

A Guide to Determining the Quality & Maturity of Finished Compost

How you determine the quality of finished compost will depend on the source materials used to make the product and on its intended use. For example, mushroom compost tends to be high in soluble salts and, knowing that, you might test for salts if you plan to use the compost in high concentrations for uses such as potting mixes and field nursery containers. If you apply mushroom compost high in soluble salts to a field, you may or may not see any affects, depending on how salt sensitive the crops are and on which type of soluble salts are in the compost.

As you can see, measuring the quality of compost is not always straightforward, and, in fact, researchers across the country are still exploring the best methods for determining different levels of quality in compost. This is intended to be a preliminary guide to helping compost users and marketers identify methods of testing for compost quality.

Basic quality guidelines

The quality of compost is generally judged by its odor, color, particle size, pH, soluble salts, stability or maturity, organic matter content, carbon to nitrogen ratio, and the presence of undesirables such as weed seeds, heavy metals, phytotoxic compounds (toxic to plants), and foreign objects. Table 8.1 on page ??, from the *On-Farm Composting Handbook* gives an "Example of compost quality guidelines based on end use." This table provides compost users with an excellent guideline for matching compost with end uses. Other such compost quality guidelines are available from the Recycling Education Program of Montgomery County Cooperative Extension (telephone number listed in letterhead).

Simple methods of evaluating compost quality and maturity

The Sniff Test

One very simple test is the sniff test. If you can visit the compost site or get a sample from the composter supplying your product, check for foul odors. They indicate anaerobic or airless decomposition is occurring, creating chemicals which can be toxic to plants. As a rule, foul smelling compost should not be used.

The Bag Test

This test is used to determine if the compost is ready to be cured or stored for its final stage of stabilization. Compost that fails the bag test is actively decomposing and should not be used except for soil incorporation in the fall well before crops are planted. Take a small sample of compost from the inside of the pile, wet it thoroughly, and seal the sample in a plastic bag. Store the closed bag for about a week at room temperature. If when you open the bag the compost has a pleasant, earthy odor, rather than a foul odor, it is stable enough to be cured. If not, the composting process should be continued.

The Germination Test

The germination test is a simple and reliable indicator of compost maturity. Unfinished compost has phytotoxic compounds (toxic to plants) which inhibit seed germination, especially with highly sensitive cress and bean seeds. If these seeds have poor germination in compost being tested, the compost is not suitable for many uses.

Test the compost with curly cress by covering a seed starting flat with a shallow layer of compost and planting a predetermined number of seeds. Test bean germination in several 4 inch pots with compost, planting 3 to 4 seeds in each pot. At the same time, count out the same number of seeds and germinate these in damp paper towels. Curly cress seeds should germinate in 2 to 3 days, beans in 5 to 7 days. Compare both the germination speed and the number of seeds that germinate in towels with the number that germinate in compost. Compost containing phytotoxic compounds will inhibit germination numbers and speed.

Seedlings growing in immature compost will be less healthy. Seven days after germinating, curly cress plants should show vigorous growth and bright green foliage. Roots should be a healthy white color, well-branched and large. In 10 days to two weeks after germination, beans should have large, "bean-colored" leaves and an extensive, healthy root system. If the plants are not healthy, the compost is not mature and needs to continue composting or curing, the final stage of stabilizing compost.

The Compost Self-Heating Test

While relatively simple, this method is more costly because it requires purchasing a Dewar flask for approximately \$325. With the flask, various levels of compost stability can be determined, from fresh to very mature compost. A sample of compost is added to the flask and monitored for the highest rise in temperature. Higher rises in temperature indicate less mature compost.

Specific quality guidelines

Moisture Content

First try the squeeze test which will tell you the approximate range of your moisture content. Grab a handful of compost from the center of the pile and squeeze it. If the material stays in a ball rather than falling apart, and if very little or no water drips from the ball, your moisture content is roughly 55% to 65%. If it does not form a ball because it is too dry, then your moisture content is below 55%. If it is very moist and drips heavily when squeezed, your moisture content is above 65%.

For more specific percentages, first weigh a sample of material, dry it with air drying, in a conventional oven or in a microwave, and weigh it again. Subtract the dry weight from the wet weight, divide this result by the wet weight, and multiply by 100 to obtain your percent moisture content.

The ideal moisture content depends on how you plan to use the compost. For many applications, ideal moisture content is 30% to 50% for easy spreading. Compost that is too wet is heavy and likely to clump while compost that is too dry may be difficult to incorporate and may spread dust to the surrounding area.