

Growth and yield responses of rice CV. MR219 to rhizobial and plant growth-promoting rhizobacterial inoculations under different fertilizer-N rates

ABSTRACT

Effects of locally isolated plant growth-promoting rhizobacteria (PGPR) and rhizobial inoculations on growth and yield of local Malaysian rice variety MR219 experiments were conducted in glasshouse. The treatments consisted of three PGPR (UPMB10, UPMB19 and UPMB20) and two rhizobial (UPMR30 and UPMR31) inoculations, each with three levels of nitrogen fertilizer (0, 33, 100% of recommended rate), laid in CRD. Results showed that bacterial inoculations significantly improved rice growth and yield parameters, particularly when supplied with minimal N rate (33). Bacterial inoculations increased chlorophyll content at 43 and 67 days after planting (DAP). Similar trend for tiller numbers (except inoculation with UPMB20) at 43 DAP. UPMB10 significantly increased filled spikelet percentage (87.33) and UPMB19 produced highest straw dry weight (114.34 g/plant), spikelet weight (107 g/plant) and biological yield (220.11 g/plant) with minimal fertilizer-N. The positive effects of bacterial inoculations appeared to be due to N₂-fixing ability, solubilize phosphate and potassium, produce IAA, siderophore, cellulase and pectinase. Thus, locally isolated indigenous PGPR and rhizobial strains have the potential for using as liquid biofertilizer to increase growth and yield of rice minimizing N-fertilizer use.

Keyword: PGPR; Rhizobia; Rice; Yield; Minimal N