



Canadian Organic Growers

COG National Office, 323 Chapel Street, Ottawa, Ontario, K1N 7Z2

Tel: 613-216-0740, Toll free: 1-888-375-7383, Fax: 613-216-0743

E-mail: office@cog.ca, Web: www.cog.ca

Canadian Organic Growers Inc is Canada's national membership-based education and networking organization representing farmers, gardeners and consumers in all provinces.

COG Reference Series **# 4, Composting for Gardeners**

Humus is the complex material formed when animal and plant residues are broken down by micro-organisms. This is nature's way of utilizing decay to help create a fertile "living" soil.

Composting is an above-ground way of simulating nature by encouraging micro-organisms to reduce piles of waste, in controlled heat-inducing stages, into a nutrient rich Humus. Incorporated into the soil, this humus or compost provides food for micro-organisms, which break it down still further, releasing nutrients for plants.

Sir Albert Howard, an English agricultural scientist, created a compost making formula when working in India. This Indore Process was based on traditional techniques that had fed huge populations in the Far East for thousands of years while maintaining soil fertility. Howard's observation was that:

Vegetable and animal wastes in contact with a thin layer of soil, moistened and given air plus the organisms that work on it equal a form of Humus - namely Compost.

Compost conditions the soil, improves soil structure and increases moisture retention. Composting by high heat kills weed seeds, plant pathogens, parasites and other pest organisms, producing sweet-smelling humus. Recycling garden and kitchen waste by composting is environmentally sound. It reduces garbage by 25 to 30 %. Waste disposed of in landfill sites or burned in an incinerator does not conserve the plant nutrients.

A good balanced compost is made up of a variety of carbon-rich materials, such as straw, leaves or other dried organic matter, and nitrogen-rich materials like kitchen waste and grass clippings. The best carbon/nitrogen ration is about 30:1. The organisms that break down organic matter are "activators", and are found primarily in soil, manure and other nitrogen-rich material. The greater the variety of materials used, the richer the nutrient content and structure of the compost.

There are several methods of composting including the "no-shred" or "layering" method, the "shredding" or "14-day" method and trench composting. Before deciding the method to adopt consider:

- Location - you need a well-drained site, not in full sun, sheltered from wind and near a water source.
- Space - enough room to work comfortably, for pile turning and easy access by wheelbarrow.
- Time - choose whatever method fits in with the time you have to spare, your energy level and patience.

- Size - regulate the size by the amount of compost you will need. 1.2 m cubed of compost covers 50 sq. m of garden at a depth of 5 cm, enough for good fertility. Piles smaller than one cubic meter do not usually get hot enough for decomposition, and large piles need frequent aeration.

Whatever method you select, one rule is common to all: rotting materials must have moisture and air to remain aerobic. Without these factors in proper balance, the mixture becomes anaerobic, smells unpleasant and heating slows down.

No-Shred or Layering Method

Good compost can be made without shredding by layering materials in open heaps. An average pile would be 1 to 1.5 m wide and 2 to 2.5 m long and about 1.5 m deep. Start by making a criss-cross layer of materials such as corn stalks, raspberry canes, wood prunings, brassica stumps, and twigs, which will rot slowly and let air in at the base. Piles can be built around a perforated drainage pipe or a small wire cylinder to let air in the middle. Use two pipes 1 m apart if the pile is large.

Materials in each of the four groups: activators, supplements, decomposing agents and other organic material are listed under **Composting Material - Selected List**

After the base has been laid, begin with up to 30 cm of “organic material” tender, sappy, juicy waste plus dry, tough and small stemmy materials, either mixed together or in separate alternate layers. Stemmy materials create good air pockets. Sandwiched between the layers add 5 cm of “activator materials” which provide energy to get the compost going. If possible use manure with bedding or waste high in nitrogen. Then add a thin (3 mm) topping of fertile soil, good compost or other “decomposing agents” and sprinkle with dried granular “supplements which add minerals.

You can put in a little wood ash if you feel you need lime. Moisten the pile as you go. Continue layering in this way, and finish with a high nitrogen layer. Cover with a good amount of straw, hay, black plastic or old carpeting to keep the heat in. It is best to assemble the materials before making the pile, and try to do it in two days. If not, try to add at least one layer of organic material plus activator to the pile each time. Keep the sides straight - a wire cage or extra straw bales help.

Once the pile is complete, it will shrink and heat up within a few days. It can reach 75 degree Celsius, which kills harmful organisms. By turning the pile, you should have good, black, friable compost in 3 months. Turning the pile involves peeling off the less decomposed top and sides, and layering this material with the rest to admit air, keeping the pile moist as before. The heap will heat up again, but not more than 60 degree Celsius. After 3 more weeks turn the pile again. This time it will heat up to only 45 degree Celsius. Turn a third time after two more weeks and relax. Manure worms can be added with the last turning but not before, as they would bake.

If this all seems like too much work, just let the pile sit unturned. After 4 or 5 months, or even more, some will have decomposed enough to use. The less decomposed material from the top and sides can be used to start another pile.

Shredding or 14-Day Method

If you own, or can borrow or rent a shredder, this method is probably the best for the home gardener. The heap can be enclosed with wire cages, concrete blocks, bricks, wooden structures, bins, straw bales or boxes. Select the same material as before and shred everything, mixing it all together and moistening. There is no need to layer. After 4 days it should be good and warm to the touch; turn it and do the same on the 7th and 10th days. By the 15th day, it should be friable and ready to go out in the garden, where it will decompose further.

As the material is lighter than the layered compost, it is not such a chore to turn it. Smaller quantities should be enclosed in boxes or cages lined with cardboard to keep the heat in, and cooling rain out. They also look tidy. You can buy compost bins. If you do follow the manufacturer's instructions.

Trench Composting

This is a method of burying waste in trenches up to two feet deep which you fill in as you go. You can reserve a space in your garden rotation to use every year, or use it to break up new ground. If animals or rodents are a problem, put chicken wire flat over the area. As you fill up an area, sow red clover seed on top. The plants can be dug in or rototilled in the spring to add nitrogen to the soil.

Compost Structures

There are many possible structures for composting, but one of the most useful is the three-bin New Zealand type. One compartment is used to collect material, and when it is full, the next bin is used to build up the working pile in the recommended layers. When it heats up, turn the pile back into the first compartment, repeating as necessary. The third bin is used to collect new material, which can be added to the fermenting material as it becomes reduced, or used to start a new pile when there is a vacancy.

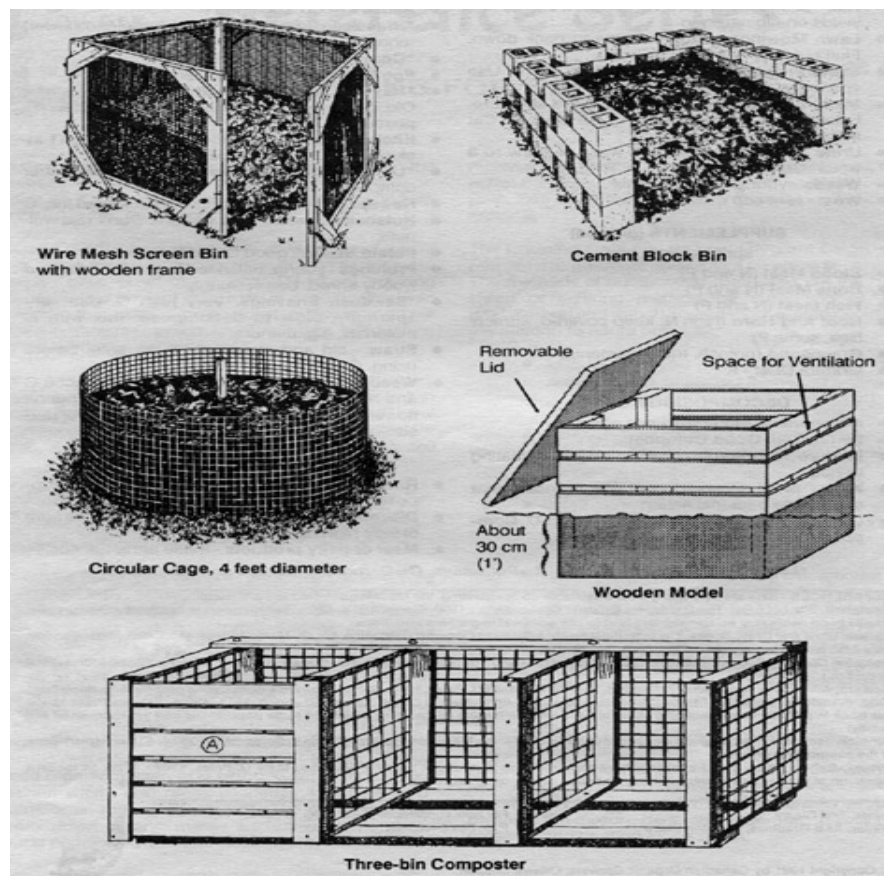
Composting Materials - Selected List

Activators (high nitrogen (N))

- Lawn Mowings - high N, tends to pack down, fluff out, mix with stemmy waste, be sure the clippings have not been sprayed
- Weeds (young) - high N, moist
- * Manure (Stable with bedding) - good structure; balanced N and carbon, do not use dog or cat manure
- Manure (Poultry) - very high N, P and K; use sparingly, add straw
- Hair - animal or human; very high N; 6/7 lbs hair yields one lb nitrogen
- Urine - high N, dilute with water, 1 urine to 3 water; contains K
- Feathers - good N, moisten
- Wool - N, keep moist

Supplements (ground) - sprinkle on lightly

- Organic Bone Meal (N and P)
- Greensand (potash, trace elements)
- Fish Meal (N and P)
- Granite Dust (K)
- Organic Blood Meal (N and P)
- Organic Hoof and Horn Meal (high N, keep covered, attracts flies, some P)



Decomposing Agents

- Fertile soil, good compost
- Kelp - dried seaweed contains alginates that encourage bacterial action
- Manure worms - don't add when the pile is heating or hot
- High nitrogen materials - see activators lists
- Q.R. Herbal Compost Maker and B-D Composter - fermented plant material

Other Organic Material (mainly high in carbon)

- Ashes - wood, lime and K
- * Brassicas (e.g. broccoli, cauliflower, Brussels sprouts plants) - chop or smash with a hammer; C
- * Corn Stalks - chopped up; C
- Egg Shells - lime, calcium, some N and P
- * Hay - dry; chop to mix with sappy or wet waste; old hay is good as it is already partly decomposed
- Kitchen Waste - balanced N and C; don't include meat, fat or pesticide coated skins
- * Leaves - small amounts only, they mat; better composted separately
- Newspaper - tear into strips; no colored ink; C
- Nutshells - crushed; N, K, some P; don't use walnuts
- Potato Stalks - good C and N ratio
- Prunings - young; balanced C and N; shred older and woody branches; use sparingly
- * Sawdust, Shavings - very high C; use very sparingly; slow to decompose; mix with N materials
- Straw - old and chopped; if dry soak before using; C
- Weeds - mature and garden trash; balanced C and N; pull perennials before seeding or cut off flower heads; roots contain minerals; omit persistent rhizomes

Do Not Compost

- Rhubarb Leaves are not recommended - supposedly toxic but authorities differ on this
- Diseased Plants - omit unless you can be sure of very high heat in the pile
- Meat or dairy products - these attract animals

N=Nitrogen; P=Phosphorous; K=Potassium; C=Carbon; * indicates good structure

Additional Resources and Web sites

Composting. EAP Publication - 56. 1981. Ecological Agriculture Projects, McGill University, Montreal. www.eap.mcgill.ca/Publications/eap56.htm

Garden Compost. Donald H. Steinegger and Donald E. Janssen. 1993. NebGuide. University of Nebraska, Lincoln. www.ianr.unl.edu/pubs/Horticulture/g810.htm

Let it Rot! the Gardeners Guide to Composting. Stu Campbell. Storey Publishing, Pownal, VT. 1998. Discusses materials to compost, making a pile, how to build necessary equipment and how to use compost in gardens and lawns.

The Rodale Book on Composting, Easy Methods for Every Gardener. 1992. Eds Gershuny, Grace and Deborah Martin. Rodale Press, Emmaus, PA. 278 pp. An introduction to composting including discussions on materials needed, methods of production, structures, equipment and uses of compost.

Tips for Buying Garden Compost. Bob Richards and David Jennings. 1996. In *Cognition*, Fall, 1996, pp. 7-8 or at .

updated by COG, 2002.

For reference series copies write to Office Manager, Canadian Organic Growers, 323 Chapel Street, Ottawa, Ontario, K1N 7Z2

Tel: 613-216-0740, Toll free: 1-888-375-7383, Fax: 613-216-0743, E-mail: office@cog.ca

Copyright 2004 Canadian Organic Growers. No portion of this publication may be reproduced without written permission of Canadian Organic Growers. COG is a non-profit charitable organization.