Phosphorus Mobility, Enzyme Activity and Microbial Community in Manure-treated Soil. (S11-deng115121-Oral)

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Abstract:

Phosphorus accumulation was observed in soils applied manure. One hypothesis is that manure-P accumulates in soils in short-term application, but mobility of manure-P increases with time due to increasing microbial activities induced by manure application. Long-term research plots at Oklahoma State University provided us the opportunity to examine the fact and test the hypothesis. Treatments included manure, P, NP, NPK, and NPK plus lime. Total soil P increase in soils ranged from 4.5 to 10.3 kg P ha-1 yr-1 with the highest detected in the P-treated and the lowest in the manure-treated plot. Approximately 77 to 86% of the applied inorganic fertilizer-P in the past 69 to 71 yrs was recovered either in the harvested grain or remained in the top 30 cm of soil, while only 32% of the applied manure-P was recovered. Results from this study suggested that manure-P is relatively more mobile than inorganic fertilizer-P. Moreover, microbial biomass C and activities of phosphatases and dehydrogenase were significantly higher in the soil treated with cattle manure, excluding acid phosphatase activity, which was significantly higher in soils treated with chemical fertilizers.

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