

Key Factors to Composting

- *Moisture Content
- *Temperature
- *Carbon to Nitrogen Ratio
- *Nutrient Balance
 - *Aeration
 - *pH
 - *Substrate

Moisture Content

- Not less than 45%
- Not more than 70%

Carbon to Nitrogen Ratio:

- Between 25:1 and 30:1

Aeration:

- To speed up composting it is important to maintain aerobic conditions and proper temperatures within each windrow.



Windrows should be turned to accomplish this.

Windrow Turning Frequency:

First 3 - 5 days	Turn Daily
Next 3 - 4 weeks	Turn 2 - 3 Times/Week
Week 5 to End	Turn Once/Week

The Illinois EPA, Bureau of Land and Bureau of Water regulate composting and in some instances permits are required.

Composting Siting Regulations

Permits are NOT required if:

- * The site is located on the farm on which the compost is applied.
- * Appropriate setbacks are followed.
 - ◆ ¼ mile from the nearest non-farm residence.
 - ◆ ½ mile from the nearest populated area.
- * The site is protected from flooding.
- * The site does not discharge runoff.
- * The site is 200 ft. from the nearest potable water.
- * The site is operated by the farmer who is not a partner or employee of a waste hauler or generator.

Permits are required:

- * For livestock operations larger than 1,000 head, a National Pollution Discharge Elimination System Permit is needed.
- * If compost is sold, a siting permit is needed.
- * If livestock waste is combined with landscape waste and exceeds greater than 10% of the total volume, an EPA organic waste-composting permit is required.

ILLINOIS STATE UNIVERSITY
DEPARTMENT OF AGRICULTURE

Campus Box 5020
Normal, IL 61790-5020
Phone: 309-438-3881
Fax: 309-438-5653
E-mail: pwalker@ilstu.edu

ILLINOIS STATE UNIVERSITY
DEPARTMENT OF AGRICULTURE

Composting



Composting is an age old practice of waste management whereby the organic components of the waste streams are biologically decomposed under controlled conditions to a stabilized state in which they can be safely handled, stored or applied to land as a soil amendment.

Composting can occur in the presence of oxygen referred to as aerobic composting, or in the absence of oxygen referred to as anaerobic composting. Most modern compost systems are aerobic for important reasons.

Aerobic composting is:

- * Free from objectionable odor.
- * Makes pathogens and weed seeds inactive.
 - * Relatively in expensive.
 - * Little technological input.

There are three methods of aerobic composting with the windrow method being the most cost effective.

Methods of Aerobic Composting

- Vessel
- Static Pile
- Windrow

Raw Materials

The raw materials for composting can be split into two categories: Carbon Sources and Nitrogen Sources.

Characteristics of Nitrogen Sources:

- * Wet
- * High in nitrogen
- * Not very rigid
- * Decompose quickly
- * High in bulk density

Examples of Nitrogen Sources:

- * Livestock manure
- * Grass
- * Food waste

Characteristics of Carbon Sources:

- * Dryer
- * Low in nitrogen
- * Somewhat rigid
- * Decompose slowly
- * Low bulk density

Examples of Carbon Sources:

- * Corn Stalks
- * Sawdust
- * Leaves
- * Wood Chips

Fresh Compost: has undergone partial decomposition, but is not stabilized and continues to breakdown.

Mature Compost: generally suitable as an organic soil conditioner, but is only partially stabilized and may temporarily arrest plant growth if it comes in direct contact with the roots.

Cured Compost: highly stabilized product, excellent organic soil conditioner.

Class A: includes cured compost, suitable for lawn and garden application, referred to as designer compost.

Class B: includes fresh and mature compost, used as an agronomic soil amendment.



Analysis of Raw Materials

ITEM	%DM	%C	%N
Woodchips	83.08	35.84	1.27
Grass	58.39	43.99	3.79
Leaves	77.75	48.02	1.37
Solid Manure	49.10	25.75	1.38
Liquid Manure			.5072

Analysis of Mature Compost

pH	DM	Ash	N	C	C:N
7.6	64.43	67.31	1.75	18.16	11.00



Solid Livestock Waste

1.59 lbs. manure: 1 lb. landscape waste
 652.0 lbs. liquid manure: 1 cu. yd. landscape waste
 1.96 tons of raw material to make 1 ton of compost

Swine Liquor-Grass

.20 lbs. liquid manure: 1 lb. grass
 135.59 lbs. liquid manure: 1 cu. yd. grass
 1.82 tons of raw material to make 1 ton of compost

Compost Process

No. of turns – 11
 Days between turns – 5.2
 Days from first to last turn – 53
 Days to compost – 75

Swine Liquor-Wood Chips

3.19 lbs. liquid manure: 1 lb. wood chips
 1,592.59 lbs. liquid manure: 1 cu. yd. wood chips
 5.78 tons of raw material to make 1 ton of compost

Compost Process

No. of turns – 16
 Days between turns – 2.2
 Days from first to last turn – 33
 Days to compost – 151

