

Composting Fundamentals

How does compost improve the soil?

Compost does several things to benefit the soil that synthetic fertilizers cannot do. First, it adds organic matter, which improves the way water interacts with the soil. In sandy soils, compost acts as a sponge to help retain water in the soil that would otherwise drain down below the reach of plant roots (in this way, it protects plants against drought). In clay soils, compost helps to add porosity (tiny holes and passageways) to the soil, making it drain more quickly so that it doesn't stay waterlogged and doesn't dry out into a bricklike substance. Compost also inoculates the soil with vast numbers of beneficial microbes (bacteria, fungi, etc.) and the habitat that the microbes need to live. These microbes are able to extract nutrients from the mineral part of the soil and eventually pass the nutrients on to plants.

Good composting is a matter of providing the proper environmental conditions for microbial life. Compost is made by billions of microbes (fungi, bacteria, etc.) that digest the yard and kitchen wastes (food) you provide for them. If the pile is cool enough, worms, insects, and their relatives will help out the microbes. All of these will slowly make compost out of your yard and kitchen wastes under any conditions. However, like people, these living things need air, water, and food. If you maintain your pile to provide for their needs, they'll happily turn your yard and kitchen wastes into compost much more quickly. Keep in mind the following basic ideas while building your compost piles:

AIR

Composting microbes are *aerobic* -- they can't do their work well unless they are provided with air. Without air, *anaerobic* (non-air needing) microbes take over the pile. They do cause slow decomposition, but tend to smell like putrefying garbage! For this reason, it's important to make sure that there are plenty of air passageways into your compost pile. Some compost ingredients, such as green grass clippings or wet leaves, mat down very easily into slimy layers that air cannot get through. Other ingredients, such as straw, don't mat down easily and are very helpful in allowing air into the center of a pile. To make sure that you have adequate aeration for your pile and its microbes, thoroughly break up or mix in any ingredients that might mat down and exclude air. You can also *turn* the pile to get air into it, which means completely breaking it apart with a spade or garden fork and then piling it back together in a more 'fluffed-up' condition.

WATER

Ideally, your pile should be as moist as a wrung-out sponge to fit the needs of compost microbes. At this moisture level, there is a thin film of water coating every particle in the pile, making it very easy for microbes to live and disperse themselves throughout the pile. If your pile is drier than this, it won't be very good microbial habitat, and composting will be slowed significantly. If your pile is a great deal wetter, the sodden ingredients will be so heavy that they will tend to mat down and exclude air from the pile, again slowing the composting process (and perhaps creating anaerobic odor problems). If you are using dry ingredients, such as autumn leaves or straw, you'll need to moisten them as you add them to the pile. Kitchen fruit and vegetable wastes generally have plenty of moisture, as do fresh green grass clippings and garden thinnings. Watch out for far-too-soggy piles in wet climates (a tarp may help to keep rain off during wet weather). In dry climates, it may be necessary to water your pile occasionally to maintain proper moisture.

FOOD

In broad terms, there are two major kinds of food that composting microbes need.

'Browns' are dry and dead plant materials such as straw, dry brown weeds, autumn leaves, and wood chips or sawdust. These materials are mostly made of chemicals that are just long chains of sugar molecules

linked together. As such, these items are a source of energy for the compost microbes. Because they tend to be dry, browns often need to be moistened before they are put into a compost system.

'Greens' are fresh (and often green) plant materials such as green weeds from the garden, kitchen fruit and vegetable scraps, green leaves, coffee grounds and tea bags, fresh horse manure, etc. Compared to browns, greens have more nitrogen in them. Nitrogen is a critical element in amino acids and proteins, and can be thought of as a protein source for the billions of multiplying microbes.

A good mix of browns and greens is the best nutritional balance for the microbes. This mix also helps out with the aeration and amount of water in the pile. Browns, for instance, tend to be bulky and promote good aeration. Greens, on the other hand, are typically high in moisture, and balance out the dry nature of the browns.