



## Demonstration of swine carcass composting as part of an environmentally friendly production system

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**Abstract:** *Carcass composting is not a new technology, but it has excellent potential to be part of a swine production system that uses solid bedding.*

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**Budget:**  
\$23,800 for year one  
\$11,700 for year two

### Background

Swine mortalities occur on a daily basis in every production system. Average death losses of 9,000 lb/year per 100 sows pose a significant management and disposal task for Iowa swine producers.

Methods of carcass disposal used in the past included rendering but a dwindling number of rendering companies now charge to pick up carcasses, and farmers have concerns about biosecurity for their farms when rendering vehicles drive on their land. Burial is time consuming, impractical during the winter, and poses a threat to groundwater. Landfills generally are reluctant to take dead animals. Incineration, while effective, is costly at three to five cents per pound of carcass, and may lead to odor complaints by neighbors.

Carcass composting has been found to offer an environmentally safe, inexpensive, year-round alternative in the poultry industry. Composting also does not generate odors when properly managed, and eliminates the need for off-farm rendering vehicles that transport infectious pathogens along with mortalities. Liquid swine manure is not an acceptable catalyst for the composting process, but with the rise in hooped hog houses and deep-bedded swine systems, there is a supply of used bedding materials and manure suitable for co-composting.

Project objectives were to:

1. Construct and operate a swine carcass

composting facility at the ISU Bilsland Farm, near Madrid, to illustrate the operation of a composter for a farrow-to-finish farm that uses traditional liquid manure systems;

2. Construct and operate a swine carcass composting facility for breed-to-wean, swine farm mortality at ISU's Lauren Christian Swine Farm near Atlantic, working in concert with swine deep-bedding projects;
3. Examine various co-composting materials, such as wood chips, straw, and soybean residue that could be used in situations when deep bedding was not available;
4. Develop displays for producer education about carcass composting;
5. Participate in future field days at the farms to showcase the success of this technology; and
6. Evaluate the impacts of the demonstration.

### Approach and methods

Objective 1) A composter was constructed at the ISU Bilsland Farm, in fall 1999. The farrow-to-finish farm has approximately 300 sows and an average of 78 lbs of mortalities per day. Annual rendering fees were \$2,500 and increasing. The composter was constructed as a 24 x 40-foot post frame structure with a steel roof and end walls. The floor, working pad, and partition walls were concrete. Co-composting materials were wood shavings, sawdust, and ground corn stalks.

**Question:** *What should swine producers do about carcass disposal? Rendering is sometimes not readily available or is more expensive than is comfortable for some producers. Burial or incineration may not be environmentally friendly in some situations.*

**Answer:** *Composting of carcasses is a good alternative and fits well with many production systems, but some producers are skeptical of trying it, especially with large animals. This project showed that composting would work in a variety of situations with different swine production systems.*

Objective 2) A composter was constructed at the Lauren Christian Farm in spring 2000. This farm has 450 sows in a breed-to-wean operation, plus half of the pigs are taken through nurseries located on the site. Mortality rates are nearly 50 lb/day. (A higher mortality rate is associated with farrow-to-finish operations.) The bin composter was constructed using a simple shed-roof design with six bins in one row. Bin walls were wooden. Spent corn stalk bedding was used as co-compost.

Objective 3) The two sites used various substances for co-composting including wood shavings, sawdust, old pallets that were hammer-milled, corn stalks, and chopped corn stalks.

Objective 4) Rather than relying on a conventional display, a “virtual tour” was created on the project web site at <http://www.abe.iastate.edu/pigsgone>. The swine mortality management web site earned a Blue Ribbon Award from the American Society of Agricultural Engineers.

Objective 5) Information was made available during tour stops at regular field days at the Lauren Christian Farm. Other field days included a veterinary conference workshop that brought vet students to ISU from all over the country, and sessions for various producer groups.

Objective 6) A swine mortality survey was developed in cooperation with the environmental committee of the Iowa Pork Producers Association and mailed to 2,400 Iowa producers.

## Results and discussion

The composters that were constructed represented two different levels of investment. The composter at the Bilsland Farm used off-farm labor for most of the commercial-grade con-

struction and was made of concrete. The cost per bin was \$2,058 or approximately \$17 per square foot. The composter at the Lauren Christian Farm used on-farm labor for a lower-cost structure and had a concrete floor and apron only. The cost per bin was \$1,146, or roughly \$11.50 per square foot. Both types of composters worked reasonably well. The Bilsland composter is likely to be more durable because of the concrete walls, according to the farm manager who was concerned about possible damage from the skid steer bucket. The roof and all-weather surface are the most important components of a composter.

**Loading compost (top)**

**Turning bin (bottom)**



Several materials were used as co-compost substances. Lacking an objective way of rating co-compost performance, the farm managers were asked for their opinions. They indicated that wood shavings worked very well, but were somewhat expensive (\$500 per semi-truck load) and weren't always readily available. Sawdust tended to blow off the pile at times, exposing carcasses, and encouraging fly and scavenger problems.

Old pallet particles tended to be too large and dry to work effectively. Corn stalks and chopped corn stalks worked well, but sometimes were too dry. One of the farm managers reported using water, snow, and liquid manure to help the composting process, but noted that adding too much moisture caused problems. Crop residue likely will be the preferred co-compost in Iowa.

***Compost supply  
and fill***

This project and the Iowa Pork Producers Association jointly funded a survey on swine mortality management, and 300 swine producers responded to it. Nearly 12 percent of those Iowa swine producers are now using composting as their sole method of mortality management/disposal. Composting was identified as the most satisfactory method of disposal. Many of those who answered the survey requested additional information on composting practices and effectiveness.

**Conclusions**

Composting of swine carcasses was shown to work well with two different types of swine production farms, two different types of facili-



ties, and with several co-composting materials. It is important that swine producers see a working facility demonstration before they try this technology. Currently, an estimated 12 percent of Iowa swine producers use composting. Due to rising costs of rendering services and increased concerns about biosecurity, use of composting is likely to grow.

### **Impact of results**

The results of this project will help to further the acceptance of swine carcass composting. Often when composting is mentioned, people without firsthand knowledge are skeptical about its effectiveness. The demonstration sites allow people to see, smell, and become familiar with an actual operating facility for composting. The demonstration also allowed the researchers to gather information about management techniques, amount of co-compost used, and the number of carcasses that can be placed in one bin.

Acceptance of carcass composting is increasing. The demonstration has shown that it is possible to compost large sows.

Rendering cost and availability also concern the cattle industry. Some cattle producers improperly dispose of carcasses and that fosters growth of scavenger populations. It would be valuable to conduct a project on the possibilities for cattle composting.

### **Education and outreach**

Efforts included field days, magazine articles, involvement in an Iowa Communications Network (ICN) conference, and development of a web site. Mentions of the project and web site appeared in PORK magazine and in the Iowa Pork Producer magazine. The composting demonstration was part of several farm field days at the Lauren Christian Farm near Atlantic. Informal tours were conducted for visitors from six other states and several foreign countries.

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