Understanding and Troubleshooting Mortality Composting

Benefits of Swine Mortality Composting

- Low capital & operating costs
- Simplicity & reliability... no need for special equipment or materials
- Biosecurity & environmental protection
- Easy to construct or expand in emergencies

4 Keys to Successful Composting

- Absorptive base layer
  - controls leachate
- Moist bio-filter zone...
  - adsorbs & degrades odorous byproducts
- Thick layer of "insulating materials" surrounding carcasses...
  - sustains high temperature...
  - kills pathogens...
  - speeds decay
- Permeable cover material...
  - lets oxygen IN, excess water vapor OUT
- Moist bio-filter zone ...
  - adsorbs & degrades odorous byproducts

Troubleshooting Mortality Composting Problems

- Most Common Problems
  - Leachate production
  - Poor odor retention
  - Slow carcass decay

Troubleshooting - Leachate

- Cause #1: Excessive precipitation exposure during wet seasons
  - Solution: Reduce exposure
  - Roofed bin system; or
  - Install tarp over piles

- Cause #2: Inadequate liquid absorption capacity
  - Solution: Use thicker envelope of absorptive material under, between, & over carcasses

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Troubleshooting - Leachate

- Cause #3: Overloading ... too many carcasses in one spot
  - Remember ... every 1000 lbs of carcasses contains 650 lbs WATER!
  - Solution:
    - Carcasses should not touch each other (no room for absorptive material)
    - Avoid stacking of large carcasses (> 400 lbs)

Troubleshooting - Leachate

- Cause #4: Use of envelope material that is too wet
  - Solution:
    - Use "squeeze" test to check moisture
    - Material should feel moist ... but yield only a few drops of water when squeezed (not saturated)
    - Store envelope material in dry location to avoid excessive moisture

Troubleshooting – Poor Odor Retention

- Cause #1: Envelope material placed over carcasses too thin ... or too coarse
  - Solution:
    - Use at least 12 inches of envelope material over carcasses
    - Avoid use of extremely coarse envelope materials
      - Must grind coarse materials such as cornstalks or straw (use 2-inch screen)

Troubleshooting – Poor Odor Retention

- Cause #2: Compost turned prematurely
  - Solution:
    - Don't turn compost too soon
    - "Too soon" varies with carcass size & seasonal temperatures
      - A few days for small pigs during warm weather
      - 8-12 weeks for large pigs during cold weather
    - Experience the best teacher
    - Stockpile extra envelope material ... be prepared to cap pile with more material if needed to suppress odor emissions

Troubleshooting – Poor Odor Retention

- Cause #3: Compost too wet
  - Prevents oxygen penetration ... pile goes anaerobic ... produces excessive odor
  - Often accompanied by leachate release
  - Solutions: Same as for leachate ... easier to prevent than to fix after odor starts
    - Reduce exposure to excessive rainfall
    - Avoid overloading pile
    - Mix wet compost with drier cover materials
      - CAUTION ... likely to increase odor releases during mixing ... re-cap with thick layer of material to retain odor

Troubleshooting – Slow Decay

- Cause #1: Inadequate O₂ penetration caused by fine textured cover material
  - Solution: Use coarser cover material
    - Particles with 1/8th inch minimum dimension ...
      - Obvious pore spaces between particles (below right)
    - Avoid "soil-like" materials comprised of small particles with tiny pore spaces (below left)
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Troubleshooting – Slow Decay

• Cause # 2: Inadequate O₂
  • Caused by excessive moisture
  • Often accompanied by leachate
  • Solution: Again … similar to those for leachate
    • Reduce exposure to excessive rainfall
    • Avoid overloading pile with too many carcasses and too little absorptive material
    • Mix wet compost with coarser and drier cover materials
    • Time consuming, may not work if compost is too sticky to mix

• Causes # 3: Inadequate moisture
  • Typically occurs only during very dry weather
  • Solution:
    • Add water sparingly and turn (to mix)
    • May need to repeat several times
    • Proceed slowly … very easy to over wet small sections resulting in odor and leachate

• Causes # 4: Low temperature caused by inadequate heat production or retention
  • Solution:
    • IF material near carcasses is moist … increase thickness of envelope material to improve heat retention
    • If material near carcasses is dry … add moisture to improve microbial activity & heat production
    • Note: do not put frozen carcasses into a composting system … takes extremely long time for carcasses to thaw and produce heat

For More Information

• Composting Swine Mortalities in Iowa (ISU Extension Publication Pm-1917)
• ISU swine mortality composting web site
  • www.abe.iastate.edu/pigsgone/