

Nano-Hydroxyapatite/Dextrin/Chitin Nanocomposite System for Bone Tissue Engineering

Authors : Mohammad Shakir, Reshma Jolly, Mohammad Shoeb Khan, Noor-E-Iram

Abstract : A nanocomposite system incorporating dextrin into nano-hydroxyapatite/chitin matrix (n-HA/DX/CT) has been successfully synthesized via co-precipitation route at room temperature for the application in bone tissue engineering by investigating biocompatibility, cytotoxicity and mechanical properties. The FTIR spectra of n-HA/DX/CT nanocomposite indicated a considerable intermolecular interaction between the various components of the system. The results of XRD, TEM and TGA/DTA revealed that the crystallinity, size and thermal stability of the n-HA/DX/CT scaffold has decreased and increased respectively. The result of SEM image of the n-HA/DX/CT scaffold indicated that the incorporation of dextrin affected the surface morphology while considerable in-vitro bioactivity has been observed in n-HA/DX/CT based on SBF study, referring a step towards possibility of making direct bond to living bone if implanted. Moreover, MTT assay suggested the non-toxic nature of n-HA/DX/CT to murine fibroblast L929 cells. The swelling study of n-HA/DX/CT scaffold indicated the low swelling rate for n-HADX/CT. All these results have paved the way for n-HA/DX/CT to be used as a competent material for bone tissue engineering.

Keywords : autograft, chitin, dextrin, nanocomposite

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