

TECHNOLOGY SUMMARY

Full paper is published in the proceedings of:

MITIGATING AIR EMISSIONS FROM ANIMAL FEEDING OPERATIONS CONFERENCE

Iowa State University Extension
Iowa State University College of Agriculture
and Life Sciences

Conference Proceedings

Sponsored by:

NRI Air Quality Extension & Education
U.S. Pork Center of Excellence
Iowa Farm Bureau Federation
Iowa Egg Council
Iowa Pork Industry Center
Iowa Pork Producers Association

Significant Odor Reduction from a Highly Efficient Micro-ecosystem based on Biofiltration

Robert R. & Roger Treloar, Odor Cell Technologies LLC

Species: Swine

Use Area: Animal Housing

Technology Category: Biofilter

Air Mitigated Pollutants: Ammonia, Hydrogen
Sulfide, Particulate matter

Point of Contact:

Odor Cell Technologies LLC
2385 Sugar Bottom Road
Solon, IA 52333
Ph: 319-624-7176
Email: odorcell@southslope.net

System Summary

Odor Cell Technologies LLC manufactures odor filtration technologies that attach to the exhaust ventilation of CAFO's. These odor cells are approximately 1.2 m (4 feet) square hollow cubes with porous side walls filled with pine bark that vary in thickness depending upon the cfm and actual run-time of each stage of ventilation. Internal and external hydration is provided to the cells by a uniquely designed irrigation system controlled by timers and sensors.

Odor cells utilize the principles of physical entrapment, water chemistry and microbial activity to dramatically improve air quality in and around agricultural and industrial facilities. Using the proven odor reducing principles inherent to composting, the organic odorous particles are entrapped, activated with moisture and attacked biologically at the point source. This allows naturally occurring bacteria to break down and cleanse gases and odors commonly found around these facilities. Odor Cell Technologies LLC's patented process creates a "micro-ecosystem" that significantly reduces odors and represents an environmentally friendly option to odor control. The successful installation of our technology has occurred on many sites throughout the Midwest.

Applicability and Mitigating Mechanism:

- Captures odorous organic particulate matter commonly produced by CAFO's
- Reduces NH₃ and H₂S concentrations
- Utilizes an environmentally friendly filtering media, pine bark, that becomes biologically active with controlled hydration intervals
- Cost efficient, durable, easily installed and maintained with positive aesthetic appeal
- Ventilation efficiency can be easily monitored through physical inspection and static pressure measurements

Limitations:

- Biofiltration is most effective on organic based odors and particulate matter
- Media moisture levels need to be maintained between 30% and 65%
- Static pressure requirements vary from .05 inches of water upon installation to .08 inches of water on a mature system
- Pine bark may not be available at local retail outlets
- Substitution of the recommended media may affect odor cell performance

Cost:

Odor cell frames are constructed using stainless steel, Duramesh™ hex netting, stainless steel tubing, nylon fittings and brass nozzles. These construction materials were chosen for durability and longevity due to the environment they will operate in. The following represents current pricing for the most common odor cells:

- Standard P-8, \$1200 plus \$50 initial media fill
- 5 inch odor cell, \$1425 plus \$65 initial media fill
- 10 inch odor cell, \$1650 plus \$125 initial media fill
- Porous rock base, approximately \$20 per odor cell
- Standard hydration package (Approximately \$360 – timer, valves, control box, fittings, tubing, and hose)

Operational and maintenance costs are minimal. Media usage is approximately 10% per year. Hydration cycles can be controlled by an irrigation timer and rain sensor. A typical 1200 head swine finishing barn with 6 standard pit exhaust fans using all 10 inch odor cells would cost \$11,130 upon installation (excluding shipping and labor) and \$75 a year in operational expense. Assuming a complete change of media every 5 years, this equates to \$.62 per pig space over 20 years or \$.23 per pig produced over 20 years (assuming 2.6 turns per year).