

Basic Management Practices to **Mitigate and Control Odors** from Swine Operations

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Introduction

Swine producers that have facilities with odor problems or want to be proactive in management approaches to prevent odors have a variety of options. Some of these options are easily implemented, while others are more of a challenge. The cost and benefit of any approach should be considered carefully before implementation. This brochure will discuss key options to mitigate and control odors from swine operations.

Ventilation Management

Ventilation air leaving the building carries with it a potential to impact neighbors downwind from the facility. Dust, gases and odorous compounds can be filtered or dispersed in a few key ways. Care should always be taken to not negatively impact the ventilation system since its function is key to efficient production and health of animals.

- **Filtration** – Dust particles absorb odorous compounds, essentially carrying it directly to a person's nose. By filtering dust from air, the odor potential can be reduced. Mechanical filtration systems can be relatively effective for large particles but generally are less effective on particles less than 10 microns. Smaller particles may actually carry further and serve as a potent odor vector.
- **Biofilters** – Biofilters may be constructed to filter exhaust air, thereby removing most of the odorous compounds and dust from the air. Studies have shown they can remove more than 50 percent, and maybe as high as 90 percent, of

odor when properly maintained and operated. These are generally made of wood chips and are designed to retain the air in the filter for 3 or 4 seconds. Biofilters are effective, but can be quite large and take some maintenance. Care should be taken to design and install biofilters in a way that does not reduce ventilation potential. Biofilters require more pressure than just exhausting air to the environment and some fans may not be designed to operate under these conditions. Rodent control should be a consideration when constructing biofilters.

- **Chimneys** – One way to minimize odor potential is to avoid creating a plume which flows toward neighbors. Exhausting air vertically rather than simply horizontally through wall fans can allow the plume to vertically disperse more quickly. Chimneys should be taller than the peak of the roof and even taller, if it can be done without creating a visual spectacle, is best. Fans can be installed in chimneys or chimneys can be built around wall fans in order to direct air upward. Naturally ventilated buildings use chimneys quite often, however chimneys are mostly for cold weather ventilation and most of the time air is exhausted through sidewall curtains rather than chimneys.
- **Windbreak walls** – Much like chimneys, windbreak walls are intended to disrupt the odor plume. Windbreak walls are walls made of plastic and installed a few feet out from fans. This pushes the air upward and helps in accelerating mixing and dilution of gases and dusts. Some large particles of dust may also settle out as they



impinge on the wall surface. These are relatively inexpensive but require some maintenance.

- **Selective treatment** – Treatment of ventilation air should be focused on air that will be released during periods when the atmosphere is most stable, such as evening and night time. For example, biofilters are difficult to maintain for summer ventilation fans because of the large surface that they require, but much easier if they are placed mostly on minimum and mid-level ventilation fans. These treat the fans that are most likely to be operating when the problem is greatest, thereby getting the most benefit for the least cost.

Oil Sprinkling for Dust Control

Dust can be controlled within the building in order to reduce the release to the surrounding environment. Fat added to feed will reduce dust from feed but will do little to reduce dust from dander and dried feces. Sprinkling of vegetable oils within the barn can

be effective in reducing dust and, therefore, odor transport potential. Some studies have indicated odor reductions from 40 to 70 percent. However, oil sprinkling can have several disadvantages including slick floors and difficulty in handling oil at lower temperatures. Most of the cost is associated with daily labor to perform the spraying.

Landscaping

Windbreaks or Vegetative Environmental Buffers (VEB) can be effective in forcing the plume to mix vertically, thereby dissipating more quickly. VEBs also will serve to hide the facilities somewhat from public view which helps in reducing the perception of odor. The disadvantage of VEBs is that they take years to effectively develop the height which can be most effective. Care also needs to be taken to not place VEBs so close to naturally ventilated facilities that it disrupts air flow patterns. Initial cost is high but low per pig if it is amortized over 15 to 25 years of service.

Using trees as a windbreak



VEBs can not always hide a facility from public view. Attractive landscaping and a well-kept site will help to improve the perception of the facility and often helps to reduce odor complaints. Mortality disposal pickup sites should also be well camouflaged.

Additives

There are various feed and manure additives on the market. It is difficult to make general statements about effectiveness because of the wide range of products available. Questions should be asked about rate of application, cost per pig marketed and exactly what the additive will do. Some additives reduce solids in the manure pit or will reduce ammonia, but do little for odor. Reduction in ammonia and hydrogen sulfide do not necessarily mean that odor will be reduced.

Diet Manipulation

Some research has been performed on changes in rations which will impact the odor released by modifying the excreted manure and the products given off during decomposition. Trends toward reduced odor intensity have been identified in relation to reduction of crude protein concentration and the inclusion of crystalline amino acids. Research also suggests that inclusion of bloodmeal products in diets will increase odor intensity when included at an excess level when diets are formulated on a lysine basis only.

To learn more about odor mitigation practices, visit the Checkoff-funded Air Management Practices Assessment Tool at <http://www.extension.iastate.edu/airquality/practices/homepage.html>.



Pit additives can be used for odor reduction