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# Control of odors and solids with manure management

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*First author, Dr. Okhwa Hwang, operating a gas chromatograph for chemical analysis of odorous air. Photo courtesy of Steven Trabue, USDA-ARS.*

Manure management systems have a major impact on both odors and solids from swine operations. In the Midwest, deep-pit systems are designed to maintain the fertilizer value of manure while flushing barn systems in South Korea are designed to lower odor emissions.

Researchers from the Republic of Korea Rural Development Administration and USDA-ARS compared deep-pit manure management systems to flushing barn systems for controlling odors and promoting degradation of solids. Results of this study, published in the *Journal of Environmental Quality*, showed total solids in the manure were positively correlated to nitrogen, carbon, volatile fatty acids (VFAs), total phenols, and total indoles and positively correlated to air concentrations for VFAs, ammonia, total phenols, and total indoles. Reducing manure solids reduced odorants derived from protein in air by equal amounts.

Diluting manure increased organic-C degradation by as much as 10-fold with an overall average rate of 5% of total C added daily. Carbon dioxide was the main C source evolved, averaging more than 90% of total C evolved. Methane production increased quadratically with dilution. Although organic-C degradation increased with dilution, it was still minor compared with the increase in manure volumes. Diluting manure solids effectively controls odor, but it may not be cost effective as dilution increases manure disposal costs.

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Hwang, O., Scoggin, K., Andersen, D., Ro, K., & Trabue, S. (2021). Swine manure dilution with lagoon effluent impact on odor reduction and manure digestion.

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