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SYNTHESIS AND CHARACTERIZATION OF NEW CRYSTALLINE MESOPOROUS BETA-TRICALCIUM PHOSPHATE NANOPARTICLES

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Calcium phosphates, including hydroxyapatite [HA, $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$] and beta-tricalcium phosphate [B-TCP, $\text{Ca}_3(\text{PO}_4)_2$], are the main mineral component of bone tissue and teeth. The synthetic calcium phosphates are of special interest in medicine because of their biocompatibility, bioactivity and non-toxicity. B-TCP is advantageous to HA for drug delivery system due to their high solubility and controllable bioresorption rate. To obtain B-TCP, the literature reports the transformation of calcium deficient hydroxyapatite (CDHA) to β -TCP since it could not be synthesized directly in aqueous solution, until now. For the first time, B-TCP have been successfully synthesized by wet precipitation method at room temperature with a Ca/P molar ratio equal to 1.5 and pH at 6. The present work is concerned with the preparation of B-TCP and its characterization through XRD, BET and TEM analysis. The results showed well-characterized peaks of crystalline pure B-TCP (JCPDS 09-0169) for the dried powder, with a high BET surface area of 574 ± 7 (m^2/g). The TEM micrographs exhibit mesoporous structure, which is suitable as a drug carrier.