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Development and Evaluation of Poly-Herbal Antifungal Gel for the Treatment of Fungal Skin Infection

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Abstract: *The present study focuses on the development and evaluation of a polyherbal gel formulated using extracts of Allium sativum (garlic), Curcuma longa (turmeric), and Azadirachta indica (neem) for the management of fungal skin infections. Fresh plant materials were collected, authenticated, shade-dried, and powdered before undergoing sequential Soxhlet extraction using petroleum ether and methanol. The resultant methanolic extracts were subjected to detailed physicochemical and qualitative phytochemical analyses, revealing diverse classes of bioactive constituents such as alkaloids, flavonoids, saponins, tannins, terpenoids, glycosides, and phenols, supporting their therapeutic relevance. Polyherbal gels (F1 to F9) were formulated by varying the concentrations of Carbopol 940 and herbal extracts, with triethanolamine employed to adjust pH within a skin-friendly range of 6.8–7.0. The gels were evaluated for physical characteristics, pH, viscosity, spreadability, and extrudability, all formulations exhibiting smooth texture, acceptable consistency, and absence of phase separation. In vitro antimicrobial and antifungal activities were assessed by agar well diffusion against Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Candida albicans, and Aspergillus niger. Notably, formulation F3 demonstrated superior zones of inhibition, indicating potent broad-spectrum activity, likely due to an optimal synergy of phenolic compounds, flavonoids, and terpenoids. Stability studies conducted under various temperature and humidity conditions confirmed the formulations' physicochemical integrity over time. The study concludes that such a polyherbal gel holds significant promise as a safe, effective, and natural alternative for treating fungal skin infections, warranting further clinical exploration.*

Keywords: Polyherbal gel; *Allium sativum*; *Curcuma longa*; *Azadirachta indica*; antifungal activity; phytochemical analysis; topical formulation

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