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Assessment of the Effects of Poultry Litter on Surface Runoff Water Quality from Agricultural Lands

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ABSTRACT

The use of pelletized poultry litter (PPL) as a substitute for inorganic fertilizers is increasingly being encouraged in states like Delaware which have a considerable surplus of poultry litter. However, we know very little about the impacts of PPL on runoff water quality and whether it is an environmentally-sound and sus-tainable alternative to inorganic fertilizer. To address these questions we compared the exports of nutrients (NH4-N, NO3-N and PO4-P) and trace elements (As, Cu, and Zn) in surface runoff from agricultural plots receiving PPL, raw poultry litter (RPL), urea and no-fertilizer (control) treatments. The study was conducted on agricultural land located in Middletown, Delaware with corn as the cover crop. The experimental plots were 5 m wide and 12 m long with reduced tillage and no-tillage management practices. Sampling was con-ducted for six natural rainfall events from April through August 2008. Nutrient (NH4-N, NO3-N and PO4-P) exports from plots receiving PPL were less than those with urea or raw litter applications. While exports of trace elements from the PPL treatment exceeded those from urea, they were much lower than the corre-sponding exports from the RPL treatments. Mass exports of nutrients and trace elements were correlated with event size (rainfall amount) but were not correlated with timing of event (days since litter application). Results from this study suggest that the use of PPL in combination with no-tillage may provide an environ-mentally safe alternative to synthetic fertilizers.

KEYWORDS

Poultry Litter, Surface Runoff, Water Quality, Tillage, Best Management Practices, Nutrients, Trace Elements

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