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(57) Abstract :

The present invention relates to a rutin-loaded nanoemulgel formulation for topical application designed to enhance dermal delivery of the poorly soluble flavonoid rutin for treating inflammatory and oxidative skin conditions. The formulation comprises an oil-in-water nanoemulsion incorporated into a Carbopol-based hydrogel matrix. The nanoemulsion is prepared using high-energy emulsification with liquid paraffin as the oil phase, Tween 80 as surfactant, Span 20 as co-surfactant, and propylene glycol as penetration enhancer, producing droplet sizes below 200 nanometers with narrow polydispersity. The optimized nanoemulsion is incorporated into Carbopol 934 gel neutralized with triethanolamine. The nanoemulgel exhibits skin-compatible pH, pseudoplastic viscosity, good spreadability, high drug entrapment efficiency, sustained drug release, and stability under varied storage conditions, offering superior skin penetration and cost-effective topical therapy.

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