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## Composting Yard Waster

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# extension extra

South Dakota State University • U.S. Department of Agriculture

## Composting Yard Waste

*David F. Graper, Extension horticulture specialist*

One of the best alternatives for yard waste is to use the materials in composting. Gardeners have been composting to dispose of yard and garden waste for many years and have used compost to increase the organic matter content of their soils.

Composting leaves, grass clippings and other waste organic materials before putting them into the garden or using them as mulch has many advantages. Composting often will reduce bulk by 50%, thereby facilitating storage and use of the material. Composting eliminates the problem of decomposing microbes competing with garden plants for the nitrogen needed for decomposition to occur. Composting also will allow you to utilize materials that ordinarily would be unacceptable for use.

Home composting does take up some space, however. You will need to find a suitable location for the compost pile or enclosure. This area can be fairly small or relatively large depending on the amount of composting you intend to do and the storage enclosure you choose. If you live in a larger city, you may have the option of hauling your yard waste to a local nursery or municipal composting site, as well.

### Compositing conditions . . .

**Four main factors -- aeration, moisture, fertilizer, and particle size -- determine how quickly and efficiently composting will occur.** Although some composting will occur if optimal requirements are not met, the process may take a year or more rather than the two to eight weeks normally needed to have finished compost under

ideal conditions. Efficient composting will greatly increase the rate of decomposition and develop sufficient heat to destroy most weed seeds and disease pathogens.

#### **Aeration**

Proper aeration is important to provide sufficient oxygen to microbes thus allowing maximal rates of decomposition and the development of the high internal pile temperatures necessary for the destruction of weed seeds and pathogens.

Periodic turning of the pile, every few days to once or twice a month, will loosen the mixture and allow for increased aeration.

Lack of oxygen will cause the pile to become anaerobic, develop a bad odor, and greatly slow the process.

#### **Moisture**

Moisture content of the pile also will greatly influence aeration. The pile should be moist but not so wet that large amounts of water can be squeezed from the material.

During periods of prolonged dry and hot weather, turn and water the pile to allow for better aeration and insure uniform moisture throughout the pile.

#### **Fertilizer**

Proper nutrient level in the compost pile, particularly nitrogen, is important. The bacteria and fungi, which act to break down the organic materials, need nitrogen to reproduce and thrive.

Organic materials may be categorized by their carbon to nitrogen ratio (C:N). Materials high in nitrogen have a low C:N ratio. When materials which have a high C:N ratio are added, either a nitrogen fertilizer or sufficient materials having a low C:N ratio need to be added.

Other nutrients such as potassium and phosphorous are usually in adequate supply.

### Particle size

Particle size plays a major role in determining when the final product will be ready for use since smaller pieces decay faster. Adding large stems such as broccoli, corn stalks or big wood chips to the pile will slow down the decomposition process significantly.

Avoid an overabundance of extremely fine materials as well since this will drastically limit aeration inside the pile. Particles should be fairly small (1/2 inch to about 4 inches) yet of a variety of sizes to allow for good aeration and quicker composting.

Use a garden shredder, lawn mower, or even a hand pruner, to cut larger materials into smaller pieces.

## The compost pile enclosure . . .

Compost piles typically are located near the garden or yard in an area out-of-the-way yet easily accessible for the addition of materials and removal of the finished compost.

One of the most common and inexpensive compost pile designs consist of a movable circular bin constructed of woven wire fencing. The fencing should have fairly small openings to better contain the materials and should be about three to five feet in diameter and four to five feet high.

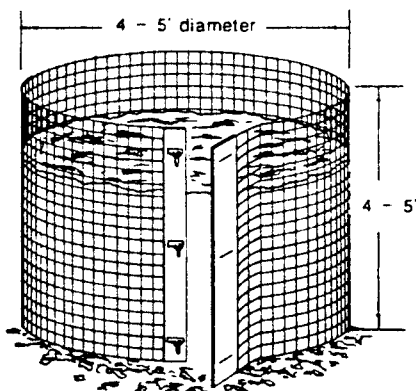
Turning the pile is facilitated by simply unfastening the wire, removing it from around the pile, moving it a few feet away, reform and refasten the wire then turn the pile back into the enclosure.

Compost should be ready in one to four months depending on the materials used and how frequently the pile is turned.

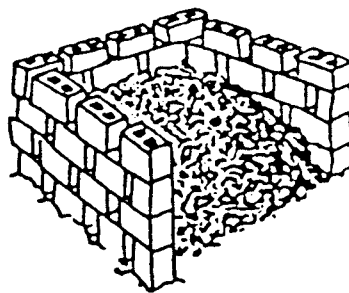
Smaller amounts of compost can be made in an old 55 gallon barrel. Drill 1/2-inch holes every four to six inches over the surface of the barrel for aeration. Simply stand the barrel on end on some blocks to allow for air movement. Fill it 3/4 full with composting material, add enough water to moisten the material, and replace the cover.

Mix the compost two to three times a month simply by taking the barrel down from the blocks and rolling it around the yard. Compost should be ready in one to three months.

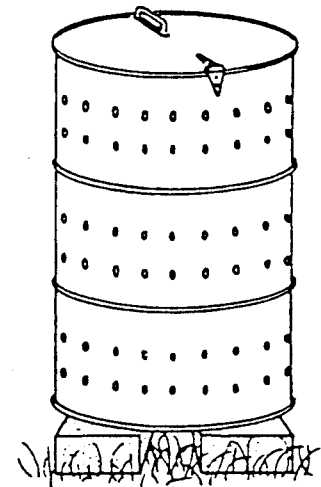
Small compost bins and containers also are available commercially.



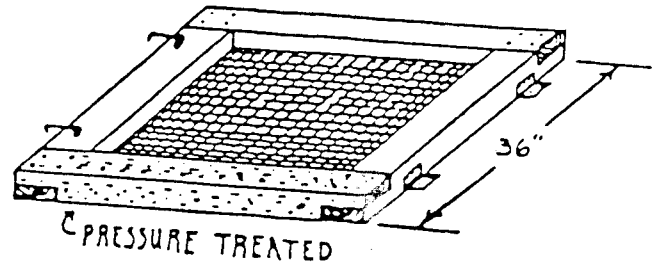
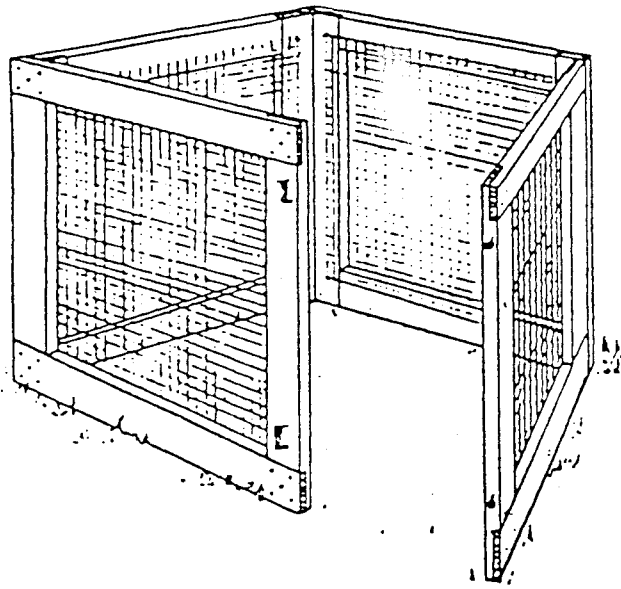
Wire fencing or snow fence can make a simple composting structure. Multiply the diameter you want by 3.14 to determine the length of fence needed. Fasten with wire or 3 to 4 chain clips. When you need to turn the pile, peel the fence away and set it up nearby. Turn the compost into the structure in its new location.



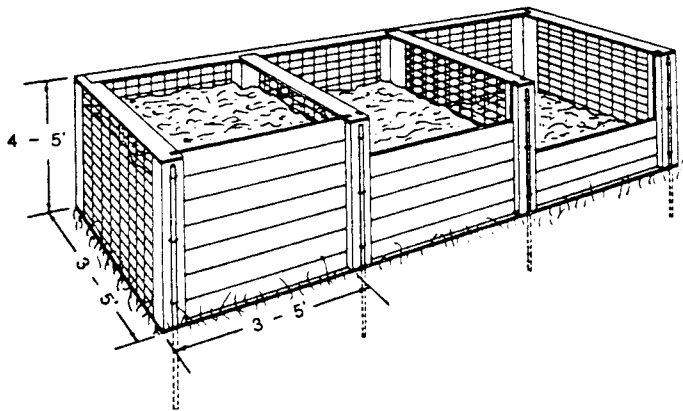
Cement block or brick compost bins can be layed without mortar. Leave spaces between blocks to permit aeration. Build a three-sided, square, or three-bin unit. The potential for instability of loosely stacked blocks or bricks may make this structure an inappropriate choice if located near areas where children play.



A barrel composter can be built from a 55-gallon drum. Drill 6 to 9 rows of 1/2" holes over the length of the barrel to let air circulate. Fill 3/4 full of material. Every few days, lay the barrel down and roll it over a few times to mix. (Use a barrel that has not been used for toxic substances.)



The portable wood and wire composting bin is a flexible unit. It works well in small spaces as a holding unit for yard wastes or as a portable turning unit for kitchen and yard wastes. The unit can be moved easily to turn piles or build a new one. Simply undo the latches, pull the sides apart, and move it.



A three-chambered bin is an efficient and durable structure for fast composting. It holds a considerable amount of compost and allows good air circulation. The three-chambered bin works like an assembly line, having three batches of compost in varying stages of decomposition. Start the compost material in the first bin and allow it to heat for 3 to 5 weeks. Next, turn it into the middle bin for another 4 to 7 weeks, while a new batch is started in the first bin. Finally, the material in the middle bin is turned into the third bin as finished or nearly finished compost.

For larger amounts of compost, it often is best to build a three-chambered bin. The bins may be constructed of concrete blocks, bricks, posts, and woven wire fencing or treated wood lumber. Each bin should be about four feet square and four to five feet high. Leave spaces between the blocks or boards for aeration.

Layer raw materials in the first bin and allow to compost for three to four weeks. Turn this material into the second bin where it will remain for another four weeks or so. In the meantime, new material for composting may be placed in the now empty first bin. The material in the second bin is then finally turned into the third bin for final composting. After about another month the material in the third bin should be ready for use and the process can be repeated.

## Preparing the compost pile . . .

The composting process will be most efficient when materials are of the proper size, at the proper moisture content, and adequately supplied with oxygen and nitrogen. This can be accomplished best by the way the various materials are layered into the compost pile.

Materials on the bottom and center of the pile generally will compost at the fastest rate while materials on the edges of the pile, which may dry out, decompose more slowly.

Start the pile by putting a layer of organic wastes like grass clippings, leaves, kitchen vegetable scraps, egg shells, coffee grounds, weeds, old hay, straw, etc. about

6 to 8 inches thick. Sprinkle water on this material until it is moist.

Next apply 1 to 2 inches of fresh, dried or bagged livestock or poultry manure or scatter about 1/3 cup of a high-nitrogen fertilizer, like 20-5-5, over the surface of the pile. Do not use a fertilizer which contains an insecticide or herbicide.

The next layer is about a 2 inches of garden soil or finished compost to supply the necessary fungi and bacteria that will work to decompose the wastes. This layer also helps keep the layer beneath it from smelling.

Commercial compost starter solutions are available but generally are no more effective than just using ordinary soil or finished compost. Old leaves often have sufficient numbers of microbes already present to start the decomposition process.

Repeat this layering process until the pile is at least 4 feet high.

Finish the pile by leaving a small depression in the center of the pile to help capture rainfall and facilitate adding water to the pile.

Additional materials, such as shredded newsprint or sawdust, may be added in small quantities but must first be mixed with additional nitrogen fertilizer – about 1 cup of fertilizer for each 100 lbs. of sawdust or 1/2 cup for each 100 lbs. of shredded newspaper.

Do not use human and pet feces because of the possibility of spreading disease. Also restrict the addition of meat, bones, grease, whole eggs, and dairy products since these will cause foul odors and attract animals and other pests.

Compost ordinarily should be ready in 2 to 4 months. However, frequent turning and mixing of the pile will speed the process.

Check the pile periodically to see that it's heating up sufficiently. The easiest way to do this is to push a metal rod into the center of the pile for a few minutes. Pull out the rod and check to see if the end of the rod is hot. You also should see steam escaping from the pile when it is being turned.

An active compost pile should develop internal temperatures of 130° to 160°F. If the pile is not heating properly, additional nitrogen may be added to supply the microbes or more organic material may be added to increase pile volume and allow for more efficient composting.

Turning the pile will mix lesser decayed material from the outside of the pile into the center where more active decomposition is occurring. Turning adds oxygen to the pile and mixes the contents of the pile as well.

Composting is completed when further mixing no longer produces additional heat, all materials are of uniform texture and fairly indistinguishable, and the compost has an earthy smell. The pile also should have decreased in size by 1/2 to 2/3 of its original volume.

## Uses for compost . . .

Finished compost is an excellent additive for gardens and flower beds. It increases the organic content of the soil, adds nutrients, improves soil structure, drainage and nutrient -holding capacity, and increases crop productivity. The high temperatures in the compost pile also have destroyed most weed seeds and disease spores.

Compost works very well as a summer mulch to hold moisture and deter weed growth.

Finished compost also may be used for up to about 15% of a potting soil for house plants or bedding plant mix.

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