

Preliminary Analysis of Functional Diversity of Bacterial Communities Associated with Mangrove Ecosystems Located Within Puttalam Lagoon, Sri Lanka

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Mangroves are composed of a broad range of well-adapted vegetations associated with macro and microorganisms. As a tropical country, Sri Lanka mangroves provide habitats to a microbial population rich in compositional and functional diversity. The present study aimed at exploring the functional diversity of the bacterial isolates associated with sediments from mangrove ecosystems located in the Puttalam lagoon, Sri Lanka. Bacteria were isolated based on the cultural techniques using sea water (50% v/v)- nutrient agar medium. Extracellular enzyme production including amylase, protease, cellulase and lipase, phosphate solubilization and antimicrobial activities of bacterial isolates were evaluated through culture-based screening techniques. The ratio of clear zone diameter (z) to colony diameter (n) was used to identify the highest amylase, protease, and cellulose producers among the isolates. Out of eighteen isolates, eight (44% of total isolates) exhibited amylase activity, while 50% of total isolates exhibited protease and cellulase activities. The highest activities of amylase, protease and cellulase were observed in bacterial isolates PUTS2_7 (3.00 z/n), PUTS1_6 (3.93 z/n) and PUTS1_1 (3.33 z/n), respectively. Six isolates (33% of total isolates) showed lipase activity by creating a yellowish zone around the colony. Five isolates produced yellow coloration around the colonies when grown on modified Pikovskaya medium indicating their phosphate solubilization ability. The preliminary screening for antimicrobial activity was performed using the cross-streak method against *Staphylococcus aureus* (ATCC 25923), *Escherichia coli* (ATCC 25922) and *Pseudomonas aeruginosa* (ATCC 27853). None of the isolates exhibited antimicrobial activity against pathogens tested. Further studies are necessary to evaluate the potential use of extracellular enzymes produced by those bacterial isolates in various large scale industrial applications.

Keywords: Mangroves, Bacteria, Extracellular enzymes, Antimicrobial activity, Phosphate solubilization

Financial assistance from the University of Kelaniya, Sri Lanka (Grant No: RP/03/02/03/01/2019) and TWAS (Grant No: 17-446 RG/BIO/AS_I-FR3240297764) is acknowledged.