

# The Rapid Composting Method

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Composting is a process in which organic substances are reduced from large volumes of rapidly decomposable materials to small volumes of materials which continue to decompose slowly. In this process, the ratio of carbon to other elements is brought into balance, thus avoiding temporary immobilization of nutrients. One of the many benefits of adding compost to the soil is that the nutrients in it are slowly released to the soil and are then available for use by plants. Decomposition will take place in soil if undecomposed organic materials are added to it, but in the breakdown process nutrients will be tied up and unavailable for plants to use. This may result in nutrient deficiencies and poor growth, especially if large amounts of material are added.

The old method of composting was to pile organic materials and let them stand for a year, at which time the materials would be ready for use. The main advantage of this method is that little working time or effort is required from the composter. Disadvantages are that space is utilized for a whole year, some nutrients might be leached due to exposure to rainfall, and disease-producing organisms, some weeds, weed seeds and insects are not controlled.

Recently, a new method has been developed which corrects some of the problems associated with the old type of composting. With this process, compost can be made in 2 to 3 weeks.

Extra effort on the part of the composter is required in exchange for this time saving, but for those who want large amounts of compost, or for those who wish to convert materials which are usually wasted into useable compost, the effort is worthwhile.

There are several important factors essential to the rapid composting method. Because all are important, there is no significance to the order in which they are listed here.

1. Material will compost best if it is between  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches in size. Soft, succulent tissues need not be chopped in very small pieces because they decompose rapidly. The harder or the more woody the tissues, the smaller they need to be divided to decompose rapidly. Woody material should be put through a grinder, but most grinders chop herbaceous materials too finely for good composting. Chopping material with a sharp shovel is effective. When pruning plants, cut material into small pieces with the pruning shears—it takes a little effort but the results (and the exercise!) are good.
2. For the composting process to work most effectively, material to be composted should have a carbon to nitrogen ratio of 30 to 1. This cannot be measured easily, but experience has shown that mixing equal vol-

Division of Agricultural Sciences  
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LEAFLET 21251

PRINTED SEPTEMBER 1981

umes of green plant material with equal volumes of naturally dry plant material will give approximately a 30/1 carbon to nitrogen (C/N) ratio. Green material can be grass clippings, old flowers, green prunings, weeds, fresh garbage and fruit and vegetable wastes. Dried material can be dead, fallen leaves, dried grass, straw and somewhat woody materials from prunings. Such materials are easy to find in fall and early spring but are more difficult to find in the growing season. During this time, paper bags, cardboard boxes, cereal and milk cartons, and paper can be used for dried materials but they must be finely chopped or shredded. Newspapers can be used if shredded and separated by plant tissues so they do not mat—matting is bad because oxygen is necessary for rapid decomposition and matting excludes oxygen. Any material which is cut green and is allowed to dry is considered green. Some green materials, such as grass clippings also may mat if care is not taken to separate them using dry materials.

3. Composting works best if the moisture content of materials in the pile is about 50 percent. This is not easy to measure, but with experience the correct amount of moisture can be estimated. Too much moisture will make a soggy mass, and decomposition will be slow and will smell. If the organic material is too dry, decomposition will be very slow or will not occur at all.
4. Heat, which is very important in rapid composting, is supplied by the respiration of the microorganisms as they break down the organic materials. To prevent heat loss and to build up the amount of heat necessary, a minimum volume of material is essential: a pile at least 36" × 36" × 36" is recommended. If less than 32", the rapid process will not occur. Heat retention is better in bins than in open piles, so rapid composting is more effective if bins are used. (In addition, the use of bins is much

neater.) High temperatures favor the microorganisms which are the most rapid decomposers; these microorganisms function at about 160° F (71° C) and a good pile will maintain itself at about that temperature. A thermometer to measure temperatures inside the pile is helpful although not necessary.

5. The compost pile needs to be turned to prevent the pile from getting too hot. If it gets much above 160° F, the microorganisms will be killed, the pile will cool, and the whole process will have to start from the beginning. By turning the pile it will not overheat, and it will be aerated also, both of which are necessary to keep the most active decomposers functioning.

The pile should be turned so that material which is on the outside is moved to the center. In this way, all the material will reach optimum temperatures at various times. Due to heat loss around the margins, only the central portion of the pile is at the optimum temperature. Because of the necessity for turning, it is desirable to have two bins so the material can be turned from one into another. Bins made with removable slats in the front make the turning process easier.

Bins with covers retain the heat better than do those having no covers. Once the decomposition process starts, the pile becomes smaller and because the bin is no longer full, some heat will be lost at the top. This can be prevented by using a piece of polyethylene plastic slightly larger than the top area of the bins. After the compost is turned, the plastic is placed directly on the top of the compost and is tucked in around the edges.

If the material in the pile is turned every day, it will take 2 weeks or a little longer to compost. If turned every other day, it will take about 3 weeks. The longer the interval between turning the longer it will take for the composting to finish.

6. Once a pile is started, do not add anything (with perhaps one exception, which will be mentioned in 9). The reason is that it takes a certain length of time for the material to break down and anything added has to start at the beginning, thus lengthening the decomposition time for the whole pile.

Excess material should be as dry as possible during storage until a new pile is started. Moist stored materials will start to decompose and if this occurs, they will not do a good job in the compost pile.

7. Nothing needs to be added to the organic materials to make them decompose. The microorganisms active in the decomposition process are ubiquitous where plant materials are found and will develop rapidly in any compost piles.
8. If done correctly, a pile will heat to high temperatures within 24 to 48 hours. If it doesn't, the pile is too wet or too dry or there is not enough green material (or nitrogen) present. If too wet, the material should be spread out to dry. If too dry, add moisture. If neither of these, then the nitrogen is low (a high C/N ratio) and this can be corrected by adding materials high in nitrogen (such as ammonium sulfate, grass clippings, fresh chicken manure or urine diluted 1 to 5).
9. If the C/N ratio is less than 30/1, the organic matter will decompose very rapidly but there will be a loss of nitrogen. This will be given off as ammonia and if this odor is present in or around a composting pile, it means that valuable nitrogen is being lost in the air. This can be counteracted by the addition of some sawdust to that part of the pile where there is an ammonia odor — sawdust is very high in carbon and low in nitrogen (a high C/N ratio) and therefore will counteract the excess nitrogen. Other than adding water should the pile become dry, this is the only thing

which should be added to a pile once it's started. Because composting can be done anytime, during the rainy season some covering of the pile may be necessary to keep the composting materials from becoming too wet.

10. Materials which should not be added to a composting pile include soil, ashes from a stove or fireplace, and manure from carnivorous (meat-eating) animals. Soil adds nothing but weight to a compost pile and will discourage the turning of the pile which is necessary for the rapid composting process. Wood ashes will not decompose. Most soils in California have a basic pH and as wood ashes are basic, they should not be added to a compost pile or to the soil. Manure from carnivorous animals such as dogs, cats, lions, tigers, etc., could contain disease-producing organisms that might infect humans. It is not known whether or not the rapid composting process will kill these organisms and therefore such manures should not be used — manures from herbivorous animals such as rabbits, goats, cattle, horses, elephants or fowl can be used.
11. The rapid decomposition can be detected by a pleasant odor, by the heat produced (this is even visible in the form of water vapor given off during the turning of the pile), by the growth of white fungi on the decomposing organic material, by a reduction of volume, and by the change in color of the materials to dark brown.
12. As composting nears completion the temperature drops and, finally, little or no heat is produced. The compost is then ready to use. If in the preparation of the compost, the material was not chopped in small pieces, screening the material through 1-inch-mesh chicken wire will hold back such pieces. These can be added to the next pile and eventually they will decompose.

Advantages of the rapid composting system include:

- The production of a valuable soil amendment from many organic materials which normally might be wasted.
- Compost can be made ready for use in as short a time as 14 to 21 days.
- Rapid composting kills all plant disease-producing organisms if done as described. It does not inactivate heat resistant viruses such as tobacco mosaic virus.

- Insects do not survive the composting process. Though some may be attracted to the pile, if they lay their eggs in the compost the heat will destroy them.
- Most weeds and weed seeds are killed. Some weeds such as oxalis bulbs, seeds of burr clover, some amaranthus seeds and seeds of cheeseweed are not killed by the high temperatures in the pile.

In addition to the above, outdoor exercise is an added benefit.

This composting project was supported in part by a grant from the Elvina J. Slosson Fund.

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