

Composting Horse Manure

Composting is an economical and efficient method for managing equine manure

Overview

Efficiently managing manure is an important aspect of caring for horses. Storing fecal matter is unsightly, malodorous, attracts flies, takes up valuable space, can pollute nearby stream and ponds, and is typically costly to remove from the farm. Composting is a viable option for virtually any equine operation, regardless of size.

By definition, composting is the controlled breakdown of organic material (i.e., carbohydrates, fat, proteins) to produce carbon dioxide and “humus.” While composting relies on microorganisms to convert manure and other organic products—such as bedding, leaves, and grass clippings—when done properly, the final product is free of pathogens and weed seeds.¹ Composting is an active process requiring oxygen (aeration), heating to proper temperatures, moisture control, and a balanced carbon to nitrogen (C:N) ratio.¹ Specifically:

- The moisture content should be approximately 50-60%, which means that it should feel like a damp sponge, but void of water drops;
- Oxygen is needed to support aerobic, rather than anaerobic, microbes to breakdown organic material. Mix manure with lawn clippings, leaves, or hay, or insert a perforated PVC pipe into the pile, to help provide oxygen;
- Compost for agricultural use, referred to as thermophilic composting, is produced at temperatures between 130°F and 160°F; and
- Carbon and nitrogen are both nutrients required by microbes during composting. An optimal C:N ratio is 25:1 or 30:1. While supplemental nitrogen (fertilizer) might be required, equine manure in wood shavings is generally well-balanced.

The “Ins” and “Outs” of Composting

Each composting program is farm-specific and depends on space available,



Using concrete bins for composting that allow the pile to be turned and managed with machinery makes the composting of horse manure a much easier job.

equipment (e.g., accessibility of a front-end loader), and the number of horses contributing to the pile. The main factors that need to be considered are the location, number, and type of compost bins that are required.² A well-located, aesthetically pleasing, organized composting system is more likely to be used appropriately, particularly on farms where multiple individuals are mucking stalls.

Location An ideal location for the composting bins is on a high, level area convenient to access (so the time and energy needed to clean stalls is not negatively impacted). Bins in low-lying areas will collect too much water. Composting bins should also be installed a considerable distance from creeks, ditches, and other bodies of water.^{2,3}

Number In general, at least two bins are required for composting. For many operations, however, either a three-bin or six-bin system is more effective. In the three-bin system, one bin is actively being added to, one bin is full and composting, and one bin contains the mature

compost that is ready to be used.

Type There are a myriad of options regarding bin type. Some designs are described in detail, including the supplies required for each bin type.² Some examples include landscape timber compost bins, wooden, three-bin turning units, wood and wire three-bin turning units, concrete block composting bins, and wooden pallet or snow fencing holding units. To improve composting speed and efficiency and minimizing the need to turn the compost pile, mechanically aerated composting systems are also available. These O₂ composting systems also claim to reduce offensive odors by facilitating aerobic (rather than anaerobic) composting.⁴

Supplemental equipment needed for composting includes a compost thermometer, a tarp to cover the bins, pitchforks, shovels, wheelbarrows or a tractor with a bucket (front-end loader), or a trailer or manure spreader.

Assessing Compost Maturity

There are a number of ways, varying

markedly in price, to determine when the compost is mature (i.e., completely degraded). One of the easier and more economic (yet not completely reliable) approaches is temperature monitoring. Temperatures in fresh compost rise quickly to approximately 160°F, then decrease slowly to near-ambient temperatures while the compost matures. If after aerating, turning, or wetting the compost the temperature increases, the compost is likely not yet mature. A second method to test maturity is to measure oxygen consumption and/or carbon dioxide production. If oxygen consumption (indicating aerobic bacterial activity) is below a certain threshold value, for example, the compost is considered mature. Commercial tests for compost maturity are available.

Properly prepared compost created on-site can be spread on pastures or cropland or given away. Unless high-quality compost is specifically produced using established guidelines, selling compost is generally not an option.⁵ Instead, experts suggest advertising free compost on specific dates and times and encouraging prospective consumers to bring their own shovels and

buckets for transporting the compost.


The Importance of Proper Composting

Compost quality is important, particularly if it is to be used on paddocks. For example, horse manure needs to be “cooked” for a specific length of time and at high enough temperatures to result in sufficient reductions in viability of roundworm (*Parascaris equorum*) eggs and *Rhodococcus equi* populations. *R. equi* and *P. equorum* eggs are both very hardy and can potentially remain infective for years on pastures and in compost.⁶

The Texas AgriLife Extension Service advises that compost can catch fire if it reaches temperatures higher than 172°F. Monitoring compost temperature and ensuring compost bins are not next to any building or structure that can burn is imperative. If compost temperatures reach and/or surpass 160°F, hose the pile down and turn the compost to decrease the core temperature.⁵

Additional Resources

General information and resources to assist in designing a composting system

to best meet your farm’s needs is available from TheHorse.com/6631. More information on initiating a composting program can also be obtained from local agriculture extension specialists. Check with the township or municipality to determine guidelines/regulations regarding composting prior to commencing. Extension specialists might also have information on how to obtain grants to help offset the cost of initiating an on-farm composting program. 

KEY REFERENCES

- 1) Healthy Landscapes, University of Rhode Island. “How To Manage Manure.” http://www.uri.edu/ce/healthylandscapes/livestock/how_manure_composting.htm.
- 2) Pennsylvania’s Small Scale Livestock Committee. “Composting for Small Scale Livestock Operations.” http://panutrientmgmt.cas.psu.edu/pdf/rp_ss_composting.pdf.
- 3) Texas Agricultural Extension Service, The Texas A&M University System. “Composting Horse Manure.”
- 4) O2Compost, Compost Systems and Training. <http://www.o2compost.com/>.
- 5) TheHorse.com/15571.
- 6) Hébert L, Cauchard J, Doligez P, Quitard L, Laugier C, Petry S. Viability of *Rhodococcus equi* and *Parascaris equorum* Eggs Exposed to High Temperatures. *Curr Microbiol.* 2009 Sep 1. [Epub ahead of print] and TheHorse.com/15032.

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