

***In-vitro* Antimicrobial Properties of Plant Mixture against Common Microbial Strains Causing Urinary Tract Infections and Cytotoxicity Determination using Brine Shrimp Lethality Assay**

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Abstract

In recent years antibiotic resistance has emerged as a global health concern. Ayurvedic and traditional medicine use plant based medications to treat Urinary Tract Infections (UTIs). Aim of the study to detect the antibacterial activity of a medicinal plant mixture against uropathogenic *Escherichia coli* (*E. coli*), *Pseudomonas aeruginosa* and determine the cytotoxicity using Brine Shrimp Lethality Assay (BSLA). Plant mixture was tested using agar well diffusion and MIC to determine the antibacterial activity of the methanolic extract of the plant mixture against *E. coli* (ATCC 25922), *P. aeruginosa* (ATCC 27853) and their UTI-positive strains extracted from positive culture plates. Results were compared with Gentamycin and 50% DMSO. Plants used for the mixture were *Phyllanthus emblica* fruit, *Ocimum tenuiflorum* whole plant, *Terminalia chebula* fruit, *Zingiber officinale* rhizome, *Tribulus terrestris* root, *Asparagus falcatus* root, *Boerhavia diffusa* root, *Tragia involucrata* root and *Aerva lanata* whole plant according to a ratio of 1:1:4:1:4:4:2:2:3 respectively. Selected nine plants were tested for their antimicrobial activity separately before making the plant mixture. Plant mixture prepared based on the antimicrobial activity against selected bacterial pathogens. The plant mixture showed the mean ZOI *P. aeruginosa* (ATCC 27853) > *P. aeruginosa* UTI positive strain > *E. coli* (ATCC 25922) > *E. coli* UTI positive strain. According to BSLA LC50 was calculated using GraphPad software and compared with or toxicity scale (LC50 < 1,000 µg/ml=toxic). The resulting LC50 was 8.69 µg/ml. In conclusion, the plant mixture had the highest antimicrobial activity against *P. aeruginosa* (ATCC 27853) with 35 mm inhibition zone and 0.0015 mg/ml MIC value. According to the results of BSLA, plant mixture is toxic so needs future toxicity studies. The present study needs future validation, and this study would pave the way for new plant-based treatment options and drug development.

Keywords: *Antimicrobial, Brine shrimp lethality assay, Urinary tract infections*