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Formulation and Evaluation of Nanosponges Loaded Terminalia Chebula Gel for Wound Healing

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Abstract: Terminalia chebula, a key herb in traditional Ayurvedic medicine, is known for its potent antioxidant, antimicrobial, and anti-inflammatory properties, making it a suitable candidate for wound healing applications. To enhance its therapeutic efficacy and overcome limitations such as poor solubility and stability, a novel nanosponge-based gel formulation was developed. Nanosponges were prepared using the quasi-emulsion solvent diffusion method and loaded with ethanolic extract of Terminalia chebula. These nanosponges were further incorporated into a Carbopol 934-based gel to facilitate sustained topical delivery at the wound site and to minimize systemic dispersion.

The formulated nanosponges and nanosponge gel were evaluated for various physicochemical and in vitro parameters, including particle size, entrapment efficiency, pH, spreadability, viscosity, drug content, and in vitro drug release. The results demonstrated satisfactory characteristics, with sustained drug release and good stability. The incorporation of Terminalia chebula extract into a nanosponge gel system presents a promising strategy for effective and safe wound healing, offering the advantages of enhanced bioavailability, prolonged action, and localized therapeutic effect.

Keywords: Nanosponges, Terminalia chebula ,Wound healing, Gel



