Performance of Meloxicam Niosomal Gel Formulations for Transdermal Drug Delivery

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Abstract:

Niosomes have been reported as a possible approach to improve low skin permeation shown by conventional vehicles. In this study, a noisome-based delivery system of meloxicam (MX) was developed and characterized for in vitro performance. Niosomes were prepared by reverse-phase evaporation method (REV) using different non ionic surfactants and cholesterol in different molar ratios (1:1, 2:1, 3:1, 1:2 and 1:3) and different drug loading (5, 10 and 15 mg). The used surfactants included Tweens (20, 40 and 80), Brij (35 and 58) and Myrj 52. The prepared systems were characterized for entrapment efficiency, and in-vitro release. Accordingly, selected systems were evaluated for vesicle size, and formulated into different hydrogel bases (sodium carboxymethyl cellulose, hydroxypropyl cellulose, and sodium alginate). Invitro drug release from the different formulations was studied over a period of 8 hr. Effect of formulation additives on drug release was also investigated. The anti-inflammatory activity of the selected formulations was evaluated by the paw edema test. Results showed high encapsulation efficiency which ranged from about 81.93% to 99.23%. The highest entrapment efficiency was obtained with 1:1 surfactant: cholesterol ratio and 15 mg drug loading, so niosomes prepared by this ratio were selected for further studies. Particle size ranged from 4.047 to 12.334 μm for different niosomal systems. In vitro drug release from different gel formulations containing 0.3% MX was compared to that from the same formulations containing 0.3% niosomally entrapped drug. In all formulations the drug release was more sustained in case of niosomally entrapped drug. Incorporation of glycerol and propylene glycol as formulation additives into gel formulations markedly enhanced the drug release, but the release from gels containing niosomally entrapped drug was still delayed

Keywords:

Meloxicam; niosomes; non-ionic surfactants; niosomal gel

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