

Enzymatic Hydrolysis of Organic Phosphorus in Soils.

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Abstract:

Up to one-half of the total phosphorus in surface soils of the temperate zone is bound to soil humic substances. This organically-bound phosphorus must be mineralized to make it available to the biota. Microorganisms and plants can release enzymes, phosphatase and phytase, to hydrolyze organically-bound phosphorus. Soils were treated with various concentrations of citric acid or EDTA and enzymes to determine the effect of removing metals bound to soil humic substances on the efficacy of the enzymes. The amount of organically-bound phosphorus hydrolyzed by phytase and the concentrations of total dissolved metals increased with increasing concentrations of citrate or EDTA. The amount of organically-bound phosphorus hydrolyzed by phosphatase also increased with increasing concentrations of citrate or EDTA but to much smaller extent than that observed with phytase. Calcium was the most important element controlling the hydrolysis of organically-bound phosphorus. These results are consistent with our earlier observations that plants which are the most efficient in utilizing organically-bound phosphorus secrete both enzymes and citric acid.

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