

# FACT SHEET

## Environmental Science & Technology FS-2

### Guidelines for Composting Large Animal Mortalities in Maryland<sup>1</sup>

**How composting works:** In composting, naturally occurring microorganisms convert unstable organic material—including carcasses—into a stable product (compost) that can be used as a soil amendment. If done correctly, composting is an efficient, biosecure, and environmentally sound practice. Correct composting mainly involves combining materials with different properties in the correct proportions:

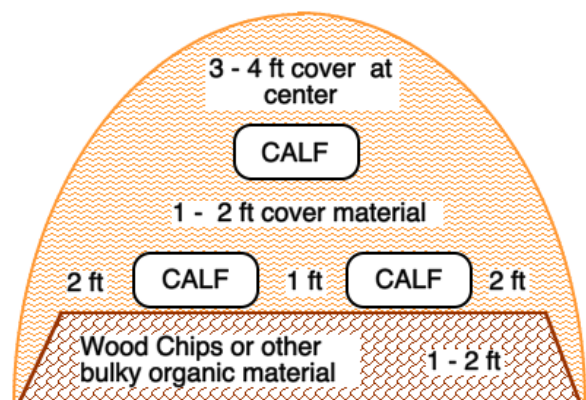
- In mortality composting, carcasses are the primary ingredient and have a high nitrogen (N) content.
- The N in the carcasses must be balanced through the addition of high carbon (C) material (such as spent silage, sawdust, straw, or old bedding material).
- A bulky material with large, firm particles (such as wood chips) is needed to help air reach the carcasses.

**Selecting a composting site:** The site used for composting on the farm should be:

- high and dry (avoid wet areas or flood plains), low permeability soil, slope 1-6%
- at least 200 ft from streams, ponds, lakes, wells, sink holes, or seasonal seeps
- surface water diverted away from pad, pad runoff contained or run through filter strip
- hard enough to tolerate equipment maneuvering
- out of direct view of neighbors and motorists (also consider prevailing wind direction)
- easily accessible
- pad constructed from geotextile fabric, rock, and sand

**Building the pile:** In mortality composting, compost piles are built in layers in the following steps:

1. Put down a 1 to 2 ft base layer of bulky material (wood chips or mulch are ideal). Make the base layer big enough so that there is at least 2 ft clearance around the carcass (1 ft for calves and other smaller animals). Carcasses that are too close to the edge will not adequately heat. Typically 14' to 16' wide.
2. Place animal on top of the base layer using a front-end or skid loader. If adding animals next to, or on top of, carcasses in an existing pile, maintain 2 ft of cover material between carcasses (1 ft for smaller animals). If possible, do not allow carcasses to freeze in the winter. This will greatly slow the composting process.
3. Cover carcasses with at least 2 ft of dry silage, bedding, or other high carbon material. Not manure or old compost. Mound cover layer so that there is 3 to 4 ft at the center line (see diagram at lower right) where maximum settling will occur. Make sure no animal parts are exposed anywhere in the pile. Uncovered carcasses will create odors, attract scavengers, and create a biosecurity risk. Mound and shape to shed water



<sup>1</sup> Authors: Gary Felton, Mike Bell, Stanley Fultz, and Jeff Semler.

**Maintaining the pile:** Maintenance of mortality compost piles primarily involves turning the pile at lengthy intervals. Monitoring the temperature with a long-stem thermometer is also recommended.

- The temperature of the pile should be monitored (at least weekly) to ensure that:
  - it is heating up rapidly (indicating good pile construction)
  - temperatures are high enough to destroy disease-causing organisms (at least 131°F)
- After 4 to 6 months and reaching 131°F, turn pile using a loader. Lift and turn compost, as opposed to just pushing it around. No flesh should be present, but large bones and some hide may be visible.
- Form a new pile with the turned compost and cap with 1 ft of cover material (aged mortality compost or wood chips/mulch) to control odors. Allow pile to age for 4 to 6 months. Reheating should occur, although it may take longer and temperatures will be lower than in first pile.

**Use of finished compost:** After aging, the mortality compost should be stable and free of offensive odors. Large bones will be present but should be fairly brittle. The finished material can be used again to compost new carcasses or land-applied on the farm, according to the following guidelines:

- Finished mortality compost should be used in creating the base layer of new mortality compost piles. This reduces the amount of bulky material that has to be brought on to the farm. Bones are especially useful because they provide structure. Finished compost can also be mixed with fresh high carbon material (50:50 ratio by volume) and used as a cover material during new pile construction.
- Finished mortality compost that is not recycled in the composting operation can be land-applied.
  - In Maryland, mortality compost can be land-applied only on the farm where it was generated.
  - Do not apply mortality compost to crops that are directly consumed by people. Application on hay, corn, winter wheat, tree plantations, and forestland is appropriate.
  - Land applied mortality compost must be included in the farm's nutrient management plan.
  - It is advisable to remove (or break up) skulls and other large bones before land-applying compost, particularly if the fields are visible or accessible to neighbors, motorists, children, and/or pets. Large bone fragments can also puncture equipment tires.
  - If the farm operation does not include fields where compost can be land-applied, compost can be taken to a certified composting operation.

**Material and equipment requirements:** Most of the materials and equipment needed in mortality composting are found readily on dairy operations and other farms. However, it may be necessary to bring additional cover/base material on the farm. Plan ahead to identify sources of the following materials for routine and catastrophic mortalities:

- Cover/base material: About 12 cubic yards of cover material is needed per 1000 lb animal composted. This translates to approximately 1 ton of ground hay or straw, 1.4 tons of ground cornstalks, or 3.2 tons of corn silage.
- Thermometer: A probe-type thermometer with a long-stem is needed to monitor the pile temperature. It is also a good idea to log the measured temperatures in a dedicated log book.
- Front-end or skid steer loader
- Manure spreader

**Caution:** Any animal that is suspected of having bovine spongiform encephalitis (BSE or mad cow disease) or related neurological diseases should not be composted. Report these animals to MDA.