

# Assessing the Efficacy of Some Phosphate Solubilizing Bacteria and their Mineral Phosphate Utilization Pattern

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**Abstract**—Plants acquire phosphorus from soil solution as phosphate anion. It is the least mobile element in plant and soil contrary to other macronutrients. It precipitates in soil as orthophosphate or is absorbed by Fe and Al oxides through ligand exchange. Phosphorus solubilizing bacteria (PSB) play role in phosphorus nutrition by enhancing its availability to plants through release from inorganic and organic soil P pools by solubilisation and mineralization. In the present investigation Six PSB isolates viz. *Pseudomonas putida*, *Bacillus polymyxa* (T3), *Pseudomonas striata*, *Pseudomonas fluorescens*, *Fraturia aurantea* and *Acetobacter diazotrophicus* were tested in Pikovskaya's solid media supplemented with insoluble inorganic tricalcium phosphate as P-source following the criteria of clear halo zone surrounding the colony. The efficacy of the isolates was estimated by measuring the diameter of the halo zone. It was observed that out of six isolates *Bacillus polymyxa* (T3) showed highest diameter of halo zone. The different mineral phosphate utilization pattern by the six isolates were also tested. Three insoluble P source viz. Tricalcium phosphate (TCP), Mussorie rock phosphate (MRP) and Purulia rock phosphate (PRP) were taken in basic Pikovskaya's broth media. Growth pattern of the isolates on P-source and solubilization of P were estimated and recorded accordingly. The isolate *Bacillus polymyxa* (T3) again exhibited maximum solubilisation of P out of different rock phosphate and the highest solubilisation was observed in Tricalcium phosphate by *Bacillus polymyxa* (T3). Therefore, it was concluded that the isolate *Bacillus polymyxa* (T3) can be tested on the field to rate its performance as a bio fertilizer.

**Keywords:** Bio fertilizer, halo zone, mineral phosphate, Phosphorus solubilizing bacteria