



Bioprospecting of the Polychaete *Marphysa madrasi* as a Sustainable Source of Antimicrobial Agents

R. Sivalakshmi, M. Madhavi*

Aquatic Sciences and Biotechnology Laboratory (ASB LAB), PG & Research Department of Zoology, Ethiraj College for Women (Autonomous), Chennai - 600 008, Tamil Nadu, India

*madhavisuccess@gmail.com

The increasing global threat of antimicrobial resistance has intensified the search for novel bioactive compounds from marine invertebrates. Marine polychaetes, particularly those found in estuarine ecosystems, are known to produce secondary metabolites with potent biological activities as part of their chemical defense. This study focused on the bioprospecting of the annelid *Marphysa madrasi* to evaluate its potential as a sustainable source of antimicrobial agents. Specimens were collected from their natural coastal habitats at Ennore, Tamil Nadu, and processed to obtain crude extracts using an organic solvent like acetone. The antimicrobial efficacy of these extracts was evaluated against a panel of pathogenic bacteria and fungi using the standard disc diffusion method. The results revealed that the crude extracts from *Marphysa madrasi* exhibited significant inhibitory activity against the tested microorganisms, as evidenced by the formation of clear zones of inhibition. These findings suggest that the species contains promising bioactive compounds that could be utilized in the development of new therapeutic agents. The polychaete extract exhibited concentration-dependent antimicrobial activity against all tested pathogens, with the highest inhibition observed at 30 μ L against *Staphylococcus aureus* (22 mm) and *Bacillus subtilis* (20 mm), while comparatively lower activity was recorded against *Escherichia coli*. The study underscores the importance of exploring marine annelids for their pharmacological properties and supports the sustainable use of marine biodiversity for medical applications. Although the crude extract showed broad-spectrum effectiveness, future research is required to isolate and characterize the specific molecules responsible for these effects. In conclusion, *Marphysa madrasi* represents a valuable biological resource for the discovery of novel antimicrobial compounds, highlighting its significance in the field of marine bioprospecting and drug discovery.

Keywords: Marine, Polychaetes, *Marphysa*, Bioactive, Antimicrobial