

Treatment, Storage and Use of Swine Waste Solids

Using swine waste solids can save plant and food growers money by providing a source of nutrients to fertilize crops. Wastes can be dried or composted and sold to neighbors and other farmers. Be aware, however, that manure and manure-based compost should be used with caution because manure can carry diseases. Care must also be used because over-applying nutrients from swine wastes and other fertilizers to croplands can lead to pollution and groundwater contamination. See ADAP fact sheet 2003-2 on *Collection and Separation of Solid and Liquid Swine Wastes* for ideas on waste solid collection methods.

Drying waste solids

Swine waste solids that have been dried lack the liquids that would normally make the manure heavier and more difficult to store and handle. Waste solids should be dried by spreading on a flat surface, such as concrete, plastic, or steel roofing. If possible, locate the drying facility near the farm's solid separation system.



Waste solids drying under PVC frame cover on Guam



Dried swine waste solids applied to banana trees

When drying waste solids, consider the following best practices:

- Provide cover for drying and storage areas to keep rain out. A simple structure, such as a PVC pipe frame and plastic roof, can be used.
- Direct any runoff away from the drying facility through a gutter to the liquid collection area.
- Keep direct rainwater away from the drying or storage facility.
- Allow wind to pass through the drying facility.
- Spread solids into thin layers to quicken the drying process.
- To speed the drying process, turn over the solids when the surface layer has dried.
- Dry solids to the point where they can be piled into a stable heap without blowing away in the wind.

Storage and land application

Piles, bags, or covered drums can be used to store the waste solids until ready to use. Once dried, the waste solids can easily be moved, piled, or applied with a spade.

Swine waste solids can be applied to the land to improve soil structure and productivity. If possible, a soil test should be done every 1 to 3 years to check nutrient levels and adjust the amount of manure used. If testing is not available, use the waste solids sparingly, rotate application areas, and monitor plant response. Over-application can “burn” plants.

- Untreated solid wastes can be applied safely around the base of trees (e.g. bananas, breadfruit, etc.) or around other crops (e.g. sweet potatoes which will be cooked), but avoid direct contact with food plants (e.g. lettuce, cucumbers) that could be consumed raw.
- Mix waste solids thoroughly into the soil and wait a minimum of 60 days before planting crops that are eaten raw.

Never apply fresh swine wastes to crops, such as leafy vegetables, that are eaten raw.



Dried swine waste solids applied to fields

Compost swine waste solids

While dried waste solids are often placed directly onto fields for use as fertilizer, composting waste solids before land application is a better practice to reduce environmental risk. The composting process produces heat, which drives off moisture and destroys disease organisms, plant diseases and weed seeds. Waste solids are most effectively composted when mixed with a carbon source, such as coconut or macadamia nut husks, or chipped tree trimmings. Compost is an excellent soil conditioner and saleable product. With special management techniques, dead animals can be broken down in a composting system. Contact your local extension agent for assistance in getting started.

Composting includes the following benefits:

- Improves manure handling, as it reduces moisture content.
- Lowers risk of polluting surface and groundwater.
- Destroys disease organisms after a minimum of three days at temperatures between 130 and 155°F/54–68°C.
- Produces a product that can be sold.
- Reduces or eliminates odor, even in wet material.
- Can break down dead animals.

Composting of solids entails layering the material like a sandwich, then thoroughly mixing the layers. Make the layers no more than a few inches thick if possible. Alternate wet material (manure and food wastes) and dry material (chipped tree trimmings, macadamia nut or coconut husks). Then add regular soil or finished compost and finally some water until it has the moisture content of a wrung out sponge. To avoid interrupting a compost cycle that has started and possibly introducing new disease organisms, allow the materials to finish composting without adding more to the mixture.

The pile must be kept damp and turned occasionally to get air inside. Let it heat to temperatures over 130°F/54°C for a couple of weeks. If the pile is getting too hot, turn it or wet it down. The bacteria that do the work of composting are killed at temperatures over 160°F/71°C. After the compost pile does not reheat upon turning, the compost can be applied to appropriate crops or sold to neighbors and other farmers.

One very effective composting system used in Hawaii consists of having a landscaper pile chipped tree trimmings next to the pig barn. Unseparated wastes from the barn are collected in a sump and pumped over the tree trimmings. Any excess liquids flow back to the sump. The tree trimmings are fluffy enough that excellent compost is produced for sale with almost no need for turning.



Compost can be bagged and sold

For additional resources and publications, refer to ADAP fact sheet 2003-11 on *Additional Information for Swine Waste Management*.

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