



# ORGANIC WASTE MANAGEMENT

## WHY SHOULD I BE CONCERNED ABOUT ORGANIC WASTES?

Organic wastes are receiving increasing scrutiny throughout the world as resources that are being "wasted" by being disposed of in landfills. Yard waste is the most prevalent type of organic waste produced in many areas of the United States. Because of its prevalence, yard waste is often the first type of organic waste to be handled in a different fashion other than landfilling.

In the United States, many states have banned yard waste from being disposed of in landfills. This has resulted in a change regarding how yard waste is managed. The state of Iowa implemented a ban on landfill disposal of yard waste on January 1, 1991. This ban has forced communities throughout Iowa to develop alternative yard waste management systems.

Yard waste can be dealt with both at the home and on a municipal level. There are a variety of methods of dealing with yard waste at home. Some strategies can even utilize food waste. Organic wastes can be dealt with effectively in an environmentally sound fashion without having to resort to landfilling.

## WHAT CAN I DO WITH YARD AND FOOD WASTE?

Probably the most effective way to manage yard waste is to keep it "on site". In other words, deal with it on your own lawn instead of paying somebody to collect it, haul it away, and then process it. Not only does this minimize your waste, but it will also result in lower disposal costs. The following are some on-site yard waste management strategies:

### PROPER LAWN CARE

#### Mowing:

In many cases, a bulk of the yard waste produced at a residence comes from bagging grass clippings. Several studies throughout the United States have found that bagging is unnecessary in most cases if the resident utilizes proper mowing strategies. The rule of thumb is to mow when the grass needs it and to mow only the top third of the grass blade.

Studies have found that in most cases it actually takes less time to mow more frequently and not bag than it does to mow infrequently and bag the clippings. Proper mowing starts by establishing a proper mowing height and then mowing only when the grass exceeds that length. The grass clippings that fall to the ground will decompose very quickly, within two to three days. As these clippings decompose they will release nitrogen into the soil, a nutrient that lawns desperately need on an on-going basis.



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Further, since these clippings decompose so quickly, there will be no problem with thatch build up. The nitrogen released by the grass clippings will help build a stronger root structure that in turn will result in a hardier lawn that is more resistant to disease and weeds.

### **Mulching:**

Mulching will also result in less work as well as allowing the grass clipping to fall to the ground where their nutrient value can be utilized. Although mulching is not necessary, it is an option that has many added benefits.

### **Watering:**

The key to properly watering lawns is to water heavily and *infrequently* that thoroughly wets the root zone. This promotes strong and deep root growth that results in a hardier lawn. Constant watering ends up drowning the grass and/or developing a shallow and therefore inferior root structure. This does not apply to transplanted sod which needs a great deal of water as it strives to root itself in the home soil. Under no circumstance should watering be undertaken during hot daylight hours as this will end up "burning" the lawn.

### **Fertilization:**

One of the most misunderstood lawn care practices is that of fertilization, especially if the grass clippings are left on the lawn. In many cases lawns are either over fertilized or fertilizer is applied at the wrong times of the year.

Proper fertilization promotes root development and provides for a healthier lawn. Improper fertilization often only promotes top growth at a time when the plant is usually having little difficulty in terms of growth. Remember: Spring fertilizing will create faster growing grass resulting in more mowing needs.

Fertilization should employ a fertilizer with a 4-1-2 ratio of Nitrogen to Phosphate to Potash. In addition the fertilizer should be of a controlled release nitrogen type.

In fact, proper mowing, watering and fertilization will result in a healthier and greener lawn with less effort than mowing and bagging. Remember, we all want green golf-course like lawn, but when was the last time you saw a golf course bagging its grass clippings?

## **NATURAL LANDSCAPING (xeriscaping)**

Natural landscaping is a method of controlling organic wastes from a household or business establishment. This form of landscaping involves nothing more than native plants that require little or no maintenance to provide a green scape with a minimum of waste. Native and decorative stone, bark mulch, wood chips, etc. can be utilized to dress up an outdoor area while at the same time minimizing any waste generated.

While natural landscaping is becoming increasingly popular, many communities currently have ordinances on the books that may not permit this strategy as an option. However, for a unique landscaping idea, this strategy will provide a beautiful and cost effective way to enhance a home or business.

## **COMPOSTING**

There are a variety of methods to compost at home that will process unwanted organic materials into a usable soil product. Composting is the biological and chemical decomposition of organic matter into a humus material. It is Mother Nature's way of recycling waste materials. With a little planning, a homeowner can harness this process to work for them.

In most cases composting will result in a 90% reduction in volume of material and a 50% reduction in weight. This means that a denser type material is created which has high moisture retention and erosion resistant qualities.

Trouble free and odorless composting requires four components in order to function properly:  
Food: The first component is organic wastes. Organic wastes include yard and food wastes. A good mix of carbon based organic materials such as leaves (browns) and nitrogen based organics such as grass clippings (greens) is essential to the process.

Ideally, a compost mixture should have a carbon to nitrogen ratio of 30:1. Since browns have high carbon ratios and greens have high nitrogen ratios, determining the proper mix for a particular area may take some experimentation. The following is listing of materials and their ratios.<sup>1</sup>

### **Carbon to Nitrogen (C/N) Ratios**

<b>Material Type</b>	<b>C/N Ratio (by weight)</b>
Grass Clippings	20
Leaves	40-80
Sawdust	511
Wood (pine)	723
Fruit Wastes	35
Paper	170
Table Scraps	15
Livestock Manure	10-12
Coffee Grounds	20

Air: The second component is air. Without air the system will turn anaerobic. This condition will create odors and slow down the process. Air is essential to the process. Not much is needed but without it the process suffers.

Moisture: The third component is water. The process needs enough water to promote decomposition but not too much that it will drown the process. A simple test can determine what is the proper moisture content. Squeeze a handful of material. If it has the proper moisture content, just a few drops of water will be squeezed out.

Microorganisms: The fourth component involves microorganisms, bugs and worms. These organisms are the workhorses of the composting process. They consume waste material and digest it into humus. As the organisms work they expend energy which creates heat in the process. It is not uncommon for temperatures in compost piles to achieve temperatures of 160 degrees Fahrenheit. This energy is released as carbon dioxide. Water and air is necessary in order for the organisms to function properly.

The temperature of the process varies as composting develops. It primarily involves three different types of microorganisms and each play a key role. These are: Psychrophilic - less than 40 degrees F; Mesophilic - 40 to 100 degrees F, and; Thermophilic - 100 to 150 degrees F.

All of these components are necessary in order for proper decomposition to occur. If a pile is too dry, decomposition will slow down. If it does not have enough air, the process will slow down and generate odors. If the pile does not have a proper mix of browns and greens it will become unbalanced and either stop or become troublesome. In many cases compost should be treated like a cooking recipe. Although you can stray from the base recipe slightly, it will not work if played with too much.

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<sup>1</sup>Composting and Mulching: A Guide to Managing Organic Yard Wastes, Rosen, Schumacher, Mugaas, and Halbach, Department of Soil Science, Minnesota Extension Service (AG-FO-3296, 1989)

### Items that can be composted at home:

A variety of products can be composted at the home. On-site composting can include yard wastes, as well as, food wastes. The following is a listing of materials acceptable for composting:

#### Acceptable for Composting:

Yard Wastes:	Leaves	Grass Clippings
	Prunings	Garden Wastes
	Flowers	Herbs
	Weeds	Sawdust
	Ash (small quantities)	
Food Wastes:	Bread	Vegetable Wastes
	Pastas	Coffee Grounds
	Grains	Fruit Wastes

#### Compost Additives:

There are several manufacturers of compost additives to help kick-off the process or speed it up. For example, there are additives that will add nitrogen to a heavy carbon based compost projects (i.e. leaves and no grass). Likewise there are additives available for heavy nitrogen based compost projects that will add carbon (i.e. grass and no leaves).

These additives, if used according to instructions will be beneficial to your compost. However, be sure that the additives are truly needed prior to using them so as not to buy something that is not really needed.

#### Items that can cause significant problems for home composting:

*The following items can cause significant problems in a home composting project:*

Red Meat	Bones
Fish	Poultry
Manure	Dairy Products
Eucalyptus Plants	Rose Bushes
Pet Wastes	Chemicals

### **METHODS OF BACKYARD COMPOSTING:**

Composting on-site involves providing a location in which the organic material can break down and become compost. There are three different methods for carrying this out. Two are very simple and require little maintenance. The third will produce compost more quickly but involves more effort.

#### **Sheet Composting:**

The first method is called sheet composting. Sheet composting works just like its name implies. Organic waste material is spread out on top of soil and allowed to rot. The process can be speeded up by applying soil over the spread of organic waste.

Sheet composting works well if a resident has a garden that has areas that can be held out of planting for a year. By applying organic wastes to an area one year, by the next year the area will be rich in soil nutrients and ready to be planted.

### **Trench Composting:**

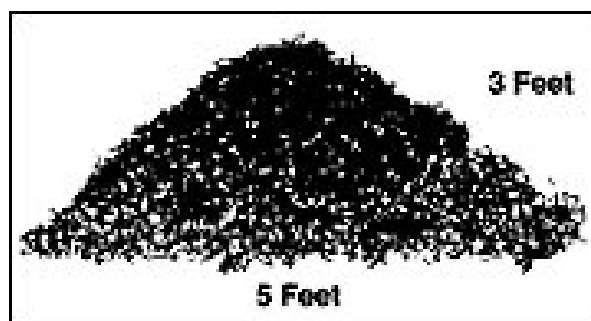
The second method is called trench composting. Trench composting is similar to sheet composting in that it is a low maintenance method. However, instead of simply applying the waste over an area, trench composting involves digging a hole (or series of holes) or a ditch, filling it partly with organic wastes and then covering that with soil.

Like sheet composting, trench composting works well in garden areas. Care must be taken to dig the hole deep enough and cover it with enough soil in order to prevent animals from digging it up. At least eight inches of soil is required to prevent pests from digging up the material. To speed up the process in both sheet and trench composting add some healthy red worms to provide air space and to help break down the material.

### **Pile or Heap Composting:**

The third method is called pile or heap composting. This is the most common form of on-site composting. Pile composting involves the creation of a pile of mixed organic wastes containing both carbon (browns) and nitrogen (greens). Although pile composting is a more sophisticated method it can be carried out in both simple or complex methods.

**Open Pile Method:** The easiest method of pile composting is to just create a pile mixing greens and browns in layers. Occasionally add air to the pile by either turning it with a pitchfork and mixing it up or by placing a number of stakes into the pile and periodically removing one or two to draw air into the pile.



Source: University of Missouri Extension

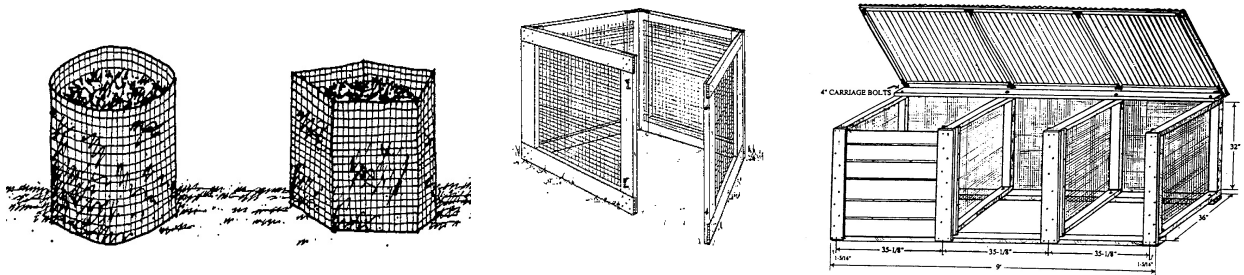
Although this is the easiest method it does have some distinct drawbacks. One is that a pile that is not contained can become messy and is open to prying animals. There are other methods that will accomplish the same goal but require more in the way of construction.

**Home-Made Backyard Composting Bins:** One step up from just a pile is to construct a circular bin made of chicken wire. A bin of this type can range in size depending upon volume needs. It is constructed of wire stapled to wooden stakes with hooks to join the ends together in a circle.

An advantage of this type of bin is that it is inexpensive, keeps out pests, is aesthetically pleasing, and can be easily set up, taken down and moved to another location.

More elaborate bins can be made from wood in various sizes. Composting bin kits can be bought at most hardware and lumber stores ranging from a few dollars to over a hundred dollars. Many may be more pleasing to the eye, but rarely will they do a better job of producing compost than the more simple and inexpensive methods.

## Home-Made Wood & Wire Composting Bins<sup>2</sup>



**Manufactured Bins:** In addition, various vendors manufacture pre-built or ready to assemble backyard composting bins. Prices for these manufactured units vary from relatively inexpensive to quite expensive. Price does not necessarily equate to durability or composting efficiency or effectiveness. Regardless of price, look for a unit that will provide durability, adequate ventilation, and effective moisture management.

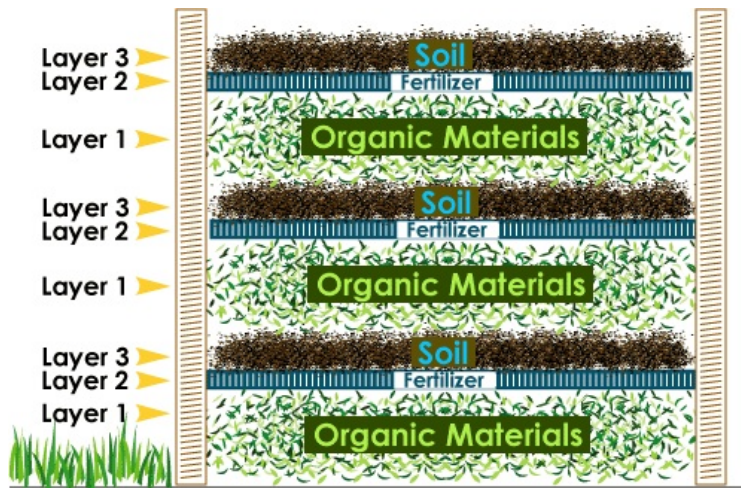
### Pile Composition:

Regardless of the pile method used, a well constructed compost pile will have the following ideal composition:

- o 50% dry, carbon based organic waste such as leaves;
- o 40% wet organic waste such as grass and weeds;
- o 10% soil or previously composted material.

A pile made of this composition will be a balanced carbon and nitrogen pile that will promote an efficient and effective compost process resulting in high quality compost.

### Pile Layering<sup>3</sup>



<sup>2</sup> Source: King County Washington Solid Waste Division

<sup>3</sup>Source: University of Illinois Extension Service.



## **Using compost around the home:**

Compost has a number of uses around the home. Since compost is a dense soil material it has high moisture retention and erosion resistant characteristics. It also contains varying degrees of natural nutrients such as nitrogen. These characteristics make it ideal for use around flowers, vegetables, and shrubbery. Compost helps improve drainage and moderates soil temperatures.

It will hold moisture longer than normal soil as well as prevent soil loss due to water and wind erosion. This, in turn, helps to protect plants against nutrient loss and root damage. Compost releases vital nutrients on a constant basis thereby creating a beneficial soil layer. Depending upon the makeup of what organic wastes were composted the compost can range from good quality top soil to almost fertilizer quality material.

## **WHAT OTHER ORGANIC WASTES CAN BE COMPOSTED?**

On a municipal level many different materials can be composted. Some examples are: sewage sludge composting; municipal solid waste composting; co-composting of sewage sludge and solid waste; food waste composting, and; animal manure composting.

Obviously, many of the above composting operations require a great deal of monitoring and hard work in order to produce a usable compost product. What is surprising is the quality and variety of compost products that can be made from various waste materials.

Compost made from the above listed wastes can range from being just good dirt to material that is rich enough to qualify as fertilizer. Whatever a soil need may call for there is a compost product that can fulfill it.

## **Useful Resources:**

### **USEPA:**

<http://www.epa.gov/epawaste/conserv/rrr/composting/index.htm>

### **US Composting Council:**

<http://www.compostingcouncil.org/>

### **Composting Yard Waste, Iowa State University Extension, PM683:**

<https://www.extension.iastate.edu/store/> (enter "composting" in search box)

### **University of Illinois Extension:**

<http://web.extension.uiuc.edu/homecompost/building.html>

### **University of Missouri Extension:**

<http://extension.missouri.edu/explore/agguides/hort/G06957.htm>

**Backyard Composting: Your Complete Guide to Recycling Yard Clippings**, Harmonious Press, Ojai, CA, 1992, ISBN 0-9629768-0-6

**Rodale Book of Composting**, Rodale Press.

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**Disclaimer: This guide is intended only to provide ideas for those individuals considering organic waste management strategies. The Boone County Landfill makes no guarantees on the results. The responsibilities lie solely with the reader.**

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Source: This handout was adapted from a document authored by Scott A. Smith, Des Moines Metropolitan Area Solid Waste Agency, 1991.

## Trouble Shooting Guidelines

Problem	Possible Cause	Solution(s)
Malodorous Compaction	(insufficient oxygen)	Turn pile for increased air circulation.
Pile damp, but won't heat	Excess moisture	Turn pile or add dry, porous materials such as sawdust.
	Insufficient nitrogen	Add fertilizer (see Table 2) or fresh grass clippings.
	Materials too wet	Allow pile to dry, turn pile to dry out center, or add additional dry materials
Dry and not composting	Insufficient water	Form pile so center is the lowest point (this prevents runoff). Apply water to moisten.
Ammonia odor	Too much nitrogen	Add carbon-rich material, such as sawdust, wood chips, or straw, and turn pile.
High pile temperature	Pile too large	Reduce pile size.
	Insufficient ventilation	Turn pile.
Low pile temperature	Pile too small	Make pile bigger or insulate sides.
	Insufficient moisture	Add water while turning pile.
	Poor aeration	Turn pile.
	Lack of nitrogen	Mix in nitrogen sources such as grass clippings, manure, or commercial fertilizer.
Pests (rats, raccoons, insects)	Cold weather	Increase pile size, or insulate pile with an extra layer of material such as straw.
		Presence of meat scraps or Fatty food waste

Source: Utah State University Cooperative Extension