Identification and Characterization of Enterobacter sp. to Evaluate their Potential on Maize (*Zea mays* L.)

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Abstract

Biotechnology offers several sustainable solutions to mitigate problems of modern agricultural systems by using plant growth-promoting rhizobacteria (PGPR). Studies have shown that PGPR genes contribute to root colonization, and their survival in the rhizosphere, nutrient solubilization, hence directly enhancing plant growth and development. Moreover, the plants' indirect protection against fungal and bacterial infections (quorum sensing) is enhanced. This study aimed to isolate nitrogen-fixating and phosphate solubilizing bacteria from the air in the natural forest. Then to evaluate if their root colonization can induce maize growth-stimulating effects. Lastly, the isolates will be assessed to strengthen field stress tolerance with better yield, biomass, nutrition, and other biochemical properties. The bacteria samples were swabbed in nitrogen starvation media plates, followed by a streak method on three consecutive agar plates to confirm their nitrogen-fixation capabilities. The screened single colonies were then grown at 37 ℃ for 48 h in Pikovskayas agar to examine their ability to solubilize phosphate observed with a clear zone. The hemolysis test was done, and the isolates were safe; hence 16S *r*RNA identification classified them to *Enterobacter* sp. The preliminary findings on germination implied that seeds inoculated at 10^8 CFU/mL increased root growth compared to the uninoculated group. Hence, further research will be done on more seed inoculations to exploit this scenario and others at field-stress conditions.

Keywords: Maize *(Zea mays* L.), Nitrogen-fixation, Phosphate solubilization, *Enterobacter,* Root colonization

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