FACT SHEET

CARCASS COMPOSTING FOR MORTALITY MANAGEMENT

Many pig producers are adopting composting for the disposal of pig mortalities because of concerns about groundwater pollution and odour from burial and economic and environmental issues concerned with proper incineration mean that. Correctly managed composting effectively breaks down carcasses, with minimal environmental impacts, producing a safe and nutrient rich humus-like material that can be spread on land as a fertiliser and soil conditioner. When carried out correctly, composting produces little odour and effectively kills most pathogens.

Most operators compost mortalities with sawdust, straw or spent bedding for a period of 3-12 months. The compost may then be screened to remove larger bones before land spreading or reuse for composting new carcasses.

Composting can be carried out in an intensively managed way (which will rapidly break down the carcasses) or with low management input which is a slower process. Low input management can still effectively decompose the carcasses if there is adequate time for the process to occur (usually 12-18 months).

Photograph 1. Carcass composting with sawdust in bays

Setting up

Carcass composting requires a level, compacted, low permeability pad with controlled drainage to prevent runoff and leachate releases to the environment. Composting can be undertaken within open windows or bays, which are typically 1.5-2.5 m high. Bays can be formed using large round or square hay bales for the walls or silage type bunkers. As a rough guide, 6 m3 of sawdust is recommended per 1000 kg of carcasses, or about 0.25 m3 per sow per year for a farrow-finish unit. Around 4 m3 of windrow volume per 1000 kg of carcasses per year needs to be provided (i.e. 2 m2 of floor space area for bays 2 m high, or 0.5 m of windrow length if windrows have a base width of 4 m and a height of 2 m).

The Composting Process

Carcass composting requires adequate:

- Carbon – bulking agent
- Nitrogen - carcasses
- Oxygen
- Moisture levels
- Management.

Carbon and Nitrogen

The composting process requires high carbon content agricultural and forestry wastes, such as straw, rice hulls and woodchips. For deep litter piggeries, the spent bedding can provide an effective carbon source. The addition of these materials is essential to provide the microorganisms involved in the composting process with a food source for energy and growth. They also provide a covering to minimise odour emissions and protect from vermin infestation.

Pig carcasses contain enough nitrogen to supply the composting process. However, the material around the carcass readily composts while the material at the edges of the pile or windrow does not. Hence, the finished compost may contain some material that is composted and some that is not. This problem can be overcome with turning.

There is sometimes sufficient carbon remaining in the compost for it to be useful as a carbon source when the next batch of composting commences. Blending of the compost with fresh bulking material (50:50 mix) is recommended to ensure there is enough carbon to compost additional carcasses.

Oxygen

The bacteria behind the composting process are aerobic and will die or become dormant if there is insufficient oxygen available in the pile. If this occurs, they will be replaced with anaerobic bacteria, which produce odorous compounds. To maintain adequate oxygen in the compost pile it is necessary to provide adequate porosity, maintain a suitable moisture content and possibly to turn the compost.

Porosity is determined mainly by the type of carbon source. Straw and wood chips provide a higher porosity than sawdust. A combination of 1 part straw/woodchip to 2 parts sawdust improve the porosity and helps the composting process.

To ensure a good supply of oxygen in the pile, it is important to keep the moisture below 60%. A pile that is too wet will often become odorous. However, excessive moisture is not likely to be a problem provided piles effectively shed rainfall.

Moisture

Water is essential in the compost mix. In low management input systems, the water in the decaying carcasses supplies adequate moisture for composting. Wetting the carcasses as they are added to the pile (using rates of about 1 part water to 3 parts carcasses by volume) may speed up the composting process by helping to generate more microbial activity and heat. However, adding too much water will restrict air movement and produce odours.

Management

The compost pile needs to be constructed with at least 300 mm of fresh bulking material all around the carcasses. This ensures that no leaching occurs from underneath the carcasses, and that no part of the carcass will be exposed to the environment, which may attract flies and scavenger animals. Once the pile is set up correctly (see procedure section) and carcasses have been added, the process can be monitored by checking the temperature of the pile.

The first sign that the composting process is working is the generation of heat within the pile. The centre of the pile should reach 50-65°C within the first week. These temperatures stimulate the growth of the thermophilic bacteria, which promote break-down and destroy pathogens. This improves on-farm biosecurity and creates a product that is safe for land application. Nevertheless, land spread with carcass compost should not be allowed stock access for 3 weeks after spreading to minimise the risk of pathogens and protect Australia's BSE-free status.

Maintaining 300 mm of bulking material around the pile helps to maintain the temperature around the carcasses. Core temperature can be measured by inserting a 1 m temperature probe into the pile near the carcasses. Provided temperature rises to above 55°C for 3 or more days consecutively and all the material is exposed to these temperatures, the pathogens in the pile should be killed or inactivated.

In Australia most carcass composting systems use low input management with no turning. However, turning the pile about three months after the last carcasses were added will accelerate the process by improving air flow and promoting mixing. Adding water (if required) when the pile is turned also speeds up the composting process. It is important to cover the pile with fresh or recycled bulking material after turning to maintain high internal temperatures. This will also reduce the likelihood of odour generation and pest attraction. The biggest advantage to turning carcass compost piles is the reduction in turnover time, which also reduces the required space for the carcass composting area.

Procedure

To begin the composting process, a layer of clean, high carbon material (sawdust, shavings etc) 300 mm deep should be laid to act as an absorbent base layer (Figure 1 – 1). One or two layers of pigs can be deposited over this layer, provided there is adequate bulking material between the layers (150-200 mm is suggested). At least 300 mm of bulking material should be spread over the top and sides of the pile to prevent odour generation and scavenger attraction (see Figure 1 – 2).

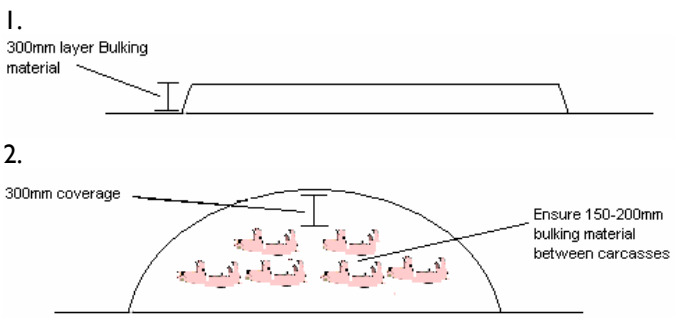

Figure 1. Carcass compost pile construction – base layer (1) and pile with mortalities (2)

Piles should then be left for 3 months before turning, or 12 months if the piles are not going to be turned. The composted material can then be reused for composting in a 50:50 mix with fresh bulking material, or spread on land.

Final Composition

The nutrient value will vary depending on the bulking agent used, the period of composting, turning frequency and whether the material has been recycled for several batches. Typical nutrient analysis is 1.5% N, 0.5% P and 0.3% K when sawdust is used as a bulking agent.

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Fact Sheet

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