INFLUENCE OF TWO ONE-STEP METHODS OF SYNTHESIS ON THE PHYSICOCHEMICAL PROPERTIES OF HYDROXYAPATITE/CHITOSAN BIOMATERIALS

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Biomaterials based on calcium phosphates are more viable for bone tissue reparation, specifically those based on Hydroxyapatite (HAp) due to its similar chemical composition to natural bone. Natural polymers help to improve the mechanical and biological properties of HAp, being Chitosan (CS) a very interesting polymer because of its anti-inflammatory, antimicrobial and anti-tumor properties. In this study we present an analysis of the influence of two different one-step methods of synthesis on the physicochemical properties of HAp/CS composites. Methods were one-step precipitation and one-step sol-gel. Composites were prepared with various Hap/CS ratios (80/20, 50/50, and 20/80 w/w), maintaining the calcium/phosphorus ratio in 1.6 as in pure HAp. The materials were characterized using XRD, FTIR, SEM, EDS, AFM and BET.

Our results showed clear differences in the morphology, particle size, topography and porosity of the composites depending on the method of synthesis. Particle and pore size were smaller by the precipitation method, and decreased as Cs was increased for both methods. In all cases we obtained homogeneously dispersed materials but with different morphologies. In the sol-gel composites, particles were block-shaped whereas they were spherical in the precipitation composites. The highest surface area and porosity were obtained for the biomaterial with the highest ratio of mineral (80/20) synthesized with the precipitation method.

Keywords: one-step sol-gel, one-step precipitation, hydroxyapatite/Chitosan composites

References:


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