

ROLE OF PYROPHOSPHATE AND ORGANIC ACIDS IN ORTHOPHOSPHATE SORPTION BY VARIED NATURE SOILS

Fiaz Ahmad^{*}, and William Ian Kelso^{**}

ABSTRACT

Sorption of orthophosphate (OP) applied in different forms was studied in the laboratory using a Typic Camborthid Pakistani soil and a Typic Haplorthod soil from UK. In another trial, the Typic Haplorthod soil was amended with two lime levels i.e. 5 percent and 10 percent on weight by weight basis. The experiment was run for 384 hours under continuous shaking. Samples were drawn at different time intervals and analyzed for solution P, organic carbon (OC) and / or iron contents. Solution pH was also noted at each sampling. Orthophosphate sorption by the soils studied was in the order of Typic Camborthid Pakistani soil < Typic Haplorthod < Typic Haplorthod with 5 percent lime < Typic Haplorthod with 10 percent lime. Orthophosphate sorption and pH increased with the liming of Typic Haplorthod soil whereas OC and iron contents decreased. Addition of pyrophosphate (PP) or PP extract of rice straw totally inhibited OP sorption by Typic Camborthid soil whereas in Typic Haplorthod soil reduction in OP sorption was observed. Hydrolysis of PP to OP and dissolution of calcium carbonate by the added PP and/ or organic extract increased solution P in Typic Camborthid soil. In Typic Haplorthod soil, added PP or PP extract of rice straw lowered P sorption by competing with OP for sorption sites of Fe- and Al-oxides. Increases in solution pH, OC and Fe contents were noticed with sorption time in all the treatments in Typic Haplorthod soil both original and amended with lime. Added organic acids (PP extract of rice straw) lowered pH in Typic Camborthid soil and increased pH in Typic Haplorthod soil in comparison to OP treatment.