

Obtaining High Purity Hydroxyapatite from Bovine Bone: Effect of Chemical and Thermal Treatments

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Abstract : The biological hydroxyapatite obtained from bovine bone arouses great interest in its application as a material for bone regeneration due to its better bioactive behavior in comparison with synthetic hydroxyapatite. For this reason, the objective of the present investigation was to determine the effect of chemical and thermal treatments in obtaining biological bovine hydroxyapatite of high purity and crystallinity. Two different chemical reagents were evaluated (NaOH and HCl) with the aim to remove the organic matrix of the bovine cortical bone. On the other hand, for analyzing the effect of thermal treatment temperature was ranged between 500 and 1000°C for a holding time of 4 hours. To accomplish the above, the materials before and after the chemical and thermal treatments were characterized by elemental compositional analysis (CHN), infrared spectroscopy by Fourier transform (FTIR), RAMAN spectroscopy, scanning electron microscopy (SEM), thermogravimetric analysis (TGA) and X-ray diffraction (XRD) and energy dispersion X-ray spectroscopy (EDS). The results allowed to establish that NaOH is more effective in the removal of the organic matrix of the bone when compared to HCl, whereas a thermal treatment at 700°C for 4 hours was enough to obtain biological hydroxyapatite of high purity and crystallinity.

Keywords : bovine bone, hydroxyapatite, biomaterials, thermal treatment

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