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(57) Abstract :
The present invention relates to antimicrobial formulations derived from medicinal plants, including Azadirachta indica (Neem), Ocimum sanctum (Tulsi), and Terminalia chebula (Haritaki). The method involves identifying plants with documented antimicrobial properties, extracting bioactive compounds using techniques like Soxhlet extraction and supercritical fluid extraction, and isolating key antimicrobial agents such as nimbin, eugenol, and gallic acid through bioassay-guided fractionation. Characterization of these compounds is performed using analytical methods like NMR and MS to confirm their structures and mechanisms of action. Synergistic formulations are developed, combining the bioactives to enhance efficacy against drug-resistant pathogens. A stable, biodegradable topical gel with extended shelf life is prepared, demonstrating potent antimicrobial activity. The invention provides a sustainable, eco-friendly alternative to synthetic antimicrobials, addressing global challenges of microbial resistance with broad-spectrum applications in healthcare, food preservation, and personal care.

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