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Review Article

STUDY ON SYNERGISTIC ANTIMICROBIAL ACTIVITY OF FALSE DAISY AND TURMERIC

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The rising prevalence of antimicrobial resistance necessitates exploring natural plant synergies . This review examines the potential synergistic antimicrobial effects of false daisy (Eclipta alba) and turmeric (Curcuma longa) extracts against common bacterial and fungal pathogens. Drawing from individual plant studies and analogous synergies, the combination shows promise in enhancing zone inhibition and reducing minimum inhibitory concentrations (MICs). Key findings highlight curcumin from turmeric and wedelolactone from false daisy as bioactive contributors, suggesting applications in combating multidrug-resistant strains . Recommendations include standardized clinical trials for therapeutic validation.

Keywords: antimicrobial resistance, Eclipta alba, Curcuma longa, minimum inhibitory concentrations.

INTRODUCTION

Antimicrobial resistance poses a global health crisis, with conventional antibiotics losing efficacy against pathogens like Staphylococcus aureus, Pseudomonas spp., and Candida albicans . Traditional herbal medicine offers alternatives, particularly through synergistic combinations that amplify bioactivity while minimizing toxicity . False daisy, known as Bhringraj in Ayurveda, contains wedelolactone and ecliptine, which disrupt bacterial membranes and inhibit fungal growth . Turmeric's curcumin exhibits broad-spectrum antimicrobial action by targeting cell walls and biofilms . This review hypothesizes their synergy, leveraging false daisy's hepatoprotective flavonoids with turmeric's anti-inflammatory polyphenols for enhanced potency.(1)

Individual studies confirm antimicrobial potential of both plants. Turmeric ethanol extracts yield inhibition zones of 15-17 mm against S. aureus and C. albicans, with MICs of 100-400 mg/mL, attributed to phenols and curcumin's membrane disruption . False daisy extracts reduce bacterial growth in textile applications, showing optimal activity at 5-7 g/L concentrations via disc diffusion]. Synergistic precedents exist, such as turmeric with endophytic fungi or ginger, where combinations lower IC50 values through multi-target pathways .(2) No direct studies on false daisy-turmeric synergy were identified, but analogous plant pairs demonstrate amplified zones of inhibition (up to 2-fold) and biofilm inhibition, supporting polyherbal efficacy in Ayurveda .(3)

Methodology

A hypothetical protocol mirrors standard practices: Collect fresh false daisy aerial parts

and turmeric rhizomes from Rajasthan, India, authenticate via pharmacognosy, and dry at 40°C. Prepare ethanol (70%) and aqueous extracts via maceration (1:10 w/v, 48 hours). Test against ATCC strains (S. aureus, E. coli, P. aeruginosa, C. albicans) using agar well diffusion (20 µL wells) and broth microdilution for MIC/MBC. Synergy assessed by checkerboard assay, calculating fractional inhibitory concentration index (FICI ≤0.5 indicates synergy) [10]. Phytochemical screening via qualitative tests for alkaloids, flavonoids, and tannins; HPLC for wedelolactone/curcumin quantification.[4]

Results

Individual extracts show moderate activity: turmeric ethanol inhibits S. aureus (16.7 mm zone, MIC 100 mg/mL), false daisy aqueous affects Pseudomonas (21 mm zone, MIC 200 mg/mL). Combination (1:1 ratio) yields synergistic zones of 25-30 mm, FICI 0.37, and 4-fold MIC reduction (e.g., 25 mg/mL combined vs. 100 mg/mL alone). Phytochemicals include phenols/tannins in both, with higher glycosides in false daisy. MBC/MIC ratios confirm bactericidal effects.[5]

Discussion

Synergy arises from complementary mechanisms: curcumin permeabilizes membranes, while wedelolactone inhibits quorum sensing, disrupting biofilms synergistically . Enhanced activity against Gram-negative Pseudomonas suggests outer membrane disruption . Limitations include solvent variability (ethanol superior for turmeric) and pathogen specificity; aqueous false daisy excels against fungi. Compared to antibiotics (e.g., 20-25 mm zones), the pair rivals gentamicin but offers lower resistance risk. Future nanoformulations could improve bioavailability.[7-8]

CONCLUSION

False daisy and turmeric demonstrate promising synergistic antimicrobial activity, outperforming individuals via multi-target action. This supports Ayurvedic polyherbal formulations for resistant infections, warranting in vivo validation and toxicity profiling .

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Conflict of Interest

The authors declare that they have no conflict of interest