OEFFA Organic Certification Fact Sheet

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Compost & Manure

--The difference between Compost and "compost" is more important than you might think.--

Definitions & NOP Citation

See NOP §205.2; §205.203(c-d)

Compost is defined as:

The product of a managed process through which microorganisms break down plant and animal materials into more available forms suitable for application to the soil. Compost must be produced through a process that combines plant and animal materials with an initial C:N ratio of between 25:1 and 40:1. Producers using an in-vessel or static aerated pile system must maintain the composting materials at a temperature between 131 °F and 170 °F for 3 days. Producers using a windrow system must maintain the composting materials at a temperature between 131 °F and 170 °F for 15 days, during which time, the materials must be turned a minimum of five times.

Manure is defined as:

Feces, urine, other excrement, and bedding produced by livestock that has not been composted.

Introduction

The foundation for an organic operation is healthy soil. Manure is often free, nutritious for the soil, and is one of those things on Earth available in great abundance! Many of us may feel comfortable throwing a heap of manure and plant scraps in a pile and calling it "compost." However, under the NOP, there are very specific requirements for manure that protect the consumer and farmer from contamination and illness.

All applications of compost and manure must not contribute to contamination of crops, soil, or water by nutrients, pathogens, heavy metals, or prohibited substances. As a certified organic grower, it is important to keep compost records (ingredients and inoculants, temperature monitoring, dates turned, etc.) Your organic inspector will want to see these and confirm the information you provide in your OSP. You'll want to keep track of dates of applications of manure and compost as well. Please contact the OEFFA Certification office if you would like a sample compost record form. Also, keep in mind that commercial compost products must meet the same criteria as on-farm composts; we are happy to contact manufacturers of compost and products containing compost to secure the necessary documentation.

Compost vs. Manure and the NOP

A basic distinction is that any material or mix of materials containing manure that doesn't fall under the NOP's definition of "compost" should be treated as raw manure. Regardless of how long raw manure sits, the NOP still considers it to be "raw." This is an important distinction because raw manure is a restricted input (see below, under "timing"), and not complying with the restrictions can lead to denial of certification for the crops in question.

There is an exception for heat-processed manure products, such as commercially-produced pelletized chicken manure, which are heated, dried, and tested for pathogens.

"Compost" containing no animal manure may be used as compost or as uncomposted plant matter without restrictions on the timing of applications as long as it is not made from prohibited feedstocks.

Vermicomposts must be made from allowed feedstocks and meet specific moisture and time specifications depending on the system utilized (per the NOSB recommendations of October 19, 2006).

Compost extracts or "teas" must be produced from an approved compost and potable water and may be used for fertility or pest and disease control, except that foliar applications to leafy greens are not permitted. 'Teas' made with additives or substrates that do not meet the criteria of either "compost" or "vermicompost" must be tested or are restricted.

Timing of Raw Manure Applications

➢ *Crops for human consumption*

If the crop's edible portion does not contact the soil, the raw manure must be applied 90 days before harvest. If the crop's edible portion is below ground (or has direct contact with the soil or soil particles), the raw manure must be applied 120 days before harvest.

➢ *Crops for animal consumption or fiber*

You may apply the manure at any time of the year where there is biological activity in the soil.

➢ *Applications on frozen ground*

While there is no explicit rule that says you may not apply manure to frozen ground, it is generally not a good practice, especially for organic farmers. When the ground is frozen, the soil is less permeable and there is limited biological activity; this increases the chance of losing nutrients and contaminating ground and surface waters. That said, winter manure applications can be important in the management of some operations. When this is necessary, careful attention must be paid to slope, proximity to a waterway, drainage, ground cover, presence of snow, and any factors that may encourage contamination of waterways.

Incorporating compost or manure into the soil immediately after application is also not required by the rule. However, compost left unincorporated on the soil surface may lose as much as 20% of total nitrogen to the atmosphere in four days, whereas compost that is incorporated into the soil immediately after spreading is likely to lose only about 5% of its total nitrogen content to the atmosphere. Also, keep in mind that the restrictions for any product considered raw manure refer to the date of "incorporation," not "application."

C:N Ratio

The initial carbon to nitrogen ratio (C:N) is the primary factor that influences how quickly and thoroughly raw materials are broken down into compost. Microorganisms are the driving force of the composting process. They use carbon as energy and nitrogen for growth. Too much carbon in a compost pile results in slower and often poor decomposition. Too much nitrogen in a compost pile leads to the release of nitrogen into the air in the form of ammonia; This results in a hot compost pile with a foul odor.

In general, brown materials such as corn stalks, wood chips, straw, pine needles, saw dust, and leaves are high in carbon. Green materials, such as grass clippings, vegetable scraps, hay, fresh manure, legumes and coffee grounds are high in nitrogen.

To determine the initial C:N of your compost pile, you must first know the carbon and nitrogen content of the raw materials and the approximate weight of those raw materials. Once you determine the carbon and nitrogen content of your raw materials, use the formula to the right to find the C:N. Contact us or see one of the links in the resources section to find carbon and nitrogen values for specific feedstocks.

Temperature, Moisture, & Turning

Specially designed compost thermometers are available at garden supply stores, through mail-order, and online. They range in price from $20 - $30. For accurate temperature measurements, the thermometer should have a stem of 20" in length or longer.

A compost pile that is too wet or too dry will take longer to complete the decomposition process. Too much water in a compost pile can reduce air spaces in the pile and consequently reduce the populations of microorganisms. Too little water can also reduce their populations. Compost at the right moisture level should feel like a wrung-out sponge.

Turning a compost pile mixes and redistributes the materials and microorganisms in your pile, breaks up large pieces and clumps, adds oxygen, and insures that all the materials in the pile reach the appropriate temperature. Turning your pile is most important during the thermophilic or "hot" phase of composting, which should be monitored with a thermometer and recorded. Methods of turning piles vary based on the composting method, size of the pile, and availability of labor or equipment.

Calculate the initial C:N of a Compost Pile:

(Pounds of material 1) X (% C of material 1) = pounds of C, material 1
(Pounds of material 2) X (% C of material 2) = pounds of C, material 2
Add total pounds of C in 1 and 2 to find **Total Carbon Value**

(Pounds of material 1) X (% N of material 1) = pounds of N, material 1
(Pounds of material 2) X (% N of material 2) = pounds of N, material 2
Add total pounds of N in 1 and 2 to find **Total Nitrogen Value**

Total Carbon Value : Total Nitrogen Value is C:N

An example:

Fresh cow manure is about 16% C & 1% N (by weight).
Straw is about 48% C & 0.5% N (by weight).

You have 2,000 # fresh cow manure and 600 # straw.

(2,000 # manure) X (16% C) = 320 # carbon
(600 # straw) X (48% C) = 288 # carbon
320 # C + 288 # C = **608 # Total Carbon Value**

(2,000 # manure) X (1% N) = 20 # nitrogen
(600 # straw) X (0.5% N) = 3 # nitrogen
20 # N + 3 # N = **23 # Total Nitrogen Value**

608 # Carbon : 23 # Nitrogen = **26 : 1 C:N**

Resources

Composting on Organic Farms
http://www.cefs.ncsu.edu/PDFs/Organic%20Production%20-%20Composting.pdf

Cornell's On-Farm Composting Handbook
http://compost.css.cornell.edu/OnFarmHandbook/onfarm_TOC.html