COMPOSTING

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may be added in moderate amounts if additional nitrogen is added. Approximately one pound of actual nitrogen (six cups of ammonium nitrate) is required for 100 pounds of dry sawdust.

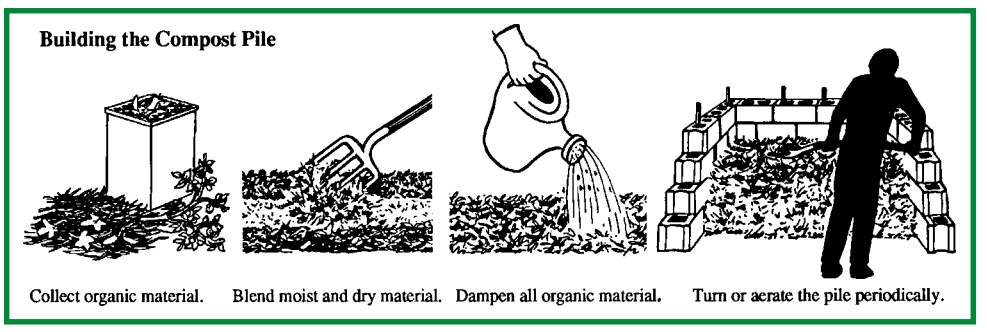
Certain organic materials should not be used to make compost because they may pose a health hazard or create a nuisance. Do not add pet feces since they may transmit disease. Meat, bones, grease, whole eggs and dairy products should not be added because they can attract rodents. Most plant disease organisms and weed seeds are destroyed during the composting process when temperatures in the center of the pile reach 140° to 150° F. However, in most compost piles, it is impossible to mix efficiently enough to bring all wastes to the center. Consequently, large amounts of weeds with seeds or diseased plants may create problems.

Carbon-to-Nitrogen Ratios

All living organisms are made of large amounts of carbon (C) combined with smaller amounts of nitrogen (N). The balance of these elements in an organism is called the carbon-to-nitrogen ratio (C:N). This ratio is an important factor determining how easily bacteria can decompose organic waste. The microorganisms in compost use carbon for energy and nitrogen for protein synthesis. The proportion of these two elements used by the bacteria averages about 30 parts carbon to one part nitrogen. Given a steady diet at this 30:1 ratio, bacteria can work on organic material very quickly.

Most materials available for composting don't have the ideal ratio. So, to speed up composting, the numbers need to be balanced. For instance, a mixture of one-half brown tree leaves (40:1 ratio) could be used with one-half grass clippings (20:1 ratio) to make a pile with the ideal 30:1 ratio. This will work best on a weight rather than volume basis. Mixing materials of different sizes and textures also helps to provide a well-drained and well-aerated compost pile.

A pile that is too high in carbon will stay cool and compost slowly. A pile too high in nitrogen will decompose too fast and smell like ammonia gas. In both instances, the decomposition process is working. If you have the time to wait and the space to keep these materials, you'll eventually be rewarded with compost.



Making a Compost Bin

To save space, hasten decomposition and keep the yard looking neat, contain the compost pile in some sort of structure. Composting structures can be made from a variety of materials. They can be as simple or complex as desired.

Yard wastes can be composted either in simple holding units, where they will sit undisturbed for slow decomposition, or in turning bins, which produce finished compost in six to eight weeks. Holding units are simple containers used to store garden waste in an organized way until these materials break down. A holding unit is the easiest way to compost. It only requires placing wastes into a pile or bin as they are generated. Non-woody materials such as grass clippings, crop wastes, garden weeds and leaves work best in these systems. Decomposition can take from six months to two years. The process can be hastened by chopping or shredding wastes, mixing dry and wet materials and maintaining proper moisture. Since yard and garden wastes will be added continuously, the stage of decomposition will vary from the top to the bottom of each compost pile. Generally, the more finished compost will be found near the bottom of a pile and partially decomposed materials near the top. Once the compost at the bottom of a pile is finished, it can be removed and used.

Turning units are typically a series of bins used for building and turning active compost piles. A turning unit allows wastes to be conveniently mixed for aeration on a regular basis. This speeds composting by providing bacteria with the oxygen they need to break down materials. Turning systems require frequent maintenance and preparation of the wastes to be composted. Composting in these units is most efficiently done in batches. Materials should be stockpiled until there is enough to fill the bin. These bins should be monitored and turned after temperatures have peaked (90°–140° F) and begun to fall. This occurs four to seven days after pile construction. Turn a second time when the temperature peaks again, four to seven days later. Compost processed this way will be ready in six to eight weeks.

Location

The compost pile should be located close to where it will be used and yet not offend neighbors. The pile will do best where it is protected from drying winds.

Building the Compost Pile

A compost pile should be large enough to hold heat and small enough to admit air to its center. As a rule of thumb, the minimum dimensions of a pile should be three feet by three feet by three feet (one cubic yard) to hold heat. The maximum to allow air to the center of the pile is five feet tall by five feet wide and as long as you wish.

Microorganisms can only use organic molecules dissolved in water. A moisture content of 40–60 percent provides adequate water without limiting aeration. The "squeeze" test is an easy way to gauge the moisture content of composting materials. The material should feel damp to the touch, with just a drop or two of liquid being released when the material is tightly squeezed in the hand. The compost pile can initially be prepared in layers. This will facilitate decomposition by insuring proper mixing. To build a compost pile, start with a four to six inch layer of chopped brush or other coarse material set on top of the soil. This will let air circulate under the base of the pile.

Next, add a three to four inch layer of low carbon organic material such as grass clippings. This material should be damp when added to the pile. On top of this, add a four to six inch layer of high carbon organic material (leaves or garden waste) which should also be damp.

On top of this, add a one-inch layer of garden soil or finished compost. This layer will introduce the microorganisms needed to break down the organic matter.

Mix the layers of high carbon organic matter, low carbon organic matter, and soil before adding another layer to the pile. This will ensure a speedy and even composting of the organic matter. Repeat the "layering" process until the composting bin is filled.

Using Compost

Finished compost is dark brown, crumbly, and is earthy-smelling. Small pieces of leaves or other ingredients may be visible. If the compost contains many materials which are not broken down, it is only partly decomposed. Allow partly decomposed compost particles to break down further or separate them out before using compost around growing plants.

Compost can be blended into soil mixes and is suitable for most outdoor planting projects. It is typically mixed with other ingredients such as peat moss, shredded bark, sand, or loamy topsoil when used as an outdoor planting mix. Mixing ratios vary; but 10 percent compost is considered to be a minimum, 30 percent optimum and 50 percent maximum in planting shrubs and trees.

Compost has its greatest value when rototilled directly into the soil. One cubic yard of compost covers 108 square feet at three inches, 216 at two inches, and 324 at one inch. The rule of thumb is to spread compost no more than one-third the depth of the rototiller. A one-inch layer of compost should be tilled in three inches, a two-inch layer tilled in six inches, and a three-inch layer tilled in nine inches. Making two or more passes with the tiller helps blend the compost with the topsoil and break up any clumps of material.

Compost Equipment

- stiff-tined garden fork
- compost thermometer
- garden hose
- containment structure (optional)

NEW USES

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Mature compost appears to mimic the organic makeup of the muck and promote healthy growth of native wetland species.

"Brownfield" Rehabilitation

Finished compost provides many of the soil nutrients that can provide new opportunity for healthy plant growth on contaminated urban property. Increased plant growth and biodiversity helps create a healthier eco-system for humans and other animals.

Erosion Control

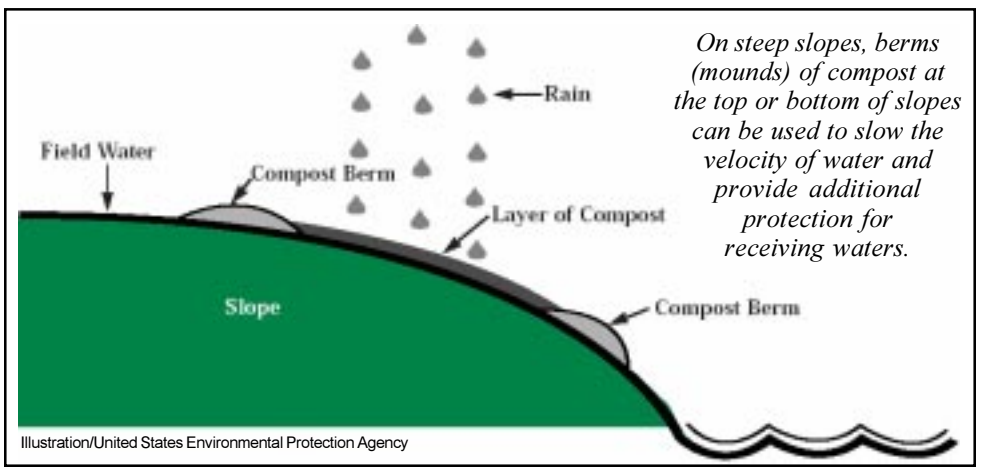
Use of compost to inhibit erosion has been shown in several trials carried out by CSF Treatment Systems of Oregon. The simple application of compost on roadside cuts without vegetation markedly reduced soil losses by erosion, both by "holding" the soil and stimulating rapid plant growth.

Traverse City, Michigan municipal landscape crews previously applied topsoil on slopes to establish turf for erosion control. However, this system was not satisfactory because the topsoil was often of poor quality. After several years of experimentation, the city found compost serves as a better seedbed than topsoil. It is less likely to erode from a slope when it rains, and also holds water better, thus promoting faster seedling germination. After applying 3 to 4 inches of compost on bare soil to seed perennial rye, germination generally occurs within 7 to 14 days. They attribute success to the increased water-holding ability of compost.

Sediment Control

Compost may also be used to construct a filter berm for sediment control. Composts denser in nature and containing particles that range in size produce the most stable berms. Do not use compost filter berms in channels.

Construct a 1-1/2 to 2 foot high by 2-1/2 to 3 foot wide berm of compost parallel to the base of the slope or other affected area. For maximum water filtration ability, construct a 1-1/2 to 2 foot high trapezoidal berm which is 3 feet wide at the top and 4 feet wide at the base.



On steep slopes, berms (mounds) of compost at the top or bottom of slopes can be used to slow the velocity of water and provide additional protection for receiving waters.

How Organic Materials Prevent Erosion

There are two main reasons filter berms and slope protection assist in reducing erosion. First, filter berms reduce the speed of water flowing on a given slope. By preventing speed of water, which reduces the speed of soil particles tumbling down the slope, overall displacement of other soil particles is reduced. Many applications have tried a series of filter berms down the slope which has worked well to slow the water down long enough to reduce erosion of the slope.

A layer of compost or composted mulch applied to the slope acts like a 'wet blanket' over the surface. Soil particles are normally round and roll easily once displaced by water. As they gain speed and momentum, they displace other soil particles which channel together in faster moving water and this creates small rills. Rills lead to channels and channels lead to gullies. The rounder the soil, steeper the slope and greater quantity of water, the more erosion.

A secret of success is making sure that water is not able to 'get under the blanket' at the top of the slope. If water is allowed to get under the layer of compost, and if the slope is steep, you can expect erosion and the compost or composted mulch will float away. However, if you have a filter berm at the top of the slope and keep the compost layer continuous over the 'shoulder' of the slope, the water will hit the slope and ride all the way to the bottom on top of the blanket of organic materials.

Organic materials are more flexible, lighter and absorb more water than soils in general, so they aid in helping water infiltrate into the soil underneath. For vegetation establishment, this is crucial to new seedling germination.