

# Composting

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## Outline

- I. Introduction
  - A. Put it in coffee can because we must give it back to Earth.
  - B. Coffee can was filled with left-over food, eggshells, coffee grounds and all things biodegradable to put back into the Earth.
  - C. If we do not give back, we will soon deplete the Earth.
  - D. Recycling/composting is the way to give back.
- II. Body
  - A. History and points about recycling
    1. Pre-industrial
    2. World War I
    3. Post War
  - B. Why recycle?
    1. Landfills too full
    2. Save energy
    3. Reduce pollution
    4. Replenish the Earth
  - C. Composting
    1. Why composting is important
    2. Organisms needed to complete composting
    3. How to build a compost bin
    4. How to use compost
- III. Conclusion
  - A. Thesis of paper
  - B. Summary
  - C. Closing sentence--Recycling will become more important as our country grows to supply the needs of the population. Composting is necessary for the healthiness and replenishment of our soil.

That we must give back to the Earth was an idea that was expressed often when I was growing up. My great-grandmother had a coffee can kept in the kitchen that all appropriate leftovers, egg shells, and coffee grounds were kept in until they were buried in the back yard flower bed. Can one imagine the Earth bare, fields without plants or food not growing because we have depleted the soil, and it is not able to produce? Recycling and composting are two of the main ways to revive the Earth.

It is shocking that Americans produce so much waste: “In 2010, Americans generated about 250 million tons of trash, equivalent to a 34.1 percent recycling rate. On average, we recycled and composted 1.51 pounds of our individual waste generation of 4.43 pounds per person per day” (“Municipal Solid Waste,” 2012). The Environmental Protection Agency (EPA) suggests that the practice of waste prevention, recycling, and composting will reduce the amount of waste that needs to be disposed: “Recycling and composting prevented 85.1 million tons of materials away from being disposed of in 2010, up from 15 million tons in 1980. This prevented approximately 186 million tons of carbon dioxide equivalents into the air” (“Municipal Solid Waste,” 2012). It is important that we learn to prevent waste and make a real effort to recycle and compost.

“Recycling is the process of collecting and processing materials that would be thrown away as trash and turning them into new products” (“Recycling Basics,” 2012). Recycling is the third component of the waste hierarchy: reduce, re-use, recycle. The main thought of the waste hierarchy is to maintain resources by decreasing waste or to extract the most good from items and generate the least amount of waste. Recycling and composting are not new to this time. There are recorded advocates as far back as Plato (“History of Recycling,” 2011 ). Later in

the Byzantine period, there is evidence that glass was “being recycled in the ancient city of Saga-lassos, located in current day Turkey. In hard times (e.g. wartimes), metals from everything like jewelry and coins were being melted into weapons or other necessary goods” (“History of Recycling,” 2011). It is clear that since ancient times, some people have careful with their resources.

Books on composting almost all begin with a statement that composting is an ancient art, practiced by man since before the dawn of recorded history. Evidence does suggest that man had a long affair with composting: “We know the Alkkadians practiced composting in ancient Mesopotamia, a thousand years before Moses was born” (Dailey, 2008). In the writings in the Talmud, the old Testament, ancient Chinese, ancient Hindu, there are references to composting. The ancient Greeks buried used straw from animal stalls in their cultivated fields. A retired Roman General wrote of composting in a book titled DeAgri Culture. This book’s writing “influenced farming operations in Europe for hundreds of years. Sir Francis Bacon and Sir Walter Raleigh also mentioned composting” (Dailey, 2008).

In the early settlements of North America, too, compost was used in farming. Fish and “muck” were allowed to decompose together. George Washington was a great sponsor for composting. He constructed a compost collection building and taught about airing manure. He used the compost in his tobacco and wheat field to increase the yield of his crops (Dailey, 2008).

In pre-industrial times, as well, recycling was practiced. Economics seems to be the main factor in deciding to recycle. It was cheaper to re-use something rather than to buy a new product. When industrialization took place, recycling took a hit. It was easier and often

cheaper to get a new item than to recycle. During an economic slump, such as the depression, due to simple economics, recycling resurfaced. During war time, because of economic and scarcity of materials, recycling was popular. In fact there was a “general patriotism in recycling” (“History of Recycling,” 2011). Later in the mid- 20<sup>th</sup> century, with the development of artificial fertilizer, composting declined. In the 1920, there had been a few recordings of organic farming, though. Rudolf Steiner was the founder of the farming method called biodynamic. During 1950-1958, Anne Frances Harrer was appointed by Mexican government to set up a humus organization in the fight against erosion and soil degradation. Composting was imported to America by various followers (Dailey, 2008). Generally, however, the interest in recycling was lost after war times. Landfills became prevalent as a way to dispose of trash. It wasn't until 1970 that recycling became popular again, and there was a public awareness of the need for recycling and taking care of our environment (“History of Recycling,” 2011).

There are many items that can be recycled, such as glass, paper, metal, plastic, and electronics. Reasons to recycle are plentiful. Recycling will help prevent pollution by reducing the greenhouse emissions, which are generally thought to affect the climate. Recycling decreases the need for landfills and incinerators. The environment is sustained by recycling by conserving our natural resources, such as trees, water and other minerals. There are many products we use from recycled material like plastic bags, furniture, and paper. Recycling is not a new idea of taking something old and making something new. “The climate recycler is none other than Mother Nature. If not for her wonderful decomposition process, we would be covered in leaves and other dead organic matter” (“History of Recycling,” 2011).

The re-use of biodegradable waste or composting is not always identified as a part of recycling, but by this definition, it is very similar if not the same:

Compost is an organic soil conditioner that has been stabilized to a human-like product, that is free of viable human and plant pathogens and plant seed that does not attract insects or vectors, that can be handled and stored without nuisance, and that is beneficial to the growth of plants. (Haug, 1993).

The three basic beneficial purposes as discussed by Roger Haug in his book, are

First, to compose can serve as a source of organic matter for maintaining or building supplies of soil humus, necessary for proper soil structure and moisture holding capacity. Second, compost can improve the growth and vigor of crops in commercial agriculture and home related use. Stable compost can reduce plant pathogen and improve plant resistance to disease. Third, compost contains valuable nutrients including nitrogen's, phosphorus, and a variety of trace elements (1993).

To start composting, the items that can be used need to be identified and then the ratio of chemical elements can be considered. Ingredients that make good compost are high in carbon and high in nitrogen. Those high in carbon are ashes, bark, shredding cardboard, pine needles, and sawdust. Those high in nitrogen are alfalfa, algae, clover, coffee grinds, and garden waste. Materials to avoid are colored paper, coal ash, meat, and synthetic chemicals as fertilizers ("What to Compost,"2006).

The best raw material for compost is organic waste:

This can come from your garden, your kitchen and even your home at large.

According to United States EPA, yard trimmings and food residue together constitutes 23 percent of the US municipal solid waste stream. That is a lot of waste to send to a landfill when it could become useful and environmentally beneficial compost instead. (“What to Compost,” 2006)

Since all organic matter is made up of large amount of carbon and smaller amount of nitrogen, the need for the ratio of these two elements is an important factor in composting. This is referred to as the carbon-to-nitrogen ration. In the past few decades, studies have found that the best ratio is approximately “25 to 30 parts carbon to one part nitrogen. If the C to one N ration is too high decomposition slows down” (“What to Compost,” 2006), and if it is too low, a smelly mess is produced. Many ingredients used for composting do not have the ideal ratio of 25-30 to one. Mixing other ingredients is needed. As an example, if there is a high C:N ratio, add grass clippings or manure to lower the ratio (“A Balancing Act (Carbon-to-Nitrogen Ratios),” 2006) .

When the materials are collected and placed in a bin, and the right C:N ration is established, the cooking begins. There are several ways to enhance the process. Compost decomposes fastest between 120 to 160 degrees Fahrenheit. To speed up the process, there are some ways to enhance the temperature. Chopping up or shredding the material first makes the bacterial break-down easier. Turning the materials lets air in, which always increases heat. Adding large amounts versus small amounts at a time will also increase the compost heat. The area or container should be in a sunny spot to take advantage of the sun’s heat as well.

Moisture in the right amount is needed to maintain decomposition activity without creating an anaerobic condition. If the compost is too wet, it will become odorous. Oxygen is needed to oxidize the carbon, which is the basic decomposition process (“A Balancing Act (Carbon-to-Nitrogen Ratios),” 2006).

There are several approaches to composting using different processes, ingredients, locations, and applications. To name some, there is grub composting, which uses the black spider fly larvae to convert manure or cooking waste into animal feed. Bokashi is a mix of micro-organisms to cover food waste to cover the smell. Compost tea is a liquid extract of compost and other material (“What to Compost,” 2006).

There is a process that has some popularity called vermiculture. Vermiculture is the use of worms to help with composting. This does not just help the individual composter, but also the environment. Usually the red worms are the worms of choice. “Red wigglers, which are also called red worms, are the most voracious eaters of the earthworm family. They can consume half their own weight in organic matter each day and leave behind fertile compost” (Filsinger, n.d.) They will work the compost pile, turning it into rich, dark, earth-smelling soil to be used on lawns, flower beds or vegetable gardens (“How about Worm Composting?,” 2006).

No matter which method is used, the compost is excellent to use in gardens.

Composting is done by many people for a variety of reasons. The ones that are foremost in the minds of most are the wishes to improve the soil and also to help the environment. Composting will add many nutrients to the soil; it will also make it darker, which allows it to warm faster in the spring. Composting makes the structure of the soil granular so that it holds oxygen, which will help the soil hold moisture. Holding moisture is good so that it



will allow the water to soak down and not just run down or across the ground. Composting also recycles some materials, keeping them out of the landfills. Compost helps curb the overuse of synthetic fertilizers (“Using Compost-The Finished Product,” 2006).

After composting the appropriate waste material, there is rich soil to re-supply the Earth. The mission of saving the bounties of the Earth, providing the needs for the present and eliminating as much waste materials can be accomplished. Recycling and composting are a wave of the future, or are they things of the past? This one question is one that will be continually debated. There is legislation concerning these issues; some communities, towns, and states have made laws regarding parts of these processes. Environmental groups have issued education and supplied ways to accomplish these processes. The importance of these processes is now in the hands of individuals. Recycling and composting are for those who care and want to continue and provide a healthy and plentiful world for the future.

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