Title: Screening of Actinobacteria from Vermicompost for Their Plant Growth Properties

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ABSTRACT

Vermicompost, a product of organic waste decomposition mediated by earthworms and associated microorganisms, is a highly valued organic fertilizer due to its rich nutrient content and beneficial microbial communities. Among these, actinobacteria are widely distributed and recognized for their plant growth-promoting (PGP) potential. Therefore, this study aimed to isolate actinobacteria from commercial vermicompost and evaluate their plant growth-promoting properties. Two commercial vermicompost products were chosen for isolation using three selective media —starch casein agar, glycerol arginine agar, and humic acid vitamin agar, supplemented with nystatin and nalidixic acid. A total of 17 isolates were obtained from Panya farm (11 isolates) and JB farm (6 isolates), which were classified into six groups based on substrate and aerial mycelium pigmentation. Representative isolate from each group were identified via 16S rRNA gene analysis. Subsequently, all actinobacterial isolates were screened for plant growth-promoting (PGP) traits, specifically indole-3-acetic acid (IAA) and siderophore production. The results showed that all isolates produced phytohormone indole-3-acetic acid (IAA), with concentrations ranging from 1.47 ± 0.59 to 8.73 ± 1.71 μg mL^{-1}. Furthermore, six isolates produced siderophores on Chrome Azurol S (CAS) agar. Quantitative analysis identified two siderophore types: catecholate-type (2.98 ± 2.13 to 67.44 ± 4.00 μmol L^{-1}) and hydroxamate-type (95.58 ± 21.31 to 731.33 ± 200.56 μmol L^{-1}). These findings demonstrate that commercial vermicompost is a promising reservoir of plant growth-promoting actinobacteria with significant potential for sustainable agricultural applications.

Keywords: Actinobacteria, Plant growth promoting bacteria, Vermicompost

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