Phosphorus Sorption/Desorption in Brazilian Oxisols: Effects of pH and Organic Anions on P Bioavailability. (S07-comerford121243-Oral)

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Abstract:

Phosphorus bioavailability is a major limitation to plant productivity in many weathered Brazilian soils. A change in pH and elevated concentrations of organic anions such as oxalate and citrate are known rhizosphere effects which influence P sorption and desorption, yet very little information documents their influence on P bioavailability in these soils. The objectives of this study were to (1) evaluate the effect of pH on the P sorption isotherm, and (2) evaluate the effect of pH on the P desorption isotherm and the total P desorbed through the use of anion exchange membranes. An increase in pH of an Atlantic Forest Oxisol from 4.8 to 6 and 7 decreased P sorption (0 to 4%) at a lower range of the isotherm, and increased P desorption (13 to 56%) for all rates of applied P (40, 80 and 180 micrograms P per g soil). Citrate and oxalate increased the amount of P desorbed, yet it was unable to distinguish between ligand exchange and dissolution even at short reaction times. Citrate desorbed more P than oxalate under quasi-equilibrium conditions, however P desorption by oxalate was greater than citrate for short reaction times. Soil management options that incorporate the use of lime and organic ions may improve bioavailability of native and applied P.

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Presentation Information:

Presentation Date: Thursday, November 14, 2002
Presentation Time: 8:15 am

Keywords:
P desorption, pH, Organic anions, P bioavailability