Reducing Phosphorus Runoff from Biosolids with Water Treatment Residuals

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Approximately 40% of the biosolids (sewage sludge) produced in the U.S. are incinerated or placed in landfills because of potential water quality problems associated with non-point source phosphorus runoff. The objective of this study was to determine the impact of chemical amendments on soluble P and P runoff from biosolids applied to small plots. Rainfall simulations were conducted in 2006 on small plots fertilized with biosolids that had been treated with alum or ferric chloride. The effect of adding an alum-based water treatment residual (WTR) at a rate of 20% (wt/wt) was also evaluated. The following year, rainfall simulations were conducted using WTR/biosolid blends of 0.15:1 and 0.3:1 that were allowed to incubate for three weeks prior to application. Soluble P runoff loads observed with the 20% WTR treatment were not significantly different from other chemical treatments and resulted in a 48% reduction in soluble P runoff. Soluble P runoff loads in year 2 for the 15% and 30% WTR treatments resulted in significantly lower soluble P compared to untreated biosolids and led to soluble P runoff load reductions of 78% and 85%, respectively. The greater load reductions found in year 2 indicate that longer storage times may allow for greater P adsorption, most likely caused by P diffusion into micropores. Treating biosolids with WTRs will allow for greater land application of biosolids and WTRs and reduce or eliminate the economic costs associated with landfiling and incineration of these two resources.