



Defence Seminar

Seminar : Preparation and Characterization of Freeze Dried and Electrospun Scaffolds from Chitosan, Gelatin and Monetite Nanoparticles for
Title Bone Tissue Engineering

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Venue : Online mode (Microsoft Team): meeting code-gnnvc6s

Date & Time : 01 Dec 2022 (3.00 p.m.)

Abstract : Gelatin, chitosan and nano calcium phosphate-based composite scaffold with tailored architectures and properties has great potential for bone regeneration. Herein, we aimed to improve the physicochemical, mechanical, and osteogenic properties of the 3D porous scaffold by incorporation of dihydrogen calcium phosphate anhydrous (DCPA) nanoparticles into biopolymer matrix with variation in composition in the prepared scaffolds. Scaffolds were prepared from the slurry containing gelatin, chitosan, and synthesized nano DCPA particles using the lyophilization technique. DCPA nanoparticles were synthesized using calcium carbonate and phosphoric acid in water-ethanol medium. XRD pattern showed phase pure DCPA in synthesized nanopowder. Scaffolds were prepared by the addition of 10- 20% DCPA nanoparticles into the gelatin-chitosan solution at a fixed solid loading of 20 wt%. The prepared scaffold showed interconnected porosity with pore size varying between 90-390 μm . With addition of DCPA nanoparticles, the average pore size of the prepared scaffolds decreased. With increase in nano ceramic phase content from 10 wt% to 20 wt%, the compressive strength of the scaffold increased. Scaffold containing 20 wt% DCPA showed the highest average compressive strength of 2.43 MPa. Separately, fibrous scaffolds were prepared from a mixture of gelatin, chitosan solution in acetic acid, and an aqueous suspension of DCPA nanoparticles using the electrospinning technique. The electrospun scaffold with an average fiber diameter of nearly 120 nm were successfully prepared at 20 KV, 15 cm of distance between collector and needle tip from a suspension containing 7 wt% of total polymer concentration. The results demonstrated that both the physicochemical properties and mechanical strength of the gelatin-chitosan scaffold could be improved by the addition of anhydrous dihydrogen calcium phosphate nanoparticles into it.