

# Composting

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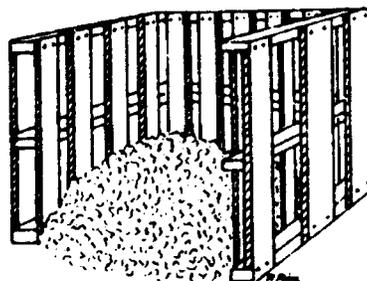
Composting is a degradation process brought about by bacteria and fungus organisms. Large amounts of organic kitchen, garden, lawn, and/or farm refuse can be reduced in a relatively short time to a pile of black, crumbly humus which makes an ideal soil conditioner. Compost added regularly to soil will inevitably benefit the soil. The soil's structure will improve, since humus contains substances which cause aggregation (sticking together) of soil particles. In a clay soil this means that the microscopic individual particles will be clumped together and more air spaces will be opened up between clumps. Without these air spaces the clay particles stick tightly to each other, forming a nearly impenetrable barrier to water and gases. This is why clay is so sticky when wet and hard when dry. In sandy soils, the large sand particles are clumped with humus too, the humus adding its nutrient- and moisture-holding capacity. Normally, water and nitrogen fertilizers leach quickly from sandy soil, making it necessary to add them frequently.

A less widely recognized benefit from compost is that it contains humic and other organic acids which help to degrade compounds naturally present in the soil into the simpler form that plants use. These elements, or ions, can then be held by the humus particles, which contain many ion exchange sites on their surfaces. The ions are released into soil water, and plant roots are able to take them up.

Because there are so many ion exchange sites on humus particles, humus increases the buffering capacity of the soil. This condition helps to prevent rapid leaching of lime and nutrients as well as reducing the effects of over-liming and over-fertilizing. For example, when a soil's pH is increased too much by adding too many wood ashes, the most economical way to correct the condition is generally to add compost, which will adsorb (take up on the surface) the extra ions that produce the high pH. (compost itself is somewhat acid because of the acidic products made by microorganisms.) In other words, compost buffers the effects of other soil additives.

Compost and other organic matter turns the soil dark brown or blackish and increases heat-absorbing capabilities to a small extent. Compost reduces soil erosion because it allows water to percolate into lower soil layers, rather than puddle on top and then run off. This quality also reduces crusting of soil. Compost provides food for earthworms, soil insects, and microorganisms, many of

which will, over the years, help balance the populations of less desirable soil fauna. Mycorrhizal fungi, which have been proven to benefit plants through their association with plant roots, are also prolific in high humus soil. Finally, the products from the breakdown of plant and animal refuse contain many fertilizing elements in and of themselves, including trace elements not available from commonly used synthetic fertilizers.



## Composting equipment

If you wish to make compost regularly, it will be helpful to have compost bins in some form. You can construct two bins out of planks or concrete blocks. Make the bins about 4 feet high, 4 feet wide, as long as desired, and open at one end for easy access. Leave spaces between blocks or planks for aeration. Plant refuse may be accumulated in one bin while the composting process is taking place in the other. A third bin may be desirable for nearly finished or finished compost storage.

A simple, portable, compost bin can be made with three or four sturdy used pallets that are simply stood on their ends in a square or open square and lashed or otherwise held together. This type of bin can be disassembled for easy turning and emptying, then reassembled around the new pile. A chicken wire cage supported by three or four wooden stakes will also work satisfactorily, but is somewhat less sturdy.

There are also ready-made and kit composters available, including slat-sided cylinders into which refuse is added from above and compost removed at ground level. Rotating barrels for easy turning are also available; gardeners who have physical disabilities may find either of these types easier to deal with than the standard compost bin.

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Whichever type of compost maker you use, it's a good idea to make use of the nutrients that leach out from under the pile. This is easily done by locating the composter in the garden (which also reduces hauling time), or under a large fruit tree, or by making some provision to catch the runoff from the pile and use it as liquid fertilizer.

## Making Compost

Start the compost pile with a 3-inch layer of coarse plant material such as small twigs or chopped corn stalks. This will aid in aeration and drainage. On top of this, put a layer of plant and kitchen refuse - leaves, straw, weeds, waste from garden plants, husks, coffee grounds, crushed egg shells, canning wastes, etc. It is not a good idea to use meat wastes because they will attract digging animals. Next, add a layer of nitrogen-rich material. This can be fresh manure if available, fresh grass clippings (not too thick a layer, as they will mat) or fresh hay. If you don't have enough nitrogenous material, there will not be enough nitrogen for the microorganisms to make proteins. Add more in the form of synthetic nitrogen fertilizer (1/2 cup 10-10-10 per 6-inch layer will do), blood meal (also 1/2 cup per 6-inch layer), or cottonseed meal (1 cup per 6-inch layer). The latter two are expensive when purchased in the typical 5-pound bags available in garden centers, but cottonseed meal can be found at a very reasonable price in bulk at a farm supply store.

If a more alkaline compost is desired, add 1 pint of ground limestone per square yard of surface area. Liming will also help reduce odors and keep compost "sweet."

It has formerly been recommended that a 1-inch layer of soil be added for each 6 inches of plant wastes to supply microorganisms for the composting process, but research has shown that this is not always necessary. Enough soil is generally included on roots of plants and in manure to inoculate the compost pile. Compost starters may also be unnecessary. If the wastes are free of soil for the most part, however, a sprinkling of soil or starter at each layering may be beneficial. Repeat the layers of plant material and nitrogenous material as many times as needed to use all the plant refuse available. If you are using a ready-made composter, follow the manufacturer's instructions.

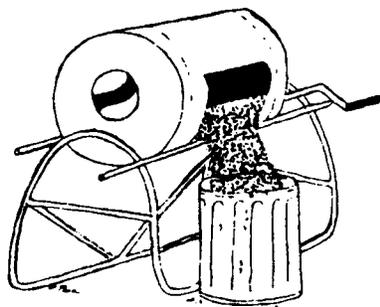
Water the pile as often as necessary to keep the contents moist, but not soaking wet. The top of the pile should be low in the center to cause water to move into the pile rather than to run off. Within a few days, the pile should heat up significantly, to about 160° F. This is a necessary stage in composting, as the temperature will kill many weed seeds and harmful organisms. If the pile fails to heat, there is insufficient nitrogen or water in the pile, and more should be added. The pile will decrease in size after a few weeks if it is composting properly.

If the compost pile smells like ammonia, it may mean that the materials in the pile are too tightly packed or that the pile is too wet; i.e., there is not enough air. Turn the heap, adding some coarser material, and start over.

The pile should be forked over after about a month (2 weeks if the material is shredded), putting the outside materials on the inside and vice versa to make sure everything gets broken down. Turn again 5 to 6 weeks later. The plant materials should decompose into good compost in about 4 or 5 months in warm weather, but may take longer under cool or dry conditions. Composting may be completed in 1 or 2 months if the materials are shredded, kept moist, and turned several times to provide good aeration.

When compost is finished it will be black and crumbly, like good soil, with a pleasant, earthy smell. Only a few leftover corncobs or stalks will remain undecayed. These can be sifted out and added to the next batch. For use in potting mixtures, a relatively fine sieve (1/4-inch hardware cloth) will take out the larger chunks. Otherwise, the compost can be spread in the garden as it is and dug or tilled under.

If you need only a small amount of compost, you can use a plastic trash bag to compost relatively fine material such as leaves, lawn clippings, or chopped garden refuse. Make layers as in a compost pile, or mix all materials together. Add 2 quarts of water to dry material (one quart if it is quite moist or succulent). Tie the bag and turn it over every few weeks to aerate the material and distribute the moisture.



## BUILDING A COMPOST PILE

