

# In-vessel composting of animal tissue

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In-vessel Model 0824 (8' long, 36" diameter, 24 yd<sup>3</sup> capacity) has been used. The vessel consists of an insulated drum which is mounted on rotor casters. The drum is rotated by a chain drive approximately one complete rotation per 20 minutes. Materials are loaded and exit through ports at the ends of the drum. The drum is mounted at an incline to a steel frame resulting in the movement of the compost material from one end to the other as it rotates.



From May 25 to July 13, 2006, we composted one batch of 589 lb. ground by-product and 569 lb. of amendment (103 lb. dry bagged shavings at about 10% moisture and 466 lb. dairy gestation bedding).



Temperatures of 130 to 150 degrees F were recorded each week. They decreased to 80 to 90 degrees F each week as well. The cessation of composting activity was a result of the compost becoming too dry (as little as 10% H<sub>2</sub>O); due to evaporative moisture loss. To restart compost activity, 35 to 85 gallons of water were added at a rate of 1 gallon per 33 seconds or less to avoid leachate release from the IV unit.



Finished compost was not fully cured (Solvita of 3, still very active). Other characteristics:

|               |       |
|---------------|-------|
| Carbon, %     | 47.1  |
| Nitrogen, %   | 2.3   |
| Calcium, %    | 2.9   |
| Phosphorus, % | 1.4   |
| Sulfur, %     | 0.16  |
| Iron, ppm     | 12548 |
| Aluminum, ppm | 125   |



From May 13 to August 21, 2007, we composted swine mortality from the MSU Swine Farm on a continuous flow basis. Over that time 576 lb. of mortality (carcass sizes 8 to 146 lb.), 440 lb. of dry bagged shavings (10% moisture), 7 lb. urea N, and 146 lb. fresh hog manure solids were added overtime,



Carcasses decomposed quickly, becoming darker in color in just 3 days. Soft tissue was not recognizable in about 10 to 14 days.

We struggled to maintain activity and did not obtain desired 130 to 150 degree F temperatures on a weekly basis. Estimated C:N ratio was about 15 and may have been too low.



Because of the decreased activity, we observed less volume reduction over time. We decided to empty the IV unit after 12 yd<sup>3</sup> of compost material was accumulated in the IV unit and desired temperatures could not be achieved.

It was more difficult to operate the IV unit and achieve consistent active decomposition on a continuous flow basis



Screens were fabricated for the 3 exit doors using 1 inch chicken wire fencing. When the IV unit was emptied, the screen effectively prevented larger bones from being removed.