

A GUIDE TO COMPOSTING HORSE MANURE

(Adapted from: *A Guide to Composting Horse Manure*)

by Jessica Paige, [HTTP://WHATCOM.WSU.EDU/AG/COMPOST/HORSECOMPOST3.HTM](http://WHATCOM.WSU.EDU/AG/COMPOST/HORSECOMPOST3.HTM)

Horse manure makes great fertilizer that can be used on pastures, but should not be applied **just before or during a rainstorm**. On average, a well-managed pile can be composted in one or two months in the summer and three to six months in the winter. To ensure efficient composting, follow the tips below. Please note that a permit may be required for your composting your horse manure. See the “Permits Required” section at the end of this document for more information.

- **Choose a good location for your compost pile(s).** Choose a well drained site on level ground in a location that is convenient to your stall and paddock areas. It is also useful to choose a site with convenient access to water which will be needed to moisten the compost pile periodically.

Any permanent animal enclosure should be constructed in such a way that runoff water can be controlled and confined. Animal pens should be placed 50 feet or more from the edge of a water source, even when placed on level ground or when utilizing a grassy strip. During winter rains when the soil gets saturated and the grass is dormant, additional structures such as berms or retention structures are needed to direct runoff away from the water source. If animals must be housed closer than 50 feet from water, a lagoon or retention pool should be constructed to trap and retain runoff. **Please note: all animal structures must be located at least 10 feet from any water source, although a greater distance is strongly recommended.**

- **Build the optimum pile size.** Your pile must be at least 3 feet high. For best results, try for a pile 5 to 7 feet square on the bottom rising to 3 or 4 feet high.
- **Choose the right pile ingredients.** The organisms that decompose the material in a compost pile need carbon for energy and nitrogen for growth. It is important to supply both kinds of materials in roughly the right proportions. The ideal carbon to nitrogen ratio for composting is between 25:1 and 30:1 (with carbon being the higher number). On its own, horse manure is about the ideal ratio. However, you may need to adjust the amount of carbon/nitrogen within your pile depending on the type of bedding used. High carbon materials include plant materials such as straw, wood chips, shavings, sawdust, and leaves. Materials that are high in nitrogen include animal by-products like manure and blood meal, along with grass clippings and hay.

Most composters use trial and error to attain a good carbon to nitrogen ratio; however, it is also helpful to understand the underlying mathematical concepts. Please be aware that the formula below is simplified for use by home composters.

Example of determining C:N ratio (2-input pile):

You have 5 pounds of grass clippings (C:N ratio = 20:1)

You have 5 pounds of leaves (C:N ratio = 40:1)

You have a total of 10 lbs. of material: 50% are grass, 50% are leaves

1. Multiply the % of grass in the pile by the C:N ratio of grass = A.
2. Multiply the % of leaves in the pile by the C:N ratio of leaves = B.
3. Add A + B to determine your C:N ratio.

Example: $(50\% \times 20/1) + (50\% \times 40/1) = 10 + 20 = 30$ ---> which in fraction notation is 30/1 or 30:1. The C:N ratio is 30:1

Common Compost Ingredients & C/N Content		
Alfalfa hay	Nitrogen	13:1
Bark	Carbon	100:1
Blood meal	Nitrogen	4:1
Coffee grounds	Nitrogen	20:1
Cornstalk	Carbon	60:1
Grass clippings	Nitrogen	12-19:1
Leaves	Carbon	40-80:1
Horse manure	Nitrogen	25:1
Pig manure	Nitrogen	5:1
Cow manure	Nitrogen	20:1
Oat straw	Carbon	74:1
Seaweed	Nitrogen	19:1
Straw	Carbon	40 - 100:1 (usually about 80:1)
Wood chips	Carbon	500:1

*From: <http://www.mastercomposter.com/ref/orgmat1.html>

- **Maintain airflow through the pile.** If you have a tractor, turning the pile at regular intervals, especially during the first few weeks after building the pile, will speed up the decomposition process considerably. If you are not able to turn the pile with a tractor, you can insert a couple of five-foot PVC pipes into the center of the pile like chimneys. Use a drill to put some holes into the pipes-approximately a half-inch in diameter at six-inch intervals. Another method of achieving airflow through the pile is the aerated static pile method (see Composting Options).

- **Monitor temperature.** You can buy a long-stemmed compost thermometer at local nurseries or home and garden stores to monitor your compost piles. Most compost piles begin at a lower temperature range (about 50°F-110°F) and then increase to a higher temperature range (110°F-160°F) before gradually dropping to ambient air temperatures. These high temperatures are necessary to speed up the rate of decomposition and to kill weed seeds and diseases. At least several days of temperatures between 135°F and 150°F are recommended. If you find your pile is reaching temperatures above 160°F, you may want to reduce the size of your pile.
- **Manage moisture.** Unsuccessful attempts at composting often result from a failure to maintain the proper moisture conditions. Too much or too little water can greatly impact your piles performance. To determine if your pile contains the right amount of moisture, use the “squeeze test.” Take a handful of material from the interior of the pile and give it a squeeze. A handful of material should feel damp like a wrung-out sponge, not dripping wet.
 - If you pick up a handful of material and it drips without being squeezed, it is too wet. If your pile is too wet, turn the pile to release excess water.
 - If the material appears dry and crumbles after squeezing, it is too dry. Add water to the pile to moisturize.
 - If the material retains its clumped shape after squeezing without releasing excess water and your hand is damp, then it is just right for composting.
- **Add water when needed.** If you turn your compost pile, you can water it down with a garden hose when you turn it. Otherwise, you can water down wheelbarrow loads before adding them to the pile.
- **Minimize bedding.** The less bedding you put in the pile, the faster it is likely to compost. A manure pile with less bedding is also more likely to compost completely. Most horses don't need as much bedding as is often used; they just need enough to soak up urine and moisture. When you clean stalls, try to remove only soiled bedding so that less bedding makes it into the compost pile.
- **Consider your bedding options.** Straw and shredded newspaper will compost faster than sawdust or shavings because they contain less carbon. Wood pellets are also available and are much more absorbent than straw or shavings. As a result, less bedding is used and less bedding ends up in the compost pile. You may also want to consider using rubber mats in stalls to provide the same amount of cushioning with less bedding.
- **Cover your pile(s).** Using a tarp is one of the easiest ways to cover a compost pile. Stapling or nailing a board across the front of the tarp can make it easier to pull the tarp forward and back. A permanent structure with a roof also works well, especially for larger horse farms with larger compost piles. If it is not possible to cover your pile, build a small dirt berm around the pile approximately 3-6 feet away to capture runoff to soak into the ground.

Composting Options

Passive Composting

This method involves forming small piles of manure approximately 5 to 7 feet at the base and 3 to 4 feet high. Piles are left mostly undisturbed until they have decomposed into a stabilized product.

Although it is easiest to construct compost piles using a tractor, it is possible to do without one. To build a pile to the minimum 3-foot height without a tractor, it's easiest to place the pile within a bin or enclosure. The sides of the bin should have some space between each board to increase the amount of air that can reach the pile. In addition, it's helpful to keep the following facts in mind:

- Small piles are better than large ones as they are designed to take advantage of natural air movement.
- If possible, you'll still want to turn the pile occasionally.
- Two bins will probably be adequate for one to five horses; however, you can add a third for convenience.

Turned Piles

Turning takes the material from the exterior of the pile and puts it into the interior of the pile so that all materials are composted evenly and weed seeds, parasites, pathogens, and fly larvae can be destroyed by the high interior temperatures. Piles are most easily turned if placed on a concrete pad. As with the passive method, it is optimal to have three compost piles: one to which the fresh manure is added daily, one in the process of decomposing, and one composted and ready to use. A 30' x 30' pad will house three piles with some room to move.

Aerated Static Piles

This method uses an aeration system, typically composed of perforated pipes connected to a blower, which is placed under the compost pile to periodically blow or draw in air. A simple on/off timer is used to control the aeration rate. A typical setting might be 3 minutes on and 12 minutes off, running 24 hours a day, 7 days a week for 30 days or more.

Adjusting the frequency and duration of airflow into the pile controls the temperature. This process provides more direct control of composting and permits larger piles. Although this method requires a considerable initial investment, it may be worth it if you have more than five horses on your property, especially if you are able to sell your compost.

Use a Private Composting Service

MarBorg industries collects and composts horse waste. Call MarBorg at 963-1052 to arrange for a dumpster at your stable.

Permits Required

Composting of horse manure falls into the category of green material composting. Title 14 Section 17857 of the California Code of Regulations outlines the requirements for permitting based upon the quantity of raw material and all stages of processed material present on site at any given time.

Permit Parameters

- Composting of 1,000 cubic yards (cy) or less would require notification of the Local Enforcement Agency (LEA).
- 1,000 to 10,000 cy would require a registration permit issued by the LEA.
- Over 10,000 cubic yards requires a standardized permit concurred by the California Integrated Waste Management Board (CIWMB).

Composting more than 1,000 cy of material requires monthly inspections, while quarterly inspections are required for 1,000 cy or less. Processing to reduce pathogens, temperature monitoring, nuisance control, and other standards apply to all sizes of operations. Composters need to comply with state minimum standards under permit and inspection by the LEA.

Upcoming Regulations

The CIWMB is currently in the process of developing new composting regulations, which may impact those people composting both small and large quantities of horse manure. These new regulations are expected to come into effect in 2003, and will be updated on this site. Please contact the County's Environmental Health Services office with additional questions about possible permitting requirements.

****Check back soon for updated composting regulations!****

Contact Numbers

County of Santa Barbara Environmental Health Services – Lisa Sloan (805) 681-4942
(LEA) Contact for large composting operations and permitting questions

County of Santa Barbara Solid Waste & Utilities– Richard Placencia (805) 681-4346
Contact for general composting questions and for small composting operations

California Integrated Waste Management Board (916) 341-6000