# RESOURCE RECYCLING

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## HHW Drop-off

## Compost on Roadsides

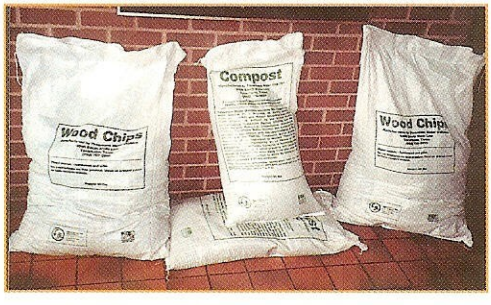
## Scrap Glass Markets and Issues

# Compost characteristics

by Ron Alexander

**Understanding the variable attributes of compost can help users choose a product appropriate to their application.**

Since growing conditions and plant requirements vary, compost users benefit from information that accurately characterizes the compost products they use. Characterization data help users obtain products appropriate for their specific project or application.




**pH** is the measure of soil/media acidity or alkalinity. The pH scale ranges from zero to 14, with a pH of seven indicating neutrality. A pH change of one unit means a 10-fold increase or decrease in pH. Most composts have a pH level between five and 8.5. Based on the amount of compost applied and its pH, the addition of the product can affect the pH of the soil or growing media. Soil pH often is adjusted through the utilization of materials such as lime (to raise pH) and sulfur (to lower pH).

**Soluble salts** refer to the amount of soluble ions in a solution of compost and water. The concentration of soluble ions typically is estimated by determining the solution's ability to carry an electrical current, i.e., electrical conductivity. Essential nutrients actually are supplied to plants in a salt form. While some soluble salts (e.g., sodium chloride) may be detrimental to plants, most composts do not contain sufficient levels of these salts to be a concern in landscape applications. Most composts have a soluble salt conductivity of 1.0 to 10.0 dS/m, whereas typical conductivity values in soil range from 0 to 1.5 in most areas.

**Nitrogen, phosphorus and potassium** are the three nutrients utilized by plants in the greatest quantities and, therefore, are contained most often in commercial and retail fertilizers. In compost, nutrient content is expressed as a percent, based on dry or wet weight. Knowing the content of these nutrients helps users to make decisions regarding supplemental fertilization. Although concentrations of nutrients found in compost typically are not high compared to most fertilizer, compost usually is applied at much greater rates and can represent a significant cumulative quantity. Calcium and magnesium also are monitored in the U.S. Composting Council's Seal of Testing Assurance program.

**Organic matter content** is the measure of carbon-based materials, typically expressed as a percentage of dry weight. Organic matter plays an important role in soil structure, nutrient availability and water-holding capacity. Knowing a product's organic matter content is useful for estimating the age and physical properties of the compost as well as determining particular compost application rates, such as turf establishment and agricultural crop production. There is no ideal level, and organic matter content ranges from 30 to 70 percent.

**Moisture content** is the measure of water present in a compost product, expressed as a percent of total weight. The moisture content affects bulk density (weight per unit volume) and, therefore, affects handling and transportation. Overly dry compost (at or below 35 percent moisture) can be dusty and irritating to use, while very wet compost (55 to 60 percent) can become heavy and clumpy, making its application more difficult and delivery more expensive. A preferred level is 40 to 50 percent.

The measure of **compost particle size** typically is based on the product's end use. For most applications, specifying the product's maximum particle size may be suf-

ficient. For certain applications, such as golf courses or potting media production, a complete particle size distribution may be required. Particle size distribution measures the amount of compost meeting a specific particle size range. A compost product's particle size also may determine its usability in specific applications. For example, a compost product with a maximum particle size of ½-inch or greater may be too large for turf top-dressing. Most composts that are used as soil amendments are screened through a ⅜- or ½-inch screen.

**Maturity** is the degree or level of completeness of composting. Maturity is not described by a single property, but rather by measuring two or more compost characteristics. Some immature composts contain high amounts of free ammonia, certain organic acids or other water-soluble compounds that limit seed germination, restrict root development or cause odor. The STA bioassay uses a seed germination and growth test to measure the percent of seed emergence and relative seedling vigor.

**Stability** refers to a specific stage of organic matter decomposition during the composting process, which is related to the type of organic compounds remaining and the resultant biological activity in the material. Stability is important in determining the potential impact of compost on nitrogen availability in soil or growing media, as well as maintaining consistent volume and porosity in container growing media. Most compost applications for soil amendment require a stable product that will prevent nutrient tie-up and maintain or enhance oxygen availability.

**Man-made inerts** are materials that may be a part of the waste stream, including textiles, glass, plastic and metal objects. These materials are not decomposed through composting but may be degraded to some extent in physical characteristics, primarily through size reduction. Inerts can decrease the value of the finished compost product because they offer no benefit to the com-

post and often are aesthetically offensive. Inerts can be controlled by separating them out at the source during feedstock recovery or during product refinement (through screening or ballistic separation, for example). Other "natural" inerts, such as stones, rocks and twigs, also may be found in compost, but only minimal levels are considered acceptable.

**Trace metals** are elements regulated due to potential toxicity. Specific trace elements include arsenic, cadmium, chromium, copper, lead, mercury, molybdenum nickel, selenium and zinc. The quantity of these elements are measured on a dry weight basis. Many of these elements actually are needed by plants for normal growth, although in limited quantities. Measuring their concentration, therefore, can provide valuable data relevant to fertilizer requirements. Certain heavy metals and trace elements also are known to cause phytotoxic effects in plants when present in very high quantities, and specific plant species are known to be more sensitive than others. These elements include boron, manganese, molybdenum, nickel and selenium. These elements, however, are not typically found in compost in detrimental quantities. All composts that contain regulated feedstocks must meet state and federal safety standards in order to be marketed.

**Pathogens** are disease-causing organisms that may be present in raw wastes or by-products. Both plant and human pathogens are found in living organisms and are present at some background levels in the environment. Therefore, the composting process must eliminate or reduce pathogens to a level that is below the threshold at which diseases can be transmitted. Both pathogens and weed seeds are inactivated or destroyed by elevated temperatures, which occur over time within the composting process.

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This information was provided by the USCC Seal of Testing Assurance program.