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OBTAINMENT OF NANOSTRUCTURED CALCIUM PHOSPHATE USING AVIAN EGGSHELL WASTE AS RENEWABLE CALCIUM PRECURSOR

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The avian eggshell is a waste material produced on a large scale worldwide, which has great difficulty of final disposal. It is composed mainly of calcite (CaCO_3), and is considered to be a waste material of difficult final disposal. It is mainly composed of calcite (CaCO_3) and, therefore, has potential to be used as an alternative calcium precursor to obtain calcium phosphate. Such calcium phosphate biomaterials have attracted high interest in medical and dental applications for bone grafting and implants. In this work calcium phosphate biomaterials were prepared by a simple precipitation method using avian eggshell waste as a low-cost alternative calcium precursor source. The synthesized powders were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM/EDS), thermogravimetric analysis (TGA), and Fourier transform infrared spectroscopy (FTIR). It was found that the avian eggshell waste is highly suitable as a renewable calcium precursor. The results indicate that nanocrystallites of pure beta-calcium pyrophosphate (beta-CPP) and biphasic calcium phosphate (beta-CPP/beta-TCP mixture) were successfully synthesized from avian eggshell waste, depending on the synthesis conditions.