
Organic acid production and phosphate solubilization by phosphate solubilizing bacteria isolated from green house soils in South Korea

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The present study was aimed at assessing organic acid production and inorganic phosphate solubilization by phosphate solubilizing bacteria (PSB). Fifteen inorganic PSB strains were isolated from green house soils at Daejeon, South Korea and their organic acid production and inorganic phosphate solubilizing efficiency were assessed under laboratory conditions. All the tested isolates demonstrated diverse phosphate solubilizing capacity in liquid culture medium. They increased available phosphorus concentration in the medium and the increments were pronounced ($> 600 \mu\text{g/ml}$) during the 2-3 days of incubation. Simultaneously, the pH of the medium lowered (3.63-3.85), and the relative time course coincided with the increase in the phosphate solubilization. Analysis of the culture medium by High Pressure Liquid Chromatography (HPLC) revealed that strains produced gluconic acid as the main organic acid followed by oxalic and citric acids. Results further indicated that organic acid production in the culture medium increased with the incubation period, reaching the maximum at 2-3 days as in the case of soluble phosphorus concentration in culture medium, thus it can be concluded that the production of organic acid may enhance the phosphate solubilization.

Key words: Organic acids, phosphate solubilizing bacteria, gluconic acids, oxalic acids, citric acids

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