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TITLE: Synthesis and characterization of nanocrystalline hydroxyapatite derived from eggshell for biomedical applications

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ABSTRACT BODY:

Abstract: Hydroxyapatite(HAP) a crystal-chemical analog of the bone tissue mineral component has been intensively studied in recent years as a potential bone substitute in orthopedic and dentistry because of its biocompatibility, biodegradability, bioactivity, and osteoconductive properties. Hydroxyapatite in a nanocrystalline state with uniform size and morphology has many applications in different fields of medicine ranging from targeted drug delivery to designed load-bearing implants. This work presents the synthesis and characterization of nanocrystalline hydroxyapatite derived from hen's eggshell waste for biomedical applications. Firstly, bio-hydroxyapatite was synthesized by the wet precipitation method in which white hen's eggshell waste was used. The white hen`s eggshells were washed, dried and reduced to powder with particle size ≤ 30 μm. Then, the eggshell powder was subjected to a heating cycle at 800 ° C for 3 hours to obtain calcium oxide. Calcium oxide was converted to bio-hydroxyapatite by the addition of a solution of distilled water and phosphoric acid under magnetic stirring at 100 ° C, until a viscous slurry was formed, which was oven dried at 110 ° C for 24 hours. The dried material was disintegrated and calcined at 900 ° C for 2 hours to obtain the hydroxyapatite phase. The bio-hydroxyapatite was irradiated with a high intensity ultrasonic (20 kHz, and 450W/cm2) in order to obtain nanocrystalline hydroxyapatite. These synthesized nanocrystalline hydroxyapatites have been characterized by XRD, FE-SEM, FTIR, and TG analyzes.

(No Image Selected)