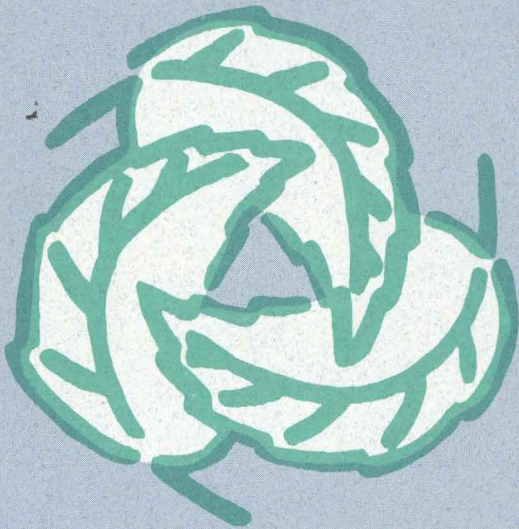


HOME COMPOSTING



Turning Your Spoils to Soil

Waste Management Assistance Division
Iowa Department of Natural Resources

What Is Compost?

Compost is a dark, crumbly, and earthy smelling form of decomposing organic matter.

Why Make Compost?

Composting is the most practical and convenient way to dispose of yard wastes. It can be easier and less expensive than bagging these wastes or taking them to the local composting facility. Compost also improves soil and the plants growing in it. If you have a garden, a lawn, trees, shrubs, or even planter boxes, you have a use for compost.

By using compost you return organic matter to the soil in a usable form. Organic matter in the soil improves plant growth by helping to break heavy clay soils into a better texture, by adding water and nutrient holding capacity to sandy soils, and by adding essential nutrients to any soil. Improving your soil is the first step toward improving the health of your plants. Healthy plants clean our air, conserve our soil, and require fewer pesticides.

What Can Be Composted?

Anything that was once alive can be composted. Yard wastes, such as fallen leaves, grass clippings, weeds, the remains of garden plants, and kitchen scraps free of meats, bones or fats make excellent compost. Woody yard wastes can be shredded for mulching and path-making where they eventually decompose and become compost.

How Can Compost Be Used?

Compost can be used to enrich flower beds and vegetable gardens, to improve the soil around trees and shrubs, as a soil amendment for house plants and planter boxes and, when screened, as part of a seed-starting mix or lawn top-dressing. Before they decompose, chipped woody wastes make excellent mulch or path material. After decomposition, these same woody wastes will add texture to garden soils.

The Essentials

With these principles in mind, everyone can



Biology

The compost pile is really a teeming microbial farm. Bacteria start the process of decaying organic matter and are the most numerous and effective composters. Fungi and protozoans soon join the bacteria and somewhat later in the cycle, centipedes, millipedes, beetles and earthworms do their parts.



Materials

Plant materials growing in your yard or kitchen scraps free of fats, meats, and bones are potential foods for these tiny decomposers. Carbon and nitrogen, from the cells of dead plants and kitchen scraps, together with dead microbes, fuel decomposition activity. The micro-organisms use the carbon in leaves or wood wastes as an energy source. Nitrogen provides the microbes with the raw elements of proteins to build their bodies.

Everything organic has a ratio of carbon to nitrogen (C:N) in its tissues, ranging from 500:1 for sawdust, to 15:1 for table scraps. A C:N ratio of 30:1 is ideal for the activity of compost microbes. This balance can be achieved by mixing two parts grass clippings (which have a C:N ration of 20:1) with one part fallen leaves (60:1) in your compost. Layering can be useful in arriving at these proportions, but a complete mixing of ingredients is preferable for the composting process. Other materials can also be used, such as kitchen scraps, weeds and garden wastes. Although the C:N ratio of 30:1 is ideal for a fast, hot compost, a higher ratio (i.e. 50:1) will be adequate for a slower compost.



Surface Area

The more surface area the micro-organisms have to work, the faster the materials are decomposed. It's like a block of ice in the sun—slow to melt when it's large, but melting very fast when broken into smaller pieces. Chopping garden wastes with a shovel,

of Composting

take excellent use of their organic wastes.

machete, shredding machine or lawnmower will speed decomposition.



Volume

A large compost pile will insulate itself and hold the heat of microbial activity. Its center will be warmer than its edges. Piles smaller than 3 feet cubed (27 cubic feet) will have trouble holding this heat, while piles larger than 5 feet cubed (125 cubic feet) don't allow enough air to reach the microbes at the center. These proportions are important only if your goal is a fast, hot compost.



Moisture & Aeration

All life on Earth needs a certain amount of water and air for subsistence. The microbes in the compost pile are no different. They function best when the compost materials are as moist as a wrung-out sponge, and provided with many air passages. Extremes of sun or rain can adversely affect the moisture balance in your pile.

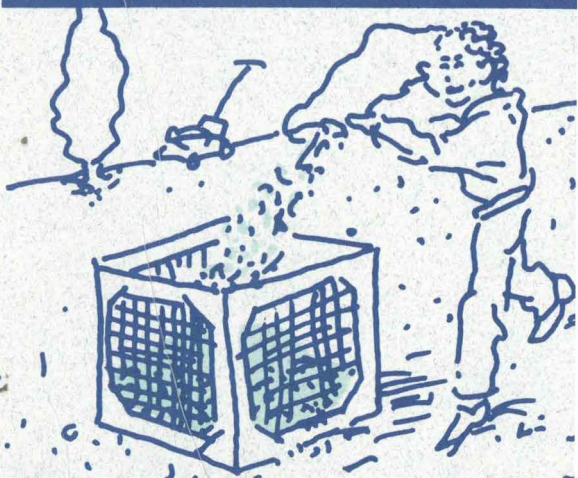


Time & Temperature

The faster the composting, the hotter the pile. If you use a large volume of materials with a proper C:N ratio, and maintain adequate moisture and aeration, you will have a hot, fast compost (hot enough to burn your hand)! You may want to use the turning unit discussed in the next section. If you just want to dispose of your yard wastes in an inexpensive, easy, non-polluting way, the holding unit (discussed below) will serve well.

The Iowa Department of Natural Resources thanks Thurston County, Washington Community Composting Education Program for permission to modify and/or re-print this brochure.

Composting Yard Waste



Holding Units

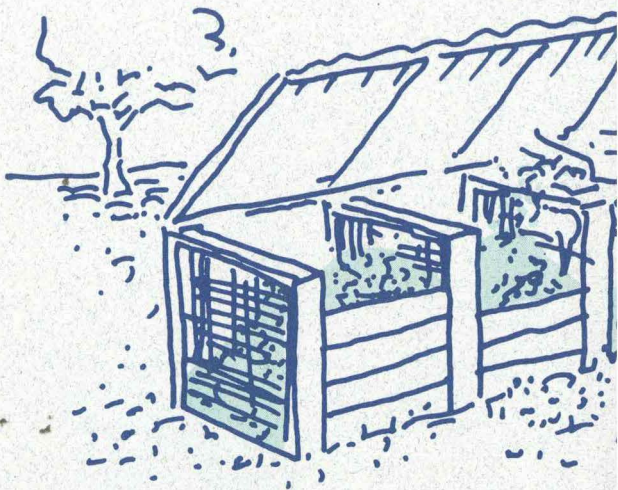
These simple containers for yard wastes are the least labor and time-consuming way to compost.

Which wastes? Non-woody yard wastes are the most appropriate.

How? Place the holding unit where it is most convenient. As weeds, grass clippings, leaves and harvest remains from the garden plants are collected, they can be dropped into the unit. Chopping or shredding wastes, alternating high-carbon (brown) and high nitrogen (green) materials, and maintaining good moisture and aeration will all speed the process.

Advantages & disadvantages. Holding units are the simplest method to accommodate yard wastes. The units can be portable and moved to the needed area of the garden. Composting yard wastes in a holding unit can take from six months to two years.

Variations. Holding units can be made of circles, hardware cloth, old wooden pallets, or wood and wire. Sod can also be composted with or without a holding unit, by turning sections of it over, providing adequate moisture and covering the unit with black plastic.



Turning Units

This is a series of three or more bins allowing wastes to be turned on a regular schedule. Turning units are most appropriate for gardeners with a large volume of yard wastes and the desire to make a high quality compost.

Which wastes? Non-woody yard wastes are appropriate. Kitchen wastes free of meat, bones or fats can be added to the center of a pile if it is turned weekly and reaches high temperatures.

How? Alternate layers of high-carbon and high-nitrogen materials to approximately a 30:1 ratio, and moisten to the damp sponge stage. The pile temperature should be checked regularly; when the heat decreases substantially, turn the pile into the next bin. Dampen the materials if they are not moist, and add more high-nitrogen material if heating is not occurring. Then, make a new pile in the original bin. Repeat the process each time the pile in the first bin cools. After two weeks in the third bin, the compost should be ready for garden use. See the *Rodale Guide to Composting* in your library for more information on hot composting.



The following troubleshooting chart is a guide to more efficient composting using a turning unit.

Symptoms	Problem	Solution
The compost has a bad odor.	Not enough air; too moist.	Turn it. Add dry, porous materials such as leaves or straw.
The center of the pile is dry.	Not enough water.	Moisten materials while turning the pile.
The compost is damp and warm in the middle, but nowhere else.	Too small.	Collect more material and mix the old ingredients into a new pile.
	Insufficient moisture. Lack of green materials.	Add water; turn pile. Add greens, manure or food scraps free of meat, bones, fats.
The heap is damp and sweet-smelling, but still will not heat up.	Lack of nitrogen.	Mix in a nitrogen source like fresh grass clippings, fresh manure, bloodmeal or ammonium sulfate.
The heap attracts pests, rodents and small animals.	Presence of meat scraps.	Remove meats, fats and bones; use soil incorporation method.



Mulching

Yard wastes can be used for weed control and water retention.

Which wastes? Woody yard wastes, leaves, and grass clippings.

How? Simply spread leaves or grass clippings beneath plantings. For woody materials up to one inch in diameter, rent or purchase a chipper/shredder. Tree services may deliver wood chips for a nominal fee.

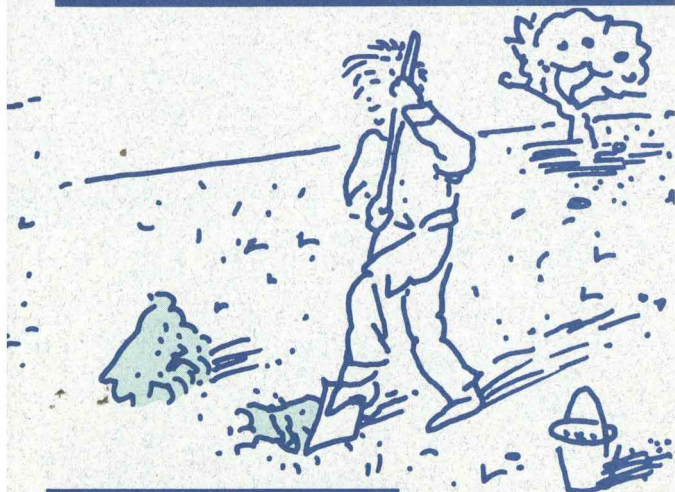
Advantages & disadvantages. All yard waste will work first as a mulch and then, as decomposition proceeds, as a soil enrichment. A disadvantage of mulching with woody yard wastes is that you may have to buy or rent power equipment or make arrangements with a tree service.

Variations. Use chipped materials for informal garden paths.

Public Education Video Available

Copies of the video "Home Composting - Turning Your Spoils" are available from the following sources: Iowa State University Libraries Film Service; ISU Horticulture Extension; Council on Environmental Quality; Springbrook Film Library; Iowa Recycling Association; Iowa Department of Natural Resources. For more information, contact Waste Management Assistance Building, Des Moines, IA 50319-0034; Telephone: 515/281-1234.

Composting Food Wastes



Soil Incorporation

Burying your organic wastes is the simplest method of composting.

Which wastes? Kitchen scraps free of meat, bones or fats.

How? All food wastes should be buried at least eight inches below the surface. Holes can be filled and covered, becoming usable garden space the following season.

Advantages & disadvantages. Soil incorporation is a simple method, but because of the absence of air, some nutrients will be lost. Rodents and dogs can become a problem with wastes buried less than six inches deep.

Variations. Using a posthole digger, wastes can be incorporated into the soil near the drip line of trees or shrubs and in small garden spaces.

Soil" are available locally from: County Conservation Boards; Public
overnments; Regional Recycling Coordinators; DNR Field Offices;
rural Heritage Foundation and the DNR's Central Video Library. For
ion, Iowa Department of Natural Resources, Wallace State Office
NR or 515/281-5145.



Earth Worm Compost

Feeding earthworms in wooden bins is an excellent method for making high-quality compost from food scraps.

Which wastes? Kitchen scraps free of meat, bones or fats.

How? Fill a bin with moistened bedding such as peat moss for the worms. Rotate the burying of food wastes throughout the worm bin. Every three to six months the worm population should be divided and moved to fresh bedding. Refer to *Worms Eat My Garbage* by Mary Appelhof (available at some libraries) for more information.

Advantages & disadvantages. Earthworm composting is an efficient method to convert food wastes into high-quality soil for house plants, seedling transplants, or general garden use. The worms are a useful product for fishing. However, worm composting of food wastes is more expensive and complicated than soil incorporation.

Variations. A stationary outdoor bin can be used in all but the coldest months, or a portable indoor/outdoor bin can be used year-round.

Supplemental Reading List

Composting to Reduce the Waste Stream: A Guide to Small Scale Food and Yard Waste Composting. (1991) by N. Dickson, T. Richard, and R. Kozlowski. 44 pp. Available from: Northeast Regional Agricultural Engineering Service, 152 Riley-Robb Hall, Cooperative Extension, Ithaca, NY 14853.

The Earth Worm Book. (1977) by J. Minnich. Rodale Press, Emmaus, PA 18049. 327 pp.

The Incredible Heap: A Guide to Compost Gardening. (1983) by C. Catlon and J. Gray. St. Martin's Press, Inc., New York, NY 10010.

Let It Rot: The Gardeners Guide to Composting. (1975) by S. Campbell. Garden Way Publishing. Story Communications, Inc. Pownal, VT 05261. 152 pp.

Master Composter Resource Manual. (1987) by C. Woestendiek, C. Benton, J. Gage, and H. Stenn. 44 pp. Available from: Seattle Tilth Association, 4649 Sunnyside Avenue North, Seattle, WA 98103.

Organic Gardening Magazine. Published monthly by Rodale Press, Emmaus, PA 18049.

The Rodale Guide to Composting. (1979) by J. Minnich and M. Hunt. Rodale Press, Emmaus, PA 18049. 405 pp.

Worms Eat My Garbage. (1982) by M. Appelhof. Flower Press, 10332 Shaver Rd., Kalamazoo, MI 49002. 100 pp.

This is only a partial listing of available resources. By providing this listing to you, the Iowa Department of Natural Resources is not recommending these resources over any others.

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*Assisting Iowans to protect and conserve natural
resources and the environment through the
practice of responsible waste management.*

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