effects of therapy in cariogenic biofilms formed *in vitro* and *in situ*.

Keywords: Photochemotherapy; *S. mutans*; Dental Caries; Nanotechnology

Development Agency: Fundação Cearense de Apoio ao Desenvolvimento Científico e Tecnológico- FUNCAP