

Title

Direct Determination of Phosphate Species in Alum-Amended Poultry Litter.

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abstract

Phosphate contamination of the Chesapeake Bay is one of the largest environmental issues in the eastern United States today. Decades of intensive poultry litter application to sandy, low-lying soils in the Delmarva region has led to soils that contribute large amounts of phosphate to the watershed in both runoff and leaching. One possible solution to improve environmental quality is to lower water-soluble phosphate levels in poultry litter with wastewater coagulants such as alum (aluminum sulfate). It has been proven that addition of alum lowers water-soluble P levels dramatically in poultry litter, but the mechanism has never been fully addressed. We used XANES spectroscopy at the P k edge to directly determine the speciation of phosphate in poultry litter samples with varying amounts of alum amendment. No aluminum-phosphate solid phases were observed in the samples, and instead adsorption of phosphate to amorphous aluminum oxides appears to be the dominant mechanism. This has important implications for the long-term stability of phosphate in alum-amended litters.

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