TITLE: BACTERIAL METABOLIC ACTIVITY ALTERED AFTER TREATMENT WITH DIFFERENT PROTEIN-ENRICHED ARTIFICIAL SALIVA FORMULATIONS FOR HEAD AND NECK CANCER (HNC) PATIENTS

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ABSTRACT:
Radiotherapy used in the treatment of head and neck cancer (HNC) patients results in hyposalivation if radiation involves the salivary glands. Consequently, the development of caries is frequent, with rapid and severe progression even after radiotherapy. Due to the lack of salivary substitutes, the aim of this study was to evaluate the bacterial metabolic activity of different artificial saliva formulations with CaneCPI-5 and Hemoglobin, isolated or in combination, on the microcosm biofilm formed in irradiated and non-irradiated bovine enamel, from saliva of healthy participants or HNC participants, submitted to radiotherapy. The irradiated and non-irradiated specimens (n = 216) were divided into groups A (saliva of five healthy participants with normal salivary flow) and B (saliva of five irradiated HNC participants with hyposalivation). The specimens were previously washed for 60 s with one of the following treatments: a) Phosphate buffered saline (CTR); b) Inorganic constituents with carboxymethylcellulose at 0.8% (AS); c) AS with 0.1 mg/mL CaneCPI-5 (AS+Cane); d) AS with 1.0 mg/mL Hemoglobin (AS+Hb); e) AS with 0.1 mg/mL CaneCPI-5 and 1.0 mg/mL Hemoglobin (AS+Cane+Hb); and f) BioXtra® commercial formula (BXT). The microcosm biofilm was formed for 5 days from samples collected from both groups and diluted in McBain (2009) saliva with 0.2% sucrose (5% CO_2, 37ºC). Every 24 h the biofilm was treated with its respective formulation for 60 s. The bacterial metabolic activity (MA) was assessed through the resazurin assay. The data were analyzed by three-way ANOVA and Tukey test ($p < 0.05$). The results showed a significant interaction effect between the enamel type and saliva for treatments AS+Cane ($p = 0.003$), AS+Hb ($p < 0.001$) and AS+Cane+Hb ($p < 0.001$). The MA of group B was significantly higher when compared to group A for non-irradiated enamel after AS+Cane treatment and for irradiated enamel after AS+Cane, AS+Hb and AS+Cane+Hb ($p < 0.001$). A significant reduction in MA for group B was observed in irradiated enamel compared to non-irradiated one after AS+Cane treatment ($p < 0.001$). For group B, the AS+Hb did not cause significant changes in the MA parameter and, after AS+Cane+Hb treatment, the MA was significantly increased in irradiated enamel when compared to non-irradiated one ($p < 0.001$). CaneCPI-5 isolated promoted a decrease in bacterial MA. Therefore, its use in artificial saliva formulations for HNC patients should be considered.

Keywords: dental caries, oral biofilm, protein incorporation, salivary substitute

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