Materials Questions

by Brian Baker

The final decision as to whether a specific use or application of any given input is permitted on a particular operation is the right of the accredited certification agent.

Crops: C:N ratio in compost

What is the value of the carbon to nitrogen (C:N) ratio in making compost and how do you determine the C:N ratio in the beginning of the process?

The C:N ratio is a useful indicator that there is a balance of energy (carbon) to nutrient (nitrogen) to sustain microbial growth in the composting process and indirectly achieve temperatures needed for heat-loving (thermophilic) bacteria in a properly constructed compost pile. Many compost feedstocks tend to be outside the 25:1 to 40:1 range considered ideal as a starting point for composting.

A very low C:N ratio that is caused by high nitrogen levels will trigger potentially large losses of nitrogen to the atmosphere in the form of ammonia. High nitrogen is also associated with attraction of flies resulting in maggots and the emission of unpleasant odors. Feedstocks such as manure, some food processing wastes, and grass clippings during wetter seasons typically have a low C:N ratio.

Materials with high C:N ratios caused by elevated carbon include leaves, straw, crop residues, sawdust, wood chips, paper, and cardboard. There are some feedstocks, such as grape pomace and horse manure, that fall within the ideal range with regard to C:N alone. However, most require some kind of blending to optimize composting.

To accurately determine the C:N ratio, the feedstocks should be tested for carbon and nitrogen, given seasonal variation. However, for most practical purposes, it is acceptable to use the average values and blend accordingly. There are several publications available that provide examples for blending compost.

Sources

Appropriate Technology Transfer for Rural Areas. 2005. *Farm Scale Composting Resource List.* Fayetteville, AR: ATTRA. Online at http://attra.ncat.org/attra-pub/farmcompost.html#software

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Jerry Minnich et al., 1979. *The Rodale Guide to Composting.* Emmaus, PA: Rodale.

Robert Rynk et al., 1992. *On-Farm Composting Handbook.* Ithaca, NY: NRAES.

Mark van Horn. *Compost Production and Utilization: A Grower's Guide.* Oakland: University of California.

Table of C:N Ratios for Various Feedstocks

Feedstock	Average % N	Average C:N Ratio	Average % Moisture
Apple pomace	1.1	48	88
Cardboard	0.1	500	8
Food waste	2.5	15	69
Grape pomace	1.8	28	75
Grass clippings	3.4	17	82
Hay (legume)	2.5	16	10
Hay (non-legume)	1.3	32	10
Leaves	1	54	38
Litter (broiler)	2.9	14	37
Manure (cattle)	2.5	19	81
Manure (horse)	1.6	30	72
Manure (layer)	6	6	69
Manure (swine)	3.1	14	80
Newsprint	0.1	400	5
Rice hulls	0.3	120	14
Sawdust	<0.1	442	40
Straw (cereal)	1.3	75	10
Wood Chips	<0.1	500	5