Potency of rhizosphere bacteria to promote rice growth under saline condition

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Abstrak

Saline soil is a common problem in coastal paddy field, especially in Indonesia. Salinity affects rice growth and the activities of soil functional microbes, including functional bacteria, which play roles in plant growth. Some of these microbes are associated with rice plants and are able to survive under saline condition. The presence of functional microbes is also important to improve soil quality. Nitrogen and phosphate are essential soil nutrients and is available in soil due to the activities of nitrogen-fixing bacteria and free-living plant-associated bacteria.Â The objective of the present study was to obtain nitrogen-fixing, phosphate solubilizing and Indole Acetic Acid Â (IAA)-producing bacteria that are able to survive and promote the growth of rice under saline conditions. From rice and peanut rhizosphere, Ca-phosphate (Ca-P) solubilizing and nitrogen-fixing bacteria were isolated separately using specific media. Then, the Ca-P solubilizing ability, phosphomonoesterase activity and IAA-producing ability were quantitatively examined. Based on the abilities, 20 strains were selected and identified as Burkholderia cepacia-complex, Burkholderia anthina, Burkholderia cenocepacia, Bacillus cereus-complex (three strains), Achromobacter spanius, Azospirillum sp. (four strains), Azotobacter sp. (three strains), Rhizobium leguminosarum, Rhizobium sp. (two strains), and Pseudomonas sp. (three strains). The inoculation of several single strains or the mixture of the selected strains promoted the growth of rice under saline conditions. These inoculants could be potential as biofertilizer in saline paddy fields.