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Preparation of waste mussel (Mytella strigata) shells as precursor for development of apatite powders

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Abstract: This study investigates the extraction of calcium oxide (CaO) from waste mussel shells (Mytella strigata) as a precursor for synthesizing bioceramics, specifically hydroxyapatite (HAp). Mussel shells, a byproduct of the seafood industry, are rich in minerals, particularly calcium. Additionally, they contain a significant amount of calcium carbonate (CaCO3), which can be thermally decomposed into calcium oxide through calcination at temperatures ranging from 700℃ to 1000℃. Consequently, innovation is essential to maximize the utilization of mussel shells. The extracted CaO serves as a key raw material in the synthesis of bioceramics, which are recognized for their biocompatibility, bioactivity, and applications in medical fields such as bone prosthetics and tissue engineering. Characterization techniques like X-ray fluorescence (XRF) and scanning electron microscopy (SEM) were employed to ensure the purity and suitability of the calcium oxide for bioceramic production. This process provides a sustainable, low-cost alternative to traditional methods of obtaining calcium precursors while also promoting the recycling of waste materials. The study highlights the potential of utilizing waste mussel shells as a renewable source for calcium oxide, contributing to the utilization of hydroxyapatite non-medical applications.

Key Words: waste mussel shells; calcium oxide; calcium carbonate; morphology; composition

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