



Purchasing Compost & Mulch

Compost Quality: Performance Requirements

Matching Performance Needs With Product Characteristics

Compost is becoming an increasingly popular soil amendment with growers, landscapers and other end users. Compost consists of organic matter (such as leaves, landscape trimmings, food scraps, or woody debris) that has undergone varying degrees of decomposition.

In California, commercial composters are required to meet specific regulatory requirements on the compost process itself that protect health and safety. However, because no state or national standards exist for rating the quality of compost products, you must perform your own quality assessment. In addition to a visual inspection, you may want to assess other compost characteristics to ensure that you're getting a product that meets your specific needs within the price range that you're willing to pay.

Before shopping for compost, determine your reasons for using compost. Once you've determined the performance requirements (e.g., for seed germination), look for a compost with appropriate characteristics. To help you assess compost products, see our list of [performance requirements and their characteristics](#), which offers information on what to look for in terms of feedstock type, salinity, composting method, stability/maturity, nutrients and pH for the following needs:

- [Source of available nutrients](#)
- [Source of beneficial microorganisms](#)
- [Appropriate for seed germination and/or transplants](#)
- [Will not introduce viable weed seeds or pathogens](#)
- [Will not introduce contaminants](#)
- [Enhances water holding capacity, soil structure, organic matter, drainage, and nutrient holding capacity of soil](#)
- [Does not significantly increase soil salinity](#)

You can also use the [compost quality guidelines](#) for finished compost provided by Organic Ag Advisors and BBC Laboratories, Inc.

Assessing Compost Stability and Maturity

It is difficult to determine the stability and maturity of a compost by visual analysis. Opinions regarding the parameters of stability and maturity vary widely within the compost, agricultural, and horticultural industries. The term "stable" is often used to describe compost that is not undergoing rapid decomposition and whose nutrients are relatively available for release into the soil; unstable compost, in contrast, can tie up nitrogen from the soil. It is important to note that compost that is not fully stable can be useful in certain situations. For example, conventional growers may apply moderately unstable compost to increase soil organic matter; if they normally apply fertilizer, they may not be concerned about a small amount of nitrogen immobilization from compost. The term "mature" refers to the degree of phytotoxicity of a compost.

An immature compost will contain more growth-inhibiting compounds than a mature compost. Compost that is immature may, for example, produce short-chain organic acids that are phytotoxic (toxic to plants), especially to seedlings. The following are sometimes used as indicators of compost stability and maturity.

Indicators of compost stability

1. **Temperature of the Compost.** In general, in moderate climates, if the temperature of the compost is more than 15 degrees F (8 degrees C) higher than the ambient air, the compost is still fairly unstable.
2. **Respiration Rate.** The rate of oxygen utilization represents the extent of biological activity. For horticultural applications, < 20 mg O₂ / Kg compost dry solids/hour is considered stable. For field applications, < 100 mg O₂ / Kg compost dry solids/hour is considered stable. The Solvita test, available from Wood's End Laboratories, is a quick test for respiration rate and also measures ammonia content. CO₂ production may also be used to assess respiration rate. Less than 5 mg CO₂ carbon/g compost carbon/day is considered stable and is usually suitable for seeds. Greater than 20 mg CO₂ carbon/g compost carbon/day may be fairly unstable. Composts that are cold, dry, or very salty may not respire even though they are not stable.
3. **Length of Compost Processing.** In general, compost made by the aerobic windrow method should be processed for a minimum of 60 to 90 days to produce a "finished" compost. "Finished" means usable, but not fully stable. However, compost should be processed a minimum of 90 to 120 days to be considered "stable." This is sometimes referred to as being "cured." Some experts believe that compost should cure for six months before use.
4. **Carbon:Nitrogen (C:N) ratio.** The C:N ratio decreases as compost becomes more mature or stable. Consequently, the C:N is sometimes used as an indicator of compost stability. However, for this ratio to be meaningful, you need to know the C:N ratio at the beginning and the end of the compost process. Ideally, the C:N should be approximately 30:1 at the beginning of the compost process. If the C:N ratio is low at the beginning of the compost process, a low C:N at the end of the process may not be a meaningful indicator of compost stability. Assuming the beginning C:N is approximately 30:1, the C:N of a moderately stable finished compost will be between 15:1 and 20:1. A very stable compost will have a C:N between 10:1 and 14:1 at the end of the composting process. A final C:N ratio above 20:1 may not readily release nitrogen. A final C:N of greater than or equal to 30:1 is thought to inhibit mineralization of nitrogen and may actually tie up nitrogen from the soil.
5. **Visual/Olfactory Inspection.** Although not a reliable method, one can do a cursory assessment of a compost by look and smell. In general, a mature compost will not contain recognizable feedstock material and should smell like rich soil. It should not smell foul or of ammonia.

Indicators of compost maturity

1. **Seed Germination.** Growers may want to perform a germination test using the seeds they will be planting. The following Web site includes guidelines for conducting your own seed germination tests: www.compostinfo.com/tutorial/MaturityTests.htm. Many labs will also perform seed germination tests.
2. **Maturity Index.** Some labs will assign a maturity index to compost based upon both the germination rate and the root tissue growth compared to a control.

Additional Resources

Additional information on compost quality may be obtained from the following Internet sites and publications:

Internet Sites

- **California Integrated Waste Management Board:** www.ciwmb.ca.gov/Organics/, (916) 341-6620.
- **U.S. Composting Council:** www.compostingcouncil.org, (440) 989-2748.
- **Compost Council Research and Education Foundation:**<http://tmecc.org>
- **Wood's End Laboratories:***www.woodsends.org (800) 451-0337.
- **BBC Laboratories, Inc.:*** www.bbc-labs.com(602) 967-5931.

*Reference does not imply endorsement by the California Integrated Waste Management Board.

Publications

- **[How Agricultural End Users Can Assess Compost Quality](#)**
Jean VanderGheynst, UC Davis.
- **[Field Guide to Compost Use](#)**
U.S. Composting Council, (440) 989-2748.
- **Interpretation Guides to Compost Stability and Compost Maturity**
BBC Laboratories, Inc., (602) 967-5931.
- **[Compost Quality Guidelines](#)**
Organic Ag Advisors and BBC Laboratories, Inc. (530) 292-3619.
- **[Recommended Test Methods for the Examination of Compost and Composting](#)**
U.S. Composting Council, (440) 989-2748.
- **Compost Production and Utilization: A Growers's Guide**
Mark Van Horn, UC Division of Agriculture and Natural Resources, (510) 642-2431.
- **[A Farmer's Field Guide to Compost Production and Use](#)**
U.S. Composting Council, (440) 989-2748.
- **Compost--A Guide for Evaluating and Using Compost Materials as Soil Amendments**
William Darlington, Soil and Plant Laboratories, Inc.

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Organic Materials Management <http://www.ciwmb.ca.gov/Organics/>

Contacts: <http://www.ciwmb.ca.gov/Organics/Contacts.htm>