Gelatin Adsorbed Solid Lipid Nanoparticles (SLN) For Targeted Drug Delivery Of Anti -Inflammatory Drug

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Abstract

The purpose of this research was to study the effects of surface modified solid lipid nanoparticle of diclofenac as targeted and controlled drug delivery system. Diclofenac SLN were developed using glyceryl monostearate by solvent emulsification diffusion technique followed by sonication and then characterized by particle size analysis, zeta potential, TEM, drug entrapment efficiency. The in vitro dissolution profile showed that the GSLN were able to sustain the release of the Diclofenac for considerable period of time (89.04% within 24 hr.). The in vitro data fits to zero order, first order, Higuchi model, r^2 value showed the drug release characteristics and mechanism. The paw edema test after i.p administration showed that GSLN had extended anti-inflammatory effects compared with Diclofenac. The stability study showed the no alteration in physical appearance, size, shape, drug content and in-vitro drug release after storage at 4^0C and 25^0C during the 60 day (7, 15, 30, 45, and 60 days). These results suggest that GSLN could be promising target drug delivery for Diclofenac with an extended pharmacological effect owing to delayed released of parent drug and were stable at room temperature.

Keywords: Diclofenac: solid lipid nanoparticle: sustain release system: anti-inflammatory: targeted drug delivery.

Abbreviations: SLN, solid lipid nanoparticle: GSLN, gelatin adsorbed solid lipid nanoparticle: PCS, photon correlation spectroscopy: NSAID, non-steroidal anti-inflammatory drug: GMS, glyceryl monosterate: TEM, transmission electron micro spectroscopy.

INTRODUCTION

SLN are sub-micron colloidal carriers (50-1000nm) which are composed of physiological lipid, dispersed in water or in an aqueous surfactant solution. [1] Solid lipid nanoparticles (SLNs) have recently gained significant attention as potential alternate colloidal drug delivery systems for liposomes and lipid emulsions. The use of solid lipid is an attractive innovation that is advantageous because the solid matrix of the lipid provides more flexibility in controlling the drug release and protects the encapsulated ingredients from chemical degradation. [2] The efforts to improve drug effectiveness have led to developments in drug delivery technology. Targeted drug delivery implies selective and effective localization of pharmacologically active ingredient at preselected target in therapeutic concentration, while restricting its access to non-target area, thus maximizing the effectiveness of the drug. [3] SLNs have attracted increasing attention as a potential