

Molecular characterization of stress tolerant plant growth promoting rhizobacteria (PGPR) for growth enhancement of rice

ABSTRACT

The study was undertaken to characterize plant growth promoting rhizobacteria (PGPR) for growth enhancement and stress tolerant traits and their efficacy on early establishment of rice seedling. In vitro growth promoting traits revealed that out of 30 PGPR isolates, 18 fixed nitrogen, 17 solubilized tri-calcium phosphate, 29 and 17 produced IAA with or without addition of L-tryptophane. In case of stress tolerant activities, PGPR isolates tolerated pH ranging from 5 to 10, NaCl from 1 to 6% and polyethylene glycol (PEG) from 10 to 40%, respectively. They showed antagonistic activity against *Pyricularia oryzae* with PIRG values ranging from 7–68%. After two-stage of screening, isolates UPMR7 and UPMR17 were identified based on 16S rRNA gene sequences and matched to the genus *Bacillus* and *Citrobacter* with 97–98% similarity. UPMR 7 and UPMR 17 were further evaluated on early growth promotion of rice variety MR219. Results revealed that PGPR inoculation had significant effects on plant growth compared to non-inoculated plants. Thus, it could be suggested that the isolates UPMR7 and UPMR17 have the potential to be used as biofertilizer and bioenhancer in sustainable rice cultivation.

Keyword: *Oryza sativa*; PGPR; Stress tolerant; Growth promotion