Comparative Topical Delivery of Antifungal Drug Croconazole Using Liposome and Micro-Emulsion-based Gel Formulations

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Abstract:

The aim of this study was to develop liposomal-based (LBGF) and micro-emulsion-based (MBGF) gel formulations of croconazole to compare their topical delivery potential. Conventional gels were also prepared using various polymers such as sodium carboxymethyl cellulose (SCMC), Poloxamer 407, Carbopol 971P and chitosan. The in vitro release of croconazole from conventional gel formulations, LBGF and MBGF were carried out using cellophane membrane as permeation membrane. However, in vitro skin permeations studies of all formulations were carried out using rat skin. The results of the drug release/skin permeation studies indicated that the highest release was obtained from SCMC followed by chitosan, Poloxamer 407 and finally Carbopol 971P gel. Therefore, liposomes and micro-emulsions were loaded on Carbopol 971P gel. The drug release and skin permeation of croconazole from different LBGF and MBGF showed that MBGF had superior release/permeation than LBGF. MBGF having ethanol as co-surfactant showed higher release/permeation of drug than MBGF-containing propylene glycol. The analysis of data according to different kinetic models indicated that the release of drug from different LBGF and MBGF followed the Higuchi model. The antimicrobial activity of the different LBGF and MBGF of croconazole was carried out by measuring the inhibition zone (mm) and compared by the effect of miconazole cream as control. The different LBGF and MBGF showed an excellent activity against different species of fungi as compared with miconazole cream. Overall, these results indicated that developed LBGF and MBGF could have great potential for topical delivery of croconazole.

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