CLINTON COUNTY WASTE MANAGEMENT

FACT SHEET

COMPOSTING BASICS

Before Michigan's Yard Waste ban, yard wastes were a significant component of the solid waste stream and landfills. It's been nearly ten years since Michigan has prohibited the landfill disposal of yard waste. Disposal of yard wastes through burning has also been banned in many communities. Composting (i.e. the biological decomposition of organic wastes) offers a safe, easy, beneficial alternative, and produces useful organic humus along with byproducts such as carbon dioxide, heat and water.

Benefits of Composting

Compost is good soil conditioner and can be used in landscape applications, to improve crop production and to control erosion. These benefits of compost or humus are derived from its high organic matter content, which increases water holding capacity and improves soil structure, and its balanced microbial communities which help suppress disease organisms and increase nutrient availability. Using compost decreases the need for watering and application of fungicide and fertilizer. It is also effective at limiting erosion, and as a reused resource creates a value added product to enhance plant growth.

Basic Principles of Aerobic Microbes Composting

Composting is a controlled biological process that requires adherence to a few basic principles to maintain optimal conditions for aerobic microbes. For Example:

- A Good Compost Recipe: A good recipe has the right carbon-nitrogen ratio (C:N), moisture content and porosity (air spaces created by bulking agents). Fresh grass is high in nitrogen (20:1), while dry leaves average 80:1 (leaves over-wintered may be slightly less); wood is almost pure carbon. Add no more than 1 part green material (grass) to 2 parts brown material (leaves/wood chips).

- Composting Rate: The composting rate is governed by nutrient balance, moisture content, aeration and temperature. The rate of decomposition decreases rapidly when there isn't enough moisture; however, too much moisture creates anaerobic conditions, essentially "drowning" aerobic microbes by limiting oxygen. A 50-60% (by weight) is the right moisture content. A firm squeeze of a handful of composting material that produces several drops of' water indicates a good moisture content.

- Effects of Temperature: Heat is generated from within the compost pile as a result of microbial activity. Temperatures of 145-150 degrees F are needed to kill weed seeds; however, temperatures above 160 degrees F are too high and it slows composting dramatically. Maximum composting rate occurs between 90-130 degrees F; higher temperatures will be needed for several days to kill weed seeds.

- Effects of Particle Type and Size: Particle size and type will affect the speed at which compost progresses. Shredded leaves will compost more quickly but larger particles such as wood chips are important for airflow. Turning will also improve airflow but it is not as effective as natural convection. A surface to volume ratio of 5%, along with larger particles will maintain sufficient air levels.

Composting needs little attention but there are a few problems that can develop. If the compost pile begins to take on an ammonia-like smell, chances are there's not enough air in the pile. Increase the ratio of carbon to nitrogen by adding dry leaves, wood chips, sawdust and twigs and turn the pile. Too little nitrogen material will prevent the compost pile from producing the necessary heat to compost. Too small a compost pile will have the same effect.

Clinton County Department of Waste Management, 100 E. State St., Ste. 1300, St. Johns, MI 48879
Phone: 989.224.5186 or 5187 Fax: 989.224.5102

Here are some common terms relative to Composting:

Aerobic decomposition: Decomposition of organic matter by microorganisms in the presence of air. Byproducts of aerobic decomposition are carbon dioxide and water. This type of decomposition –does not generally create offensive odors, but often results in- a rise in PH, particularly in composts utilizing grass.

Anaerobic decomposition: Decomposition by microorganisms in the absence of air. Byproducts include methane gas, alcohols or other organic compounds and carbon dioxide. Odors are often associated with anaerobic decomposition.

Bulking agent: Material added to a compost mix to maintain airflow. Bulking agents reduce compaction and settling and decrease bulk density. Wood chips or dry leaves are typical carbon-rich bulking agents.

Carbon to Nitrogen Ratio (C:N): The C:N ratio (by weight) indicates the nutrient -balance in a compost mix, which is the food source for microbes. C:N ratio is one factor that affects the composting potential of a feedstock and may, under certain conditions, serve as an indicator of compost quality. The optimal initial C:N ratio for effective composting is generally 30:1, roughly equivalent to 2 parts leaves to 1 part grass by volume. Average C:N ratios for some common materials include:

Grass clippings	20:1
Cow manure	20:1
Green leaves	40:1
Dry leaves-	80:1
Sawdust	500:1
Dry straw	100:1

Humus: The relatively stable end product of composting. Humus is rich in nutrients and organic matter, improves soil structure and increases water holding capacity.

Stability: The degree to which finished compost can be stored or used without phytotoxic effects or further giving rise to nuisance odors or additional heat.

Windrow composting: A system of placing compost mix in elongated, trapezoidal piles called windrows. Windrows with the proper dimensions aerate naturally by a chimney effect: rising heat generated inside the pile draws cooler air from the bottom and sides of the windrow. Turning windrows blends the composting material, decreases particle size and ensures uniform decomposition and weed seed kill.