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BULLETIN



SHAC Manure Digester

MANURE MANAGEMENT ISSUES

- Odors and gases that are released from manure have negative effects on air quality and on the health of workers and livestock in confinement operations.
- Ammonia gases often reach high levels (>20 ppm) in manure storage areas. Within pens or manure collection systems, high levels of ammonia and other harmful gases (e.g. H₂S, CH₄) can have detrimental effects on animal health and productivity.
- Manure is often difficult to effectively manage due to its solid and sometimes crust-forming properties.

HOWEVER,

- *If properly managed and applied*, manure can be safe, cost effective and highly beneficial in restoring valuable nutrients to the land. Natural nutrients are readily available in manure and offer farmers an excellent alternative to expensive commercial fertilizers when applied at agronomic rates.



AMMONIA AND ANIMAL PRODUCTIVITY

Ammonia is a key factor in the health and productivity of livestock, predominantly in regard to confined feeding operations or intensive livestock operations. Hogs in particular are most often affected by elevated levels of ammonia gas. Industry research studies have documented decreases in several hog health and production factors related to chronic ammonia exposure. Even low levels of ammonia can reduce performance and increase the incidence of disease including pneumonia, pleurisy, arthritis, lesions of porcine stress syndrome, and abscesses. Respiratory diseases have been found to increase days to market by as much as 20 days. Even mild pneumonia has been reported to increase production costs and cause reductions in weight gains by as much as 10%.

AMMONIA FACTS

Chronic exposure to even low levels of ammonia is a critical factor in lowered animal productivity. The following production losses resulting from ammonia exposure were observed in various industry research studies:

FACT: 10 to 30% reduction in average daily gain

FACT: 9-47% reduction in feed efficiency

FACT: Increased incidence of disease

FACT: Significant delay in onset of puberty

FACT: As much as 40-60% higher medication costs

EFFECTS OF SHAC MANURE DIGESTER

(Details pg.2-4)

FACT: As high as 63% reduction in Ammonia gas

FACT: Typically between 35-85% reduction in odors

FACT: Up to 45% reduction in volume of piled manure solids

FACT: Up to 22.5% reduction in Volatile Fatty Acids, which contribute to offensive odors

FACT: Up to 100% reduction in pit solids



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BENEFITS OF SHAC MANURE DIGESTER

SHAC *Manure Digester* has been researched and proven to significantly reduce ammonia and odor levels, and aid in achievement of manure management goals for livestock operations. A combination of industry research and SHAC field results indicate many benefits of using SHAC *Manure Digester*.

- Significantly reduces odors and harmful gases resulting in improved air quality in and around confinement facilities.
- Loosens, liquefies, and reduces solids for easier pumping.
- Aids in removing and preventing crusts for easier manure management.
- Reduces fly breeding grounds.
- Minimizes time and money spent on hauling, pumping and spreading by reducing the agitation time and overall volume of manure.
- Increases digestion of organic solids by creating an environment that stimulates resident microbial activity.

HOW SHAC MANURE DIGESTER WORKS

SHAC *Manure Digester* assists in the breakdown of organic materials by stimulating and balancing the various microbial communities present in manure. Stimulation of these microbial communities allows for the digestion of organic solids to be optimized. Microbial digestion also serves to significantly reduce odors and harmful gases produced during manure storage. *Manure Digester* is manufactured from environmentally friendly, natural ingredients, and is safe and easy to use. The raw materials of the product are purchased from one of the highest quality sources of humic material in the world. The product contains:

• Activated Carbon

Activated carbon adsorbs and binds toxins (e.g. sanitizers) and compounds (e.g. feed related salts) in manure solids which otherwise may reduce or eliminate microbial/bacterial activity and growth.

• Essential Trace Minerals

SHAC products contain 32 essential trace minerals which aid in the stimulation of resident microbes (aerobic and anaerobic) which increase digestion of solids and reduce harmful gases (e.g. NH_3).

• Humic Acids

These humalite derived, organic acids also improve biodigestion of solids in manure storage by binding anti-microbial compounds (e.g. heavy metal and salts), creating an improved environment for resident microbial activation.

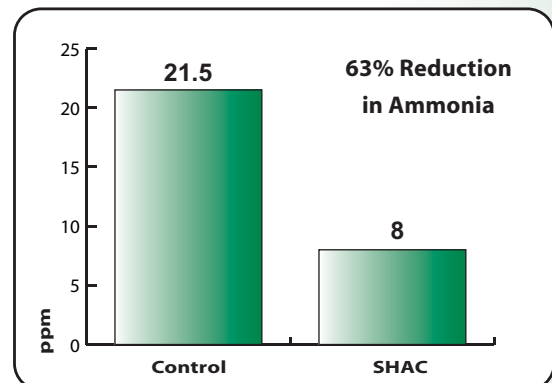


SHAC RESEARCH RESULTS

SHAC *Manure Digester* is a research-based and industry-proven product that significantly reduces concentrations of ammonia, other harmful gases, and overall odors. Academic and industry researchers across North America have conducted extensive research and field trials on SHAC *Manure Digester* and have discovered the following:

In an **Iowa State University** study, a low of 8 ppm NH_3 was achieved with *Manure Digester* treated manure storage pits compared to 21.5 ppm in the control pits.

The results indicate a dramatic 63% reduction in measured ammonia levels within the treated swine barns.



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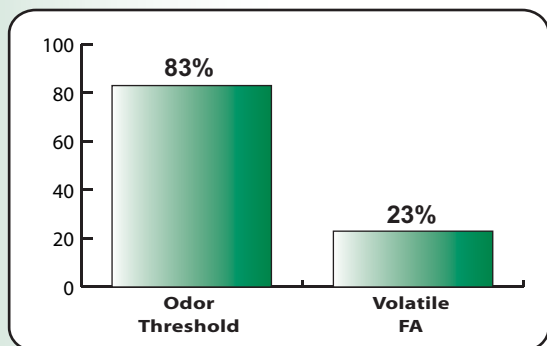
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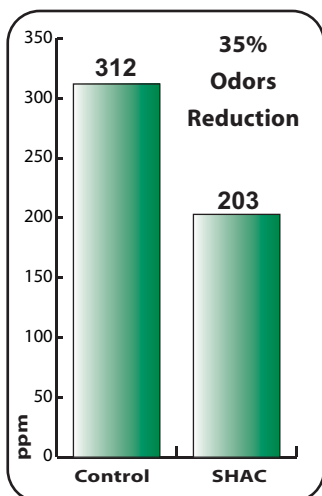
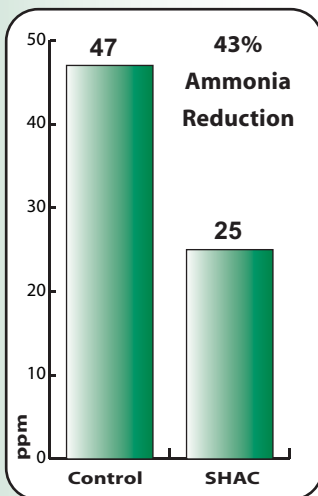
Manure Digester was analyzed by researchers in the **Agricultural and Biosystems Engineering Department of Iowa State University**. The analysis involved hog manure and simulated pit conditions for three replications using control and treated samples. Observations indicated that *Manure Digester* treatment results in:

- 83% reduction in odor threshold
- 23% reduction in Volatile Fatty Acids



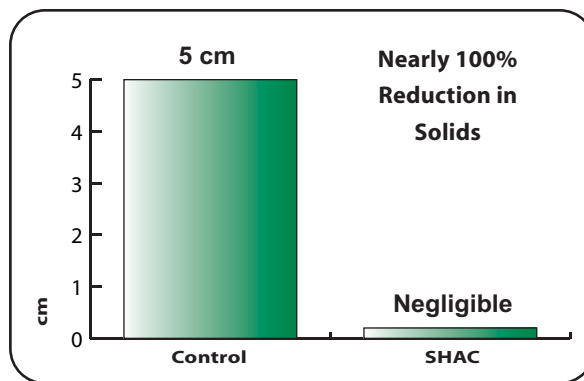
During an evaluation of commercial manure additives conducted by **Agricultural Utilization Research Institute (AURI)**, pre-treatment levels of ammonia and odors were reduced by applying *SHAC Manure Digester*. The following results were observed:

- 43% reduction in ammonia
- 35% reduction in odors in the barn



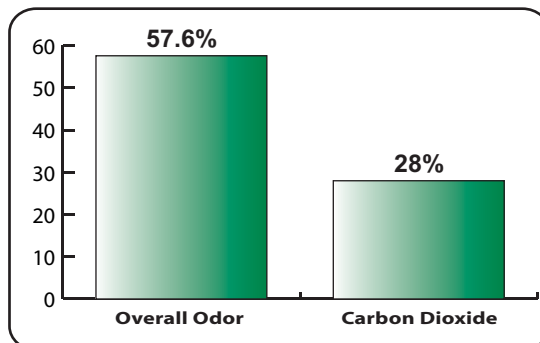
The condition of manure in the pits was also evaluated by **Agricultural Utilization Research Institute (AURI)** during their evaluation of *SHAC Manure Digester*. The following results were observed:

- Nearly 100% reduction in depth of solids
- Complete lack of crusting as well as thin liquid consistency in the *Manure Digester* treated pit



Efficacy trials using the registered feed version of the product (*SHAC Feed Additive*) were conducted by the **Department of Animal and Poultry Science, University of Guelph**, in conjunction with **Canadian Ortech Environmental Ltd.** The trials included 580 pigs in two separate grower-finishing pig barns. The following results were observed:

- Over 57% reduction in overall odors
- 28% reduction in Carbon Dioxide (greenhouse gas) emissions





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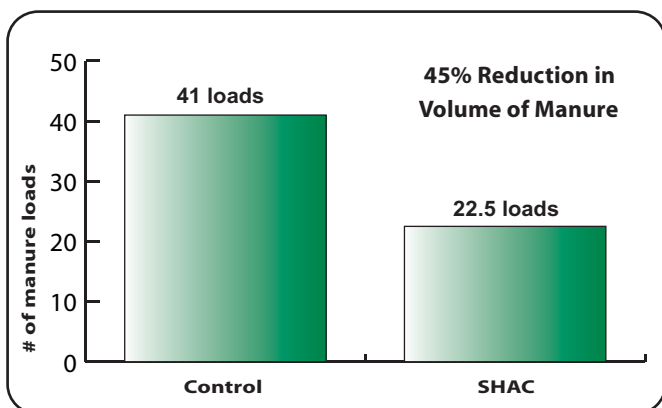
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SHAC FIELD RESULTS

In a feedlot operation in Alberta, *Manure Digester* was applied to 3 control piles and 2 test piles to determine the volume reduction ability of the product. The manure in the control piles was turned to increase aeration. The *Manure Digester* treated piles were given no other treatment.

At the end of the 106 day trial, an average of 41 loads were required to remove the manure in each control, while an average of 22.5 loads were required to remove the manure in the *Manure Digester* treated piles.

These results indicate an average 45% reduction in volume of manure.



IMPROVE HEALTH, PRODUCTIVITY, EFFICIENCY, AND THE ENVIRONMENT

SHAC *Manure Digester* is an extremely cost effective air quality and manure management tool that results in:

- Improved livestock health and productivity (particularly in confined feeding operations or intensive livestock operations) as well as improved working conditions
- Significant solids/manure volume reduction for more efficient manure management
- Significant odor and gas reduction for an improved environment

**For the authorized distributor
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www.shac.ca**

Literature Sources Cited

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Additional information regarding the research and/or case studies summarized in this document may be requested from SHAC Head Office.

