

ENVIRONMENT

Title: Odor compound production, accumulation, and volatilization from swine manure storage
NPB#06-111

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Scientific Abstract

The objectives of this project were to determine the changes in odor compound content and composition of three swine manure storage systems over the course of a year characterize and compare the relative emission of volatile odor compounds in simulated manure applications. Alcohols, volatile fatty acids (VFA), and aromatic compounds were detected in manure samples from lagoons, deep pits, and above ground slurry storage tanks. There were substantial differences in the content of these odor compounds and other nutrients between the three types of structure and even within the type of structure. Generally, lagoon slurries had lowest nutrient and odor compound content, and pits and tanks had the greatest. The differences between individual pits (or lagoons or tanks) were attributed to different management practices (manure inputs, types of animals, or diet). Looking at emissions of odor compounds, aromatic compounds (rather than alcohols or VFA) were especially important based on their high relative emission from stored manure and when applied to soil. For soil application, this was based on the large amount emitted over a longer period of time compared to the other two classes of odor compounds. There were no odor compounds emitted from sub surface (6" depth) soil applications. Finally, seasonal effects, particularly on aromatic compounds, were strongest during winter and spring and lowest during summer and fall. These finding affirm practices involving subsurface manure injection during fall as the best practice for limiting odor compound emissions.

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

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