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Fabrication and Characterization of Porous Biphasic β -Tricalcium Phosphate/Carbonate Apatite Alginate Coated Scaffolds

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Abstract

In this research, biphasic β -tricalcium phosphate/carbonate apatite (β -TCP/ CO_3Ap) scaffolds incorporated with alginate were fabricated. Sodium alginate was extracted from local brown seaweed, *Sargassum Polycystum* via calcium alginate process. Biphasic β -TCP/ CO_3Ap scaffolds were fabricated by polymer reticulate method. β -TCP slurry was infiltrated into the polyurethane foam (PU) foam, then sintered up to 1300 °C, soaked for 4 hours and immediately quenched in still air to form biphasic β -TCP/ α -TCP scaffold. Biphasic β -TCP/ α -TCP scaffold was then transformed to biphasic β -TCP/ CO_3Ap scaffold by dissolution-precipitation reaction with 1 M of NaHCO_3 at 170 °C for 1, 3 and 5 days. Biphasic β -TCP/ CO_3Ap scaffold from 5 days dissolution-precipitation reaction was chosen to incorporate with 1%, 3% and 5% of sodium alginate, respectively, as it has the highest composition of CO_3Ap phase. FTIR and FESEM analysis confirmed the presence of characteristic functional groups of sodium alginate. Mechanical strength of biphasic β -TCP/ CO_3Ap scaffold improved by increasing the concentration of sodium alginate. The highest mechanical strength achieved was 26.38 kPa for biphasic β -TCP/ CO_3Ap scaffold with 5% sodium alginate coating and it was chosen to further study with the addition of

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