

# Phosphate and Organic Acids as Competing Sorbates on Amorphous Aluminum Oxide. (3791)

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## Abstract:

Alum,  $\text{Al}_2(\text{SO}_4)_3$ , is used as an amendment to reduce phosphorus (P) loss, and subsequent eutrophication, resulting from land-applying poultry litter (PL). A thorough understanding of changes in PL chemistry, caused by the treatment, is necessary to determine its long-term capability to retain P. The retention is believed to result from sorption of P to amorphous aluminum oxides. Alum initially decreases litter pH, so the stability of P-Al complexes likely changes in response. In addition, the presence of organic compounds increases the complexity of these interactions. Therefore, the objective of this study is to understand the role that organics (i.e. oxalic acid), readily present in PL, play in P retention under varying pH conditions. In addition to batch sorption techniques, Attenuated Total Reflectance Fourier Transform Infrared Spectroscopy was employed to investigate the adsorption of phosphate and oxalate, to synthetic amorphous aluminum hydroxide. When introduced to the system individually, initial results show that, at pH 5.5, sorption of oxalate and phosphate is specific and increases with concentrations beyond 2000 $\mu\text{M}$ . Competitive studies at this pH, and pH 8.0, will offer insight into the likelihood of phosphate being released from the PL system. Overall, the aim is to provide a complete picture of P reactivity, to enable improved assessment of P transport where PL is land-applied.

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