ABSTRACT

Background and Objective

Skin is an extensively act as route of administration for local & systemic API application & is potentially a route for their delivery as non ionic surfactant vesicle. Drug delivery by topical route is effective only by better skin penetration to the required layer of skin. Dermatophyte causes the fungal infection, in which dermatophyte infect top layer of skin. Patient suffering from cutaneous candidiasis cure with combined formulation of nystatin and triamcinolone acetonie reveal prominent healing of erythema & pruritis than therapy of nystatin and triamcinolone acetonide alone.

Topical conventional formulations have limitation like penetration through barrier layer of skin. Barrier layer hampers deposition of active pharmaceutical ingredient. Therefore it is essential to select proper carrier by taking in to consideration that selected carrier enhance deposition of API (active pharmaceutical ingredient) by means of topical medicament. Topical applicability of niosomes was further enhanced by developing niosomal gel formulation using carbomers.

Method

In our present research work, we have incorporated drug into niosome by using Ether injection method by applying $3^2$ factorial designs. The niosomes were characterized for poly-dispersibility index, entrapment power, vesicle charge determination, API release study. Niosomal dispersion showed sustained released but further topical applicability of the developed formulation was enhanced by development of gel formulation. Stable niosomal gel was evaluated for the various parameters like drug content, pH, spredability, viscosity, microscopic evaluation. The stability, Safety and efficacy studies of the developed gel were carried out.

Results

Statistical technique $3^2$ factorial design was efficient tool for optimization of niosome. Microscopic observation and Particle size analysis confirmed the uniformity of
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vesicle size and outline. Ultracentrifugation technique was used for determination of entrapment efficiency and was found to be in the range of 69-88%. *In-vitro* API diffusion study revealed sustained diffusion of API from niosomally encapsulated API dosage form.

Niosomal gel showed slow release of drug than Conventional Gel. *In-vitro* drug deposition study on excised porcine skin for 48 hrs showed that the Niosomal gel shows more drug deposition than Conventional gel. Niosomal gel had good viscoelastic properties, spreadablity and uniformity. The stability studies showed that vesicles and Niogel have greater stability at 4°C followed by 25°C. Safety and efficacy study revealed that developed formulation showed good antifungal activity and non-irritant.

**Conclusion**

Extensive research study showed that the developed niogel formulation has shown great potential in the topical antifungal therapy by giving a extended release profile. Therefore safe, efficacious, non irritant surfactant based topical formulation was successfully developed for treatment of fungal disease.

**Keywords**

Niosome, Factorial design, Entrapment efficiency, Antifungal, viscoelastic properties