

# Composting Animal Mortalities

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## COMPOSTING ANIMALS

Composting is a naturally occurring process in which bacteria, fungi, and other microorganisms convert organic material into a stabilized product termed compost. This means that microorganisms do the composting work for you. Your role in managing the composting process is to make sure that the microorganisms have the environment they need in order to do their work quickly and effectively.

## ELEMENTS OF COMPOSTING

The essential elements for the microorganisms involved in composting are carbon (C), nitrogen (N), oxygen (O<sub>2</sub>) and moisture (H<sub>2</sub>O). If any of these elements are lacking, or if they are not provided in the proper proportion to one another, the microorganisms will not flourish and will not provide adequate heat. The proper compost mix requires both carbon and nitrogen at the proper C:N ratio. The proper C:N ratio will result in a composting process that generates little odor, yet offers an environment where microorganisms can flourish. Optimum C:N ratio for composting is 25-40:1

## BULKING INGREDIENTS

Sawdust works well when composting mortalities because of its high carbon content and small particle size. Sawdust also has better odor absorption capabilities than other bulking materials. Other materials include: chopped straw, corn stalks, mixture of manure, and straw/sawdust. Sawdust is used 1:1 with animal mortalities; if you use other bulking materials, more of the material may be needed to achieve the proper C:N ratio.

<u>Substance</u>	<u>C:N Ratio</u>
Sawdust	200-750 :1
Straw	48-150 :1
Corn stalks	60-73 :1
Finished compost	30-50 :1
Animal carcass	5 :1

Particle size is also important when selecting the bulking material. Sawdust generally is sized correctly, but any material that is chopped to a fine particle size will work.

## SITE SELECTION

Many factors affect where a compost area is set up. While convenience is important, you will not be accessing this area on a regular basis. Therefore, the compost area can be located away from other building on the farm site. Keep working side of compost pile facing south if possible. Other selection issues are:

### *Water Quality*

Pick an area that is well-drained and has all-weather access to roads and work areas. Areas to avoid are: 1,000 feet from streams and lakes, and 300 feet from wells.

### *Biosecurity*

Avoid locating the compost structure directly next to production units and use appropriate cleaning procedures on transportation vehicles.

### *Public Perception*

Consideration needs to be given to prevailing winds and public view in choosing a site. Provide limited or appealing view for neighbors or passing motorists and consider aesthetics and landscaping. Hauling animal mortalities on roadways may not be the sight you want for your farm.

### *Traffic Flow*

Consider access and traffic patterns required for moving mortalities and bulking agent to the composter and removing finished compost, as well as other farm traffic. Ensure all weather access. Locate safe distances from buried and overhead utilities.

### *Access to Water*

Consider the distance between a water source and the bulking agent storage or the composting bins. If you need to add moisture to your composting materials, either to the bulking agent or to the piles, consider locating the structure within one hose length of a water source.

## COMPOSTING STRUCTURES

To avoid the risk of pest problems, some type of structure around the livestock compost pile is needed. The structure can be as simple as plastic wrapped-round bales, used as a wall barrier. Others have constructed a compost facility similar to a commodity shed with a mono-slope roof and concrete sidewalls.

There will be some leachate from the compost. A concrete floor is not necessary, but an all-weather base is important for access and to control ground seepage. Leachate will not generally be a problem, especially if the composting facility is under cover or drainage flows into a grass waterway.

### Bins

Generally, three bins or load areas are used. Bins need to be sized so you can easily place animal mortalities inside. The size of your turning machine (skid steer, tractor with loader) also needs to be considered. Use 100 to 400 square feet per bin as a general rule of thumb. Remember that the pile can become 5-8 feet in height; as the material composts, size will decrease.

Filling flow of the bins is diagramed below. This chart is dated for adult cattle. Bins for calves and swine can be cycled in 30 day increments. Times may vary due to season and other factors.

## MANAGEMENT

Day	Bin 1	Bin 2	Bin 3
1-45	filling	empty	empty
45-90	1st heat	filling	empty
<b>Day 90</b>	<b>Empty to bin 3</b>	-	-
90-135	filling	1st heat	2nd heat (#1)
<b>Day 135</b>	-	<b>Empty to bin 3</b>	<b>Remove and spread</b>
135-180	1st heat	filling	2nd heat (#2)
<b>Day 180</b>	<b>Empty to bin 3</b>	-	<b>Remove and spread</b>
180-225	filling	1st heat	2nd heat (#1)

Add two feet of bulking material to the floor of the bin, place the mortalities in the sawdust. The carcasses must be placed at least one foot from the bin wall and covered with two feet of bulking material. Check daily to ensure that the bulking material has not settled and wind has not removed any bulking material.

At turning, add one foot of bulking material to an empty bin. Turn compost on to this new layer of bulking material. After turning the compost, make sure that the mortalities are completely covered with at least one foot of bulking material. During winter, avoid starting a new bin unless hot, existing compost is available for use as the bulking agent.

## TIPS FOR SUCCESS

- Mortalities are able to degrade over time because of sufficient catalytic bacteria, and enzymes which are able to break up the carcasses to useful organic material.
- Warm mortalities degrade faster and will have better ending results, it is essential to place the carcasses in the compost pile quickly.
- The compost pile destroys disease causing bacteria and viruses and reduces flies if done properly.
- Immediate burial of the livestock mortalities will reduce the chance of odor, but there needs to be at least 5% oxygen within the pile.
- When the compost pile has completed the heating cycles, it can be stored in a solid manure storage facility and kept until spreading.
- Use 1 pound of sawdust per 1 pound of mortality
- Turn compost when temperature is greater than 160°
- Temperature below 104° F indicates lack of adequate oxygen and turning is needed.

## Benchmarks for Composting Conditions

Measure	Optimum	Acceptable
pH	6.5-8.0	5.5-9.0
Temperature	130-140°F	110-150°F
Moisture	55%	45-65%
Porosity	40%	35-50%
C:N Ratio	30:1	25-40:1

## FOR MORE INFORMATION

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Mortality Composting in Wisconsin, Dan Short  
[http://cdp.wisc.edu/ppt/Compost\\_files/Compost.ppt](http://cdp.wisc.edu/ppt/Compost_files/Compost.ppt)

J.R. Morris, T. O'Connor, F. Kains, H. Fraser; Composting Livestock Mortalities: <http://www.gov.on.ca/omafra/english/livestock/swine/facts/97-001.htm>