

# Fabrication and characterization of three-dimensional porous cornstarch/n-HAp biocomposite scaffold

## Abstract

The aim of this study is to investigate the morphological, functional group, crystallinity and mechanical properties of a three-dimensional porous cornstarch/n-HAp (nano-hydroxyapatite) biocomposite scaffold. In this study, cornstarch/n-HAp scaffolds were fabricated using the solvent casting and particulate leaching technique. The porous cornstarch/n-HAp composites with various cornstarch contents (30, 40, 50, 60, 70, 80 and 90 wt%) were prepared and characterized by scanning electron microscopy, Fourier transform infrared spectroscopy, X-ray diffractometer and compression test. The morphology of the scaffolds possessed macropores (200–600  $\mu\text{m}$ ) and micropores (50–100  $\mu\text{m}$ ) with a high interconnectivity. The porosity of the porous cornstarch/n-HAp scaffolds varied between 53 and 70% with compressive strength and compressive modulus of 2.03 and 8.27 MPa, respectively. The results suggested that highly porous cornstarch/n-HAp scaffold properties with adequate mechanical properties can be obtained for applications in bone tissue engineering.

## Keywords

Hydroxyapatite; Mechanical; Porous; Scaffold; Starch