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Formation and characterization of calcium orthophosphates in the presence of two different acidic macromolecules

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Abstract

The synthetic nanocrystalline calcium orthophosphates have a notable bioactivity due to the chemical similarity with biological apatite from calcified tissues. In mineralized tissues, the highly ordered structures come from organized assemblies of biomacromolecules and inorganic nanoparticles. One of the purposes of this work was to study the effect of two types of acidic macromolecules: atelocollagen and phosphorylated curdlan onto calcium orthophosphates formation after 30 days of maturation at 2 ± 2 °C. The resulted samples after a long aging time, either calcium orthophosphates or composites, were first investigated by FT-IR spectroscopy and X-ray diffractometry and the results indicated that precipitated hydroxyapatite with low crystallinity was obtained when the synthesis was performed in the presence of phosphorylated curdlan. The macromolecules influenced the morphology of the particles as shown by scanning and transmission electron microscopy. The presence of macromolecules as demonstrated by thermal investigation also influenced the rheological properties of the samples. The second purpose of the work was to evaluate the cytotoxicity of the samples using the MTT assay, and the results revealed very good

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