MARYLAND COOPERATIVE EXTENSION
UNIVERSITY OF MARYLAND
COLLEGE PARK•EASTERN SHORE

Fact Sheet

Fact Sheet 801

Guidelines for In-house Composting of Catastrophic Poultry Mortality*

Typical methods of disposal of poultry carcasses with highly pathogenic disease include burial, incineration, landfill disposal (this is not a routine disposal method, only for pathogenic or catastrophic events), rendering, and composting. Of these five methods, composting of mortalities on the farm appears to be the most acceptable because it averts potential groundwater pollution from burial, avoids high fuel cost and potential air pollution with incineration, and prevents potential disease spread associated with transportation to landfills and the associated transport costs and tipping fees. Properly done, in-house composting of poultry carcasses is a cost-effective and biosecure means of inactivating pathogenic organisms in both the carcass and litter. While every state has specific rules and regulations on the disposal of poultry mortalities, the following composting guidelines may help poultry companies and growers who may encounter large numbers of poultry mortalities due to diseases like Avian Influenza (AI) that require depopulation. If AI is diagnosed and a flock is depopulated, in-house composting is strongly recommended because this will keep AI virus from spreading.

Step 1

In consultation with the poultry company, State Veterinarian and/or the state's emergency poultry disease team, obtain the appropriate procedures and/or request assistance on proper euthanasia and depopulation procedures. Obtain a pre-approved list of vendors that supply or provide the following for the infected farm:

A. Personnel
The number of personnel and time needed will depend on the number, type, age, and weight of the birds.

B. Equipment and Supplies
- Skid steer loaders—2 machines
- Sawdust (see Table 1 for estimate)
- Tanker for water if needed (see Table 1)
- Composting thermometers (36" or 48" stem length)—1 per house
- Power wash and disinfecting equipment
- Recommended disinfectants (five disinfectants were recently tested by USDA): Tek-trol and One-Stroke Environ, which are phenolic disinfec-

* These are general guidelines for the information and guidance of poultry companies, growers, and other related parties. These guidelines are primarily designed for clear-span houses and may need some modification for houses with posts. Contact your company or State Veterinarian for specific guidelines on euthanasia and depopulation.

Table 1. Estimated Material Requirements for In-house Composting of Poultry Carcasses.[1]

Depth of litter (inches)	Volume of litter (cu. ft.)	Volume of sawdust/litter required (cu. ft.)	Volume of sawdust needed (cu. ft.)	Volume of water needed (gallons)[2]
2	3,340	13,000	9,660	12,500
4	6,660	13,000	6,340	12,500
6	10,000	13,000	3,000	12,500
8	13,340	13,000	0	12,500
10	16,660	13,000	0	12,500

[1] Estimated material requirements for 25,000 birds at 5 pounds per bird in a 40' x 500' house. (Note: The amounts of sawdust/litter and water needed are proportional to the bird weight, i.e., a 2.5 lb. bird will require approximately half the litter and water requirement.)

[2] Based on estimated 1/2 gallon volume of water needed to wet one bird (volume may be more or less; feathers must be thoroughly wet but be sure not to saturate the sawdust/litter mix).

tants; Lysol No-rinse, a quaternary ammonia compound; Virkon-S, a peroxy compound; and household bleach, a chlorine compound. All five disinfectants were effective at inactivating virus at the recommended concentrations (Suarez et al. 2002).

Formulas**

V = (X/12) x L x W **(1)**

V = litter volume–cubic feet
X = floor litter depth–inches
L = house length–feet
W = house width–feet

WRL1 = (Y/300) x BW **(2A)**

WRL1 = windrow length with a base 12 feet wide and 6 feet high
Y = total number of birds to be composted
300 = constant = pounds of poultry that can be composted per foot of windrow length
BW = bird weight

WRL2 = (Y/225) x BW **(2B)**

WRL2 = windrow length with a base 12 feet wide and 4 feet high
Y = total number of birds to be composted
225 = constant = pounds of poultry that can be composted per foot of windrow length
BW = bird weight

CV1 = 30 x WRL1 **(3A)**

CV1 = volume of sawdust/litter mix needed
30 = constant = cubic feet of sawdust/litter mix per foot of windrow length
WRL1 = windrow length with a base 12 feet wide and 6 feet high

CV2 = 22.5 x WRL2 **(3B)**

CV2 = volume of sawdust/litter mix needed
22.5 = constant = cubic feet of sawdust/litter mix per foot of windrow length

**These formulas may be used for other sizes of birds; volume of materials needed should be adjusted accordingly.

WRL2 = windrow length with a base 12 feet wide and 4 feet high

Step 2

Determine the total number of dead birds, their age, and the amount of litter needed (Table 1). If litter is inadequate, purchase sawdust or alternative carbon source such as wood chips.

Step 3

A. For chicken or turkey broiler houses:
   1. Raise feeder and drinker lines (Figure 1).
   2. Push mortalities toward the litter-door side of the house so the litter surface can be accessible for making the composting windrow. Additional carbon (sawdust) can be piled inside at the doors (Figure 2).
   3. Create a litter windrow 12 feet wide and 1 foot deep on one side of the house (Figure 3). Consider the location of the windrow in relation to overhead equipment such as feeder or drinker lines to give the loader enough height to maneuver.
   4. Scoop the dead birds with the loader and lay them on top of the litter base of the windrow. Spread the carcasses evenly with a rake until they are about 8 to 10 inches thick (Figure 4). For larger birds such as roasters, breeders and turkeys, the layer should be only one bird deep.

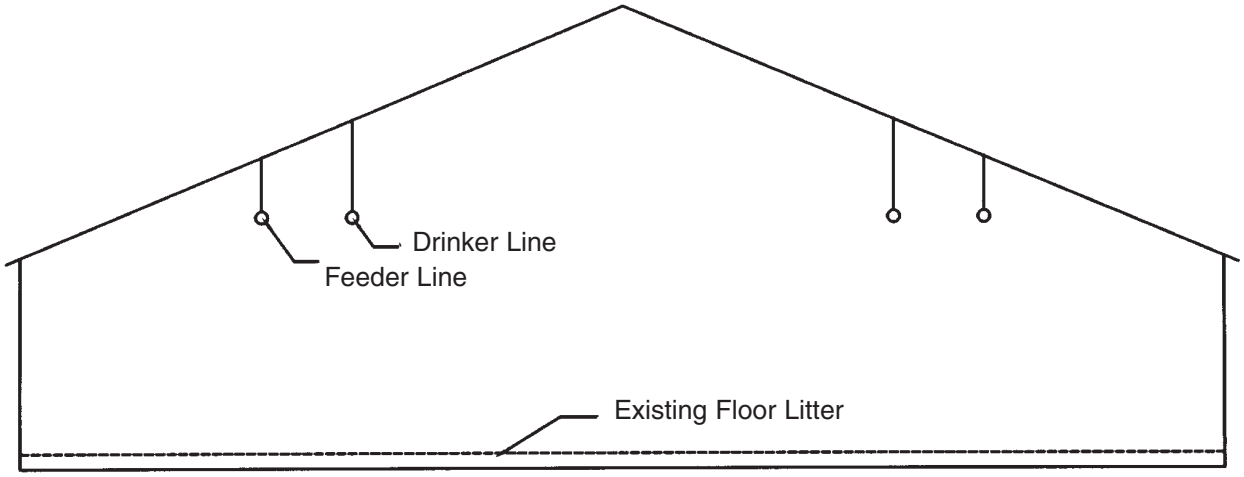


Figure 1. Cross-section of broiler house with feeder and drinker lines raised to ceiling.

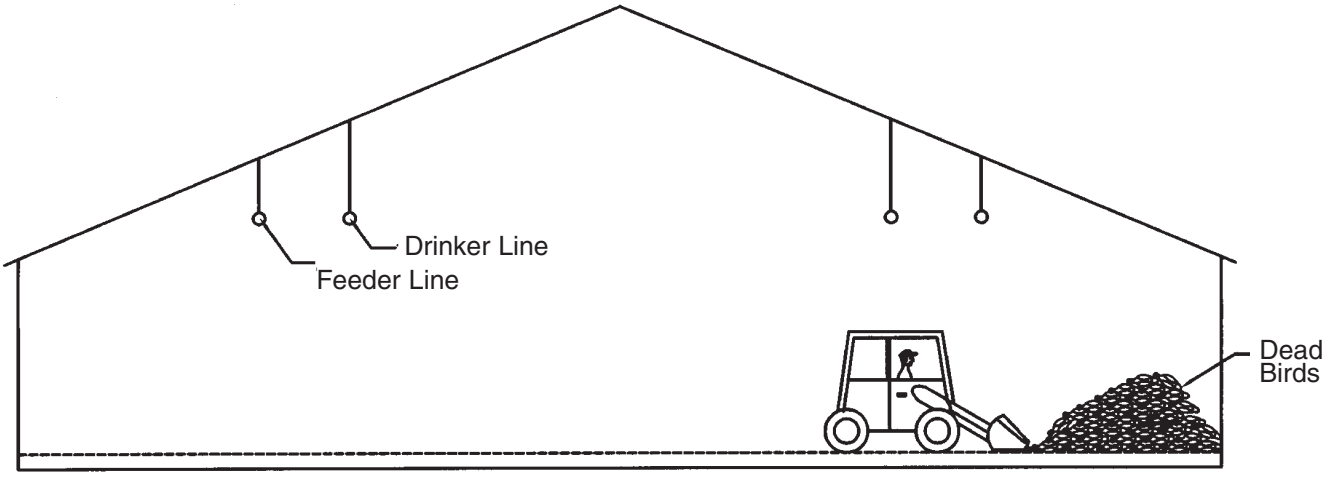


Figure 2. Use a skid loader to move dead birds to one side of the house.

5. Spray the carcasses with enough water to thoroughly wet the feathers but not saturate the sawdust/litter mix (Figure 5).
6. Deposit a 6- to 8-inch layer of sawdust/litter mix over the birds with a foot overlap on the sides. Leave no carcasses or bird parts exposed (Figure 6).
7. Repeat steps 4 to 6 two more times or until the pile is 6 feet high. If the height of the poultry house prevents a 6-foot high windrow, make only two layers, which will be approximately 4 feet high. In so doing, the windrow length requirement will increase by approximately one-third (use Equation 2B for exact calculation of windrow length and Equation 3B for volume of sawdust/litter mix). Figure 7 shows a windrow cross-section. To inactivate pathogens in the litter, all the litter in the house should be used in the composting process.

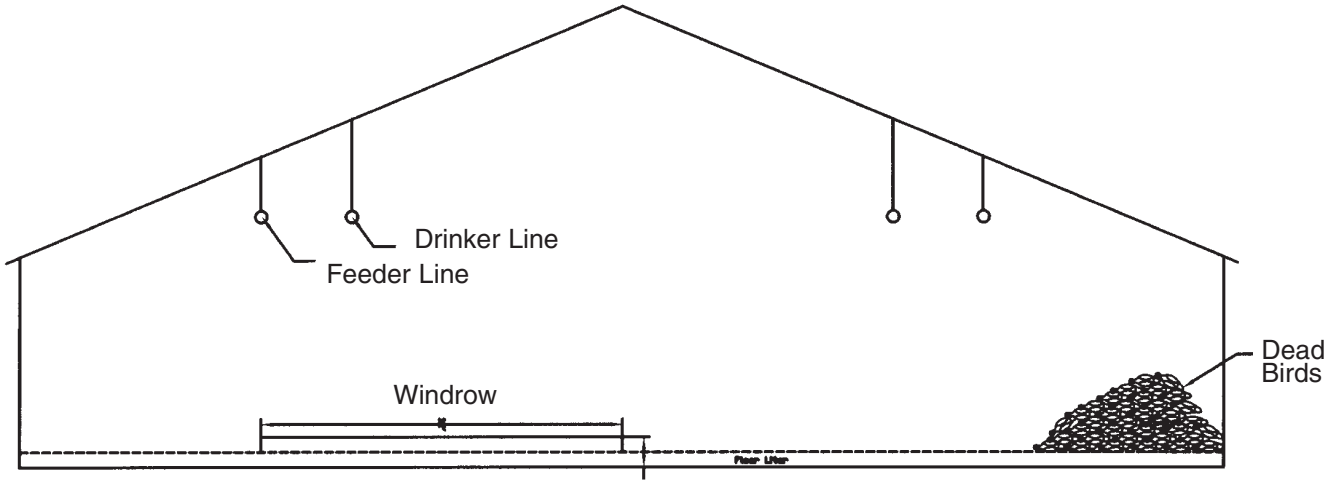


Figure 3. Create a windrow 12 feet wide with a base on one side of the house. Make sure outer edge of the windrow does not go beyond feeder line boundary.

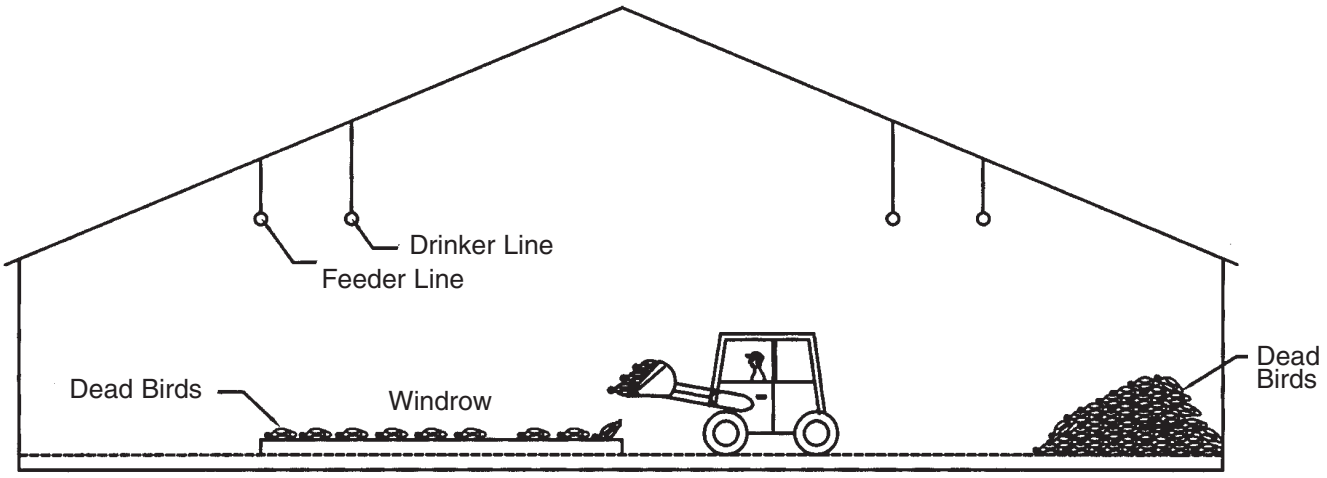


Figure 4. Scoop dead birds with loader and lay them on top of the base of the windrow. Limit bird layer thickness to 8 to 10 inches or one bird deep for roasters and turkeys.

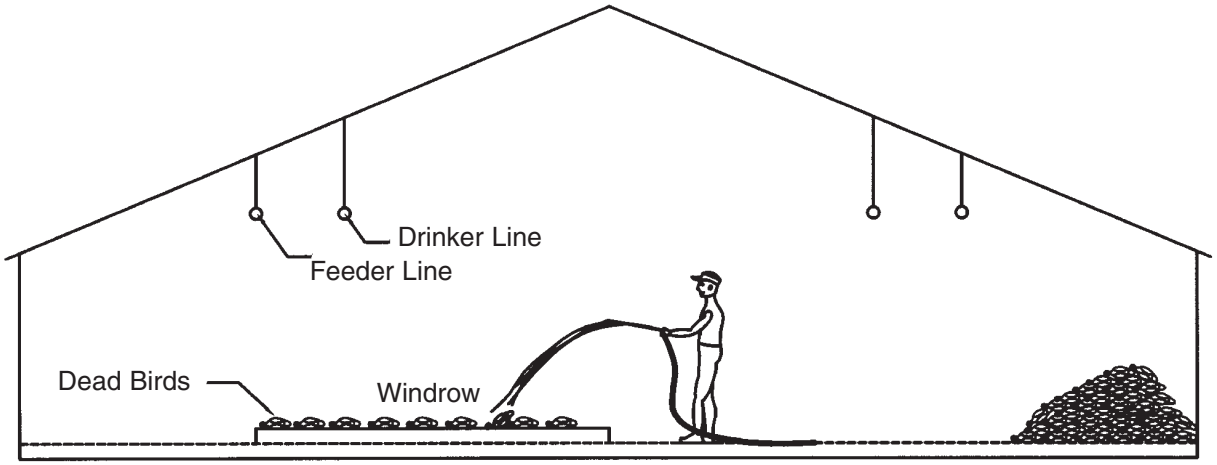


Figure 5. Spray the carcasses with enough water to saturate the feathers.

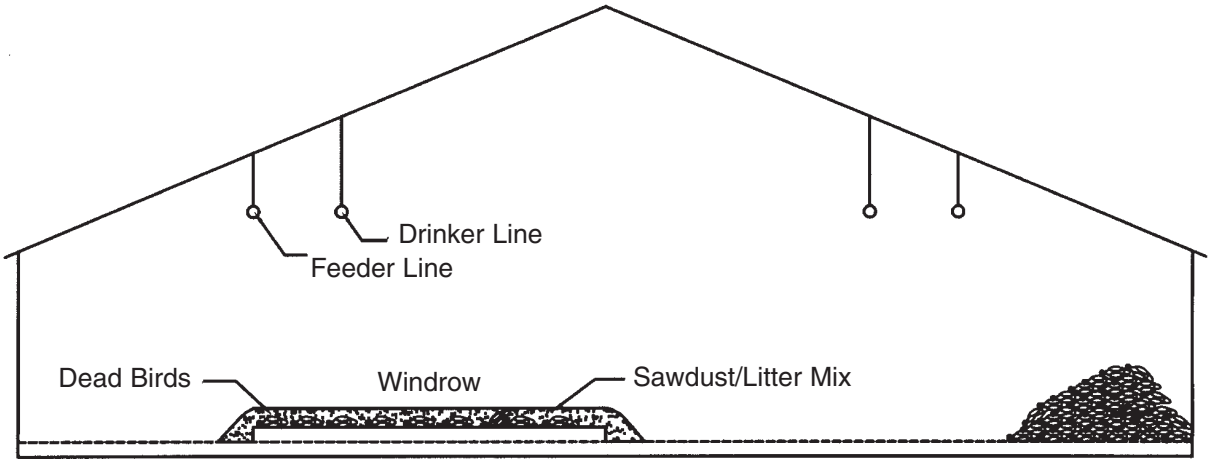


Figure 6. Deposit 6 to 8 inches of sawdust/litter mix to the width of the birds with a 12-inch overlap on each side of the windrow as shown.

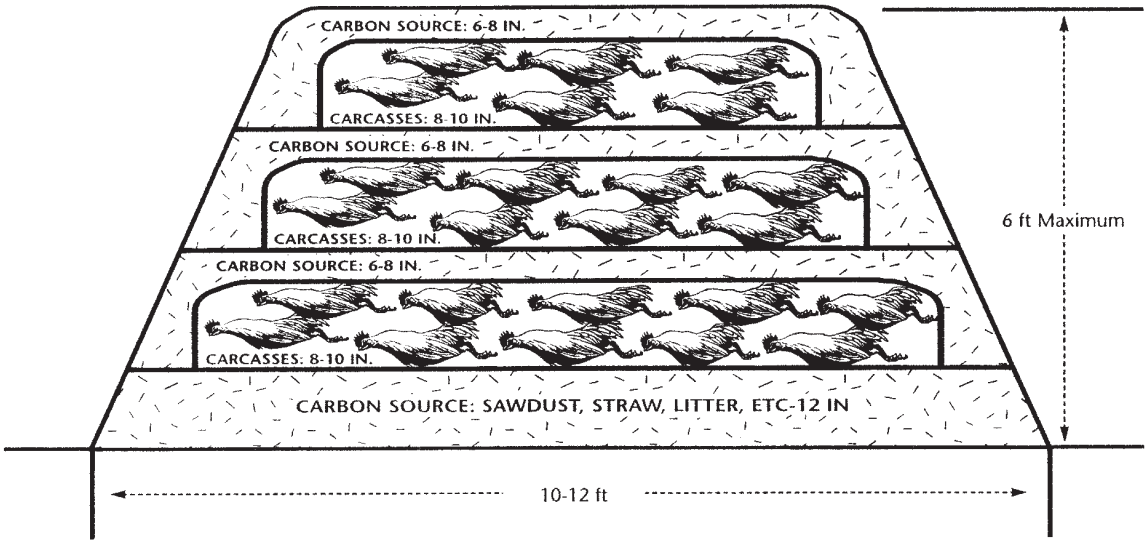


Figure 7. Cross-section of windrow

8. Cover the pile with a layer of litter, sawdust, or other bulking material 6 to 8 inches thick. Using a bucket loader, start at the bottom layer and work toward the top by tipping the bucket and moving forward to continually dump as the bucket moves up the side of the pile to make sure the sides are adequately covered. Make sure the sides of the pile are capped with a 12-inch layer of sawdust/litter mix. Make sure there are no exposed carcasses.

B. For broiler breeder houses with ⅔ slats and ⅓ litter, remove or set aside one side of the floor slats (either left or right side) and follow Items 1 to 8 under Step 3-A above.

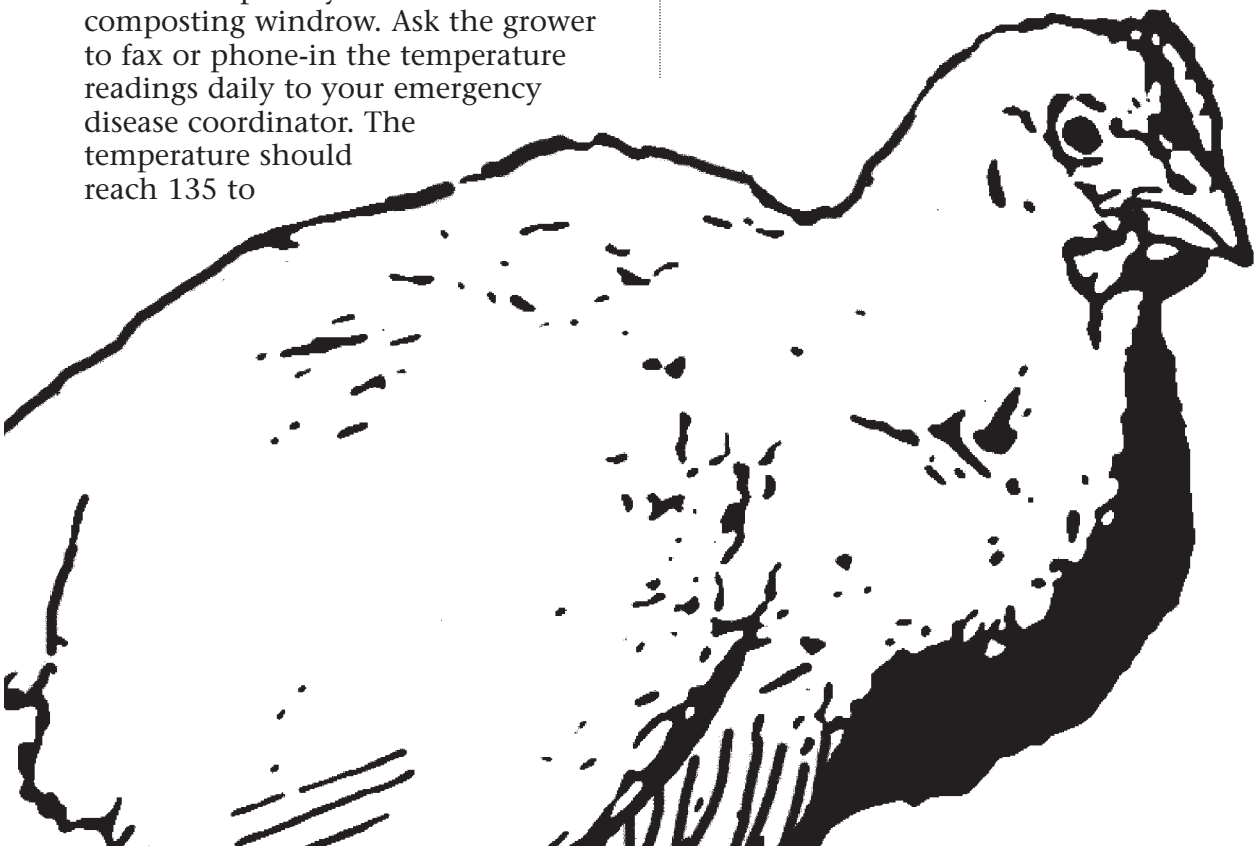
Step 4

Maintaining a Windrow

A. Use a long-stem composting thermometer to check daily temperatures in 3 to 5 sections of the windrow. The tip of the thermometer must be in contact with a poultry carcass inside the composting windrow. Ask the grower to fax or phone-in the temperature readings daily to your emergency disease coordinator. The temperature should reach 135 to 145°F within a week. If the temperature does not rise, call for assistance.

B. After 10 to 14 days, the temperature will decline. If the temperature declines before that time, be prepared to turn the windrow. As the temperature reaches 115 to 125°F, turn the windrow. Create a second windrow at a convenient distance from the existing windrow for maneuvering the skid loader. Then, on the other side of the house, create another windrow base 12 feet wide and 1 foot deep. Start on one end of the first windrow and move the contents to form a new, second windrow. Turning will aerate the material and increase the porosity of the pile. The material should be lifted and dropped, not just pushed to the new windrow.

C. If the material is excessively dry (does not leave the hand moist when squeezed), then add water while turning. If the material is excessively wet (drips more than two drops when squeezed in hand), add some dry litter or sawdust while turning.



D. Cap the new windrow with litter or other suitable material to cover any exposed carcass tissue on the surface.

E. After turning the compost windrow, the temperatures should equal or exceed those in the initial windrow.

F. After an additional 3 to 4 weeks, the compost can be stockpiled in the manure shed for storage prior to land spreading. This should pose no biosecurity risk because AI virus would have been deactivated after 10 days of composting at 140°F.

References

Carr, L.E., G.W. Malone, H.L. Brodie, D.H. Palmer, J.H. Martin, and N. Zimmermann. "Composting Catastrophic Event Poultry Mortalities." Maryland Cooperative Extension Fact Sheet 723.

Suarez, D.E. Spackman, D. Senne, L. Bulaga, and K. Froberg. "The effect of various disinfectants on detection of avian influenza virus by real time RT~PCR." In: Proc. 5th International Symposium on Avian Influenza, Athens, GA, April 14-17, 2002.

Acknowledgment

The authors would like to acknowledge Kalim Hanna of the Department of Biological Resources Engineering, University of Maryland, for his assistance in developing the figures used in this publication.

Guidelines for In-house Composting of Catastrophic Poultry Mortality

by

Nathaniel L. Tablante
Extension Poultry Veterinarian
University of Maryland
410-742-8788, x308
nt22@umail.umd.edu

Lewis E. Carr
Extension Biological Resources Engineer
University of Maryland
410-742-8788
lc5@umail.umd.edu

George W. Malone
Extension Poultry Specialist
University of Delaware
302-856-7303
malone@udel.edu

Paul H. Patterson
Extension Poultry Specialist
Penn State University
814-865-3414
php1@psu.edu

Fidelis N. Hegngi
Assistant State Veterinarian
Maryland Department of Agriculture
410-841-5810
hegngifn@mda.state.md.us

Gary Felton
Extension Biological Resources Engineer
University of Maryland
301-405-8039
gf36@umail.umd.edu

Nickolas Zimmermann
Broiler Management Specialist
University of Maryland
301-405-1366
nz6@umail.umd.edu

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, University of Maryland, College Park, and local governments. Thomas A. Fretz, Director of Maryland Cooperative Extension, University of Maryland.

P2002