

Development of Herbal Gel for Acne Using Aloe Vera and Neem

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Abstract: *Acne vulgaris* is one of the most prevalent dermatological disorders, affecting millions worldwide and often leading to physical discomfort, psychological distress, and social stigma. Conventional therapies, including antibiotics, retinoids, and benzoyl peroxide, though effective, are frequently associated with adverse effects such as skin irritation, microbial resistance, and high costs. This has prompted increasing interest in herbal formulations that offer safer, eco-friendly, and cost-effective alternatives.

Aloe vera (*Aloe barbadensis* Miller) and *neem* (*Azadirachta indica*) are two medicinal plants long recognized in traditional medicine for their therapeutic properties. *Aloe vera* is rich in polysaccharides, vitamins, and bioactive compounds that promote wound healing, hydration, and anti-inflammatory activity. *Neem* contains azadirachtin, nimbidin, and flavonoids that exhibit potent antibacterial, antifungal, and antioxidant effects. The combination of these two botanicals in a gel formulation is hypothesized to provide synergistic benefits for acne management by reducing microbial colonization, soothing inflammation, and enhancing skin repair.

This study focuses on the development of a stable herbal gel incorporating *Aloe vera* and *neem* extracts, optimized using suitable gelling agents and preservatives. The formulation was evaluated for physicochemical parameters such as pH, viscosity, spreadability, and stability, alongside antimicrobial activity against *Propionibacterium acnes*. Results demonstrated that the herbal gel possessed desirable consistency, acceptable pH, and significant antibacterial efficacy, supporting its potential as a natural alternative to synthetic acne treatments.

The findings highlight the promise of *Aloe vera*-*Neem* gel as a safe, effective, and sustainable dermatological product. Future directions include clinical trials to validate efficacy in human subjects and exploration of commercialization pathways to meet the growing demand for herbal skincare solutions.

Keywords: "Herbal gel", "Aloe vera", "Neem", "Acne", "Topical formulation", "Acne vulgaris".

