Potential Characterization and Identification of Indigenous Rhizobacteria Species of Ultisol Soil to Support the Growth of Several Superior Upland Rice Varieties

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Abstract	TG4 and SR2 were isolates of indigenous bacteria from cassava roots from Banyumas Regency, Central Java. Both are local isolates from marginal lands that can be developed as biofertilizers. This study aimed to determine the potential characteristics of bacterial isolates TG4 and SR2 in supporting the growth of superior upland rice and determining species identity based on the molecular analysis of 16S rRNA. Bacterial isolates TG4 and SR2 were determined for their potency of Plant Growth Promoting Rhizobacteria (PGPR) by fixing N2, dissolving phosphate, and producing Indole Acetic acid (IAA). Bioassays were carried out on TG4 and SR2 isolates by application of bacterial isolates (B0 = control, B1 = TG4, B2 = isolates SR2, B3 = isolates TG4 and SR2) on superior upland rice (V1 = INPAGO UNSOED 1, V2 = UNSOED PARIMAS, V3 = INPAGO 8) in sterile ultisol soil. The F test was used for bioassay data analysis, and if there was a significant difference, it was further tested with Duncan's Multiple Range Test (DMRT) with an error rate of 5%. The identity of bacterial species TG4 and SR2 was obtained by analyzing 16S rRNA sequences and genetic relationships through phylogenetic trees. The results showed that the isolates of TG4 were phosphate solubilizing bacteria and producers of IAA, while the isolates of SR2 were nitrogen fixing, phosphate solubilizing, and IAA producers. The application of bacterial isolates TG4 and SR2 significantly affected root length wet and dry weight of upland rice plants, with the highest value obtained from using a consortium of TG4 and SR2 bacteria. Bacterial isolates TG4 were identified as Bacillus albus, while SR2 as B. Paramycoides. Bacterial isolates TG4 and SR2 can be used as biofertilizers to support superior upland rice growth.
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