

Preparation and characteristics of synthesized hydroxyapatite from bovine bones and by co-precipitation method

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Abstract: Hydroxyapatite (HA, $(\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2)$) is a widely studied bioceramic due to its biocompatibility, bioactivity, and chemical similarity to the mineral component of bone. Generally, hydroxyapatite can be made from several natural and synthetic sources. The objective of this study is to prepare hydroxyapatite powders from different precursors (natural or chemical). Hydroxyapatite was synthesized by co-precipitation method, the chemical precursors of which are $[\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}]$, $(\text{NH}_4)_2\text{HPO}_4$ and the natural source was bovine bone. Bovine hydroxyapatite (BHA) was extracted from the bovine bone bio-waste via thermal method and milling process. Synthesized HA (SHA) was prepared by co-precipitation method with the pH 10.0 of mother liquor. The prepared powders were characterized using various analytical techniques such as XRD, FTIR spectroscopy, thermogravimetry (TG), and scanning electron microscope (SEM). These techniques provide information about the structural, chemical, morphological and physicochemical of each of the prepared powders. The use of co-precipitation method produced a low crystallinity of HA while the thermal method increased crystallinity. On the other hand, the results showed that the Ca / P ratio of synthetic hydroxyapatite (SHA) as well as that of bovine bone source (BHA) was also stoichiometric.

Keywords : hydroxyapatite, Bovine bone, synthesis, co-precipitation, thermal decomposition.