



# COMPOST

Landfills in Illinois can no longer accept landscape waste, so what do we do with the tons of lawn and garden waste that we generate as gardeners? Composting not only keeps these materials out of landfills, but also recycles lawn, garden, and kitchen waste into a rich soil amendment for the garden.

Compost is simply a mixture of soil and pieces of plants that have decomposed to the point of being unrecognizable. It has a rich, earthy smell if properly decomposed, and is dark brown and crumbly. It is an attractive and healthy addition to any garden. Compost is the ultimate soil conditioner since it improves both texture and structure. Compost used as an amendment loosens and aerates heavy clay soils, improving drainage and increasing nutrient availability to plant roots. In sandy soils, compost increases the water-holding capacity and nutrient-holding ability.

Compost is a superb soil amendment, topdressing, and mulch that can be utilized on lawns, garden beds, around trees and shrubs, and in containers. Mulching with compost moderates soil temperature, retains moisture, and provides nutrients for plants. Also, organic matter naturally changes soil's basic chemistry to allow the release of nutrients for use by the plants. Incorporating compost as a soil amendment enables plants to become stronger, healthier, and more easily able to fend off attacks from diseases and pests.

## Understanding the Basics

The process of composting is actually a simple one that occurs throughout nature. Microorganisms in the soil consume the nitrogen in plants and break down carbon, changing plant tissues into visually unrecognizable forms. This process gives off energy in the form of heat, which is why compost piles produce steam.

Composting requires four basic components to set the process in motion: a blend of organic materials such as manure or garden waste, air, moisture, and a population of microorganisms that function as decomposers. Composting does not require a precise recipe, but rather a basic understanding of combinations that work well. Temperature and rainfall often vary; therefore, materials that work well one time may not always work.

## Organic Materials

All garden and lawn waste contains carbon and nitrogen. The more decomposers there are, the faster and more efficiently compost will be made. Decomposers work most efficiently when

the carbon to nitrogen ratio is between 25:1 and 30:1. The various types of garden waste have differing ratios. For example, dry leaves have a ratio of about 50:1, grass clippings about 19:1, and sawdust about 500:1. Finished compost has a ratio of around 10:0. Sawdust alone will break down very slowly since the decomposers have little nitrogen to reproduce. The addition of a nitrogen source will speed the process.

Although it's not critical to know exact ratios when home composting, it is helpful to have a general idea of why ratios are important. Dry, bulky materials such as leaves, stems, straw, and sawdust have a high ratio of carbon to nitrogen and will usually require additional nitrogen to achieve an ideal proportion. Fresh, green, succulent materials such as grass clippings, weeds, and fruit and vegetable peelings have a low ratio of carbon to nitrogen and usually require little additional nitrogen to reach a good proportion.

## Materials to Use

Use all types of landscape debris such as lawn clippings, shredded leaves, weeds, hedge clippings, sawdust, wood ashes in small amounts, dead flowers, pine needles, and straw. Non-meat kitchen wastes such as fruit and vegetable trimmings, melon rinds, peanut hulls, coffee grounds, tea leaves, and eggshells can be added; however, check local ordinances prior to doing so because these scraps often attract rodents and other wildlife. The smaller the size of the materials, the faster the pile will decompose. If possible, shred large pieces before adding them to the pile.

## Materials to Avoid

Avoid adding stems or branches larger than 1 inch in diameter since they decompose very slowly. Also, it is very important to avoid meat, bones, oils, and other animal products. They are not only slow to decompose, but they also make a compost pile smell bad and often attract unwanted animals.

Be cautious adding manure to compost piles that will be used in vegetable gardens because of the possibility of contaminating the soil with harmful parasites, disease organisms, bacteria such as *E. coli*, and various drugs and antibiotics that are used on animals. Weeds and diseased plants should not be added to the compost heap unless the internal temperature reaches a minimum high temperature.

## Temperature

As compost materials decompose, energy is released and heat and the internal temperature of the pile will rise. The temperature of a working compost pile will rise until the maximum breakdown is reached, and then the temperature will begin to subside. Checking the temperature regularly with a soil thermometer will assure that the pile is working properly and when it is essentially finished. The internal temperature of a pile can reach as high as 160°F which is high enough to kill even the most stubborn weed seeds and disease organisms. However, decomposition can be achieved at a temperature of 120°F. When a pile has cooled and stops rising in temperature, it is finished and ready to use. Upon completion, it should be a dark, crumbly material that smells like freshly tilled soil.

## Aeration

Air is essential to the working compost pile. Without oxygen, microorganisms will die. A compost pile without oxygen (anaerobic) will smell badly because the dying organisms release ammonia and sulfur. The best way to ensure that the compost pile has sufficient air is to use a variety of materials applied in layers, and turn it frequently. Also, to avoid compaction and make it easier to turn, limit the height of the pile.

## Moisture

Water is also essential to a properly working pile. Too much or too little water will stop the decomposition process. The proper mix of green plant materials as well as adequate rainfall will reduce the need to add supplemental water. A pile composed of drier materials may require more supplemental water. Build the pile in a somewhat shady spot to prevent the sun from drying it out. Have a cover handy for excessively rainy periods and make sure the pile is sited in a well-drained location. If a pile becomes too wet, the addition of dry materials may be necessary.

## How to Build a Compost Pile

The most efficient compost pile is arranged in layers with a fairly uniform distribution of organic material. The construction of layers will depend upon the availability of materials. If most of

the materials are such green and succulent matter as grass clippings, the addition of extra nitrogen in the form of commercial fertilizer is usually not necessary. The depth of the layers is not critical, but thick layers take longer to break down than thin layers. A pile can have continual layers built until it is approximately 3 feet high. A height greater than 3 feet may be unmanageable and the weight may cause the pile to compact, reducing air circulation.

## Bins

Although there are a number of different types of commercially made bins available, they are fairly easy to construct. Bins can be constructed from wood, wire, a combination of wood and wire, or cinder block. One option is to construct round wire cages to hold the compost. Another popular system that produces larger amounts of compost is the three-bin system. This system is essentially three connected bins containing compost at various stages of decomposition.

Commercial bins are usually constructed of plastic and come in various shapes and sizes. Decomposition occurs rapidly in most enclosed commercial bins due to the high temperatures generated in the plastic. Some have removable tops, bottoms, and/or fronts for easy access to compost. Others have built-in handles for turning ease.

## Troubleshooting

Bad odor – Odors are caused by lack of air, too much moisture, or unsuitable materials. Correct by turning the pile and adding dry materials. Remove any unsuitable materials.

Warmth and dampness only in the center of the pile – The pile is too small. Correct by adding more material.

Lack of heat – If a pile does not heat up, it is deficient in nitrogen. Correct by adding green material or another source of nitrogen, such as a synthetic fertilizer.



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