

Abstract

The emergence of bacterial resistance and the growing need for patient-compliant dosage forms have prompted researchers to explore novel drug delivery systems using natural bioactive compounds. The present study focuses on the formulation and development of an anti-bacterial oral dissolving film (ODF) enriched with curry leaf (*Murraya koenigii*) extract, a traditional medicinal plant well-documented for its potent antimicrobial properties. In this research, the methanolic extract of curry leaves was obtained through maceration, and its antibacterial potential was evaluated against common oral pathogens such as *Staphylococcus aureus* and *Escherichia coli* using the agar well diffusion method. The oral dissolving films were developed using the solvent casting method, employing Hydroxypropyl Methylcellulose (HPMC K15M) as the film-forming polymer and Propylene Glycol as a plasticizer. Other excipients included citric acid, menthol (for flavor and aroma), and a solvent system comprising methanol and distilled water. The formulated films were evaluated for various physicochemical parameters such as thickness, folding endurance, surface pH, disintegration time, tensile strength, drug content uniformity, and in vitro antibacterial activity. Among the formulations developed, the optimized film (F3) demonstrated rapid disintegration within 33 seconds, excellent folding endurance (>15), and significant antibacterial activity, exhibiting a zone of inhibition of 17 mm against *S. aureus* and 15 mm against *E. coli*. Phytochemical screening confirmed the presence of alkaloids, flavonoids, and tannins in the curry leaf extract, contributing to its antimicrobial efficacy. The study highlights the potential of curry leaf-based ODFs as a herbal, patient-friendly, fast-releasing, and effective alternative to conventional antibacterial agents, especially for pediatric, geriatric, and dysphagic patients. This formulation not only enhances the bioavailability and compliance but also provides a natural, sustainable, and side-effect-free therapeutic approach. The promising results suggest that oral dissolving films containing *Murraya koenigii* extract can be further investigated and commercialized for use as a novel herbal antibacterial oral formulation.