



Hot composting is a process of rapid decomposition that takes place at high temperatures. This decomposition is performed mostly by bacteria, which are adapted to working at high temperatures in order to break down organic materials quickly and efficiently. Hot composting allows for fast production of compost with well-managed piles decomposing completely in 8-10 weeks!

Effort Scale:

Easy	1	2	3	4	5	Hard
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Involves building the pile all at once and turning the pile at timed intervals, monitoring the temperature, and harvesting the finished compost.

How Do I Hot Compost?

Hot composting works well in a three-bin system (see photo). Simply gather your organic materials and layer them into your bin. The materials will heat up, sometimes reaching temperatures over 70°C! When the pile starts to cool down, turn the materials into the second bin to heat up a second time. When the pile cools down again, turn it into a third bin, where the process will finish.

Why Use Hot Composting?

Hot composting can be used to:

- ◆ Create compost quickly. Hot compost piles can be finished in as little as 2 months.
- ◆ Suppress plant diseases and kill weed seeds. The hot temperature in the pile effectively kills most plant diseases, pathogens and seeds.
- ◆ Compost large amounts of material in a small space. For example, yard and garden waste from a small farm or large backyard.
- ◆ Create a large amount of finished compost that can be used to build soil quickly in a new garden space.

Hot Composting Bins

The type of bin you use for hot composting is an important part of the process. The elements of an effective hot composting bin include:

- ◆ Removable front slats for easy access
- ◆ Inside lined with ¼" mesh to keep out rodents
- ◆ 3 compartments for turning piles
- ◆ Volume of at least one cubic metre (27 cubic feet)

- ◆ A lid to keep out rodents and rain
- ◆ Wood treated with organic preservative

The bin pictured makes good use of recycled materials (pallets), and is easy to construct. Pallets can be found at local hardware or lumber stores. For plans on how to build a compost bin yourself, contact the Compost Education Centre.



This three bin system was made out of recycled pallets.

Volume/Critical Mass

A hot compost pile should be **no smaller than** one cubic metre (27 cubic feet) in order to reach and maintain temperatures for hot composting (55°C). This size of pile, or larger, ensures that there is enough insulation on the outside of the pile to keep the inside hot. The outside 6-10" of a hot compost pile is mostly for insulation, while the main activity of decomposition takes place in the middle of the pile.

Building Your Hot Compost Pile

1. Gathering and Using Materials

Once you have your bin ready, it is time to gather materials to make your hot compost pile. The types of materials you use have a direct relation to the amount of heat generated in the pile. The diversity of materials you add to your pile also influences the quality of compost produced.

a) Carbon to Nitrogen Ratio

A good compost pile usually consists of almost equal parts of ‘nitrogen’ (green) and ‘carbon’ (brown) materials. As a general rule, this means adding equal amounts, by volume, of each. However, if you are using materials that are much higher in either carbon or nitrogen, adjust the mix accordingly. For example, if you are using a lot of sawdust or woody materials, use a higher ratio of nitrogen materials in your mix. It is the *nitrogen* materials that create the heat in your compost pile.

Different compostable materials have different levels of carbon (C) and nitrogen (N) known as the C:N ratio. Your finished compost pile should contain a mix of materials that result in a 25-30:1 C:N ratio. Use the table below to determine the relative amounts of different materials to add, in order to reach the desired ratio.

Greens (C:N ratio)	Browns (C:N ratio)
◆ Fresh animal manure (15-25:1)	◆ Fallen leaves (20-100:1)
◆ Fresh grass clippings (20:1)	◆ Straw (80:1)
◆ Fruit and vegetable scraps (15-25:1)	◆ Paper products (170-500:1)
◆ Garden debris and weeds (20:1)	◆ Woody plant stems (700:1)
◆ Coffee grounds (30:1)	◆ Sawdust (500:1)
◆ Seaweed (20:1)	◆ Dried weeds and garden debris (30-70:1)

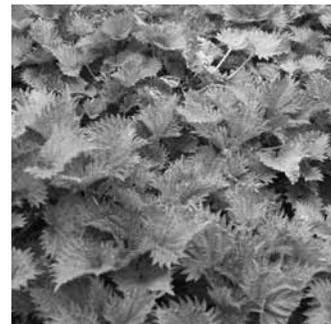
b) Surface Area

Material that is smaller in size will break down much quicker than large pieces. The greater surface area makes it easier for compost organisms to ingest the materials. You can cut materials up using many methods including a lawnmower, machete, food processor, leaf shredder, or hand pruners.

c) Diversity

Using a diversity of materials will yield compost with high nutrient qualities. Some plants, called *dynamic accumulators*, are very rich in specific nutrients and can be added to your compost to enrich its “fertilizer” value. These include:

- Comfrey** nitrogen, potassium, magnesium, silicon, iron
- Yarrow** calcium, sulphur, phosphorous, copper, magnesium, potassium
- Plantain** potassium, magnesium, calcium, iron, copper, phosphorous, sulphur
- Nettles** sodium, potassium, calcium, iron, copper, sulphur
- Thistles** potassium, nitrogen, iron
- Garlic** phosphorous, fluorine, sulphur



Nettles are a great addition to the compost pile, adding nitrogen, potassium, sodium, and many other nutrients to your compost.

2. Layering Materials

Now that you know your bin requirements and what type of materials you need for hot composting, you can build your pile – starting from the bottom up.

To start the pile, use rough materials like twigs, small branches, straw, or sunflower stalks at the bottom to allow air in from beneath the pile. When building your pile, alternate adding green and brown material in layers about 10-15 cm (4-6") thick. As you are making these layers, mix them to ensure even distribution of the materials. As you are mixing the layers, it is a good idea to add some water to the pile, unless your materials are very wet (see next page). For your final layer use a

brown material to minimize odours and flies. Cover your pile with a tarp or lid to keep the rain out and the heat in.



3. Moisture

Moisture is important in a compost pile for two reasons:

1. It helps soften organic materials.
2. It supplies water to micro-organisms in the compost pile.

It is micro-organisms that do most of the decomposing, so their survival is very important. Without enough water, they cannot do their work and the pile will not heat up. However, too much water can also cause the same problem since micro-organisms cannot thrive in an environment that is too moist. A good compost pile should be as wet as a wrung out sponge.

4. Air and Ventilation

Air provides micro-organisms in your compost pile with the oxygen necessary for aerobic decomposition. To ensure your pile has adequate air flow:

- ◆ Do not use too much material that is prone to matting down easily, such as grass clippings or okara (tofu by-product).
- ◆ Use some rough materials in your compost pile, like sunflower stalks, small twigs, or corn cobs.
- ◆ Put a floor of rough materials at the bottom of your compost pile.
- ◆ Make sure your materials are well mixed when you build your pile.

Monitoring and Turning Your Compost Pile

Once you have finished building your compost pile the decomposition process will begin. The next seven days will see the compost pile rise in temperature from 20°C up to 70°C! The optimum temperature for hot composting is 55°C-60°C. Once at its peak temperature, the pile can remain there for 5 to 15 days. You can monitor the pile's temperature by using a compost thermometer (available at local garden stores) or by using your hand (but be careful, you could burn yourself). When the temperature starts to drop, it is because the micro-organisms inside your pile are running out of air. This is when you should turn or aerate the pile.



If you are really successful, the temperature of your hot compost pile could reach as high as 150°F (66°C).

Turning the pile can be physically demanding. Using a garden fork or a large manure fork, transfer the materials into the neighbouring bin. As you transfer the pile, try to get the materials from the outside of the first pile into the inside of the new pile. This will ensure they are subjected to the higher temperature at the centre of the pile which kills weeds seeds and plant diseases.

Once you have turned the material into the second bin it will heat up and cool down again. Once it has cooled, you then repeat the turning process, moving the pile into a third compost bin where it will heat up and cool down one last time. With each turn, the peak temperature will reduce significantly, though the pile will still heat up. The compost will then go through a curing or finishing stage. At this point, macro-organisms like worms, beetles, and springtails, as well as micro-organisms like fungi and actinomycetes take over the process, finishing what the bacteria started. This “curing” stage should last at least 2 weeks, although the longer the compost is cured, the more finished it will be when you harvest it.

Harvesting Your Compost

How Do I Know When My Compost is Finished?

From beginning to end, a well managed hot compost pile will take 8-10 weeks to finish. In less than optimum conditions it can take 3-6 months. There are a number of things you should look for to determine that your compost is finished and ready to use:

Visual Cues:

- ◆ Material is dark brown to black with no discernible materials
- ◆ Material has reduced to 60% of original size



Smell Cues:

- ◆ Pile has no trace of food scrap odours
- ◆ Material smells very earthy

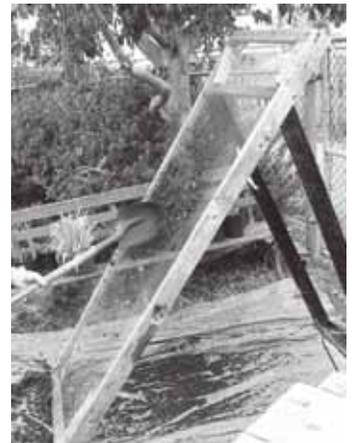
Other Cues:

- ◆ Compost does not heat up anymore
- ◆ Material feels loose and crumbly

Finished compost is dark, crumbly, and very earthy smelling. It may have varying degrees of moisture, but is usually just slightly moist. However, you may see that most of your compost looks like this, but there are still a few bits that are not yet fully decomposed or are still quite large. In order to separate the finished compost from the unfinished materials, you can screen the material to ensure you get the best quality compost.

Harvesting and Screening

Screen your compost using a half inch mesh screen (available at local hardware stores). A simple screen can be constructed using the mesh and a 2X4 wood frame (see picture). Place the frame at a steep angle either against a wall or using supporting legs, and toss the compost into the screen. The small bits will fall through and the large bits will slide down to the bottom of the screen. These large bits can be added to your next compost pile or can be used as mulch in your ornamental gardens.



A stand up screen makes sifting compost quick and easy.

Troubleshooting Your Hot Compost Pile

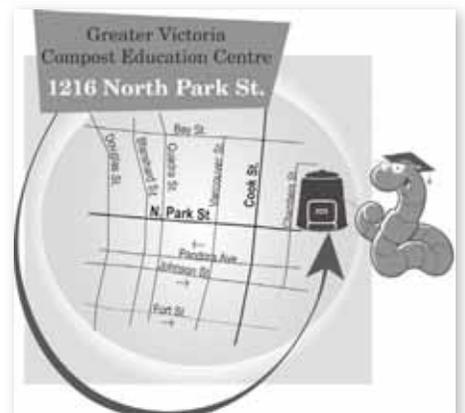
Symptom	Problem	Solution
Pile won't heat up	Not enough nitrogen 'Greens'; or, see next two options...	Rebuild pile adding more 'Green' material: manure, grass clippings, fresh nettles or comfrey
Pile dry throughout	Not enough water	Water pile thoroughly
Only warm in very middle of the pile	Pile too small	Collect more materials and build into larger pile
Pile smells like ammonia	Too much nitrogen	Rebuild pile with more brown material or just leave to decompose
Flies	Food scraps not properly covered	Keep them in the middle of pile
Takes too long to compost	Material not chopped up; not enough nitrogen	Be patient or add nitrogen

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We sell composting equipment, gardening guides and more. Call, e-mail, drop by or visit our web site.

**Call the Compost Hotline:
 386-WORM**



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