Fluconazole-Loaded Niosomal Gels as a Topical Ocular Drug Delivery System for Corneal Fungal Infections

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Abstract:

Non-ionic surfactant vesicles containing fluconazole (FLZ) were prepared using, span 60 or span 80 and cholesterol in weight ratios of 1:1, 2:1 and 1:2. The prepared vesicles were characterized for size, entrapment efficiency, and in vitro drug release. The drug encapsulation efficiencies varied from 40.0% to 84.35%. The particle size ranged from 140 to 280 nm. Higher encapsulation was obtained by the span 60: cholesterol ratio of 2:1, which showed the best drug release. The selected niosomal formulations were incorporated into poloxamer 407 and chitosan gel formulations. Drug release from niosomal dispersions and niosomal gels, permeation of drug from niosomal gels through goat cornea and its antifungal activity were evaluated. Results showed that the surfactant: cholesterol ratio had a significant effect on the encapsulation efficiency and the size of vesicles. The niosomes prepared with 2:1 surfactant: cholesterol showed superior release over the other niosomal formulations. The drug release and permeation from poloxamer gel were higher than that from chitosan gel. Permeation study showed that, the flux of drug was dependent on the viscosity of the gel. The selected niosomal gels had excellent antifungal activity where the poloxamer niosomal gel was more effective compared to chitosan niosomal gel.

Keywords:

Fluconazole, Niosomal gel formulations, In vitro release, Transcorneal permeation, Antifungal activity

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