

From Tradition to Innovation: The Role of Multipurpose Poly-herbal Gels in Modern Medicine

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Abstract: Polyherbal gels have emerged as a promising alternative in modern medicine due to their enhanced therapeutic potential, synergistic effects, and improved patient compliance. These formulations integrate multiple bioactive herbal extracts into a gel matrix, offering benefits such as antioxidant, anti-inflammatory, antimicrobial, and wound-healing properties. The evaluation and characterization of polyherbal gels are crucial for ensuring their efficacy, stability, and safety. Physicochemical assessments, including pH, viscosity, spreadability, and extrudability, determine the gel's consistency and user acceptability. In vitro studies, such as drug release, diffusion, and permeability analyses, provide insights into the formulation's bioavailability. Microbiological testing ensures the antimicrobial effectiveness of polyherbal gels against pathogenic microorganisms, enhancing their role in dermatological and wound care applications. In vivo studies utilizing animal models assess therapeutic efficacy, skin irritation, and safety before human applications. Stability studies, including accelerated and long-term assessments, help in determining the shelf-life and degradation patterns of the formulation. Advances in formulation science, including the use of nanotechnology and bio-enhancers, further optimize the delivery of herbal constituents, making polyherbal gels a viable option for modern therapeutic and cosmetic applications. Their multifunctionality, coupled with natural bioactive compounds, positions them as a bridge between traditional herbal medicine and contemporary pharmaceutical innovations.

Keywords: Polyherbal gel, antioxidant, anti-inflammatory, antimicrobial, drug release, permeability, stability, wound healing.

