Research in Pharmaceutical Sciences, 2012;7(5)
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Formulation and characterization of steric-stabilized minoxidil niosomes

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Background and Aims: Liposomal minoxidil has been developed for reducing the side effects and enhancing drug penetration into skin. Phospholipids, the main constituents of liposomes are heat and oxidation sensitive. Alternatively, we prepared and evaluated minoxidil niosomes.
Methods: Niosomes prepared by film hydration methods and composed of Spans (20, 40, 60 or 80) / Tweens (20, 40, 60 or 80)/Cholesterol (500 µmol, different molar ratios). These combinations were chosen due to the polyoxyethylene chains in Tweens which in turn would increase the steric stability of niosomes. Pharmaceutical characteristics of niosomes such as morphology, the mean volume diameter, stability of prepared vesicles and drug penetration through rat abdominal skin from the various formulations were evaluated. Entrapment efficiency of minoxidil was measured by using dialysis method.
Results: Release profiles of minoxidil showed one first rapid release related to desorption of surface drug and a second slow phase due to diffusion of drug through bilayers. High entrapment efficiency, good stability of vesicles depicted as negligible size change during 6 months and enhanced skin penetration through rat abdominal skin were observed.
Conclusions: This study showed niosomal minoxidil formulations could be used for better penetration and efficacy of this FDA approved compound as a new drug delivery system in androgenic alopecia.

Keywords: Niosome; Androgenic alopecia; Minoxidil