

TITLE: Reducing watershed nutrient loading through compost nitrogen management

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ABSTRACT:

Nutrients leached from industrial fertilizer in large-scale agriculture are an important non-point source of pollution in many watersheds, including the Chesapeake. Compost is an attractive alternative to conventional fertilizers, and has the potential to minimize nutrient loading in agricultural runoff. However, the chemical behavior of nutrients in the composting process remains poorly understood.

Nitrogen is a key component of any effective fertilizer. Conventional fertilizers often contain nitrogen as highly mobile inorganic species such as nitrate, which leaches easily into groundwater or surface runoff. Once leached, it is no longer available to the plants it was intended to fertilize. However, composting can bind nitrogen in relatively immobile organic forms, which are then transformed slowly into soluble species through mineralization. This slow-releasing organic nitrogen is a more efficient fertilizer, and is less easily washed away.

The objective of this ongoing research project is to study the behavior of organic nitrogen in the composting waste management system at Lafayette College, using methods including solids digestion. Better understanding and control of the nitrogen cycle in composting may allow compost to be optimized for agricultural purposes, so its usefulness in growing plants can be maximized while nutrient loading in local watersheds can be reduced.