

Isolation and Characterization of Endophytic Diazotrophic *Bacillus* Bacteria from Rice and its Potential as a Biofertilizer

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Multiple species of *Bacillus* are known to promote plant growth, in addition to the beneficial N²-fixing activity, by a number of direct and indirect mechanisms. Six endophytic diazotrophic bacterial strains isolated from rice cultivars BG 358 and Dahanala were tested for their plant growth-promoting (PGP) characteristics. All isolates were gram positive, motile, rod shaped, endospore-forming, aerobic or facultative anaerobic bacteria where all isolates produced acid from glucose while four produced acid from lactose. The isolates showed highest levels (96 - 98%) of 16S rRNA gene sequence similarity with isolates of the Genus *Bacillus* and clustered in different phylogenetic groups. *Bacillus* strains isolated showed significant but variable plant growth promoting activity. All isolates tested positive for cellulase activity but only isolates IS005, IS007 and IS008 tested positive for pectinase activity. Isolates IS003 and IS007 indicated significant IAA production in the presence of tryptophan. Isolates IS005, IS007 and IS008 hydrolyzed the organic and inorganic phosphate compounds. Endophytic diazotrophic isolate IS007 which exhibited cellulase and pectinase activity, IAA production and ability to hydrolyze mineral phosphates holds potential to be developed as a biofertilizer to enhance soil fertility and promote plant growth.