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Development and Characterization of Solid Lipid Nanoparticle of Diclofenac Sodium in the Treatment of Ocular Pain after Photorefractive Keratectomy

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The aim of this study was to prepare and evaluate incorporating solid lipid nanoparticles (SLNs) of Diclofenac sodium for systemic delivery of the active after ocular application. Diclofenac sodium loaded solid lipid nanoparticles (SLNs) have been successfully developed using a microemulsion technique. Three different formulations were prepared It was found that variation in the amount of ingredients had profound effects on the Diclofenac sodium loading capacity, the mean particle size, and size distribution of charge, morphology, and drug-lipid compatibility. At optimized process conditions, Diclofenac sodium loaded SLNs showed spherical particles with a mean particle size of 450 nm and 60% Diclofenac sodium incorporation efficacy was achieved. The SLNs were evaluated for in vitro drug release, *ex-vivo* permeation studies. The SLN sustained the drug release for 6 h *in vitro*. The results suggest enhancement in ocular delivery of Diclofenac sodium with incorporating SLNs.

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