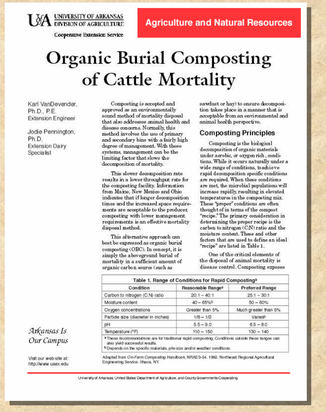

UofA UNIVERSITY OF ARKANSAS DIVISION OF AGRICULTURE Cooperative Extension Service

Agriculture and Natural Resources

Organic Burial Composting of Cattle Mortality

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Composting is accepted and approved as an environmentally sound method of mortality disposal by both environmental health and disease concerns. Normally, this method involves the use of primary and secondary bins with a fairly high degree of management. With these systems, management can be the limiting factor that slows the decomposition of mortality.

This slower decomposition rate results in a lower throughput rate for the composting facility. Information from OBC research indicates that if longer decomposition times and the increased space requirements are acceptable to the producer, composting with lower management requirements is an effective mortality disposal method.

This alternative approach can best be expressed as organic burial composting (OBC). In concept, it is simply the aboveground burial of mortality in a bed or mixture of organic carbon source (such as sawdust or hay) to ensure decomposition takes place in a manner that is acceptable from an environmental and animal health perspective.

Composting Principles

Composting is the biological decomposition of organic matter under aerobic, or oxygen rich, conditions. While it occurs naturally under a wide range of conditions, to achieve rapid decomposition specific conditions are required. When these conditions are met, the microbial populations will generate sufficient heat to increase the temperature in the composting mix. These "proper" conditions are often thought of in terms of the compost "recipe." The primary consideration in determining the proper recipe is the carbon to nitrogen (C:N) ratio and the moisture content. The C:N ratio and factors that are used to define the ideal "recipe" are listed in Table 1.

One of the critical elements of the disposal of animal mortality is disease control. Composting exposes

Table 1. Range of Conditions for Rapid Composting†

Condition	Reasonable Range*	Preferred Range
Carbon to nitrogen (C:N) ratio	20:1 – 40:1	25:1 – 30:1
Moisture content	40 – 65%†	50 – 60%
Oxygen concentrations	Greater than 5%	Much greater than 5%
Particle size (diameter in inches)	1/8 – 1/2	Variable
pH	5.5 – 9.0	6.5 – 8.0
Temperature (°F)	110 – 150	130 – 140

† These recommendations are for traditional rapid composting. Conditions outside these ranges can also yield successful results.

‡ Depends on the specific materials, pile size and/or weather conditions.

Adapted from On-Farm Composting Handbook, NRAES-54, 1992. Northeast Regional Agricultural Engineering Service, Ithaca, NY.

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Organic Burial Composting Cattle Mortality

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Abstract

Effective May 1, 2004, composting was approved as a method of disposing carcasses or portions of carcasses of large animals (cattle, other ruminants, horses, and swine) unless otherwise directed by the state veterinarian. Previously, the composting option required that the carcasses or portions be limited to 60 lb. In 1995, an exemption from the size restriction was granted for swine composted in bin style composting facilities. Composting of large animals offers a method of dead animal disposal that can be practical, economical, and legal for many cattle producers.

Although rendering, extrusion, and incineration are approved as methods of large animal disposal, burial is the only method other than composting that is feasible for most cattle producers. Burial guidelines designed to protect water quality limit the land available for burial. In addition timely access to equipment to bury mortality is often a challenge.

Program Implications

As a result of this demonstration, effective May 1, 2004 the Livestock and Poultry Commission amended their regulations for the disposal of Large Animal Carcasses to permit Organic Burial Composting for large animals. To provide information to the public the fact sheet "Organic Burial Composting of Cattle Mortality" (FAS 1044) was published. The information has been presented in slide set and poster presentations on a least 15 occasions.

For infrequent mortality disposal such as on cow calf operations, burial of the mortality in a carbon source such as waste hay at an appropriate site is recommended. This method allows for disposal in a legal, efficient, and economical manner. When composting is exposed to the weather, the compost material (carbon source) may be sawdust, hay, etc., but may not contain manure. When the compost is protected from the weather, compost material (carbon source) for the carcasses may be sawdust, hay, etc., and may contain manure. Composting involving manure must be done in bin(s) that has a concrete floor to provide an all-weather base, roof to exclude excess moisture and rot-resistant bin construction to support the compost material and withstand stresses applied by tractor loader.

There are two basic approaches that apply to the outside composting of large mortality: pile/bin and windrow. Both approaches start as a pile, however in the windrow method, new carcasses are added repeatedly to one end forming a windrow. Both approaches can be done without the use of some type of sidewall, such as fencing or wooden walls. However, the use of sidewalls will reduce the volume of carbon material required, and help to ensure the 24 inches of cover. Walls will also help to prevent pets and other animals from digging into the pile.

Additional information is provided in the fact sheet "Organic Burial Composting of Cattle Mortality" (FAS 1044).

Summary

- **Organic Burial Composting (OBC) is an economically feasible, producer friendly and effective method of mortality disposal.**
- **On May 1st, 2004, the Arkansas Livestock and Poultry Commission approved it as an acceptable disposal method for large animals such as cattle and horses**

Cow skull 31 days after the carcass was place in green sawdust. This rate of decomposition should be considered what is possible rather than typical.

Excavation where the rib cage of the cow should have been. This picture was taken 31 days after the carcass was place in the green sawdust. This rate of decomposition should be considered what is possible rather than typical.

Compost Pile after composting several animals. Note that the fence only serves to keep large animals off the pile and that the pile is closer to hay yard than is desirable.

Digging into pile 31 days after placing cow carcass in green sawdust. Note that the hay yard in the background is closer than desirable.

Temperature as read by 36" shaft compost thermometer.

Recommended OBC: Pile Method

- Select the location of the compost pile. Care should be taken to ensure that the pile will be isolated from the rest of the farming operation, on dry ground that is not in a drainage way, and accessible to equipment that will be used to move the carcasses and carbon material. Ideally the site should not be visible, or conspicuous, to neighbors and the public.
- Make a 24 inch thick pad that is large enough so that when the carcass is placed there will be at least 24 inches from the carcass to the edge of the pad. For a mature cow this results in a pad that is about 9 feet wide by 10 feet long.
- Add water to the pad as needed to ensure the pad has a moisture content of about a 50%.
- Place the carcass on center of the pad.
- (Optional) Some form of retaining wall can be used. One inexpensive method is to set a Tee-Post at each corner. Then wrap a 48 inch high net wire around the four post and secure to the posts. The post will hold the wire in place until the enclosure is filled. The use of the fence will reduce the amount of carbon material needed to cover the carcass and reduce the chances of pets and wild animals digging into the pile. It will also reduce the land area required to compost.
- Cover the mortality with at least 24 inches of carbon material. Note that if a fence is not used 24 inches of cover over the center of the carcass will likely result in less than 24 inches of cover part way down the slope. Therefore more than 24 inches will be required at the top. When finished the pile should be mounded and shaped so that the amount of rain water that infiltrates the pile is minimized.
- Maintain the carbon cover. It is likely that there will be shifting and settling of the cover material as the carcass decomposes. Therefore, as needed, additional material should be added to maintain cover and water shedding ability.
- After 3-4 months the pile may be mixed and restacked for an additional 2 months. If the pile is not mixed and restacked, then the total duration of the composting needs to be 9-12 months. If a compost thermometer is used the pile should be turned and mixed when the temperature falls below 110 ^{o}F if a faster decomposition rate is desired. The composting period is considered finished when there is no soft tissue remaining. If any of the larger bones are left they should be brittle and easily broken. These bones can be added to future piles to complete their decomposition.
- After the composting period is over, the mixture may be land applied or reused. When reusing the composted material no more than half of the carbon source should be reused compost.

Recommended OBC: Windrow Method

- This approach uses the same dimensions for pad thickness, edge distances, and moisture requirements as the pile method above. The advantage of using windrows is a possible savings in carbon material and a reduction in the land area required to compost the mortality.
- Start the windrow with the process describe for the pile approach above.
- With each new mortality the end of the pile is opened.
- If desired some carbon material from the existing windrow can be pulled down to form a pad for the new morality. Ideally the original carcass is not disturbed, unless it is ready for mixing.
- Moisten the new pad as needed.
- Place the carcass in the center of the new pad.
- (Optional) Add two new Tee-Post at the new corners of the pad then wrap additional net ware around the new length and end of the windrow.
- Cover the carcasses with the carbon material.
- Maintain the cover.
- Since a windrow is built over time, the original mortality will likely be decomposed and ready for disposal before the most recent mortality. This provides the management options of leaving the windrow alone until the last mortality is decomposed then utilizing compost. Or, starting at the older end of the windrow, utilizing the compost as the mortality is decomposed.