

ROLE OF PYROPHOSPHATE AND ORGANIC ACIDS IN ORTHOPHOSPHATE SORPTION BY CALCIUM CARBONATE

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ABSTRACT

Since the recovery of phosphate in calcareous soils is low, the effectiveness of added pyrophosphate (PP) and organic acids in reducing phosphate sorption by calcium carbonate (CaCO_3) was studied in the laboratory. Orthophosphate (OP) was applied alone or with PP as 10 per cent of total applied phosphate. Organic acids were added in the form of PP extracts of soil & rice straw. In the other treatment chelex resin extract of soil was used alone or in combination with PP. Phosphate solutions (0.05M) along with 25 g CaCO_3 in polycarbonate bottles were subjected to continuous shaking until 302 hours. Samples were drawn at different time intervals for the determination of solution P. Solution pH was also noted at each sampling. In OP treatment more than 50 per cent of the P sorption occurred during the first hour which increased gradually until 302 hours. Addition of PP to OP totally inhibited P sorption by CaCO_3 . Added organic acids in the form of chelex resin extract of soil to OP treatment also reduced P sorption whereas citric acid addition increased P sorption. Added PP alone or with organic acids buffered the solution pH around 6.5. Energy Dispersive X-Ray Analyses (EDXRA) and Scanning Electron Microscopic (SEM) studies were also conducted to examine the crystal formation of dicalcium phosphate dihydrate (DCPD). More percentage of Ca in comparison to P was found in PP (alone or with organic acids) treated samples. Similarly less established crystals were noticed in the presence of PP alone or with organic acids.