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Pharmacognostic and Phytochemical Evaluation of Selected Indian Plants and Development of A Poly-Hebral Gel

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Abstract: *The present study focused on the pharmacognostic, physicochemical, and phytochemical evaluation of three well-known Indian medicinal plants—Liquorice (Glycyrrhiza glabra), Ajwain (Trachyspermum ammi), and Turmeric (Curcuma longa)—followed by the formulation and evaluation of a polyherbal gel. Macroscopic and microscopic studies revealed distinct diagnostic features, such as fibrous roots and abundant starch granules in Liquorice, stomata and trichomes on Ajwain leaves, and high lignin-starch content in Turmeric rhizomes. Phytochemical screening confirmed the presence of multiple bioactive constituents, including alkaloids, flavonoids, tannins, terpenoids, saponins, and essential oils, supporting their traditional uses. Pharmacognostic parameters like ash values (3–7%), moisture content (5–10%), crude fiber (8–20%), and extractive values complied with standard limits, ensuring raw material quality. Antioxidant studies revealed notable DPPH and ABTS radical scavenging activities and total antioxidant capacity (TAC), with the polyherbal extract outperforming individual extracts, indicating synergistic antioxidant potential. The polyherbal gel was prepared using Carbopol 940, propylene glycol, and varying concentrations of polyherbal extract (1–9%), yielding formulations (F1–F9) with desirable characteristics. Evaluation showed pH values ranging from 4.5–5.7 (close to skin pH), viscosities between 500–900 cps, and spreadability classified as moderate to excellent. Among the formulations, F5 and F8 were identified as optimal, balancing viscosity, spreadability, color, and odor. This integrative study highlights the significance of comprehensive pharmacognostic and phytochemical assessments in ensuring the quality of herbal raw materials and demonstrates the feasibility of developing a stable polyherbal gel with enhanced antioxidant potential, paving the way for future pharmacological investigations and potential clinical applications in managing oxidative stress-related skin disorders.*

Keywords: Glycyrrhiza glabra, Trachyspermum ammi, Curcuma longa, pharmacognostic evaluation, phytochemical screening, antioxidant activity, polyherbal gel, Carbopol 940, topical formulation

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