

Basic Information regarding Composting

(Compiled from public sources)

Carbon Nitrogen Ratio

Carbon and nitrogen are the two fundamental elements in composting, and their ratio (C:N) is significant. The bacteria and fungi in compost digest or "oxidize" carbon as an energy source and ingest nitrogen for protein synthesis. Carbon can be considered the "food" and nitrogen the digestive enzymes. The bulk of the organic matter should be carbon with just enough nitrogen to aid the decomposition process. The ratio should be roughly 30 parts carbon to 1 part nitrogen (30:1) by weight. Adding 3-4 pounds of nitrogen material for every 100 pounds of carbon should be satisfactory for efficient and rapid composting. The composting process slows if there is not enough nitrogen, and too much nitrogen may cause the generation of ammonia gas, which can create unpleasant odors. Leaves are a good source of carbon; fresh grass, manures and blood meal are sources of nitrogen.

Surface Area

Decomposition by microorganisms in the compost pile takes place when the particle surfaces are in contact with air. Chopping, shredding, mowing, or breaking up the material can do increasing the surface area of the material to be composted. The increased surface area means that the microorganisms are able to digest more material, multiply more quickly, and generate more heat. It is not necessary to increase the surface area when composting, but doing so speeds up the process.

Aeration

The decomposition occurring in the compost pile takes up all the available oxygen. Aeration is the replacement of oxygen to the center of the compost pile where it is lacking. Efficient decomposition can only occur if sufficient oxygen is present. This is called aerobic decomposition. It can happen naturally by wind, or when air warmed by the compost process rises through the pile and causes fresh air to be drawn in from the surroundings. Composting systems or structures should incorporate adequate ventilation. Turning the compost pile is an effective means of adding oxygen and brings newly added material into contact with microbes. If the compost pile is not aerated, it may produce an odor symptomatic of anaerobic decomposition.

Moisture

Microorganisms can only use organic molecules if they are dissolved in water, so the compost pile should have a moisture content of 40-60 percent. If the moisture content falls below 40 percent the microbial activity will slow down or become dormant. If the moisture content exceeds 60 percent, aeration is hindered, nutrients are leached out, decomposition slows, and the odor from anaerobic decomposition is emitted.

Temperature

Microorganisms generate heat as they decompose organic material. A compost pile with temperatures between 90°F and 140°F (32-60°C) is composting efficiently. Temperatures higher than 140°F (60°C) inhibit the activity of many of the most important and active organisms in the pile. Given the high temperatures required for rapid composting, the process will inevitably slow during the winter months in cold climates. Compost piles often steam in cold weather. Some microorganisms like cool temperatures and will continue the decomposition process, though at a slower pace.