Formulation of Ciprofloxacin Hydrochloride Loaded Biodegradable Nanoparticles: Optimization of the Formulation Variables

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Abstract

The aim of this work was to formulate nanoparticles with longer sustainment since it can play an important role in treatment of chronic osteomyelitis. A factorial design 2 was used to optimize the formulation variables of ciprofloxacin hydrochloride (CP) loaded biodegradable nanoparticles (NPS). The effect of three independent variables, namely: the polymer type (Poly D, L-lactide-co-glycolide 50/50 & Poly (D, L-lactide), the polymer molecular weight (M.Wt) and the drug to polymer ratio on the particle size, encapsulation efficiency (EE%), zeta potential and the time required for 90% of ciprofloxacin to be released (t90%) was investigated. The selected drug loaded nanoparticles was subjected to further investigations including: scanning electron microscope (SEM), DSC, x-ray powder diffractometry and FTIR spectroscopy. Moreover the antimicrobial effectiveness of the selected formula was investigated. The results revealed that the mean particle size ranged from 180-355 nm while the EE% ranged from 52-70%. The selected formula retained its antimicrobial activity throughout the preparation process.

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