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Preparation and bioactivity evaluation of bioresorbable biphasic calcium phosphate microspheres for hard tissue engineering

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Bioresorbable ceramic microspheres by property of Osteoinductive and Osteoconductive such as hydroxyapatite, tricalcium phosphate and nano hydroxyapatite, due to the high surface to volume ratio, have a high potential as cell carrier. Because of that, they are good candidate for regenerate defective bone and tooth structures. Due to the high stability of hydroxyapatite and high solubility of tricalcium phosphate, microspheres combined with hydroxyapatite and tricalcium phosphate called biphasic phosphate, that their property are Osteoinductive and Osteoconductive simultaneously. The microwave synthesis offers the advantages of rapid heating of phase in the atomic levels that also influences the resorption rate of the BCP ceramics. Ceramic microspheres (HA, TCP and biphasic ceramic) were prepared by microwave method. In this method, liquid immiscibility effect using gelatin (6%, 8%) and paraffin oil. In this study the morphology of ceramic microsphere was studied by SEM and crystallographic phases were characterized by X-ray diffraction method. The bioactivity of microspheres was assessed by incubating the microspheres in a simulated body fluid (SBF) after 24 h and 14 days. Scanning electron microscope indicated spherical and porous morphology of the microspheres. These images show that microsphere which form by 6% gelatin have smooth surface and spherical shape. From XRD analysis BCP microspheres sample consist of both the peak of HA and TCP phases without any impurities, also microspheres have microcrystalline shape. The EDXA analysis shows that these microspheres are bioactive ceramics that it is very important factor in tissue remineralization.

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