



Strategies to Control Farmstead Odors

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Rotting manure is the number one source of odors on farms housing livestock and poultry. Manure is food to bacteria. Bacteria, especially those that do not need oxygen to survive, give off odors as they live, grow, and reproduce in manure. Effective plans to contain farmstead odors make use of four basic strategies:

Prevent the creation of odors.

Alter strong odors to less intense odors.

Capture odors so they do not escape to the surroundings.

Disperse odors once they leave the farm.

Prevention

There are three routes to take when preventing bacteria from creating odors. Keep bacteria from growing in manure, change manure so bacteria give off less smelly odors, and move manure to a place where the odors created by bacteria cause fewer problems.

Preventing bacteria from growing in manure is difficult. Manure is just too good a meal to pass up. Methods to reduce bacterial growth include: killing bacteria with biocides and disinfectants, adding chemicals to raise or lower pH, cooling manure, pasteurizing manure, and keeping manure dry.

Changing animal diets may also reduce odors. Nitrogen and sulfur compounds give off particularly strong smells. By reducing the nitrogen and sulfur content of feed, we might prevent the creation of these strong smells.

Another prevention strategy is to move manure away from trouble spots before bacteria can grow. For example, flushing manure frequently from buildings means fewer odors are released into the building by rotting manure.

Alteration

Alteration methods change strong odors into weaker odors. Lagoons use alteration to reduce odors. Manure solids settle to the bottom of a lagoon and form a sludge layer. Bacteria living in the sludge layer release strong smelling liquids. Another group of bacteria, living above the sludge, converts the

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odorous liquids into less odorous gas. An overloaded lagoon smells worse than a properly operated lagoon, because the good bacteria above the sludge are overwhelmed with too much food.

Two types of chemicals are used to alter farmstead odors. **Oxidants** convert organic matter to odorless gases. **Counteractants** bind to odorous chemicals and weaken their smell.

A third type of chemical, **masking agents**, are not effective at reducing farmstead odors. Masking agents cover bad odors with stronger, more pleasant odors. Masking agents do not alter odors; they merely try to hide them. Manure has a very strong odor. Trying to cover up the smell of manure with a stronger scent just adds to its power.

Capture

A third strategy is to keep odors from escaping to the surroundings. In other words, trap and hold odors before they can leave the place they are created. Usually, some type of filter is used to trap odors. Filters use physical and chemical methods to trap odor. Some filters use living organisms to alter the trapped odors.

Hydrogen sulfide is a highly toxic gas with a strong, rotten egg smell. It is produced by anaerobic bacteria (bacteria that need an oxygen-free environment to survive) growing in manure containing sulfur. Hydrogen sulfide sticks to iron. If passing manure pit gases through a filter made of iron filings, hydrogen sulfide will stay with the iron and not escape to the surroundings.

Some of the most effective filters not only capture, but alter odors as well. Living filters — sometimes called biofilters — trap odors, and then use bacteria to eat the trapped odors. The earth around us is a living filter. Raw manure worked into the soil is held on silt and clay particles. Soil microbes digest manure odors before they can escape to the air.

Dispersion

The last strategy uses the power of the wind to disperse odors once they leave the farm. Separation distances between a farm and its neighbors rely on dispersion to dilute farmstead odors before they reach the neighbors' nose. Trees strategically placed on the farm help the wind mix and dilute odors.

You cannot always count on the wind to disperse odors, though. On calm nights and early mornings, heavy farmstead odors are carried to low spots in the landscape by air flowing downhill. This process is known as **cold air drainage**. You must fall back on other strategies (prevention, alteration, and capture) to reduce odors during windless periods.

Odor Abatement Plans

The most effective odor abatement plans take advantage of a combination of more than one strategy. For instance, odors arising from barns are reduced by flushing manure and

spilled feed frequently from the barn (prevention). Treating the flushed manure in a lagoon further reduces odor potential (alteration). Passing ventilation exhaust through a biofilter cuts down on smells escaping from barns (capture). Placing the barn where prevailing winds carry odors away from neighbors reduces complaints (dispersion).

Once a plan is set, stick with it. It does not require expensive engineering changes to a farming operation to control odors. Flushing pits at the proper frequency and keeping surfaces clean of manure will go a long way in preventing creation of odors in the barn. Maintaining the proper liquid levels on the lagoon will keep it healthy. Keeping a biofilter moist will help it trap and digest odors.

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