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## COMPARATIVE EFFECTIVENESS OF ACC-DEAMINASE AND/OR N FIXING RHIZOBACTERIA IN RICE (*Oryza sativa* L.)

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### Abstract

Plant growth promoting rhizobacteria (PGPR) colonize rhizosphere and enhance growth in crop plants, by producing various regulatory substances. Since PGPR employ diverse array of mechanisms and exact mechanism and role are still to be established. Therefore experiment was designed 1) to identify and 2) to select potential rhizobacterial strains based on their impact on the growth, physiological and enzymatic activities of rice. A CRD pot experiment with six PGPR isolates; two containing only ACC-deaminase activity (ACC1 and ACC2), 2 isolates containing N fixing activity (*Azotobacter* and RN1) and 2 PGPR isolates (AN1 and AN2) containing both abilities, was conducted under controlled environment. Root infusion with all the selected PGPR isolates improved plants responses than control (CK) conversely, the AN1 isolate with both the ACC- deaminase activity and N fixing ability was found to be the most efficient. AN1 increased the root length by 3.8%, shoot length by 3.4% and other parameters over control. Macronutrient uptake e.g. N (5.0%, 5.4%), P (4.5%, 3.6%) and Mg (4.0%, 3.0%), plant micronutrient uptake e.g. Zn (5.6%, 8.1%), Cu (5.0%, 5.1%) and Fe (4.7%, 5.6%) and plants antioxidant enzymes activities were also augmented up to 5.5% by rhizobacterial inoculation. Overall PGPR isolates enriched both plant growth and physiology by mainly by improving nutrient availability, uptake and by alleviating ethylene stress due to its ACC cleaving ability in the rhizosphere. Therefore application of rhizobacterial strains as biofertilizers is viable and ecological technique to facilitate crop production on sustainable basis.

*Key words:* ACC-deaminase, antioxidant enzymes, growth attribute, PGPR, rice seedlings

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