

Hydroxyapatite from Biowaste for the Reinforcement of Polymer

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Abstract : Regeneration of bone due to the many health challenges arising from traumatic effects of bone loss, bone tumours and other bone infections is fast becoming indispensable. Over the period of time, some approaches have been undertaken to mitigate this challenge. This includes but not limited to xenografts, allografts, autografts as well as artificial substitutions like bioceramics, synthetic cements and metals. However, most of these techniques often come along with peculiar limitation and problems such as morbidity, availability, disease transmission, collateral site damage or absolute rejection by the body as the case may be. Hydroxyapatite (HA) is very compatible and suitable for this application. However, most of the common methods for HA synthesis are expensive and environmentally unfriendly. Extraction of HA from bio-wastes have been perceived not only to be cost effective, but also environment-friendly. In this research, HA was produced from bio-waste: namely bovine bones through a combination of hydrothermal chemical processes and ordinary calcination techniques. Structure and property of the HA was carried out through different characterization techniques (such as TGA, FTIR, DSC, XRD and BET). The synthesized HA was found to possess similar properties to stoichiometric HA with highly desirable thermal, degradation, structural and porous properties. This material is unique for its potential minimal cost, environmental friendliness and property controllability. It is also perceived to be suitable for tissue and bone engineering applications.

Keywords : biomaterial, biopolymer, bone, hydroxyapatite

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