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Composting Animal Carcasses

Amy Schmidt, University of Nebraska - Lincoln Livestock Bioenvironmental Engineer says the State of Nebraska used to limit mortality composting to carcasses weighing less than 600 lbs, but this restriction has been removed from state statute, opening the door to a new carcass disposal option for beef cattle and other large livestock. This puts Nebraska in line with most states who have successfully demonstrated that large carcasses, including beef cattle, dairy cattle, and horses, can be effectively composted. This is a good thing. Options for rendering dead animals have become more limited in recent years for several reasons. That leaves burial and burning as alternatives along with the composting. Proper composting is a very attractive and environmentally positive alternative.

Most farms, ranches, or feeding operations have all of the necessary materials and equipment on hand to create a successful composting program. Dry manure, spilled or spoiled feed, wood chips, ground straw or ground corn or bean stalks can be combined to create a very effective compost pile material. The basic design of a carcass compost pile includes a 24-inch base of absorbent material (wood shavings, sawdust, etc.) on which mortalities are placed and then covered with additional pile material. During the composting process, microbes in the pile break down carcass tissue into a stable organic residue while producing heat, moisture, and carbon dioxide.

The decomposition of organic matter is affected by the presence of carbon and nitrogen. The C:N ratio represents the relative proportion of the two elements. A material, for example, having 30 times as much carbon as nitrogen is said to have a **C:N** ratio of 30:1, or more simple, a **C:N** ratio of 30. A C:N ratio of 30 for the composting material and the animals being composted would be desirable. Since the animal is high N (protein) and low C, considerable high carbon materials are necessary.

Monitoring heat and moisture in the pile is important to ensure optimum success of the composting process. Appropriate moisture ensures that microbial activity will generate heat to effectively kill pathogens and weed seeds in the pile. Internal pile temperatures of 120 to 160 degrees F indicate successful heating. For windrow composting or pile composting a 131 degrees F should be maintained for at least three consecutive days during each heating cycle. Temperature measurements should be made at several locations within the windrow or bin to ensure even heating throughout the pile. Typically, an initial 90-day heating cycle is followed by turning the pile, adding pile material and moisture, if needed, and allowing the pile to experience a second heating cycle. A third heating cycle may be needed, depending on the condition of the carcass(es) at the end of the second heating cycle. Large carcasses can take up to nine months to fully decompose. Bones that remain after the soft tissue is decomposed may need to be returned to the pile for further decomposition or dumped into the tub grinder.

The term “compost” has been used to describe many products that have not been through sufficient heating cycles to destroy harmful pathogens and weed seeds. Mature compost will have an earthy scent, dark color, and consistent texture. Successfully producing this desirable product takes time and proper pile management.

To determine optimum pile design and operating considerations for Nebraska conditions, and to demonstrate large animal carcass composting as a mortality disposal method in the state, UNL assistant professor of Biological Systems Engineering and Animal Science, Amy Schmidt, and NRCS State Environmental Engineer, Jim Hicks, are working together to conduct on-farm composting trials at several locations in Nebraska. Grant funding to support the project has been requested and will support monitoring potential environmental impacts of large animal mortality composting. For additional information about composting mortalities, contact Schmidt at aschmidt@unl.edu or (402) 472-0877.

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