

Mortality and Meat Composting

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Outline

- Introduction
- Known rate of feedstock
- Composting of mass mortality
- Composting large animals
- Meat/byproducts

Introduction

- Animals die
- Disposal is normal aspect of animal agriculture
- Composting animals
 - ◆ Cost-effective
 - ◆ Environmentally sound
 - ◆ Bio-secure
- Usable final product

Introduction

- Typical methods of disposal of poultry carcasses include:
 - Composting
 - Incineration
 - Landfill disposal
 - Rendering
 - Burial

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Rationale

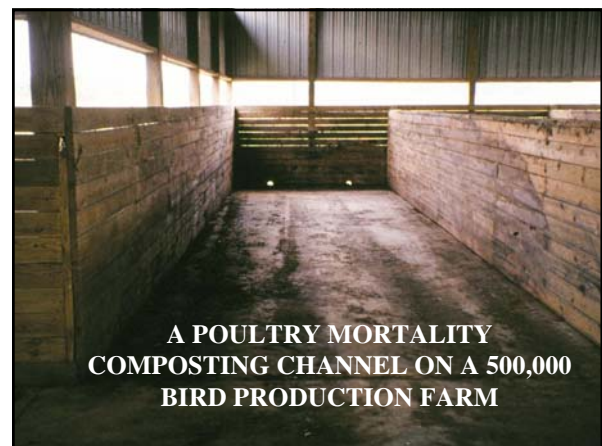
- Composting of mortalities
- Averts potential groundwater pollution from burial
- Avoids high fuel costs and potential air pollution from incineration
- Prevents potential disease spread

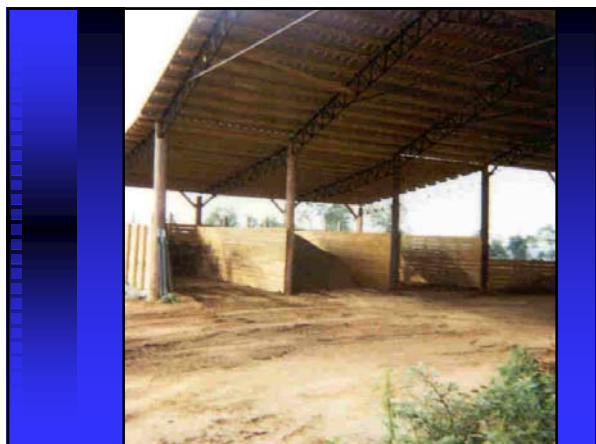
Rationale

- Composting of contaminated litter and carcasses destroys pathogens in poultry houses, thus reducing the potential for disease spread.

Types of Composters

- Mini-Composters
- Two-Stage Systems
- Channel Composters



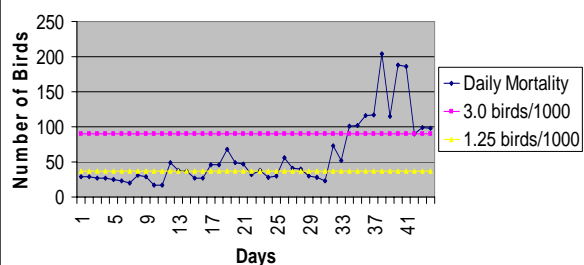


What is normal mortality?

- Approximately 0.1% per day or 1 dead bird per 1,000 birds
- Example: $30,000 \text{ birds} * 0.001 = 30 \text{ birds/day}$



Daily Mortality- AI Flock



Concrete Pad Function

- Protects against rodents, dogs
- Prevents seepage
- Identifies problems

Materials needed for composting

- Dead birds
- Bulking material (wood chips or sawdust)
- Poultry litter
- Air (oxygen)
- Water

Carcass Composting Operation

- 1.5 to 2 litter:1 birds: 1 straw + water
- C:N (20-35:1); Moisture (50%); Oxygen (>5%)
- Monitor temperature (145-160°F in 3-4 days)



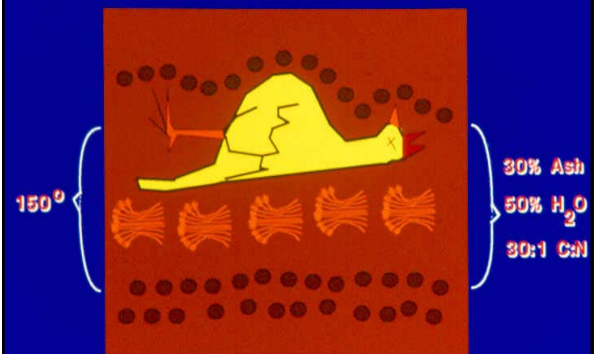
Composting Procedure

- 10-12" litter base
- Add 6" loose straw
- Layer of birds no more than 8-12" deep, none within 6" of sidewalls
- Add water till feathers are saturated?
- Cover with 6-8" litter
- Turn when temperature drops (10-14 days)
- Cover after moving to secondary bin (95% tissue degradation)

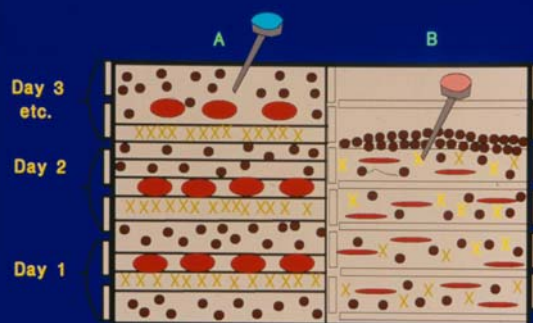
Keep Temperature Log

- Identify problems in 2-3 days
- Prove pathogen control
- Teach you about your system

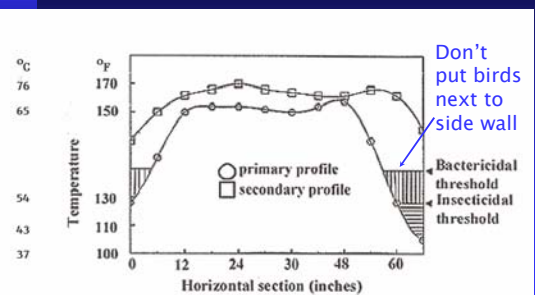
Zone of Bacterial Activity

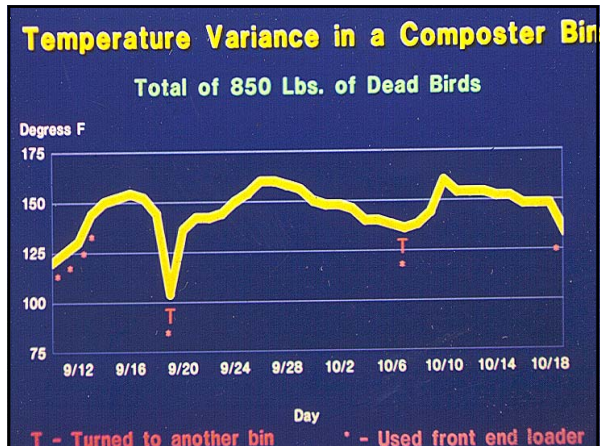


2 - Stage Composter



Temperature in Bin (side-to-side)

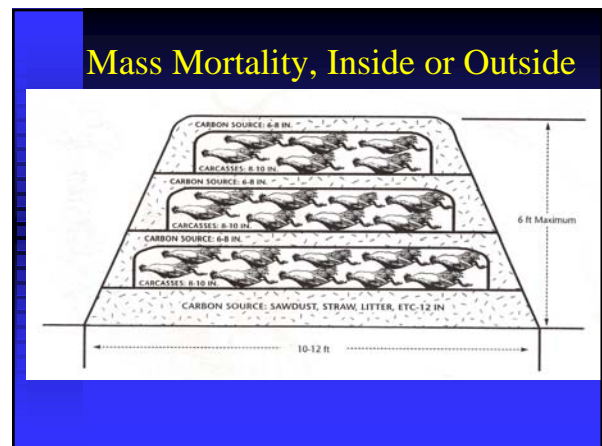




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- ### Previous Research On Composting Catastrophic Poultry Mortalities
- Previous research suggests that Avian Influenza virus can be inactivated at 140°F (60°C) in 10 minutes or 133°F (56°C) in 15 to 20 minutes (Senne et al. 1994).

- ### Previous Research On Composting Catastrophic Poultry Mortalities
- Composting of catastrophic poultry mortalities has been utilized for non-infectious conditions like heat stress.
 - Composting of large quantities of poultry carcasses has been done outside the poultry house by creating windrows instead of placing the carcasses in traditional composting bins.
 - Methodologies for large-scale windrow composting inside poultry houses have not been evaluated and adequately documented for widespread adoption.





In-house composting study: 2003

- To evaluate, demonstrate, and perfect in-house composting of catastrophic poultry mortalities
 - ◆ Used processing plant DOAs to simulate depopulation of market age birds with highly infectious disease
 - ◆ "Mix and Pile" method found to be the most effective

In-house composting

 A yellow skid steer loader is shown in a large indoor facility, likely a poultry house, with a large pile of raw poultry carcasses.

Mixing & Piling Method

Involves mixing carcasses into the existing litter base and forming windrows.

*This method involves the least time, labor and materials.

 A skid steer loader is shown mixing carcasses into the litter base.

Mixing & Piling Method

1. Remove carcasses one bucket-width wide from along the sidewall and spread them evenly in the center of the house.

If litter is inadequate and supplemental sawdust is required, this step is not necessary.

 A skid steer loader is shown spreading carcasses in the center of a poultry house.

Mixing & Piling Method

2. Starting with a 3-inch minimum litter base, use the feed line as a guide and mix the carcasses with the litter to start the formation of the windrow. Continue to roll the materials from along the sides to form a windrow 10 – 12 feet wide in the center of the house.



Mixing & Piling Method

3. Adjust the ratio of litter to carcass as needed to get a uniform mix.

Carcasses placed against each other without contact with litter will **DECOMPOSE** rather than compost!



Mixing & Piling Method

8. All carcasses must be covered with a 4 to 6 inch layer of "clean" litter or sawdust!



Turning the windrows

(14-19 days after windrow formation)



Topping off windrows with sawdust after turning





Lab results and field observations

- Although the litter moisture was not ideal for composting, windrow temperatures exceeded 130°F in most houses
- Carcass degradation at turning and upon removal of compost was excellent for broilers and good for dual-purpose birds
- All samples taken for virus isolation at turning and prior to compost removal were negative for AI



Conclusion

- In-house composting is a viable, biosecure, and practical option for the disposal of catastrophic poultry mortalities.
- The best weapon against AI or any emergency disease is still **BIOSECURITY!**

Catastrophic loss from heat

- 28,000 birds (full grown)
- Three piling techniques
 - ◆ Under roof, concrete floor
 - ◆ Under roof, shallow layer, concrete floor
 - ◆ Outside, covered, on soil
- Out-of-the-house composting





At 14 days, very little meat left



Under-roof catastrophic mortality composting requires a skilled skid loader operator



Standard pile, on soil, under cover, turned at 14 days

130-145°F



Again, very little meat left at 14 days



"Flat" pile, one layer birds, under roof, concrete floor

120-135°F



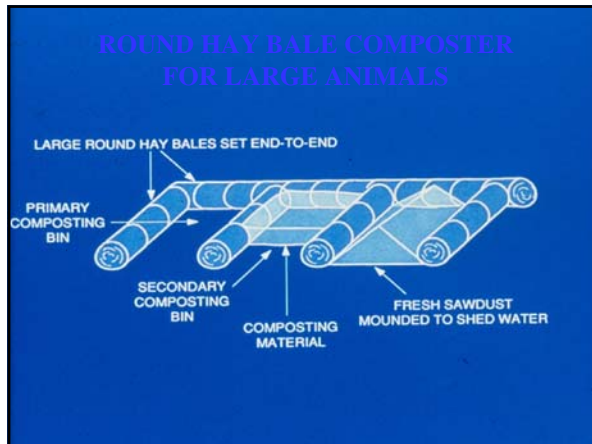
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Composter Design

- Process takes place in "bins"
- Minimum of two bins required
 - ◆ Primary composting
 - ◆ Secondary composting
- Bins can be built from round bales



Composting Swine

- Start with at least 1' sawdust under/around first carcass
- Place carcass as necessary, providing at least 1' sawdust cover on all sides



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Problems with meat byproducts and offal

- Vermin
- High moisture, reduced airflow pathways
==> anaerobic conditions (stench)
- Keep bulking agent/carbon source on hand
(large chips, not sawdust)

Problem with high water content animal byproduct (liquid)

- Large amount of “absorbing material”
- Anaerobic conditions possible
- Groundwater pollution