

# **The Basics Of Composting**

## **What Is Compost?**

Compost is simply decomposed organic material. The organic material can be plant material or animal matter. While composting may seem mysterious or complicated, it's really a very simple and natural process that continuously occurs in nature, often without any assistance from mankind. If you've ever walked in the woods, you've experienced compost in its most natural setting. Both living plants and annual plants that die at the end of the season are consumed by animals of all sizes, from larger mammals, birds, and rodents to worms, insects, and microscopic organisms. The result of this natural cycle is compost, a combination of digested and undigested food that is left on the forest floor to create rich, usually soft, sweet-smelling soil.

Backyard composting is the intentional and managed decomposition of organic materials for the production of compost, that magical soil enhancer that is fundamental to good gardening. Anyone can effectively manage the composting process. In fact, if you have organic matter, it's virtually impossible to prevent decomposition. The trick is to maximize the process of decomposition, while avoiding the unpleasant effects of the natural process of decaying matter. Compost is good; sloppy garbage heaps and rotting food are bad.

## **Why Is Compost So Good?**

Compost is good for two very compelling reasons. It's great for the garden, and it's environmentally responsible.

### **Garden Benefits**

Compost is great for the garden because it improves the soil, which in turn supports healthier and more productive plants. Compost provides virtually all of the essential nutrients for healthy plant growth, and it almost always releases those nutrients over time to give plants a slow, steady, consistent intake of the elements essential for growth. Compost also improves the soil's structure, making it easier for soil to hold and use the right amount of moisture and air. Compost will improve the texture of both clay and sandy soil; indeed, compost is the best additive to make either clay or sandy soil into rich, moisture holding, loamy soil. And, as an added benefit, compost improves plant vigor and provides for improved immunology from diseases.

### **Environmental Benefits**

The most obvious environmental benefit is that composting can significantly reduce the amount of solid waste that would otherwise find its way into the trash collection and dumping cycle. Clearly, the more we compost, the less we contribute to the cost of trash removal and

the volume of solid materials in landfills. Using compost to feed your lawn and garden will also reduce your dependency on chemical fertilizers. So, you'll save money and reduce – if not eliminate – the potential of chemical pollution to your little piece of the environment. Using compost instead of chemical fertilizers will ensure that your lawn and garden thrive in soil that is alive and healthy.

### **What's The Best Way to Make Compost?**

To make compost, you'll need to dedicate some outdoor space to the process. Ideally, the location of your compost production should be convenient to the garden, as well as close to the source of the raw materials (kitchen scraps, lawn clippings, etc.), without being an unappealing eyesore. Finding a good spot for your compost pile might be a little bit easier if you have a lot of land; but, even suburbanites and city dwellers can effectively maintain a compost pile with a little bit of creativity and effort. And, the benefits – both to the garden and the environment – far exceed the effort!

Entire books have been written on the subject of composting. In fact, a recent search on Amamzon.com indicates that there are no fewer than 8,900 books that discuss the subject. But, don't become overwhelmed. The process is fairly simple; and, as I've said, the rewards are wonderful.

### **Open Bins or Containers**

There are two basic kinds of compost piles: open bins and enclosed containers.

Open bins can be constructed with wood, chicken wire, or recycled plastic. Of course, municipal large scale composting is often conducted in large open piles without the use of any bins at all. These compost heaps are often turned by bulldozers or other pieces of heavy equipment, so container walls are not practical.

Enclosed containers for composting usually consist of one of two designs: upright box-like containers, and rotating drums.

### **Advantages of Open Bin Composting**

- Open bins easily collect rain water
- Open bins are very convenient for adding materials

### **Disadvantages of Open Bin Composting**

- Open bins can attract rodents, flies, bees, and bears
- Open bins can become too wet, if not covered
- Open bins may be more difficult to mix (more on that later)
- Open bins may be an eyesore to your neighbors

## **Advantages of Compost Containers**

- Compost containers will rarely attract pests
- Upright containers may be more aesthetically appealing
- Rotating drums are usually easier to mix or turn
- Rotating drums are easy to unload
- Rotating drums usually have "screening" options

## **Disadvantages of Compost Containers**

- Enclosed containers usually require you to add water
- Upright containers may be very difficult to mix or turn

## **Two Chambers are Always Better than One**

Whether you choose to use an open bin or a compost container, two chambers are always better than one. In fact, if you are really serious about composting, having two chambers is a necessity. Because the composting process takes at least several weeks under the best conditions, you cannot add additional materials to the heap without "resetting the clock" to day one (Mantis Makes a pretty good two chamber compost tumbler). To create an ideal batch of fully composted material, your mix needs to "cook" for at least several weeks; if you add additional material, you'll have a mix of fully decomposed material, partially decomposed material, and fresh materials. It's simply much easier, and much more desirable to use a consistent mixture of fully decomposed compost for gardening purposes. After all, you wouldn't want to buy a bag of potting soil that contained a rotting tomato in it!

## **Tools You'll Need**

After you've built or bought a compost bin or container, there are only a few tools that you'll need to make compost. If you're already a gardener, you probably already have the tools that you need.

**Pitch fork, or turning fork** – The best hand tool for mixing and turning a working compost pile. The tines of the fork will penetrate layers of leaves and grass clippings, and make the mixing process much easier than using a shovel.

**Shovel** – The best tool for removing finished compost from a bin or heap, and for tossing compost onto the garden.

**Garden Cart** – the best tool for moving compost from the heap to the garden. Garden carts can also be very useful in "catching" compost from a rotating drum composter. The Mantis Loadumper cart is especially practical for moving compost; it's cleverly balanced, and has big, easy rolling wheels. And, it's designed to be very easy to dump.

**Compost Thermometer** – not essential, but you might be interested in checking the temperature of the “core.” A properly established mix will heat up to 160 degrees F., whether you have a compost thermometer or not. Having one just might be interesting.

### **Key Ingredients for Great Compost**

One of the great aspects of composting is that the key ingredients are often things that you’d be tempted to throw away. So, with just a little effort, you can contribute less to the trash stream (good for the environment) and make great compost (good for your garden).

Compost is created when you provide the right mixture of key ingredients for the millions of microorganisms that do the dirty work. These microorganisms will eat, multiply, and convert raw materials to compost as long as the environment is right. The environment doesn’t have to be absolutely “perfect,” so you don’t need to be a microbiologist or chemist to have successful compost. You need to provide: food, water, and air.

The water and air are easy. The food is a little more complex. Food for your little micro friends consists of two classes of materials, simply referred to as “Greens” and “Browns.” Green materials are high in nitrogen, while brown materials are high in carbon. The green materials provide protein for the micro bugs, while the brown materials provide energy.

#### **Typical green materials are:**

- Fresh (green) Grass clippings
- Fresh manure (horse, chicken, rabbit, cow)
- Kitchen scraps (fruit, vegetables, coffee grounds, tea bags)
- Weeds
- Green leaves
- Leftover fruits from the garden

#### **Typical brown materials include:**

- Brown, dry leaves
- Dried grass
- Cornstalks (shredded)
- Straw
- Sawdust (in moderation; see below)

Just like us, the little microorganisms need a balanced diet, along with water and air. Too much, or too little of any ingredient significantly reduces their productivity. It is hard to have too much of the brown category. As noted earlier, leaves in the forest decompose without

significant quantities of "green" components (although animal droppings do contribute to the green part of the mix) – but, the decomposition takes a little longer.

Too much green is usually the problem. A pile of kitchen garbage will never become useful compost; it simply becomes a smelly pile of garbage. Landfills are not composting sites. Most municipal composting operations begin with the huge quantities of dry leaves that are collected each fall.

A good mix of browns and greens also helps the pile maintain the right amount of moisture and air. A pile that is 100% grass clippings, for example, will quickly become a matted, soggy mess, with too much moisture and too little air. It will decompose, quickly at first, but then stall. Mix in some dry leaves, and you'll have a significantly more efficient mixture. The dry leaves help maintain air pockets within the pile and also provide a more balanced diet for the bacteria and fungi that cause the decomposition.

### **The Ideal Combination of Browns and Greens**

The best combination of browns and greens is about 4 parts of "browns" to one part "greens" by volume. Of course, this is a rough approximation. If you have more browns, you'll still get compost. It'll just take a little longer. If you are on the side of too much green, you'll likely have a smelly garbage heap.

The best source of brown material is dry leaves. In many parts of the country, the annual fall clean-up of leaves from deciduous trees is seen as a necessary chore. I choose to see it as the harvest for next year's compost pile! Harvesting, shredding, and storing dry leaves is the best thing you can do to create great compost. Use a leaf vacuum or a lawn mower to shred the leaves, and collect them when they're dry, if at all possible. I like to store my stash of dry leaves in large plastic bags that I can hide under my deck or porch until I need them to keep the greens in my compost bin balanced.

### **"Hot" vs. "Cold" Composting**

As noted earlier, decomposition occurs naturally, and, except for extreme conditions, it's virtually impossible to stop it. But, decomposition doesn't necessarily occur efficiently.

When we provide the micro bugs with a good mixture of browns and greens, as well as some water and air, decomposition can be very efficient. This is known as "**hot**" composting, sometimes call "aerobic" composting, because the microbes that require air have sufficient air to live, eat, and reproduce quickly. The compost pile can attain temperatures as high as 160 degrees Fahrenheit, which will kill some weed seeds, make most of the microbes very active, but will deter worms and some other critters. As the pile cools, the worms will return to assist

in the decomposition. Hot composting is fast, and a well maintained compost heap can fully decompose in several weeks. While some ads claim that you can make compost in 14 days, I've never experienced that phenomenon in over 25 years of careful composting.

"Cold" composting is slower, primarily because the environment is hospitable to some of the micro bugs, but it's hardly ideal. This is the form of composting that almost always occurs in the forest, where the mix is often comprised of dry leaves and dead wood. It will decompose over time, but the temperature never gets very high, and the process can take years.

Our goal is to create a composting environment that is "hot". At least during the late spring, summer, and early fall.

### **Getting Started – Activators, Worms, Microorganisms**

You've built or bought a composter. You have some dry leaves and you'll be adding green materials (lawn clippings, kitchen waste, plant scraps) all summer. To some extent, you'll be layering these materials to provide both a balanced diet and the best mix for air and water penetration. Also if you want to try compost activators go ahead they won't hurt.

**How can you be sure that the composting will start?**

**Do you need to buy a "compost activator" or a batch of worms?**

**What if there aren't any microorganisms in the mix?**

No. No. and, Don't Worry.

The microorganism essential to composting are plentiful in nature. (That's why mom always told us to wash our hands after playing outside!) If you're starting with leaves and other natural materials, you've got bacteria and fungi that are eager to help you make compost. And, if you want to give the mix a little boost, one excellent and free additive is simply a shovel full of good garden soil. Assuming that it hasn't been polluted with nasty chemicals, the soil is full of microbes that are eager to devour the goodies in your compost pile.

Compost activators won't hurt, but they may not help enough to justify the cost. Mike McGrath, former editor of Organic Gardening magazine and host of the radio show "You Bet Your Garden," says that compost activators can be more helpful when the compost heap is almost finished, vs. using them at the beginning of the cycle. Mike has written a lot about composting; you can see his articles on the Gardens Alive web site.

Worms can significantly improve your composting effectiveness, just as worms in the garden can improve soil tilth. My open bin compost piles have a healthy supply of worms, probably because I occasionally add a shovel full of good garden soil to my bins.

Worm composting, or Vermicomposting, is a separate form of composting, which is discussed later in this article.

### **Critical Mass – When is Enough Enough?**

For efficient hot composting, you need to have a critical mass to generate a heat core. Most experienced composters agree that you need a minimum of 1 cubic foot of raw materials, of course, more is better.

As soon as decomposition begins, the volume of the pile will decrease. You might be tempted to add more materials; but, as previously mentioned, this resets the clock on that batch to "Day 1." You'll have much better success if you refrain from adding raw materials to your batch of working compost, and simply start a new batch with new raw materials. That's why it's essential to have at least two chambers, regardless of the type of composter you use. Single chamber composters are often called batch composters; don't continuously add materials to a single chamber.

### **Size Matters – Smaller is Better**

While it's nice to have a larger pile, to develop a good heat core, and to produce a nice quantity of compost, the raw materials should be shredded whenever possible. Smaller particles are simply easier to mix and easier for the little microbes to digest. Of course, the micro bugs don't eat the whole particle, but smaller particles of raw materials means that you'll have more surface area for the millions of microbes to do their work.

So, in summary, you should aim for "big heap, small particles."

### **Turn, Turn, Turn – with apologies to the Byrds**

Those of us who were music fans in the 70's will remember the great Byrds song "Turn, Turn, Turn... to everything there is a season..." a song that was based on verses from the Book of Ecclesiastes, in the Bible. And, indeed, for most of us, composting is a seasonal activity. You'll maximize your composting efforts if you continuously turn, or mix, the heap. Mixing your heap will help to keep the browns and greens in balance, will distribute moisture, and add essential air (oxygen) to the mixture. The core (the inside) of the compost heap is always hotter and is the center of activity. The outside is generally less active and much cooler. To increase the efficiency of the composting process, mix the heap to bring more of the raw materials from the outside to the core. Bring more food and water to the busy little micro bugs on the inside.

While the compost is working, or “cooking,” the best tool for turning is a pitch fork or garden fork. When the compost is completely, or almost completely done, I use my Mantis Tiller to mix the compost in my open bins. This final mix provides a great consistency, and makes removing the compost (by shovel) very easy.

### **Worm Composting (Vermicomposting)**

Worm composting is the process of using worms in a container to digest kitchen vegetable scraps. The worms (red wigglers) eat the kitchen scraps and cast off their waste to produce a very rich fertilizer. Most worm composting is done indoors, usually in one’s basement. You’ll need to build or buy a worm composting “farm” if you want to dispose of your kitchen scraps by vermicomposting. You can buy a very effective worm composter and red worms from Gardens Alive! Search for “worm composting” in the search box.

### **Compost Tea – Yum!**

Don’t drink it, unless you’re a houseplant or garden plant. Compost tea is simply the result of soaking a bag full of compost in a bucket full of water for an hour or so. The water soluble nutrients and beneficial microorganisms leach out of the compost, resulting in a brown liquid that can be used to water houseplants, your lawn, or garden plants. Compost tea will give your plants a boost of needed nutrients and help to prevent a lot of plant diseases; but, the tea won’t do as much to improve the soil structure as using fully decomposed compost.

### **What NOT to Do**

Don’t add these ingredients to your compost pile:

**Meat, Fish, animal fats** – Unless you can completely bury them, you run the risk of attracting unwanted visitors to your compost. You might be able to add very small portions (remember the Native Americans used fish to fertilize their corn), but they must be completely buried, and adding them makes turning or mixing the working compost very problematic.

**Shredded Newspapers or Office Paper** – Recycle them instead. The paper very likely contains chemicals that are not good for your compost. Newspaper shredders were very popular years ago, but the risk of adding ink chemicals isn’t worth it. By all means, recycle your paper and save trees, but don’t put them in your compost pile.

**Ashes from Your BBQ Grill** – Another no-no. Wood ashes can be very useful in small quantities. And, wood ashes can be helpful for certain lawn applications. But, never put BBQ grill ashes into your compost pile.



**Dog and Cat Feces** – Are never good for your compost. There's simply too much risk of adding nasty diseases, not to mention the unpleasant odor! Chicken, horse, cow, and rabbit manure is fine...in moderation. If you have access to these very high nitrogen sources, compost them. They're too "hot" for most direct applications to the garden. But, remember your brown to green ratio of 4-to-1. And, chicken manure is green, in composting terms... even though it's brown in appearance.

### **Be Careful When Adding These Ingredients!**

**Sawdust** – Because of its very high carbon content, and its very small particle size, sawdust can overwhelm a compost pile. But, it can also be quite useful if you have an overload of green material. I add some from my woodworking shop when I have a lot of extra fruit in my pile at the end of the season. Avoid using sawdust that came from Black Walnut wood, as it contains a chemical that will stunt or prevent the growth of some plants, tomatoes in particular.

**Wood Shavings, Chips, and Bark** – Like sawdust, the carbon content can overwhelm, and shut down, an otherwise good compost mix. Set them aside, if possible, and let them decompose the old fashioned way, over time ("cold" decomposition).

### **When and How to Use Compost**

**Soil Building** – Compost is the single best additive for good, even great, garden soil. It improves tilth, fertility, water retention for sandy soils, water drainage for clay soils, and improves your soil's disease fighting characteristics. Add compost in spring and fall, and till it in.

**Garden Fertilizer** – Compost can be used throughout the season as a garden fertilizer. Simply side dress vegetables and flowers for a slow-release food source and improved disease prevention.

**Lawn Feeding** – Screened compost (compost that has been sifted to collect the smaller particles) can be applied as a lawn fertilizer throughout the season. It will provide a wonderful slow-release food as well as assist in lawn disease prevention. And, given that the nutrients aren't as concentrated as in chemical lawn foods, you'll avoid the stripes that can easily occur when incorrectly applying chemicals. You'll avoid chemical run-off, and you'll save money. Your lawn will be alive, with earthworms (nature's aerators) and beneficial microbes.

**Compost vs. Mulch** – Mulch is any material that is applied to the garden's surface to prevent weed germination and to reduce water evaporation. Compost will help build the soil, and it will help retain moisture; but, it won't do a lot to prevent weeds. It's an ideal growing medium;

so, weeds are likely to be very comfortable in it. Use shredded leaves for mulch, or a combination of shredded leaves and lawn clippings. The combination of lawn clipping and shredded leaves creates an attractive mulch that won't blow away (as leaves alone tend to do) and allows water penetration (as grass clippings alone tend to matt and repel water).

**Potting Mix (seed starting, potted plants)** – Compost can be used to create a very good seed starting mix, or it can be added to potting soil to create a nutrient-rich mixture. Most commercial potting mix is made from Canadian peat moss, which is virtually void of nutrients, so the addition of good compost provides a real boost. "hot" compost, which has been produced at higher temperatures, is less likely to contain a lot of weed seeds. However, some of the fungi in compost may contribute to "damping off" of seedlings when compost is used for seed starting. To be safe, you should consider "sterilizing" the compost before using it as a potting mix. You can sterilize compost by microwaving it, baking it in an oven, or pouring boiling water over it. Of the three methods, the boiling water treatment is the neatest and cleanest. Simply put the compost in a large flower pot and soak it with boiling water from a teapot or saucepan.

For more information on composting, go to [HowToCompost.org](http://HowToCompost.org).

If you have any comments, I'd really like to hear from you.

OZ Gardener  
The Garden Of Oz

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