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Research Paper

In Vitro Antimicrobial Activity of Dhamargava1(Luffa cylindrica) Against Food Poison- causing microbes

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ABSTRACT

Background: Food-borne illnesses remain a major global health problem. Ayurveda correlates many such conditions with Garavisha. Dhamargava 1,2(Luffa cylindrica) possesses Vishagna1,2and Krimighna1,2properties. Aim: To evaluate the in vitro antimicrobial activity of 1,2extracts against selected food-borne pathogens.Materials and Methods: Fruit and flower extracts were prepared using maceration and percolation. Powder microscopy, phytochemical screening and TLC were performed. Agar well diffusion was used against Escherichia coli, Clostridium botulinum and Clostridium perfringens. Results: Dharmargava flower maceration extract showed moderate inhibition against C. botulinum (9–11 mm). No significant inhibition was observed against E. coli or C. perfringens. Conclusion: Dhamargava exhibits selective antimicrobial activity and warrants further phytochemical and clinical evaluation

INTRODUCTION

Food poisoning is an important public health issue caused by ingestion of food contaminated with pathogenic microorganisms, toxins or harmful chemicals. Common bacterial pathogens include Escherichia coli, Clostridium botulinum and Clostridium perfringens, which produce gastrointestinal illness and systemic complications. Increasing antimicrobial resistance has encouraged the search for plant-derived antimicrobial agents. *Ayurveda* correlates conditions resembling food poisoning with *Garavisha*, a slowly acting artificial poison formed by incompatible combinations or contaminated substances. Classical *Ayurvedic* texts recommended *Vishagna*[1,2]and *Krimighna*[1,2] drugs for such conditions. *Dhamargava* (Luffa cylindrica), belonging to the family Cucurbitaceae, is described with *Tikta rasa*[2], *Laghu-Ruksha guna* [2] *Ushna virya*[2] and *Katu vipaka*[2]. It is indicated in

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Garavisha[1,2] *Gulma*[1,2], *Udara*[1,2]and other gastrointestinal disorders. Previous phytochemical investigations have demonstrated alkaloids, saponins, flavonoids, phenolics, triterpenoids and phytosterols in *Dhamargava*[4], suggesting antimicrobial potential. However, scientific evidence against food-borne pathogens remains limited. Therefore, this study evaluated the in vitro antimicrobial activity of *Dhamargava* extracts against selected organisms.

AIM AND OBJECTIVES

To evaluate the in vitro antimicrobial activity of *Dhamargava* [1,2](Luffa cylindrica)
against food poisoning-causing microorganisms; to prepare extracts; to perform phytochemical evaluation; and to statistically analyze antimicrobial activity.

MATERIALS AND METHODS

Study design: Experimental in vitro study. Plant material: Fresh *Dhamargava* fruits and flowers were collected, authenticated, sliced, dried and powdered.
Extraction: Methanolic maceration and aqueous percolation techniques were employed. Extracts were concentrated on a hot water bath. Pharmacognostical evaluation: Powder microscopy using iodine and safranin staining. Phytochemical screening: Qualitative tests for alkaloids, carbohydrates, proteins, saponins, phenolics, tannins, phytosterols and triterpenoids. TLC fingerprinting was performed. Antimicrobial assay: Agar well diffusion method against E. coli (MTCC 1586), C. botulinum (ATCC 19397) and C. perfringens (ATCC 13124). DMSO served as solvent and standard antibiotics as positive controls. Zones of inhibition were measured after incubation. Statistical analysis: Descriptive statistics, Kruskal–Wallis ANOVA and Mann–Whitney U test; $p<0.05$ considered significant.

Dhamargava fruit

Dhamargava flower

Extraction of *Dhamargava*

Microbial activity of *Dhamargava*

RESULTS

Dhamargava flower maceration extract demonstrated consistent inhibition (9–11 mm) against C. botulinum at higher concentrations. Dhamargava fruit oven dried percolation extract showed inhibition only at the highest concentration, while Dhamargava fruit sundried maceration extract showed no activity. None of the extracts inhibited E. coli or C. perfringens significantly. Statistical analysis revealed no significant differences among groups ($p>0.05$).

DISCUSSION

The observed selective inhibition against C. botulinum may be attributed to bioactive phytochemicals identified during preliminary screening. Lack of activity against E. coli may reflect the protective outer membrane of Gram-negative bacteria. Although statistical significance was not achieved, the biological activity supports the classical *Ayurvedic* indication of *Dhamargava* in *Garavisha*[3]. Larger studies using purified fractions, MIC determination and in vivo models are warranted.

CONCLUSION

Dhamargava (Luffa cylindrica) possesses selective in vitro antimicrobial activity against Clostridium botulinum and represents a promising herbal antimicrobial candidate. Future studies should isolate active constituents and validate efficacy through animal and clinical studies.

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