

ANTIBACTERIAL AND ANTIFUNGAL ACTIVITIES OF LOCALLY AVAILABLE FOUR DUCKWEED VARIETIES IN SRI LANKA

H.R.P. Prasadini^{1,2}, T. Madhujith³, B.C. Jayawardena⁴, S. Wijesundara¹ and R. Liyanage^{1*}

¹National Institute of Fundamental Studies, Kandy, Sri Lanka

²Postgraduate Institute of Science, University of Peradeniya, Sri Lanka

³Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya, Sri Lanka

⁴Department of Animal Science, Faculty of Agriculture, University of Peradeniya, Sri Lanka

*ruvini.li@nifs.ac.lk

The overuse of synthetic antibiotics has caused multidrug-resistant pathogens, a major health issue. Secondary metabolites of plants are effective alternatives to combat antimicrobial resistance. This study aimed to evaluate and compare the antibacterial and antifungal properties of plant extracts (water, 60% EtOH, and 70% EtOH) obtained from four duckweed varieties, including *Spirodella polyrhiza* (SP), *Landoltia punctata* (LaP), *Lemna purpusilla* (LP), and *Lemna minor* (LM) owing to their rich content of secondary metabolites. The antimicrobial effectiveness of the extracts was assessed using the agar disc diffusion method. Each extract (20, 10, 5 mg/mL) was tested against bacteria; *Staphylococcus aureus* and *Escherichia coli* as well as fungi; *Aspergillus niger* and *Candida albicans*. Zones of inhibition were compared with amoxicillin for antibacterial activity and itraconazole for antifungal activity as reference standards. The SPSS MANOVA analysis showed significant differences ($p < 0.05$) in zones of inhibition against examined microbes among solvent extracts and duckweed varieties. The results indicated that the most effective inhibition ($p < 0.05$) of *A. niger* growth was observed (10.667 ± 0.577 mm) in SP 70% EtOH at 20 mg/mL. For *C. albicans*, the highest ($p < 0.05$) inhibition (31.000 ± 1.000 mm) was observed in LaP 70% EtOH at both 5 mg/mL and 20 mg/mL concentrations. These values were comparable to the inhibition by itraconazole at 0.125 mg/mL (33.000 ± 1.000 mm). The most notable ($p < 0.05$) antibacterial effectiveness against *S. aureus* (23.000 ± 1.000 mm) was observed with LaP 70% EtOH at 20 mg/mL. In contrast, SPW at 20 mg/mL demonstrated the highest inhibition activity against *E. coli* (17.333 ± 1.155 mm), which is comparable to the effectiveness of amoxicillin at 0.5 mg/mL (18.333 ± 0.577 mm). The results show that SP and LaP exhibited significantly greater ($p < 0.05$) antimicrobial activity compared to other duckweed varieties. Future studies could focus on isolating and identifying the active compounds responsible for these activities.

Keywords: Anti-bacterial activity, Anti-fungal activity, Disc diffusion method, Duckweeds, Zone of Inhibition