



Case Studies & Technical Review

INTRODUCTION

Odors and gases that build up in manure have negative effects on both air quality and the health of workers and livestock. Ammonia gases in particular are known to have detrimental effects on livestock productivity. Chronic exposure to even low levels of ammonia is a critical factor in lowered animal productivity within confinement operations.

Aside from ammonia concerns, manure may also be difficult to effectively manage due to the tendency for solids accumulation and crust formation. However, if properly managed, manure is a valuable resource and acts to restore nutrients to productive land.

SHAC Manure Digester reduces odors, ammonia gases, and the accumulation of organic solids within manure collection and storage systems; and creates an environment that stimulates beneficial microbial communities. Manure Digester is designed for pit systems, slurry stores and lagoons, straw packs, bio-shelters, solid separation systems, gutters with scrapers, open fields and pens, and compost enclosures.

CASE STUDIES

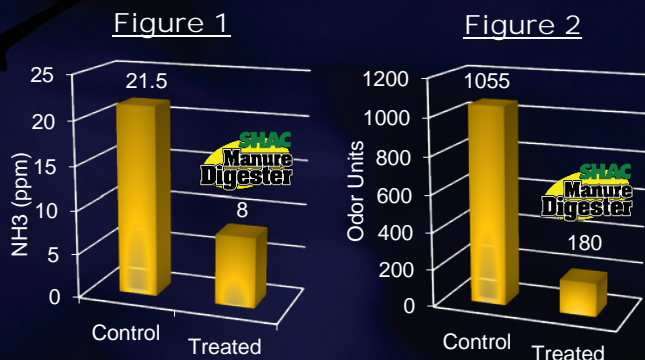
Manure Digester reduces volatile ammonia, odors, solids build-up and crusting within a variety of manure collection and management systems. Various academic and independent industry researchers have conducted field trials on SHAC Manure Digester as summarized below.

IOWA STATE UNIVERSITY STUDIES

Manure Digester was analyzed by researchers at the Agricultural and Biosystems Engineering Department of Iowa State University in a 35-day long trial that involved simulated swine pit conditions. Reductions in odors and volatile fatty acids (source of offensive odors) were observed. In a separate Iowa State University study, average ammonia concentrations of 8 ppm were reported under Manure Digester treated test conditions, while an average concentration of 21.5 ppm was reported under untreated control conditions. The following improvements to pit conditions were observed with Manure Digester:

- 63% reduction in volatile ammonia (Fig. 1)
- 83% reduction in odor threshold (Fig. 2)
- 23% reduction in volatile fatty acids also reported.

Figures 1 & 2: Volatile ammonia and odor values reported during Manure Digester treatment.



AGRICULTURAL UTILIZATION RESEARCH INSTITUTE

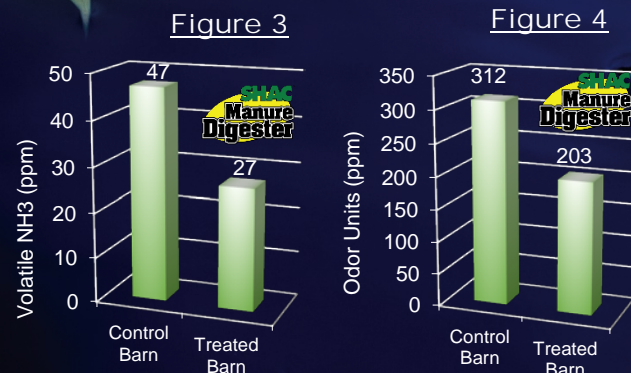
During a 6 month evaluation of commercial manure additives conducted by the Agricultural Utilization Research Institute (AURI), average ammonia concentrations of 27 ppm were observed in the treated barn, while an average concentration of 47 ppm was observed in the untreated control barn. An average odor threshold of 203 ppm was reported in the treated barn, while an average of 312 ppm was observed in the untreated control barn.

An absence of crusting and thin manure consistency was also observed in the treated barn. Crusting and thick manure consistency was observed in the untreated control barn. Following system flush, 5 cm of solids remained in the control barn, while no solids remained in the Manure Digester treated barn.

Results within Manure Digester treated swine barns indicated:

- 35% reduction in odors (Fig. 3)
- 43% reduction in volatile ammonia (Fig. 4)
- 100% reduction in compacted solids

Figures 3 & 4: Odor and Volatile ammonia values reported during Manure Digester treatment.

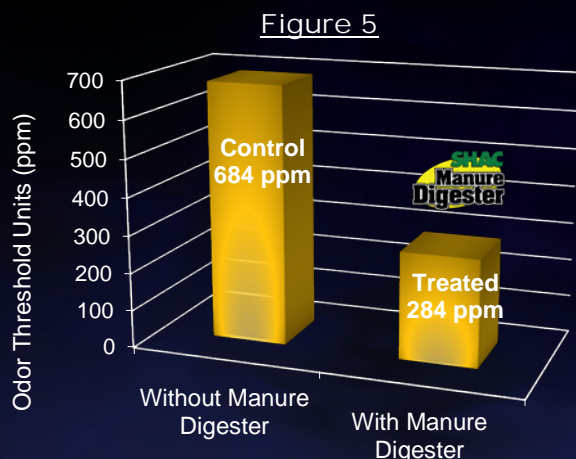


UNIVERSITY OF GUELPH STUDY

Efficacy trials using SHAC Feed Additive were conducted by the Department of Animal and Poultry Science at the University of Guelph, in partnership with Canadian Ortech Environmental Ltd. Olfactometer analysis conducted within the test rooms indicated that odor threshold values (odor units) were an average concentration of 284 ppm at hog breathing height in the treated rooms, versus 684 ppm in the untreated control rooms. Results within control and treated barns indicated:

- 58% reduction in odors with Manure Digester treatment (Fig. 5)

Figure 5: Odor values reported in control rooms and Manure Digester treated rooms.

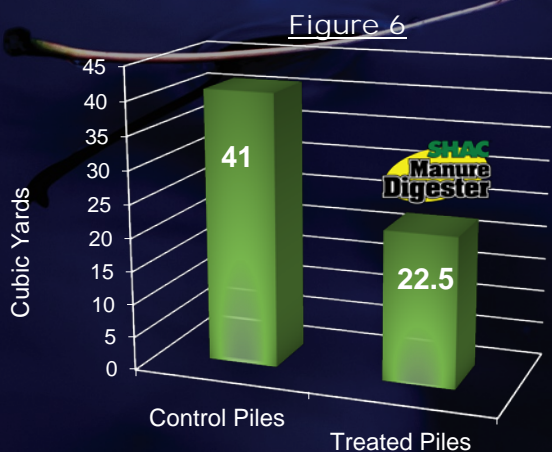


PRIVATE FEEDLOT STUDY

In a trial conducted at an Alberta feedlot, Manure Digester was applied to control and test manure piles. The manure in test piles was turned to aerate, while treated piles remained un-turned. Following the 106 day composting period, piles were removed using a front end loader. An average of 22.5 loads per treated pile was removed, versus an average 41 loads per untreated control pile. Results within control and treated piles indicated:

- 45% reduction in volume of manure (Fig.6)

Figure 6: Volume of manure reported in both control and Manure Digester treated piles.



HOW MANURE DIGESTER WORKS

SHAC Manure Digester is composed of liquefied oxidized lignite, and contains a high quality source of humic acids – complex compounds derived originally from peat.

Humic acids are known to act by a variety of mechanisms to retain elements and certain compounds within the complex structure.

The benefits of humic acid treatments, being numerous, include the stimulation of microbial communities. Manure Digester treatments encourage the decomposition of organic matter by stimulating beneficial resident microbial communities present in manure. Stimulation of these microbial communities results in digestion of organic solids at optimum rates, and the reduction of offensive odors associated with manure collection.

Humic substances also play a role in the detoxification of heavy metals. Heavy metals complexed by humic substances are generally considered less 'bio-available' within an environment and thus, less inhibitory to the microbial populations. This mechanism encourages the growth of beneficial microbial communities responsible for remediation and decomposition.

MANURE DIGESTER BENEFITS

- **Safe and easy to use.**
- **Creates an environment that stimulates microbial activity and encourages the decomposition of organic material.**
- **Loosens, liquefies and reduces accumulated organic solids.**
- **Reduces odors and ammonia, resulting in improved working conditions and animal health.**
- **Reduces ammonia volatilization leading to increased Nitrogen in manure.**
- **Aids in removing and preventing crusts for easier manure management.**
- **Reduces time and money spent on manure hauling, pumping and spreading.**

For additional information, please contact SHAC Solutions Inc. at 1-888-533-4446 or visit us at www.shac.ca

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