

Composting Swine Manure and Manure Treatment Options: Comparison of Composting to Anaerobic Digestion

Ron Fleming, University of Guelph, Ridgetown Campus

Introduction

Is there a manure management system that is better than storing and spreading on the land? It's hard to beat the economics of that system, but for years, researchers and farmers have been trying to find a better way. The list of possible treatment technologies includes additives, separators and many others, but two that seem to show up near the top of the list are anaerobic digestion and composting. Both rely on bacteria to break down organic matter. Anaerobic digestion relies on bacteria that survive only when oxygen is absent. In contrast, composting relies on bacteria that must have oxygen present (i.e. aerobic).

Ongoing Studies

What are advantages and disadvantages of each? What are the differences? Which is better? Can either system be justified? These are some of the things research efforts have tried to nail down.

Composting studies have gone on at Ridgetown since 1998 and we have learned quite a few things about composting liquid manure.

Anaerobic digestion is used in several European countries but is not common in Canada. We recently installed a pilot-scale unit at Ridgetown mainly to do some "recipe" testing – e.g. look into what combinations of manure and possibly other materials yield the most methane.

Comparison of Main Features

	Anaerobic Digestion	Composting
Inputs	Manure, heat	Manure, carbon material (e.g. straw)
Outputs	Liquid digestate, biogas	Compost (stabilized organic material), heat
Losses	None	Carbon dioxide, water
Typical system	Digester + electrical generation + digestate and gas storage	Composter + storage for compost
Nutrients?	Retained in digestate	Some loss of N to air
Pathogens?	Reduction (how much depends on system)	Reduction (how much depends on system)
Odours?	Reduced	Can be eliminated
Economics?	Critical: price of electricity, value of digestate, off-farm inputs	Critical: cost of carbon substrate, sale of compost vs use on farm, off-farm inputs