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(57) Abstract :

The present invention relates to a novel topical pharmaceutical formulation comprising nanosponges loaded with diclofenac diethylamine for enhanced transdermal drug delivery. The nanosponges are prepared using ethyl cellulose by an emulsion solvent evaporation method, producing porous spherical particles with sizes ranging from 102.8 nm to 475.5 nm and drug entrapment efficiency up to 78.50%. The drug-loaded nanosponges are incorporated into a Carbopol 934 gel matrix using triethanolamine as a neutralizing agent and propylene glycol as humectant. The topical gel exhibits pH close to neutral, good homogeneity, excellent spreadability, satisfactory extrudability, and suitable viscosity for topical application. In-vitro drug release studies show zero-order kinetics with sustained release up to 96% within 6 hours. Stability studies confirm formulation integrity, demonstrating superior analgesic and anti-inflammatory efficacy compared to conventional formulations.

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