



Exploring the Potential of Topical Praziquantel-loaded Ethosomal Gel for the Management of Psoriasis: In vitro and In vivo Assessment

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Abstract

Purpose Praziquantel (PZQ), a BCS class II drug, is widely used as an anthelmintic. The study explores the potential of topical PZQ-loaded ethosomal gel for the management of psoriasis.

Methods The formulation was prepared using the thin-film hydration method and optimized by Box-Behnken design by varying the amounts of lipid, cholesterol, and ethanol. The vesicle size and in vitro cumulative drug release were determined to characterize the ethosomes. The optimized PZQ ethosomes (PZQ-ETHs) were characterized using SEM, TEM, and FTIR, and their in vitro release kinetics were also studied. The PZQ-ETHs were further incorporated into Carbopol 940 gel base. The prepared PZQ ethosomal gel (PZQ-ETHs gel) was evaluated for pH, viscosity, spreadability, drug content, and texture analysis. Excised skin was used to study the ex vivo permeation and deposition. Furthermore, in vivo evaluation was conducted to assess the anti-psoriatic activity of the formulations in Swiss albino mice.

Results The optimized PZQ-ETHs possessed a vesicle size of 165.3 ± 1.53 nm and a percentage in vitro cumulative drug release of $93.13 \pm 1.24\%$ in 27 h. The kinetic study of PZQ-ETHs dispersion and gel showed that the release pattern followed the Korsmeyer–Peppas model. The PZQ-ETHs gel was rheologically acceptable, and skin permeation showed enhanced permeation in the epidermal region. The anti-psoriatic activity of the PZQ-ETHs gel was significantly superior to that of the PZQ gel.

Conclusion These findings suggest that the PZQ-ETHs gel exhibits enhanced anti-psoriatic potential compared to PZQ gel, potentially facilitating better management of psoriasis.

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