

Isolation and Identification of the Nitrogen-Fixing, and Phosphate-Solubilizing Bacteria for Biofertilizer

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Biofertilizer is a Global trend in this century. There are lots of advantages present in biofertilizer than chemical fertilizers. Therefore, can be a biofertilizer as an alternative to chemical fertilizer. Biofertilizers depend on beneficial soil microbial populations and cooperate with plants to increase growth rate and yield. Objectives were the isolation and identification of the rhizosphere microbes in associated two plants such as *Phyllanthus emblica* L. and *Annona muricata* and the suitability of using those isolated microbes for biofertilizer. The research conducted in the Anuradhapura district, the study involved soil sampling (*Phyllanthus emblica* L. and *Annona muricata*, rhizosphere), isolation of beneficial microorganisms under the aseptic condition through specific and selective media such as King's B medium and Pikovskaya medium. These bacterial counts have been observed under this range 0.149×10^3 to 0.222×10^3 CFU/ml-1 with three to seven days incubation, 7.504 ± 0.025 to 8.23 ± 0.07 pH range, and conductivity (*Phyllanthus emblica* L.- 72.45, *Annona muricata*. - 37.05). The study identified bacteria capable of phosphate solubilization, such as *Bacillus* sp. (0.222×10^3 CFU/ml⁻¹), *Pseudomonas* sp., *Aspergillus* sp. (0.005×10^3 CFU/ml⁻¹), and nitrogen-fixing bacteria, *Azotobacter* sp (0.018×10^3 CFU/ml-1). Morphological, physiological, and biochemical characterization like oxidase test, gram staining, and catalase test were used to identify of above microbes. Isolated microbes can be used to produce beneficial biofertilizers. The research contributes valuable insights into biofertilizer development, characterization, and its application for sustainable farming practices by using root-associated. Microbes.

Keywords: *Biofertilizer, nitrogen-fixing, phosphate-solubilizing, characterization*

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