

# Rice plant growth-promoting rhizobacteria: a focus on phosphate solubilization

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**Topic:** Ecology: interaction PGPR/PGPB on soil/plant microbiome

The application of microbial inoculants is an innovative biotechnology to preserve the productivity and sustainability of rice cultivation. Plant growth-promoting rhizobacteria (PGPR) can be applied directly to the soil by seed inoculation, plant tissue treatments or soil applications, to increase the crop biomass growth and to control several plant pathogens, thus avoiding or reducing chemical control. In particular, PGPR able to release soluble phosphorous (P) ions from insoluble mineral or organic forms is drawing attention, also in consideration of severe depletion of raw materials for phosphate fertilizer manufacturing.

In the present work, 299 bacterial strains isolated from rhizosphere compartments of rice were characterized for different PGP activities. ACC deaminase activity, phytate mineralization and N<sub>2</sub> fixation were the most represented PGP traits. Twenty-one strains possessing most of the tested PGP activities were inoculated in growth pouches experiments to determine *in vivo* the ability to promote seed germination. Four PGPR identified as *Pseudomonas koreensis*, *Priestia aryabhattai* and *Bacillus zanthoxyli* showed a major significant promotion of biomass growth. Pot experiments with Green Fluorescent Protein-transformed *Pseudomonas koreensis* strain are ongoing to evaluate plant colonization and rice growth promotion under different levels of bioavailable phosphate.

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