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Invitro, Ex vivo permeation of Voriconazole loaded nanosponges based gel and evaluation of Antifungal potential

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Abstract

The present study aimed to formulate and evaluate nanosponges-based gels of Voriconazole using Ethyl cellulose, P.V.A., D.C.M., and other excipients. Formulated optimized nanosponges of Voriconazole were added to the Carbopol-940 gel base, propylene glycol, and other excipients. The antifungal and antibacterial activity of optimized nanogel was determined against *Candida albicans*. Voriconazole has potent antifungal activity and antibacterial effects. The voriconazole nanosponges loaded with Ethyl cellulose were formulated using different excipients. Optimized formulation (F4) of nanosponges was characterized for particle size, zeta potential, entrapment efficiency, viscosity, *in vitro* drug release, *ex vivo* permeation, drug content, CLSM, S.E.M., and T.E.M. characterization. Nanogel was formulated using polymer Carbopol-934, Triethanolamine, Propylene glycol as a permeation enhancer, and sodium benzoate as a preservative. Formulated nanogels of Voriconazole were studied for antifungal activity against *Candida albicans*. The prepared nanosponges showed uniform particle size and Z.P., indicating the physical stability of nanosponges. S.E.M. and T.E.M. surface morphology showed discrete, spongy particles of prepared optimized nanosponges. The Voriconazole nanogel met all properties and complied with the pharmacopeial standards. The *ex vivo* study of the optimized formulation was subjected to a CLSM (confocal laser scanning microscopy) analysis to confirm the permeation into deeper skin tissues. The gel formulations showed therapeutic efficacy against *C. albicans*, and found effective for topical delivery.

Keywords: Voriconazole; nanosponges; nanogel; CLSM; topical delivery; antifungal, SEM; TEM

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