



Composting Basics

Compost is an organic matter resource that has the unique ability to improve the physical, chemical, and biological properties of soil or growing media that are critical for plant growth and development. It is a product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it can be used as a soil amendment. Compost bears little physical resemblance to the source material from which it originates. Grass clippings and leaves collected at Olmsted County's public drop-off area are managed to enhance the biological decomposition process of this organic material resulting in the creation of a dark, rich, friable, earthy-smelling material that can be used to improve your soil. Compost is generally not considered a fertilizer since it usually does not contain enough nitrogen (one of the essential nutrients) needed for ideal plant growth.

Benefits of Compost

Compost can be used in many ways: mixed directly into garden soils, spread as a top dressing on lawns, applied as surface mulch around plants and trees, and added as an amendment to potting soil mixes. Adding compost to finely-textured or clayey soils will increase moisture infiltration rates, improve drainage capacities, and reduce soil compaction. On sandy soils, incorporating organic matter helps improve the soil's ability to hold water and enables the soil to retain nutrients longer. As a layer spread over the ground surface, compost will help control weed seed germination, reduce water loss, moderate soil temperature extremes, and help reduce the compaction effects of heavy rains and sprinkler irrigation. Other benefits of compost include:

- supplies beneficial microorganisms to soils and growing media
- encourages vigorous root growth
- helps make nutrients more available for plant uptake
- supplies significant quantities of organic matter to soils (all soils benefit from yearly additions of organic matter from compost).

Olmsted County Yard Waste Compost Site

There are several different reasons why composting remains an invaluable part of Olmsted County's Integrated Solid Waste Management System. The Olmsted County Yard Waste Compost Site receives approximately 2,500 tons of yard waste (the site only accepts leaves and grass clippings) each year. By composting yard waste, we reduce the amount of municipal solid waste that is deposited at the Olmsted County Kalmar Landfill and Olmsted Waste-to-Energy Facility (OWEF). Landfilling organic waste takes up valuable, needed landfill space and incinerating this moist organic material at the OWEF is inefficient and results in poor combustion. Large scale composting is a less expensive and more effective method of managing organic waste than landfilling or incineration, and it provides our community with a high-quality resource that can be used to enhance your soil as a growing media.

In 2021, revenues at the Yard Waste Compost Site totaled \$37,924. The yard waste compost program had an operating expense of \$114,543. Financial shortfalls of the program are covered by the Olmsted County environmental service charge that is collected on your solid waste bill. Donation boxes are available on-site for residents who wish to support the Compost Site's daily operations. The suggested donation rate for finished compost is \$0.50 per 5-gallon container, \$5.00 per car load, and \$20.00 per pickup or trailer load. Customers load and provide their own container.

An Olmsted County employee is available to load 10,000lbs (or greater) GVW vehicles for a fee of \$15.00 per ton or \$12.00 per cubic yard from 8:00 a.m. - 3:30 p.m., Monday - Friday. From December through March, this service is available by request only; residents should call 507-328-7070 to schedule an appointment.

The Composting Process

The composting process involves five main components: organic matter, microbes, oxygen, moisture, and temperature. The organic matter used as feedstock at the Olmsted County Yard Waste Compost Site includes a mixture of brown organic plant material (leaves) and green organic material (grass clippings). Microbes are an essential part of the composting process since they break down the majority of the organic matter. Carbon and nitrogen are the primary nutrients required by the microorganisms involved in the decomposition process (the brown leafy organic materials provide carbon, while the grass clippings supply nitrogen). Since composting consumes a large amount of oxygen, particularly during the early stages of the composting process, aerating the pile becomes necessary to promote the survival of the aerobic microbes (oxygen concentrations greater than 10% are considered optimal for maintaining aerobic composting). Compost organisms also need a moist environment to survive. Moist conditions are necessary to support the metabolic processes of the microorganisms living in the compost. Another important factor in the composting process is temperature. The decomposition of yard waste is most effective when pile temperatures are between 90° to 140°F. These high temperatures are also necessary for destroying pathogenic organisms and undesirable weed seeds.

The County's composting management process begins when residents, commercial haulers, and commercial lawn care businesses deliver their leaves and grass clippings to the public drop-off area located on Silver Creek Road, just east of the Olmsted County Recycling Center Plus in Rochester. This yard waste material is then hauled by front-end loader to the composting area and placed into windrows. Large quantities of leaves collected at the site in the fall are stock piled so they can be combined with grass clippings that are received during the growing season. This mixture of leaves and grass in the windrows provides an adequate carbon to nitrogen (C:N) ratio for composting. The windrows are aerated weekly using a windrow turner. If dry conditions exist during the compost season (from about April to October), a watering truck is used to add needed moisture to the material. As the composting process proceeds, the sizes of the windrows decrease in size. This size reduction allows for windrows to be combined so that new windrows can be added to the site. The finished compost is moved to the public pick-up area near the OWEF scale house. In general, it takes approximately 60 to 90 days to transform the raw materials into finished compost during the compost season.

2022 Compost Results

Each year, the compost at the site is analyzed by a certified laboratory to determine its agronomic capabilities and maturity level. This testing also provides end users with detailed information that can improve the utilization of the product so that it may meet their particular landscaping needs. Each specific plant species has a desirable pH (measure of acidity/alkalinity) range. Compost possesses a specific pH level which, when incorporated into the soil in large quantities, can influence the pH level of the growing media. Therefore, knowledge of the compost's pH level allows users to make any needed adjustments to their gardening practices or landscape management approaches.

Most mature compost will generally have pH values ranging from 6.0 to 8.5. This year's pH result (7.7) is similar to previous years' results. Soil pH can be adjusted through the utilization of materials such as lime (to raise pH) and sulfur (to lower pH). Organic matter is the measure of carbon-based materials. This is an important test for determining the age and physical properties of the material. In addition, this test is needed for determining proper application rates for turf establishment. There is no ideal organic matter content for compost, but most users prefer a product ranging from 30 to 70% in order to help build structure and water holding capacity within their soil. This year's sample had an organic matter result of 31.68%.

When combining organic materials to create compost, the carbon-to-nitrogen (C:N) ratio is important. The C:N ratio is used for measuring the stability of the compost and determining nitrogen availability to the soil or growing media. The ideal carbon to nitrogen ratio at the start of the composting process

is 30:1, with the mature compost generally displaying a C:N ratio around 10:1. This year's mature compost sample had a C:N ratio of approximately 12.4:1. Nitrogen (N), phosphorous (P), and potassium (K) are three major nutrients used by plants and are the macronutrients most often applied through commercial fertilizers. Nitrogen promotes leaf development and shoot growth, while phosphorous promotes strong root development. Potassium is essential for many physiological processes and helps plants withstand stressful environmental conditions, such as drought and disease. This year's nutrient results indicate that yearly additions of compost will most likely supply the necessary P and K levels to your soil; however, vegetable crops and ornamental plants will likely need additional nitrogen for optimum growth. Compost samples from the site will vary from year-to-year and season-to-season based on the types and amounts of yard waste collected from the public drop-off area during each season.

Year of Analysis	pH	Organic Matter	C:N Ratio	Total Nutrient Analysis		
				Nitrogen (N)*	Phosphorus (P)	Potassium (K)
22	7.7	31.68	12.4:1	0.67%	0.11%	0.39%

*Approximately 10% of the nitrogen becomes available during the first year.

Olmsted County does not guarantee the compost is free from all substances which may be harmful to plants, animals or humans. Customers assume all risk and liability resulting from the use of the product. A representative sample of finished compost is tested annually for Minnesota Department of Transportation (MnDOT) Grade 2 specifications; however, Olmsted County cannot guarantee that each load meets the requirements noted in Section 3890 of MnDOT's Standards of Specifications for Construction (2005 Edition).

Recommendations

- An application of 100 pounds of this compost per 100 square feet provides adequate organic matter to improve the physical condition of your soil and will also provide some nutrients to your garden or flowerbed.
- Remember, it is the yearly applications (not a single application) that make soil highly productive and easy to manage.
- Soil testing every three years is a good practice to determine actual fertility needs and to monitor pH and organic matter levels in your soil. To order a soil test, please contact the University of Minnesota soil testing laboratory at 612-625-3101 or visit their website at <http://soiltest.cfans.umn.edu>.

For additional information, please contact the Olmsted County Environmental Resources Department at pwservice@co.olmsted.mn.us or call 507-328-7070.

