

MOLECULAR CHARACTERIZATION OF EX-VIVO NATURAL BOVINE DENTAL ENAMEL

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Bovine teeth are widely used to infer results on a human population. Considering this, an analysis of the mineral content of bovine enamel, focusing the hidroxiapatite (HA), was carried out to evaluate the homogeneity of the sample universe for future experiments with laser irradiation as a substitute of human teeth enamel. Twelve samples of 5 x 5 mm bovine enamel were prepared and polished plane. The mineral content was calculated through surface microhardness (SMH) and morphology by scanning electron microscopy (SEM). Main molecular components of the enamel were analysed by Energy Dispersive X-ray Spectroscopy (EDS). Surface microhardness is an indirect indicator of the mineral content of the samples, which was 258.2 (38.8) KHN. The compounds present in the samples, the values of Calcium and Phosphate oxides and the ration Ca/P were analyzes. As expected Phosphorus pentoxide and Calcium oxide were the main constituent of the samples (57.4 to 59.9%). The $\text{CaO}/\text{P}_2\text{O}_5$ ratio shows a variation with linear correlation ($R^2 = 1$). The elemental ratio (Ca/P) shows a change in the elemental content with linear correlation ($R^2 = 1$). 30% of the samples presented Strontium oxide, 30% had Zirconium dioxide, 10% had Magnesium oxide and 40% had Silicon dioxide. All samples showed Sulfur trioxide, Iron trioxide and Chlorine. 10% did not shown Zinc oxide. 5% had Potassium oxide and Nickel oxide in its composition. The surface microhardness results, although only for the initial homogenization of the sample universe, showed a Knoop hardness number within a spectrum similar to that of natural hydroxyapatite of human origin. The EDS results show that bovine enamel hydroxyapatite present great similarity with that from human enamel hydroxyapatite from the point of view of chemical composition. These results corroborate the use of bovine hydroxyapatite in substitution of hydroxyapatite of human origin. Despite the inter-species similarity, it is possible to note that in the same species the composition of hydroxyapatite varies. In the bovine species, the feeding, the period of formation of the dental germs and the origin are more standardized and controlled than in humans. Nevertheless, it is possible to notice a variation of the components elements of bovine dental enamel, and it is necessary to restrict an interval of hardness and Ca/P values to homogenise the samples properties for use in any experiment. CEPID/FAFESP 05/51689-2, INCT/CNPq 573.916/2008-0 and CNPq 830615/1999-7 supported this work.