Design and development of Niosome based Topical delivery of Mometasone furoate

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Abstract

Psoriasis is a chronic recurring condition that varies in severity from minor localized patches to complete body coverage. Fingernails and toenails are frequently affected and can be seen as an isolated sign. Between 10—30% of all people with psoriasis also have psoriatic arthritis. Eczema or Atopic dermatitis is a chronic inflammation of the skin that occurs in persons of all ages but is more common in children. Mometasone furoate is a medium-potency synthetic corticosteroid with antiinflammatory, antipruritic, and vasoconstrictive properties. Studies in asthmatic patients have demonstrated that mometasone furoate provides a favourable ratio of topical to systemic activity due to its primary local effect along with the extensive hepatic metabolism and the lack of active metabolites. The aim of present investigation was to develop and characterized mometasone furoate loaded niosomes for treatment of psoriasis and atopic dermatitis. Drug excipients compatibility was determined using Fourier Transform Infrared Spectroscopic (FTIR). Niosomes were prepared by Ether injection method. A 3^2 full factorial design was used for optimization of formulation parameter. Developed niosomes were evaluated for vesicle size, zeta potential, and percent drug entrapment. Niosomes were converted to niosomal gel using structured vehicle HPMC K100M. Niosomal gel was evaluated for viscosity, Spreadability, pH and drug content. *In vitro* drug release study was performed on franz diffusion cell using dialysis bag. Skin irritation study was also

performed on rat skin to determine skin irritation index by evaluating edema and erythema. Stability was performed at room temperature and accelerated condition. Absence of incompatibility between drug and excipients was confirmed by FTIR. Optimized formulation of niosomes containing drug to total lipid (surfactant and cholesterol) ratio (1:5) and surfactant to cholesterol ratio (8:2) showed optimum particle size (154.5±0.69nm), zeta potential (-47.4±0.74mv) and percent drug entrapment (92.57±0.63%). Viscosity, spreadability, pH and drug content of optimized niosomal gel of mometasone furoate where found to be 5400±0.0051 cps, 4.11±0.389 g cm/sec, 6.3±0.32 and 95.11± 0.32% respectively. *In vitro* drug release of prepared niosomal gel and marketed preparation was found to be 91.68 ±0.32% and 68.46 % ± 0.49 up to 24 hours respectively. Niosomal gels showed higher diffusion of drug as compared to available marketed preparation up to 24 hrs. Skin irritation study indicated that no pathological changes were found on rat skin after application of niosomal gel. The stability study indicated that niosomal gel stored at room temperature remains stable with almost no change in niosomal gel characteristic. The present investigation provides a practical approach used to topical administration of mometasone furoate in the form of gel may improve retention of drug on skin so; more drugs can be absorbed through skin. Developed niosomal gel may be useful for patients of psoriasis and eczema to deliver drug on affected area without irritation and burning sensation.

Key words: Mometasone furoate, Niosome, Psoriasis, Eczema, HPMC K100M, Ether injection method, Skin irritation test