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IN-BARN COMPOSTING SYSTEM PLUS A WARM BED FOR PIGS

ANOTHER example of "in-barn" low rate composting — similar in some respects to the poultry litter system in Ohio has emerged in the last five years, with thousands of new structures built with plastic-covered "hoops" for a roof and bedding on the floor. Hoop structures are becoming commonplace in the Midwest and western Canada. This idea is attractive in part because of the low capital cost, but also because of perceived advantages with respect to odors, water quality, animal welfare and worker comfort.

Plastic-covered hoop structures allow animals to "bed and dung" on cornstalks, straw and other materials.

A central feature of the hoop system is that the animals bed and dung on a deep bedded-pack of cornstalks, straw, or other materials. Hoops are most commonly used for "finishing" pigs from 50 lbs (out of the nursery) to 250 lbs (market weight). Bedding requirements are on average about 200 lbs of bedding per market pig, with higher requirements in winter and less in summer. Hoops can also be used for the gestation and farrowing parts of the pig production cycle, with a drier (more bedding, less manure) mixture typical for those phases.

Management of the bedded-pack is fairly simple. Each group of animals starts out on about an eight inch layer of bedding, and additional bedding is added as needed to soak up manure and give the pigs a dry area to rest. Often a farmer will simply stack one or two big round bales in wet areas of the building, and let the pigs do the spreading themselves. In the 4 to 5 months it takes to raise a group of pigs to market weight, the bedded-pack builds up to a three to four foot depth. The bedded-pack is normally cleaned out after each group of pigs is sold — two to three times a year.

One difference with the poultry system described in August *BioCycle* is that the hoop bedded pack is probably less uniform than poultry litter, since – contrary to popular belief – pigs are more fastidious than poultry. Each group of pigs quickly selects a dunging area, which tends to be a bit too compacted and wet for aerobic composting, and a drier resting area. Aerobic decomposition in the resting area of the bedded-pack generates heat and raises the effective temperature in the unheated building, improving animal comfort considerably under winter conditions. Fortunately, temperatures in the bedded pack are not as great in summer when they might contribute to overheating.

At cleanout time the manure/bedding mixture is either directly spread on fields or stored for later use. Because this is a solid manure handling system, storage requirements are minimal, although there is some concern about nitrogen leaching from manure piles, especially during high rainfall periods. In many cases, manure will need to be stored for several weeks or months before cropland is available for manure application, and in these cases a more conventional windrow composting stage is often of interest.

Although the bedded-pack coming out of the hoops was partially composted "In-Barn", it is by no means finished compost. Some of the manure is only a few days old, and much of the material was either too wet or too dry for optimal composting. Nonetheless, the average characteristics of the manure/bedding mixture are ideal for composting, with a moisture content about 55 to 65 percent and a C/N ratio of 18:1 to 25:1. Composting will occur with minimal management if the material is piled in windrows about 1.5 to two yards high and three to four yards wide.

Farmers are very interested in the volume and weight reductions during composting, which promise to significantly reduce the number of trips to the field. In our on-farm trials, we have seen weight and volume reductions of 20 percent to 60 percent within just six weeks of composting, with higher reductions a function of more frequent turning. Unfortunately, in some of our trials nitrogen losses during composting can be of similar magnitude.

Several additional studies on the trade-offs between using fresh hoop manure versus compost are also underway at Iowa State University. By examining the effects of composting on manure nutrients, mass and volume relationships, economics, crop yield, and soil quality impacts, we hope to fine-tune this emerging solid manure handling system to make it more profitable for farmers, as well as more environmentally sound.

— Tom L. Richard, Iowa State University; Sonia M. Tiquia, Ohio State University.

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product coming out of the barns is not stable compost and it is not being marketed that way. However, it is not fresh manure either." Harry Hoitink, a professor of plant pathology at Ohio State University, is very familiar with the litter management process used at this Ohio chicken farm. "The key point of the article is that it is a better management practice than putting new sawdust in the barn each time," says Hoitink. "It is not by any means a mature compost. If you wanted to have a compost or pellet, the material would have to be treated for about another six weeks. *BioCycle* readers may have been misled to think that the material after five to seven cycles is a stabilized compost but instead, it is applied to the farm's cropland as a product right out of the barn."

In summary, Dr. Brodie makes an important point — poultry litter should not be considered finished compost just because the litter goes through several cycles and experiences some decomposition. Nevertheless, advanced decomposition does take place and the end product suits the end uses. If mature compost is ever required, the litter will have gotten a good start in the barn. Furthermore, the mulitple cycle litter management system is serving the Ohio poultry operation well in regard to bird health and production costs. —N.G. ■