

On-Farm Composting

With changes to deadstock removal requirements and loss of rendering facilities, farmers are looking at on-farm disposal options. Two Iowa on-farm poultry research and demonstration projects have shown composting to be simpler than burial. Additionally, excessive nitrogen build-up can be a problem at burial sites, whereas composting produces a humus-like product containing nutrients and organic matter that can be recycled onto cropland. Composting carcasses is also a good biosecurity measure because most disease organisms can be killed by exposure to the temperature levels in a compost pile or bin (58° to 68° C/135° to 155° F). As well, it is preferable to keep any disease organism on-farm rather than risk transmitting it during removal and transporting deadstock.

Deadstock composting can be done in windrows, in a bin system, or in sealed containers. For in-vessel composting, the composting mixture must be 50% dead farm animals and 50% substrate. For other methods, the mixture should be no more than 25% dead farm animals and 75% co-composting material.

There are five key factors to successful composting: moisture, composting materials, carbon and nitrogen balance, oxygen and heat retention.

A very important factor in composting deadstock is the moisture content of the compost mix. Too little moisture promotes dehydration, which preserves tissues, while too much moisture leads to foul odours and leaching. The moisture content of the compost mix should be 40% to 50%; a squeezed handful should leave moisture on the palm of your hand without forming drops. A mix that is too dry or too wet will not develop the desired temperature to effectively compost. Large animals can add considerable moisture and the starting compost mix can be slightly dry. Small animals loaded a few at a time will add little water so you may need to add water.

The following readily available materials can be used as composting material:

- Clean, untreated and uncontaminated wood sawdust, shavings or chips.
- Straw consisting of dried grain, corn or bean stalks and leaves.
- Clean hay or silage.
- A mixture composed of livestock manure and bedding material (as listed above). The mixture must be at least 30% dry matter by weight.
- Poultry litter (a mixture of wood shavings and poultry manure).

Sawdust is particularly good for absorbing excess liquid whereas coarse material like ground corncobs or wood chips help keep the compost porous allowing oxygen into the pile and gases like ammonia to escape. Poultry litter, is the most common compost material for turkey and broiler carcasses.

Without a proper balance of carbon and nitrogen, microbial growth is slowed and the rate of decay is reduced. Temperature and odour can be used as general indicators of the C:N balance. If ammonia odours become a problem, adding a high-carbon compost material such as sawdust can raise the C:N ratio. If moisture levels appear to be within the recommended range, strong ammonia odours are not present, and decay is still slow, insufficient nitrogen may be the cause. Additional nitrogen in the form of manure can be added to lower the C:N ratio and boost the rate of decay.

Animals weighing less than 136 kg (300 lbs) can be composted whole but larger animal carcasses should be opened or split. Start with a base layer of compost material at least 30 cm (1 foot) thick to act as a sponge. Animals can be loaded in layers and covered with the compost mix. Small animals can be placed side by side in layers no more than 20 cm (8 inches) thick with compost mix between and around the layers. Water may be added as the layers are being constructed if required. At each loading, make sure that the top animal is covered with at least 60 cm (2 feet) of compost mix.

Aerobic composting (oxygen-using) is more desirable than anaerobic decomposition because the major by-products are water, carbon dioxide, and heat. Anaerobic decomposition, by contrast, produces little heat and generates unpleasant odours such as hydrogen sulfide and organic acids. Avoiding overly wet compost, periodically turning the compost with a loader, and using relatively coarse composting materials that allow oxygen into the pile can help avoid odour problems. If you are aerate the compost pile, ensure that any exposed animal parts are fully covered with at least 60 cm (2 feet) of compost mix.

The compost pile should reach internal temperatures of 58° to 68°C (135° to 155°F). This temperature range encourages the rapid growth of heat-loving bacteria that promote decay. As an added benefit, exposure to high temperatures helps to kill disease-causing organisms.

Composting is considered complete when there is:

- no soft animal tissue at all;
- no bones or bone fragments larger than 15 cm (6 inches);
- no other animal matter larger than 2.5 cm (1 inch); and,
- no offensive odours.

When the compost material meets these requirements, it may be applied to farmland where the composting activity occurred.

On-farm composting of dead animals is regulated under the Nutrient Management Act, 2002 (NMA). This regulation applies to all farm operations, regardless of the requirement to have a nutrient management strategy or plan and sets out minimum distances for composting piles from lot lines, water courses, tile drains, etc. It is recommended you review these criteria prior to establishing your deadstock composting site.

Further details on composting bin design, deadstock handling and regulatory requirements may be found on the Ontario Ministry of Agriculture, Food and Rural Affairs website <http://www.omafra.gov.on.ca/english/livestock/deadstock/index.html>

The foregoing article was provided by the Ontario Livestock and Poultry Council. The Council provides a forum to facilitate the development and coordination of an Ontario strategy to deal with foreign animal disease and other transmissible livestock and poultry diseases.

References:

Composting Animal Mortalities on the Farm, Maryland Cooperative Extension, University of Maryland.
Composting dead livestock: A new solution to an old problem, Leopold Center, Iowa State University Extension
Disposal of Dead Farm Animals, Ontario Regulation 106/09, Nutrient Management Act, 2002.