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The effect of different grades of PLGA on characteristics of microspheres encapsulated with Cyclosporine A

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Abstract

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The aim of this study was to evaluate the effect of different grades of poly D, L lactide-co-glycolide (PLGA) on the properties of microspheres encapsulated with Cyclosporine A (CyA). Microspheres were prepared by solvent evaporation method using three grades of PLGA. Various characteristics of microspheres such as morphology, size distribution, encapsulation efficiency and release profile were evaluated. Complementary studies were also carried out by Infrared (IR) spectroscopy and Differential scanning calorimetry (DSC) to evaluate possible drug-polymer interactions. Scanning electron microscopy (SEM) studies showed microspheres as spherical particles with CyA deposited as islands on the surface of spheres. Particle size range was 1-25 μm for microspheres made of PLGA (50:50) which showed the minimum size. Encapsulation efficiency was found to vary from 75% to 92% in various formulations. The profile of release was biphasic, showing an initial rapid phase followed by a continuous and slower rate thereafter. Microspheres made of grades 50:50 and 85:15 showed the highest and lowest amount of drug release, respectively. IR spectra for drug, polymer and microspheres did not indicate any chemical interaction between the components of microsphere and DSC thermograms revealed that CyA was present in its amorphous state within microspheres. In conclusion, the effect of polymer characteristics should be considered in microsphere formulations. In this study, suitable microspheres especially with PLGA (50:50) were prepared which allow the controlled release of CyA over a prolonged period of time. © 2006 Bentham Science Publishers Ltd.

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MeSH: Calorimetry, Differential Scanning; Capsules; Cyclosporine; Drug Carriers; Drug Compounding; Lactic Acid; Microscopy, Electron, Scanning; Particle Size; Polyglycolic Acid; Polymers; Solubility; Spectrophotometry, Infrared

Medline is the source for the MeSH terms of this document.

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