Benefits of a Manure Storage Cover

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A manure storage cover near Sherbrooke, QC significantly reduces manure odour, rainwater dilution and conserves valuable crop nutrients

The summer season is upon us, and as liquid manure storage temperatures begin to rise, thus producing odor, so may the concerns of those living near your operation. It may seem odd to begin a greenhouse gas article with comments on manure storage odors, but there is a remarkable similarity between periods of significant manure odor and greenhouse gas (GHG) production. Warmer temperatures mean more microbial activity in your storage, and this in turn increases the amount of microbial bi-products being produced, whether hydrogen sulphide or methane.

A recent fact-finding trip to North Carolina highlighted some options available to Canadian pork producers when it comes to actually *maximizing* the benefits of on-farm GHG emissions, while achieving significant odor reduction. Methane is a bi-product of organic matter decomposed in an oxygen-free environment, i.e. decomposition of waste feed and feces in your liquid manure storage. Methane is the primary component of natural gas. In fact, natural gas is approximately 95% methane. In essence, manure storages are a source of the same gas used to heat many hog rearing facilities during the cold, Canadian winter. The issue, therefore, becomes how do we capture this gas, and what do we do with it once we have it?

Cover Technologies

Manure storage covers have received increasing attention in the past several years with their ability to suppress odor. Straw covers offer this benefit, but have a finite lifetime, and may require modifications to manure application equipment. Additionally, storages will continue to release odor and GHGs upon agitation, and thus may not offer a net reduction in gaseous emissions, but simply change the timeline of when they are emitted.

A more effective odor and GHG mitigation option is the use of synthetic fabric manure storage covers. These covers offer a host of benefits which may help justify the initial costs of implementing the technology. Upon installation of fabric covers, manure volume will be reduced as rainwater is collected on top of the cover, and can be pumped into a potable water reservoir. Odor from the storage is essentially eliminated, and the option for collecting and using methane gas becomes viable. Simple options for the utilization of trapped methane include firing water boilers for barn, shop or home heating needs, an on-farm incinerator, or simply flaring (burning) the gas and the odor contained therein.

Energy Generation with Manure

A more advanced methane treatment option is the production of electricity using a methane-fired diesel engine and matched power generation unit. I witnessed, first-hand, a Caterpillar 3304 engine turning 84 kWh of energy from the methane produced on a 4000 sow, farrow-to-finish operation. The 1.2 acre manure storage was covered with a synthetic fabric cover, essentially turning a basic hog manure storage into an anaerobic digester. While in North Carolina, one producer explained that the Caterpillar engine working on his dairy farm in Vermont ran for 65,000 hours with minor maintenance, underscoring the viability of using methane with existing engine technologies. Anaerobic digestion with energy co-generation is gaining increased attention throughout Canada with several commercial facilities in operation, or under construction. These will be highlighted in more detail in subsequent articles.

Increased on-farm income through energy generation and the sale of GHG emission reduction credits are becoming a viable option through the advancement of manure storage cover technology. In order to weigh the full benefits of implementing this technology, be sure to factor in manure volume and odor reduction, potential GHG credit creation, conservation of the 40-60% of manure nitrogen lost annually during storage through ammonia volatilization, and a source of heat and/or electric energy to reduce barn heating costs.

Several manure storage covers are being installed at extension and research institutions across Canada with support from the Canadian Pork Council. For more information on this technology, or the Greenhouse Gas Mitigation Program, contact Cedric MacLeod, Canadian Pork Council, (613) 236-0011 or macleod@cpc-ccp.com

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