

Preparation and characterization of calcium hydroxyphosphate (hydroxyapatite) from tilapia fish bones and scales via calcination method

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ABSTRACT

Calcium hydroxyphosphate (hydroxyapatite) is a calcium phosphate that is widely used in biomedical application. Hydroxyapatite is an excellent component for bone substitutes for their chemical and structural similarity to natural bone component. In this research, hydroxyapatite was synthesized from tilapia fish bones and scales using calcination method with 3 different temperatures namely 1000 °C, 900 °C and 800 °C. The obtained hydroxyapatite powder was characterized using several techniques such as Fourier-Transform infrared spectroscopy Attenuated total reflection (FTIR-ATR), scanning electron microscope (SEM), proximate analysis and X-ray diffraction (XRD). The results indicated that temperature 1000 °C has the highest weight loss with 21.825 g compared to the temperature 800 °C and 900 °C. From FTIR-ATR analysis, the presence of characteristic peaks for hydroxyl group, phosphate groups and water molecule indicated that the powder were hydroxyapatite. SEM results showed that increasing temperature had led to more dense structure. The hydroxyapatite powder were further analysed for their proximate analysis. The results proved that the highest contents of ash, fat, moisture and crude protein were observed at 1000 °C as compared to 900 °C and 800 °C. Based on this study, it revealed that produced pure hydroxyapatite from natural resources could be a potential candidate for food industry as protein enhancer.

KEYWORDS

Bones; Calcium hydroxyphosphate; Hydroxyapatite; Scales; Temperature; Tilapia

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