

# Phosphorus Speciation in Alum Amended Poultry Litter: Effects of Aging and Al:P ratio. (S02-staats551514-oral)

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## Abstract:

The use of alum ( $\text{Al}_2(\text{SO}_4)_3$ ) as a poultry litter (PL) amendment is used as a best management practice to reduce soluble phosphorus (P) and trace metal concentrations in runoff from soils treated with PL. There is evidence that a sorption mechanism between aluminum hydroxides and  $\text{PO}_4^{3-}$  promotes P retention. It is important to understand the stability of P in the system and how aging affects distribution of phosphorus and metal availability in the litter to assess environmental fate. Sequential extractions and desorption studies are useful in trying to determine these relationships. Long-term (25d) desorption reveals that the use of alum amended litter as a soil treatment reduces the amount of P released, compared to a soil treated with unamended litter, by approximately 34, 52 and 56  $\text{mg kg}^{-1}$  for Evesboro, Rumford and Pocomoke soils, respectively. While these values may be statistically significant, they may not be considerable in terms of management of PL on these soils. Sequential extractions of soils, after one PL application, show the relative amounts of P removed by each extractant follow the trend:  $\text{NH}_4\text{F}=\text{NH}_4\text{-Oxalate}>\text{Na-DCB}>\text{NH}_4\text{Cl}=\text{H}_2\text{SO}_4$ , regardless of treatment. To understand these systems, the use of sequential extraction, of P in PL, in conjunction with X-ray Absorption Near Edge Structure Spectroscopy, will allow for direct evidence about how PL chemistry changes in the presence of alum.

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