University of Nevada Cooperative Extension

Fact Sheet-09-16

Composting Yard and Vegetable Wastes

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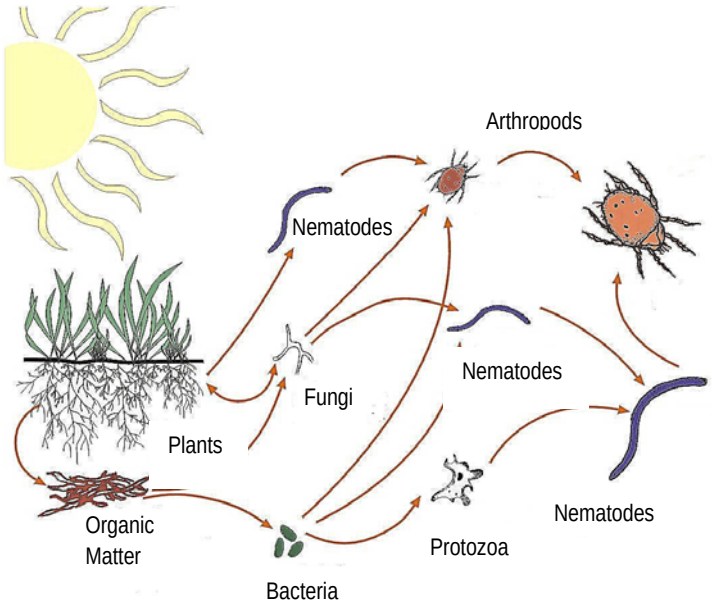
Adding compost to improve the soil is an important component of successful home gardening. Making compost at home can be a cost-effective and environmentally supportive practice. All organic materials break down or decompose eventually. Composting is a method to speed up the decomposition process by providing "ideal" conditions. These conditions include the right ingredients, moisture, air and soil organisms. A variety of organisms, including bacteria, fungi, worms, sow bugs, nematodes and small arthropods, such as springtails and mites, can be active in the composting process. To compost efficiently, you must provide the proper ingredients and an environment in which these organisms can flourish.



Soil is home to many types and sizes of living organisms.
(Graphic courtesy of University of Missouri Extension)

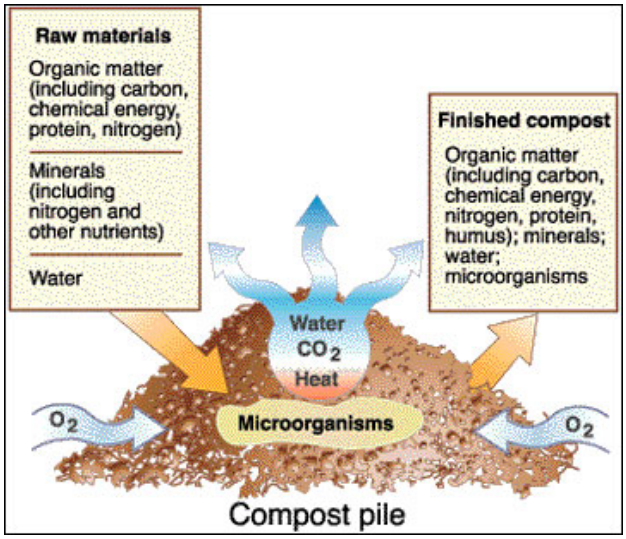
Why compost?

Compost improves the soil in a number of ways and reduces waste going to landfills. When added to soil, compost increases soil water- and nutrient-holding capacity. Compost makes all types of soil easier to work, from clay-rich to sandy soils. It also feeds soil organisms, including the bacteria, fungi, earthworms and insects living in healthy soil. It improves plant productivity and cover. Increased plant cover reduces water runoff and the potential for soil erosion and nutrient pollution.

Yard trimmings and kitchen scraps make up about 20 percent to 30 percent of household wastes. Composting these materials on your property saves landfill space and reduces auto emissions from vehicles used to transport them to the landfill. Many communities charge for garbage collection based on the size of the container. If you reduce the volume of trash hauled from your house, you may save money.

Methods of composting

Slow or cool composting, also called passive composting, is a simple but less-effective method of producing compost. To slow compost, place leaves, grass clippings and other garden wastes in a bin or pile. This method requires little to no maintenance, but it can take a year or more until the pile decomposes. Slow or cool composting is far less effective at killing weed seeds and pathogens than



In a compost pile, raw materials are transformed into a useful final product.
(Graphic courtesy of University of Missouri Extension)

other methods, but requires much less effort. If you have only small amounts of yard waste, little time, or little need for compost, this method of composting may be right for you.

Hot or active composting is a much quicker way to produce compost. The decay process is controlled and manipulated to make it proceed quickly. The increased rate of decay produces heat. Hot compost piles heat quickly to 120 degrees to 160 degrees. At these temperatures, many pathogens and weed seeds are destroyed. As the process continues, the compost pile cools and low-temperature organisms, such as earthworms and insects, add their efforts to the decay process.

Steps to creating a compost pile

1) **Site**. Pick a level, well-drained site. Build the pile on bare soil so soil bacteria and other organisms can move into it. In northern Nevada's high desert climate, a bit of shade helps maintain moisture in the pile during summer. The site should be convenient, close to a watersource, the garden or other major sources of raw materials, but not in a location where it will detract from the appearance of your landscape.

2) **Pile size**. Cool compost piles can be any size. Make hot compost piles at least one cubic yard, or 3-feet wide by 3-feet long by 3-feet high, to hold in the heat and maintain chemical processes. It is not necessary to use a bin or other structure, but it helps contain the composting materials. Bins or piles can be as large as a 5-foot cube in size. Piles or bins larger than this may lack sufficient air in the middle of the pile and are more difficult to turn. Many avid compost makers have a series of three

Okay to Compost

Green Materials

- Grass clippings
- Animal manure (from herbivores only)
- Non-animal-based kitchen wastes
- Garden trimmings

Dry or Woody ("Brown") Materials

- Fall leaves, dry cornstalks
- Wood chips or sawdust
- Hay or straw (soiled or clean)

Do Not Compost

- Yard trimmings or grass clippings treated with pesticides. They may kill the beneficial organisms in the compost pile or later in your garden.
- Weeds, if the pile will not be hot enough to kill the seeds.
- Diseased or insect-infested plant parts. The diseases or insects may be transferred to the soil with the compost.
- Parts of any plant known to contain poisons or toxins, such as black walnut.
- Too much of any plant that contains tannins or resins that inhibit decomposition, such as junipers, pine, spruce, arborvitae, oak or cottonwood.
- Charcoal ash, as this may contain substances harmful to plants.
- Fireplace ashes, since they have a very high pH, as do our native soils. High pH levels can result in nutrient deficiencies and other plant problems.
- Fats, grease, lard or oils. These do not break down quickly and may attract pests, vermin, dogs or large carnivores.
- Meat or fish bones or scraps.
- Dairy products.
- Pet wastes, such as dog or cat feces or soiled cat litter. They may contain parasites, bacteria or viruses harmful to humans.
- Swine or other omnivore wastes. They also may contain parasites, bacteria or viruses harmful to humans.

or more bins, all at different stages of decomposition.

3) **Ingredients**. By definition, cold composting does not require a specific set of ingredients. Start hot compost piles, on the other hand, as a series of layers. Maintain a ratio of 1:2 green materials to dry or woody materials. A wide variety of substances can be used, including yard wastes, manure, etc. The finer the the size of materials, the quicker they will compost. See the sidebar for materials to avoid. Sprinkle a small amount of soil or finished compost on each 8- to 12-inch layer of organic materials to start the biologic processes. Add a small amount of all-purpose fertilizer if you have less green material than dry material. Lime is not necessary and will raise the pH of the compost. Continue adding materials in layers until the pile is the desired size.

4) **Particle size**. The size of the materials you add to your compost pile plays a role in the speed of decomposition. Large particles allow air to circulate, but bacteria and other organisms can only work on the outside of large particles. Very fine particles restrict airflow and are easily compacted. Aim for materials that are one-half inch to 1.5 inches in size. Chip, chop or shred woody materials before adding them to the pile.

5) **Water**. Moisture content can often be insufficient for effective composting.The pile should be damp, not dripping wet and not dusty dry, but about as wet as a sponge that has been wrung out. Water the pile as needed to keep it damp. You may want to add the compost pile to your drip irrigation circuit. However, be cautious about over-watering. Many nutrients may be lost if water flows out of the compost pile. The excess water may also fill the air spaces. Composting is an aerobic activity that requires oxygen. Decomposition will continue without oxygen, but anaerobic decomposition produces foul odors and is a slower process. Additionally, anaerobic decomposition encourages the growth of human and plant pathogens which are especially important to avoid. Cover the pile during heavy rains so it will not get too wet.

6) **Mixing**. Once the pile is built, it should begin composting quickly. Turn the pile weekly, using a pitchfork or shovel. Turning adds air to the pile. It also mixes the material from the outside of the pile to the inside of the pile, where greater biological activity usually occurs. Check for moisture content while turning and water the pile if needed. Some hot composters do not add to the pile once it starts heating, starting a second pile instead. Others add fresh material to the middle of the pile and work it into the pile. To gauge the temperature of the pile, use a long-stemmed compost thermometer or your hand. The center of the pile should reach temperatures of 120 degrees to 160 degrees, or be uncomfortably hot to the touch.

7) **Curing**. Depending on the speed of decomposition, the pile should stay hot for several weeks to two months. The pile will decrease in size to about half the original volume. Then the pile needs to sit for another four to eight weeks to "cure." During the curing phase, pile temperatures will decrease to about 80 degrees to 110 degrees. Turn the pile at

Bins are not required for successful composting, but they are helpful for corralling your materials and maintaining the compost pile dimensions. There are many methods and designs for compost bins or compost systems. Below is a short list of Web resources:

Building your Own Composting Bin: Designs for Your Community, California Integrated Waste Management Board, http://www.ciwmb.ca.gov/Publications/organics/44295054.pdf

Build-your-own Composting Bins, Pierce County Public Works, Washington, http://www.co.pierce.wa.us/pc/services/home/environ/waste/recycle/compost/compostbins.htm

Composting at Home, Ohio State University Extension Fact Sheet COM-0001-99, http://ohioline.osu.edu/com-fact/0001.html

How to Build a Compost Bin, University of Missouri Extension G6957, http://extension.missouri.edu/publications/DisplayPub.aspx?P=G6957

Troubleshooting Compost Problems

Symptom	Problem	Solution
Compost has a bad odor.	Not enough air.	Turn the pile to aerate. Add dry material if pile is too wet. Let the pile dry out if it is too wet.
The center of the pile is dry.	Not enough water.	Add water and turn the pile.
The compost pile is damp and warm only in the center.	Pile is too small to maintain heat.	Mix new material into the old material to create a larger mass.
The pile is damp and sweet-smelling, but the pile does not heat up.	Lack of nitrogen.	Mix a nitrogen source into the pile, such as fresh grass clippings, nitrogen fertilizer (urea, ammonium sulfate, etc.), blood meal or manure.

least weekly during the curing phase. The compost is ready to use when the material in the pile no longer heats up when turned, the pile has a pleasant, earthy smell and the material in the pile is uniform, crumbly and dark brown in color.

Preventing problems when composting

Nuisance insects and animals are common problems for the urban composter. Compost piles made entirely of yard wastes generally will not attract flies. Flies may become problems in compost piles that include food wastes. Bury food wastes in the pile, rather than placing them on the surface, to reduce the chances of attracting flies.

Food wastes may also attract larger pests, such as rats, raccoons, coyotes, dogs and bears. Burying the food wastes in the center of the pile may help reduce the attractiveness of your compost pile to these animals. Never put meat or fish scraps, fats, oils or dairy products in your compost pile. Nuisance animals may also be attracted to fruit and vegetable scraps. If they are a recurring problem, refrain from adding any food-based scraps to your compost pile. Compost these materials in vermiculture or worm-composting bins. Many Web sites with information about building compost bins also include information on constructing worm-composting bins.

Consult the table above for other common problems and solutions.

Summary

Composting is a good way to recycle garden and kitchen wastes. It improves garden soil by increasing water- and nutrient-holding capacity. Many plans are available for compost bins and systems. A cool compost pile will produce compost slowly, taking a year or more to convert the ingredients. A hot compost pile with an intensive turning and watering schedule can produce compost in as little as a few weeks to months. Compost reduces the volume of material sent to the landfill while providing a valuable soil amendment to improve your garden.

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