

Euthanasia and Carcass Disposal

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Introduction

Cows die, and when they do, the dairyman is left with a carcass in need of disposal. In the southeast, there are plenty of coyotes, buzzards and other scavenging animals willing to assist with carcass removal. This seems a quite natural way to dispose of an animal carcass. It serves the purpose of disposing of the carcass and on top of that, provides food for the scavengers. Problem is, this natural method isn't permitted in many areas. Also, scavengers may become predators when carcasses are less available. This places newborn calves and other animals weakened by disease or other malady at risk of predation. Indeed, newborn calves or a calf confined to a small pen or hutch is easy prey for a coyote. Furthermore, a proper method of carcass disposal is needed to prevent the spread of infectious and/or contagious disease.

The problem is that "disposal" in ways that are socially, economically and environmentally acceptable has become increasingly difficult. Throughout the United States the disposal of animal carcasses is regulated by state laws that vary according to animal species. The most common methods of carcass disposal are burial, composting, incineration, and rendering. There are other methods with applications for non-farm situations. The following is brief summary of each of these methods.

Burial

Pit burial is the most common method of disposal in swine and poultry operations. It is obviously a more convenient means for the disposal of numerous animals. Pit burial is also popular because it is easy to prepare and use. Generally speaking, geographic areas where the water table is deep and the soil is non-porous are best suited to pit burial. Because of ground water contamination concerns, burial pits are carefully regulated and inspected by the state Department of Agriculture to assure compliance. In Georgia for example, poultry pits cannot be within 100 ft of a well, water line, pond, lake or stream.

Individual burial is usually allowed but rules vary from state to state and from county to county. It is necessary to consult local officials for advice since there are often regulations as to the number of pounds of animal carcass per acre per year that may be buried. Large animals, such as cows and horses, are usually buried in a trench approximately 7 ft wide and 9 ft deep. Since a mature cow requires approximately 14 sq ft of trench space and death rates may be as high as 5% or higher, large herds may require alternate methods of disposal.

Landfills

Landfills are an option in some locations, however costs for disposal are likely prohibitive for most dairy farm use. Also, burial of animals in landfills often requires that the animal be bagged (in some cases - double bagged) before disposal.

Composting

Composting is defined as the controlled decomposition of organic materials. It is a sanitary and practical method of carcass disposal. Breakdown of the carcass occurs by bacterial degradation and yields an odorless, humus-like substance that can be applied to fields using common manure-spreading equipment. Fertilizer values typical of composted carcass material contain 25 lb of nitrogen/ton, 13 lb of phosphorous/ton, and 7 lb of potassium/ton. The use of composting as a method for the disposal of carcasses requires a permit from the state's Department of Agriculture. Properly designed composting systems have a positive environmental impact, reduce the amount of solid waste that may potentially be dumped into landfills, yield no air or water pollution, and require no chemical additives. The ingredients required for composting are simply moisture, air, bacteria, and a carbon source (straw, inedible feed, bedding material, manure and other materials).

The Procedure for Composting is described as a 2-stage process. In the first stage, carcasses are placed into a compost area with carbon bulking agents (wood chips, straw, sawdust, dead leaves and/or other bedding material). When composting smaller animals such as calves one may use a bin or area with alternating layers of the carbon bulking material. Always begin with a base layer of dry material approximately one foot deep under the animal to act as a sponge for fluids that seep from the carcass. The bigger the animal the deeper the base layer that is required. The base layer should extend at least two feet beyond all sides of the animal. The animal should be covered with compost ingredient material to form a peaked pile such that a minimum of one foot of cover exists all around the animal. Frequently, it is convenient to compost large animals such as cattle or horses in individual piles or windrows.

Water may be added to the mixture and it is left alone for a minimum of 6 months. During stage 1 soft tissue will break down completely and bones will have softened and undergone partial decomposition. After 6 months it is time to begin Stage 2 by mixing and aerating the contents of the compost pile. When mixing is complete re-cover the pile and leave it undisturbed for another 6 months. After this time the compost is ready for field application. Alternatively, some prefer to leave the pile alone for the entire 12 month period after which time they will remove the compost and spread it directly on crops. Regardless, one of the keys to successful composting is that the compost pile remain undisturbed during the 1st and 2nd stages of the degradation process. This assures a more complete breakdown of the soft tissues and bones.

Experience has also shown that carcasses will compost more quickly if the carcass is quartered and the thorax, abdomen and rumen are opened prior to composting. It generally requires a minimum of 9-10 months to compost an intact cow carcass. Bones from immature animals will usually degrade rather quickly in the compost, whereas bones from more mature animals may take several seasons to totally breakdown. However, bones that do not breakdown may be used as base material for the next compost pile. Bones may be buried or placed in "bone pile" where they may serve as a calcium source for wild animals. As bacteria compost the carcass heat reaching temperatures as high as 140o F are produced. This is sufficient to kill most pathogenic bacteria (with the exception of spores) and viruses. Composting is likely one of the best options for disposing of carcasses, however dairymen who may be considering this option are advised to contact their local officials on regulations regarding the use of composting systems. Some states require a training program for persons to become certified to compost livestock.

Tissue Digestion

Tissue digesters are used in diagnostic laboratories and other similar industrial facilities. This technique digests the carcass by a process of alkaline hydrolysis. A strong alkali in combination with high temperature is used to solubilize and hydrolyze the tissues resulting in a neutralized solution of amino acids, peptides, sugars, and soap that is suitable for release into the sewer system. The only solid materials are minerals from bones and teeth. The College of Veterinary Medicine at the University of Florida uses a tissue digester for carcass disposal purposes. Prior to use of the tissue digester all carcasses at the College were incinerated. The tissue digester has major advantages for industrial use but is far to costly for use under farm conditions.

Incineration

Incineration has major advantages in terms of bio-security, but similar to tissue digestion, it is costly and impractical for routine carcass disposal in farm situations. When functioning properly there is little or no odor produced from incineration of carcasses. The state and federal Environmental Protection Agencies regulate incinerators used for the incineration of animal carcasses.

Rendering

Rendering is a process whereby the carcass is cooked to destroy pathogens and yield usable end products such as meat, feather, bone and blood meal. This is an environmentally safe method of carcass disposal and permitted for use in approximately 50% of the states within the United States. There are restrictions on the rendering of sheep, goats, cattle, and farm-raised deer or elk in some areas because of concerns relative to the transmission of the spongiform encephalopathies, the most notable of which in cattle is BSE (Bovine Spongiform Encephalopathy). The bigger problem with rendering is that it is an industry in steady decline. Today, there are many areas of the country with little or no rendering services available.

In Conclusion

Burial, incineration and rendering are acceptable methods of carcass disposal depending upon potential for ground water contamination, cost of fuel, and availability of renders, respectively. Whether these options exist in all areas or not, experiences with composting suggest that it is an environmentally safe and effective alternative for carcass disposal. The one sure thing is that like all living beings, cows will die and as they do, we must be prepared to properly dispose of their carcasses. Dairymen are advised to look ahead, consider the options and develop a plan for managing this inevitability.

Selected References

1. Glanville, TD, DW Trampel: Composting alternative for animal carcass disposal. 1197. JAVMA, 210(8):1116-1120.
2. Sander, JE, MC Warbington, and LM Myers: Selected methods of animal carcass disposal. 2002. 220(7):1003-1005.
3. Bonhotal, J, L Telega, and J Petzen: Natural Rendering: Composting Livestock Mortality and Butcher Waste. Fact 2002, p. 1-12.

Web sites and University Sources of Information on Carcass Disposal

Cornell University

<http://cwmi.css.cornell.edu>

<http://cwmi.css.cornell.edu/Composting.html>

<http://compost.css.cornell.edu/naturalrenderingFS.pdf>

Iowa State University

<http://www.ag.iastate.edu/>

University of Wisconsin Extension

<http://cdp.wisc.edu/>

University of Maryland

<http://www.agnr.umd.edu/MCE/>

<http://www.agnr.umd.edu/MCE/Publications/>

University of Nebraska

<http://manure.unl.edu/composting.html>

Ohio State University

<http://www.oardc.ohio-state.edu/fabe/composting.html>

<http://ohioline.osu.edu/aex-fact/0711.html>

<http://ohioline.osu.edu/aex-fact/0712.html>

<http://ohioline.osu.edu/aex-fact/0713.html>

Penn State

<http://composting.cas.psu.edu/>

Purdue University

<http://www.ces.purdue.edu/pork/>

Washington State University

<http://organic.tfrec.wsu.edu/compost/ImagesWeb/CompSys.html>

Virginia Tech

<http://www.ext.vt.edu/pubs/poultry/442-037/442-037.html>

University of Minnesota

<http://ncroc.coafes.umn.edu/November2000.htm>

Michigan State University

<http://www.msu.edu/user/mdr/news/mortality.pdf>

Texas A&M University

<http://tammi.tamu.edu/research.html>

Utah State Extension

<http://extension.usu.edu/publica/agpubs/ag507.pdf>

Notes
