

# Topical Herbal Formulations for Eczema: Advances, Challenges, and Future Perspectives

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**Abstract:** Eczema, a chronic inflammatory skin disorder, affects millions worldwide, often requiring long-term management. Conventional treatments such as corticosteroids and immunomodulators provide symptomatic relief but are associated with adverse effects like skin thinning, hypersensitivity, and rebound flares. In recent years, topical herbal formulations have emerged as promising alternatives due to their anti-inflammatory, antimicrobial, antioxidant, and skin barrier-enhancing properties. This review explores key herbal ingredients, including *Curcuma longa*, *Aloe vera*, *Neem*, *Tea tree oil*, and *Shea butter*, highlighting their pharmacological mechanisms in eczema management. Additionally, various formulation approaches such as gels, creams, ointments, and nanoemulsions are discussed to optimize herbal bioavailability and skin penetration. Furthermore, the evaluation parameters of herbal formulations, including physicochemical properties, *in vitro* release, antimicrobial activity, *in vivo* efficacy, and stability studies, are reviewed. While preclinical and clinical trials indicate positive outcomes, challenges related to standardization, regulatory approval, and large-scale clinical validation remain. Future research should focus on novel drug delivery systems, enhanced bioavailability strategies, and integrative approaches combining herbal and conventional therapies to maximize therapeutic benefits.

**Keywords:** Eczema, topical herbal formulations, anti-inflammatory herbs, skin barrier repair, nanoemulsions, antimicrobial activity, clinical trials, herbal drug delivery.

