About the Compost Mix Calculator

THIS CALCULATOR IS DIFFERENT

This Compost Mix Calculator solves for the TOTAL carbon to nitrogen ratio of up 4 materials (or less) in a mix. The calculations use average bulk weights per cubic foot, average moisture contents and take into account the availability of carbon. Woody materials, and especially straw, have a high percentage of carbon, but much of it is locked up in complex molecules that only become available over time; too late to be of use with the immediately available nitrogen.

Some C:N tables are based on dry weights, while others are based on wet weights. You can't mix the two in calculating the total C:N ratio of a mix. Most C:N tables are based on the total carbon present but not on its availability to the organisms performing the work in your compost pile. These are all significant differences.

How to Use this Calculator:

The idea behind this calculator is to reduce the calculations down to an answer that can be remembered while you are out working in your yard. Something like 2 parts of this material to 1 part of that.

Choose two readily available materials and punch in CuFt volumes that solve to an acceptable Total C:N Ratio, between 20:1 and 40:1, aiming for 30:1. If you shoot for the middle you are likely to end up with an acceptable C:N ratio in the actual compost pile.

For example:

To compost loose grass clippings and a chipped soft wood like pine this calculator suggests:

For a total C:N Ratio of 31:1 mix

3 part(s) Grass (loose)

2 part(s) Wood Chips Softwood

Note: Even if your actual density and/or volumes are off by 30% you would have a

C:N ratio between 27:1 and 36:1.

Things to Keep In Mind:

- Compacted raw materials have a greater dry weight. This calculator uses average densities. Compare the estimated Wet Pounds Per Cubic Foot value to see if your material is more or less dense than the averages used in the calculations. This is more likely a concern with food waste, leaves, grass clippings and paper products.
- Smaller particles increase the total surface area, and consequently the nutrients available to the organisms composting your organic waste.
- C:N ratio is not the only factor to consider. Compost organisms need oxygen and larger particles facilitate air flow in the compost pile. Wood chips and straw increase air flow in your compost pile while newsprint will not. Just don't expect all of your wood chips or straw to decompose on the first pass.

- Compost organisms need water. Wood chips and straw don't absorb moisture as readily as paper or leaves. Some combination of wood chips and paper or leaves make a better mix.
- The carbon in high lignin materials like wood chips and straw will become available in time. Look for a white fungus to appear in your compost pile as it begins to cool down near the end of the compost cycle. The white fungi break up the complex lignin molecules making the carbon in the material available for the next batch of compost.
- This compost recipe calculator is intended for home composting use. The values used in the calculations are averages which will give satisfactory results in most instances. In an agricultural application you will get better results if you first get a lab analysis of your raw materials and perform the calculations with the lab results. If you would like more information concerning the values required and the specific calculations, contact Klickitat County Solid Waste.

More Data:

Raw data includes:

- Bulk Density of Wet Material (average pounds per cubic foot or yard)
- Percent Moisture (average)
- Percent Nitrogen (average, dry weight basis)
- C:N Ratio (average, dry weight basis)
- Percent Cell Wall (average, van Soest Test for Neutral Detergent Fiber)
- Percent Lignin (average, van Soest Test for Acid Detergent Lignin)

The availability of carbon is determined using VBA code in an MS Access97 database. The results are exported to the javascript data array used in the Compost Mix Calculator.

The calculator would be more useful if it had data for other common compost materials like pine needles, oak leaves, maple leaves or a mix of common garden weeds. The science behind the carbon availability calculation originates from research into the nutritional value of various feed stocks as they pertain to dairy cows, cattle and other ruminants. Consequently the publicly available data is mostly some kind of animal feed.

If you would like to contribute to the data pool in this calculator you can have your specific material analyzed by a lab to obtain the data listed above. Email a copy of the lab results to averiem@klickitatcounty.org, and we will try to include it in the calculations. Expect a lab cost of $35-45 per material if you use the Washington State University, Department of Natural Resource Science's, "Wildlife Habitat and Nutrition Lab". (From their home page click on Research > Wildlife Habitat Lab > Next [near bottom of page] to see price list and contact information.)

Appreciation:

Tom L Richard, Ph.D. formerly of Cornell University, now at Iowa State University, for providing an excellent source of information on the Cornell University web site and for taking the time to share his comments on this compost mix calculator project.

For More Information on this Calculator:

The raw data and formula for this calculator are from the NRAES, On-Farm Composting Handbook and from the Cornell University Compost Science and Engineering web site.

Cornell University Composting Science and Engineering

NRAES: Natural Resource, Agriculture, and Engineering Service