Composting 101

Carbon and Nitrogen

All living organisms need relatively large amounts of the element ***carbon (C)*** and smaller amounts of ***nitrogen (N)***. The balance of these elements in a material is called the ***carbon-nitrogen ratio (C: N)***. This ratio is an important factor determining how easily bacteria are able to decompose an organic material. The microorganisms in compost use carbon for energy and protein to build and repair our bodies. ***The optimal proportion of these two elements used by the bacteria averages about 30 parts carbon to 1 part nitrogen***. Given a steady diet at this 30:1 ratio, they can decompose organic material very quickly.

Carbon-Rich Yard Waste

In general, woody materials are high in carbon. Shredding or clipping these materials increases the surface area and makes decomposing easier for the microorganisms. Dry leaves, corn stalks, straw, bark, and sawdust are also good sources of carbon. ***Carbon rich sources are often referred to as "browns."*** Even newspaper can be shredded and added to compost to supply the carbon.

Nitrogen-Rich Yard Waste

Nitrogen sources are often referred to as "greens." Grass clippings (the greener the better) are a good source of nitrogen, especially if the lawn has been fertilized. Other sources are kitchen scraps and animal manures, including cow, horse, and poultry. If using kitchen scraps, avoid fats, meats, and bones - these attract unwanted pests such as rodents and dogs - stay with vegetable waste, coffee grounds, egg shells, and fruit waste. Certainly nitrogen fertilizers can be added to compost if needed, but that is rarely necessary.

As the chart below illustrates, most materials available for composting don't have the ideal carbon to nitrogen ratio. One way to

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speed-up composting is to balance the numbers. It helps to think of materials high in nitrogen as "greens," and woody, carbon-rich materials as "browns." There is often a visual correlation between high nitrogen content in green plant material, and high carbon content in brown materials. For instance, a mixture of one-half brown materials tree leaves (40:1 ratio) could be used with one-half fresh, green grass clippings (20:1 ratio) to make a pile with the ideal 30:1 ratio. This balancing works best on a weight, rather than volume, basis.

The C:N ratios above are only guidelines. For instance, the leaves from different types of trees vary in the C:N balance. There are also some confusing exceptions to green-nitrogen, brown-carbon correlations. For instance evergreen leaves are low in nitrogen, and

Reference Chart for Carbon:Nitrogen Ratios of Selected Materials

MATERIAL	C:N	MATERIAL	C:N
Bark	120:1	Paper	170:1
Coffee Grounds	20:1	Pine Needles	70:1
Cow Manure	20:1	Poultry Manure	10:1
Corn Stalks	60:1	Sawdust	500:1
Grass Clippings	20:1	Straw	40-100:1
Horse Manure	25:1	Vegetable Wastes	12-20:1
Leaves	60:1	Wood Chips	100-500:1
Leguminous	15:1		

brown-colored animal manures are often high in nitrogen. The best way to become familiar with C:N balancing is to try to be specific about it for a while, then relax into an intuitive assessment of what a pile needs. Think like a chef varying the ingredients for a recipe. Be curious, write down the type and quantity of materials used, and take note of the temperature your pile reaches and the quality of the finished compost. After a while, the process becomes intuitive, just like cooking.