

Hydroxyapatite-Chitosan Composites for Tissue Engineering Applications

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Abstract : In the field of tissue engineering, the compositional and microstructural features of the employed materials play an important role, with implications on the mechanical and biological behaviour of the medical devices. In this context, the development of apatite - natural biopolymer composites represents a choice of many scientific groups. Thus, hydroxyapatite powders were synthesized by a wet method, namely co-precipitation, starting from high purity reagents (CaO, MgO, and H₃PO₄). Moreover, the substitution of calcium with magnesium have been approached, in the 5 - 10 wt.% range. Afterward, the phosphate powders were integrated in two types of composites with chitosan, different from morphological point of view. First, 3D porous scaffolds were obtained by a freeze-drying procedure. Second, uniform, compact films were achieved by film casting. The influence of chitosan molecular weight (low, medium and high), as well as apatite powder to polymer ratio (1:1 and 1:2) on the morphological properties, were analysed in detail. In conclusion, the reported biocomposites, prepared by a straightforward route are suitable for bone substitution or repairing applications.

Keywords : bone reconstruction, chitosan, composite scaffolds, hydroxyapatite

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