

Low Maintenance On-Farm Cattle Composting

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Unfortunately cows die. With death comes the choice of disposal method. Composting is an environmentally sound disposal practice when done properly. Ok, ok. I know what some of you are thinking, "I already have a great and cheap disposal method. I just drag the carcasses into the bush and within a few days the coyotes have disposed of them for me." Well, besides the legalities of it all, it is just not a good idea. Intentionally feeding coyotes means that they are only going to get bigger and stronger, more food means more coyotes. Also, when pasture season comes and your cows are contently eating away, a large coyote that you have been feeding may just decide to kill one of your calves for supper. Anyhow, the point of this article is not to lecture you, but to provide information on composting cattle mortalities if you should choose to do it.

Why compost

First of all, why should farmers compost mortalities? To name a few reasons, composting can be done at any time of the year, it kills pathogens, and it offers immediate disposal of all sizes of carcasses. In addition, composting is a relatively low cost, labour, and management process. Finally, it is just "neat" to see an entire carcass virtually disappear.

Composting

Composting is a controlled aerobic process in which bacteria, fungi, and other microorganisms convert organic material into a stable humus-like product. Since microorganisms do most of the work, you must provide the best environment for them to live. To provide the best habitat for microorganisms the following is required:

- (1) **Good carbon to nitrogen (C:N) ratio.** Animal carcasses are high in nitrogen so you must add large amounts of carbon. A C:N of 20:1 – 40:1 is reasonable, the preferred range is 25:1 – 30:1.
- (2) **Adequate moisture.** Microorganisms need water to move around and transport nutrients. A moisture content of 40 – 65% is reasonable, the preferred range is 50 – 60%.
- (3) **Good aeration.** Composting is an aerobic process, which means the microorganisms need air to compost properly. Oxygen levels should be maintained above 5%. The target range is about 5-15%.
- (4) **Controlled temperatures.** The warmer the pile, the faster the microorganisms work. Temperatures between 43-65 °C (110-150°F) are acceptable, but anything above 70°C (158°F) is too hot for the microorganisms to survive. The preferred range is 54-60°C (130-140°F). Temperatures maintained above 55°C (130°F) for 3 consecutive days kill pathogens.

The above four factors in combination are the key to making microorganisms happy and work hard. If you can achieve these things, then composting will be possible.

Starting a static compost pile

The compost pile must be at least 100 m away from any surface watercourse, sinkholes, springs, or wells. Depending on your soil conditions, a concrete pad or plastic liner may be required. Begin by creating a base with straw, sawdust, woodchips or any other good carbon source. Make sure that the base at least 60 cm (2 ft) thick and is large enough to

allow for 60 cm (2 ft) of clearance around the carcass (Fig.1). Next, lay the carcass flat on top of the base (on its back or side) as shown in figure 2. For larger mortalities (greater than 300 lbs) it is necessary to lance the rumen to prevent bloating and possible explosions, as well as give microorganisms quicker access in order to compost faster. Finally, completely cover the carcass with the carbon source so there is at least 60 cm (2 ft) of material surrounding the entire carcass. A 60 cm (2 ft) cover will insulate the composting material from the outside temperatures, provide the necessary carbon source, reduce odour, and absorb liquids. A fence should also be placed around the compost pile to ensure that no dogs, coyotes, rats, etc. can get into the compost pile.



Fig. 1. Sawdust composting base



Fig. 2. Carcass laid on the sawdust base



Fig. 3. Entire carcass covered with sawdust

The composting process

Unlike manure composting, mortality composting does not require frequent turning. A mortality composting pile may only need to be turned once. There are two main stages or heat cycles in mortality composting, primary and secondary. The primary stage starts once the compost pile is constructed. The primary stage takes approximately 3 to 6 months and should be monitored daily. Since microbial activity is directly related to heat, temperature is a good indicator whether or not the compost pile is working properly. Once the temperature reaches 55°C (130°F) and stays above this temperature for at least one week and then drops, the pile is ready to be turned. The primary compost pile should be turned onto a 60 cm (2ft) layer of amendment to absorb any liquids.



Fig. 4. Turning the composting pile (Source: composting.cas.psu.edu)

After the pile is turned the secondary stage of the composting process begins. Secondary composting time is similar to primary composting time (3 to 6 months).

Again, the temperature should be monitored daily. Once the temperature reaches 55°C (130°F) and stays above this temperature for at least one week and then drops, composting may be finished. Finished compost should be dark, humus-like with no signs of flesh (Fig. 5). If there is still flesh in the compost pile, it is necessary to turn the pile again and let it go through another heat cycle. Bones that remain in the compost will be very brittle and can be crushed or removed and added to a new composting pile or buried.



Fig. 5. Finished compost (Source: www.mda.state.mn.us)