The Difficulties of Gross Phosphorus Mineralization: An Analysis of Four Methods. (S08-kellogg090442-Poster)

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Abstract:

The importance of P in both managed and natural ecosystems necessitates a standard, straightforward method to provide reliable estimates of mineralization rates. We compared four previously published methods of estimating gross P mineralization: (1) an early isotope dilution method (Walbridge and Vitousek 1987 (WV)), (2) an isotopically exchangeable P method (Lopez-Hernandez et al. 1998 (LH)), (3) the Kirkham and Bartholomew (1954, KB) method used for gross N mineralization and (4) an extraction method (Zou et al. 1992 (Z)). We also compared two methods used to correct for adsorption of 32P. We ultimately recommend the use of the KB method because its assumptions were generally met, and it does not require sterilized samples, which we show to be of little utility in estimating adsorption for non-sterile soils. Because of the potential isotopic fractionation in adsorption or desorption of inorganic P (Pi), the rate will represent a net mineralization rate. We also recommend combining the Pi and Pm fractions into a single labile pool for isotopic dilution studies. This is a conservative estimate of P mineralization that would be a useful indicator in potentially any soil type.

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