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Antagonistic *Bacillus* spp reduce blast incidence on rice and increase grain yield under field conditions

Bio control effects on blast disease suppression on rice crop

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Abstract

Rice blast is a severe threat for agricultural production. Plant growth promoting rhizobacteria could be suitable biocontrol agents to reduce the disease incidence. In this study, *Bacillus* spp. KFP-5, KFP-7, KFP-17 significantly reduced disease severity by 40-52% with grain yield of 3.2-3.9 ton ha^{-1} in two rice varieties i.e., basmati super and basmati 385. *Bacillus* spp. significantly colonized the rice rhizosphere with a cell population of 2.40E+06-5.6E+07CFU. Rice plants treated with antagonistic bacterial suspension followed by challenge inoculation with *P. oryzae* were found to have higher activities of antioxidant enzymes such as superoxide dismutase (308-266 Ug^{-1} FW), peroxidase (change in absorbance (ΔA) = 0.20-0.71 min^{-1} g^{-1}FW), polyphenol oxidase (ΔA = 0.29-0.58 min^{-1} g^{-1} FW) and phenylalanine ammonia lyase (ΔA = 0.32-0.59 min^{-1} g^{-1} FW). A consistency in the performance of strains was observed in the consecutive years 2013-2014. These findings suggest that indigenous

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