Not For the birds: Basics of Small Ruminant Carcass Composting

Carol Delaney
Mark F. Hedrich
Maine Department of Agriculture Conservation and Forestry
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Nutrient Management and Composting: Maine

Figure 6-1. Whale bone remains following composting
Nutrient Management and Composting: Maine

1. Ways of handling livestock carcasses
2. The biological process of composting
3. Maine law, reportable diseases
4. Elements of a Carcass Disposal Plan
5. Creating a compost pile that works
Nutrient Management and Composting: Maine

Ways of handling livestock carcasses

Pros and Cons of:

1. Burying
2. Incineration
3. Rendering Services
4. Composting
Maine Carcass Management Options:

Bury

Figure 1. Critères d’enfouissement d’une carcasse ovine

©Christophe Cyr-Arsenault
Maine Carcass Management Options:

Incineration

Figure 1. Incinerator for managing poultry carcasses. (NDSU photo)
Maine Carcass Management Options:

Rendering
Maine Carcass Management and Composting:

The process of composting:

NEED: PLANT / MANURE / CARCASS + WATER + AIR (O2)  >>

GET: HEAT + CO2 + WATER + STABLE ORGANIC MATERIAL

The Theory and Operation of Composting, Dr. John Paul, PhD, June 2009
Mortality Management

PLAN AHEAD for CARCASSES!

<table>
<thead>
<tr>
<th>Animals</th>
<th>Annual Mortality rate (%)</th>
<th># on Farm</th>
<th># of Mortalities</th>
<th>Liveweight (lbs.)</th>
<th>Mortality weight (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ewes/Does</td>
<td>2</td>
<td>50</td>
<td>1</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Birth</td>
<td>4</td>
<td>76</td>
<td>3</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>Lambs/Kids</td>
<td>3</td>
<td>73</td>
<td>2</td>
<td>65</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total pounds per year</td>
<td>304</td>
</tr>
</tbody>
</table>

General rule for feedstock needed:
50 – 75 sq. ft/ 1000 lbs. carcass
= 6 ft by 8 ft for goats or sheep
Maine Carcass Management and Composting

- Planning is important because...
- It is unlawful to dispose of domestic animal carcasses and offal except in accordance with the State of Maine Chapter 211 “Rules for the Disposal of Animal Carcasses”

In accordance with these Rules...
Exemptions

- Allowed to compost or bury one large (500 lb. or more) or two medium-size (100 - 499 lb.) animals annually without getting a professional site assessment.

- However, set backs from sensitive features apply.
Carcass Disposal with Disease

- If a contagious disease is suspected, biosecurity measures and quarantine of the farm should be implemented immediately.
- The Department must be contacted for assistance 207-287-3701.
- The Department state veterinarian, Dr. Michele Walsh, will authorize implementation of the carcass disposal plan.

Purpose and Elements of a Carcass Disposal Plan

Map with Hand Written Legend

HealthyFarmsHealthyAgriculture
Elements of a Carcass Disposal Plan

Site Selection
# Creating a Compost Pile that Works

## Composting Materials

<table>
<thead>
<tr>
<th>Materials</th>
<th>C:N</th>
<th>Moisture, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn stalks</td>
<td>60-73:1</td>
<td>12</td>
</tr>
<tr>
<td>Corn silage</td>
<td>38-43:1</td>
<td>65-68</td>
</tr>
<tr>
<td>Hay</td>
<td>15-32:1</td>
<td>8-10</td>
</tr>
<tr>
<td>Cow manure solids</td>
<td>11-30:1</td>
<td>67-87</td>
</tr>
<tr>
<td>Horse manure solids</td>
<td>22-50:1</td>
<td>59-79</td>
</tr>
<tr>
<td>Straw</td>
<td>48-150:1</td>
<td>4-27</td>
</tr>
<tr>
<td>Sawdust</td>
<td>200-750:1</td>
<td>19-65</td>
</tr>
<tr>
<td>Wood chips</td>
<td>451-819:1</td>
<td>--</td>
</tr>
<tr>
<td>Leaves</td>
<td>40-80:1</td>
<td>--</td>
</tr>
</tbody>
</table>

*On-Farm Composting Handbook, 1992, R. Rynk*
Creating a Compost Pile that Works

For proper composting, the bulking agent Must Provide: **Adequate Carbon: Nitrogen ratio**

<table>
<thead>
<tr>
<th>Carbon Nitrogen Ratio</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Swine Carcass</td>
<td>5:1</td>
</tr>
<tr>
<td>Recycled Secondary</td>
<td>30-50:1</td>
</tr>
<tr>
<td>Sawdust</td>
<td>140:1</td>
</tr>
</tbody>
</table>

**Target** 30:1

- **Too LOW C/N**
  - NH$_3$
  - Other odors

- **Too HIGH C/N**
  - Low decomposition rate
  - Low temperature
Creating a Compost Pile that Works

For proper composting, the bulking agent Must Provide: Proper pile structure
Creating a Compost Pile that Works

For proper composting, the bulking agent Must Provide: Adequate moisture

NEED TO MAINTAIN MOISTURE BETWEEN 50 – 65%

✓ MOISTURE FOR MICROBES
✓ SUFFICIENT AIR FOR MICROBES

CAN DETERMINE BY SQUEEZE TEST
Creating a Compost Pile that Works

For proper composting, the bulking agent Must Provide: Adequate moisture

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Moisture Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swine Carcass</td>
<td>65%</td>
</tr>
<tr>
<td>Recycled Secondary</td>
<td>40-50%</td>
</tr>
<tr>
<td>Sawdust</td>
<td>20-50%</td>
</tr>
</tbody>
</table>

Target 55%

- Too LOW Moisture
  - Low decomposition
  - Low temperature

- Too HIGH Moisture
  - Putrid odors
  - Flies
Creating a Compost Pile that Works

For proper composting, the bulking agent Must Provide: Air infiltration into the pile
Creating a Compost Pile that Works

Pile construction

Cap or Cover:
- insulates and isolates,
- sheds precipitation
- adsorbs gases and odors,
- deters pests

Core Media:
- adsorbs gases and odors,
- separates carcasses and isolates intermediate layers,
- provides C, energy, mass and volume,
- absorbs liquids.

Base: adsorbs liquids, allows air to enter.

Figure 6-5. The functions of amendments in mortality composting

Cornell Waste Management Institute
Creating a Compost Pile that Works

Pile construction

Illustration by Josh Payne, Livestock Mortality Composting Protocol, USDA 2017
Pile Construction

Add used bedding material

Pile Construction

Wood chips
Cornell Waste Management Institute

Straw
Animal Carcass Disposal Options NM1422
PILE CONSTRUCTION – Covering with corn silage/bedding mix
PILE CONSTRUCTION – Venting a large carcass
Checking the Progress

36 inch Compost Thermometer
DECOMPOSITION - Cattle at 12 weeks
DECOMPOSITION TIMES - Chickens after 3 weeks 3 days
DECOMPOSITION – Goat at 4 weeks

Proceedings of the Mortality Composting Conference, April 25, 2014, Goat Field Day, Langston University, OK
Here is what is left of a 225 pound ram after six weeks. There was about 8 pounds of recognizable bones and wool. Surprisingly, there was no odor.
BEST MANAGEMENT PRACTICES
FOR
ANIMAL CARCASS COMPOSTING

Bill Seekins
October, 2011

Maine Department of Agriculture, Conservation & Forestry
1. Composting is recommended to handle livestock mortalities.

2. Composting requires appropriate plant feedstock, O2 and water in certain proportions

3. Be aware of Maine Law and Reportable Diseases

4. Composting Plan includes selection of a good location and materials to work with

5. Materials and pile building technique promote decomposition and a stable end product
Contacts

Carol Delaney, Livestock Specialist
Carol.Delaney@maine.gov.
207-215-4968

Mark F. Hedrich
Nutrient Management Program Manager
Mark.hedrich@maine.gov.
207-785-4018

https://www.maine.gov/dacf/ahw/animal_health/
Questions and Answers