

COMPOST ANALYSES - FAQ

WHAT'S THE DIFFERENCE BETWEEN THE "ANALYSIS RESULT" AND THE "DRY BASIS RESULT"?

The ANALYSIS RESULT is the analysis of the compost on an As Received basis – with moisture. It is the analysis of the compost sample as we received it at the laboratory. As the moisture level changes in the compost, the ANALYSIS RESULT will also change. When comparing compost analyses we suggest using the Dry Basis result – which is the analysis of the compost with the moisture content removed.

WHAT IS MOISTURE AND DRY MATTER?

The laboratory dries a representative portion of your compost to determine the moisture and the dry matter percentages. If you add the moisture and dry matter results together you'll get 100%. The compost pile increases and decreases in moisture based on the environment (rain, drought, etc).

WHAT IS THE NUTRIENT VALUE OF THE COMPOST?

The A & L Great Lakes report includes analyses for Nitrogen (N), Phosphorus (P), Potassium (K), Magnesium (Mg) and Calcium (Ca) – and possibly some additional secondary and micronutrients. In addition, the report may contain calculations for phosphate (P₂O₅) and potash (K₂O). The three numbers on a fertilizer label are N-P₂O₅-K₂O. You can insert the analysis result for these three components to see what the fertilizer label of the as received compost would be.

HOW DO MY COMPOST NUTRIENTS COMPARE TO OTHER COMPOSTS?

The nutrient levels vary greatly depending on the feedstocks used to make the compost. Composts made of yard waste will have lower nutrient levels than composts made with animal wastes. There isn't a standard compost for comparison.

HOW DO I CONVERT THE RESULTS INTO POUNDS OF NUTRIENTS PER TON OF COMPOST?

Multiply the Analysis Result (expressed as %) by 20 to convert to pounds per ton. For example, a compost with an analysis result of 1.50 % Nitrogen would have 30 pounds of N per ton of as received compost. ($1.50 \times 20 = 30$).

WHAT ARE THE LIMITS ON THE EPA 503 HEAVY METALS?

The U.S. Environmental Protection Agency (EPA) has established the limits for heavy metals in biosolids and composts. A & L Great Lakes Laboratories will indicate if the metal concentrations meet the EPA 503 limits at the PARAMETER LINE "503 Metals PASS / FAIL".

The USEPA 503 limits are on a DRY BASIS RESULT:

HEAVY METAL	503.13 TABLE 3 LIMITS
Arsenic (As)	41 mg/kg
Cadmium (Cd)	39 mg/kg
Chromium (Cr)	NO LIMIT ESTABLISHED
Copper (Cu)	1500 mg/kg
Mercury (Hg)	17 mg/kg
Molybdenum (Mo)	NO LIMIT ESTABLISHED
Nickel (Ni)	420 mg/kg
Lead (Pb)	300 mg/kg
Selenium (Se)	100 mg/kg
Zinc (Zn)	2800 mg/kg

The unit mg/kg (milligram per kilogram) is the same as part per million.

WHAT IS COMPOST pH?

The pH of the compost is a measurement of the acidity or alkalinity of the compost. pH 7 is NEUTRAL. pH levels below 7 are ACIDIC. pH levels above 7 are ALKALINE. The vast majority of the composts that are tested by A&L Great Lakes Laboratories are Alkaline, with a normal pH range of 7.5-7.8. There are very few composts which are acidic in pH.

WHAT ARE SOLUBLE SALTS?

Soluble Salts are determined by making a 1:5 dry compost : water slurry and passing an electrical current through the slurry. Pure water is a very poor conductor of electricity. As salts are dissolved in the slurry the electrical conductance increases. Soluble Salt units are expressed as deci-Siemens per meter (dS/M), which is equivalent to Siemens per centimeter (S/cm) and millimhos per centimeter (mmho/cm). High soluble salts can impact seedling germination and healthy plant growth.

WHAT ARE THE LIMITS FOR FECAL COLIFORM AND SALMONELLA IN CLASS A COMPOST?

Fecal Coliform and / or Salmonella are routinely used as pathogen reduction indicators. The Fecal Coliform needs to be < 1000 MPN / gram of dry compost (MPN = Most Probable Number) or the Salmonella result needs to be < 3 MPN / 4 grams of dry compost for the compost to be classified as a CLASS A Compost. The A&L Great Lakes Laboratories report has the parameter “Pathogen Reduction – PASS / FAIL” listed below the result for Fecal Coliform or Salmonella.

Pathogen Reduction and 503 Heavy Metals are the only two parameters where a compost can actually “FAIL” as a Class A Compost.

WHAT ARE ORGANIC MATTER AND ORGANIC CARBON (estimated)?

A & L Great Lakes Laboratories determines Organic Matter and Organic Carbon by placing the dried compost in a furnace at 550oC and burning off any organic or volatile material. Organic Matter is calculated from the loss of weight during the combustion, and Organic Carbon is estimated as 50% of the Organic Matter.

HOW IS THE CARBON TO NITROGEN RATIO CALCULATED?

The Carbon result is divided by the Nitrogen result to determine the C:N Ratio. A C:N Ratio of 20:1 - 30:1 is pretty normal for a finished compost. The ratio will be lower if more nitrogen is in the compost. This is especially true of animal waste composts. If the C:N Ratio is high it may indicate that the material has not finished composting.

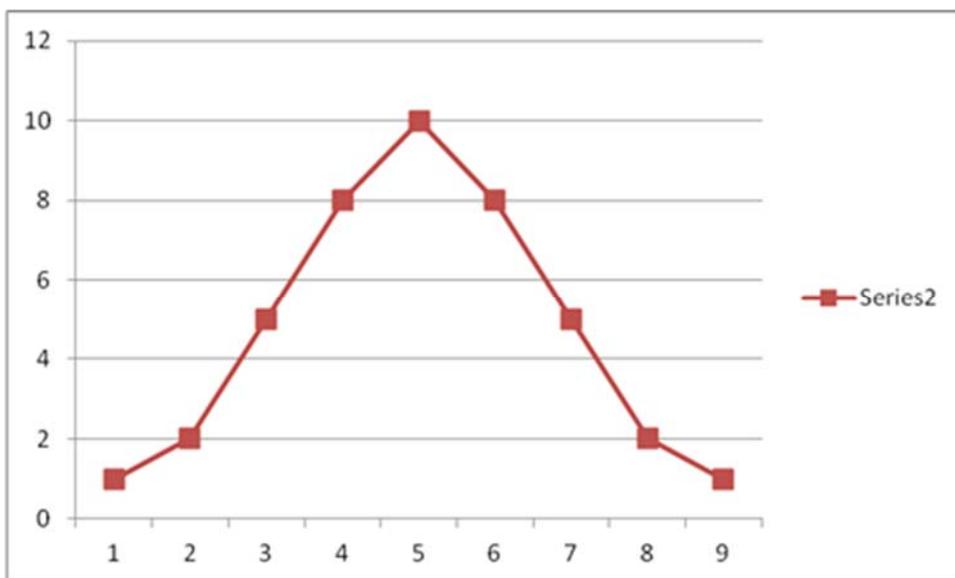
WHAT IS FOREIGN MATERIAL OR MANMADE INERTS?

The laboratory will remove and measure manmade materials, such as glass, plastic, and metal. There may be limits stated in the compost specification on the amount of manmade materials which can be in a finished compost.

WHAT DO THE GERMINATION RESULTS MEAN?

The germination test is used as a maturity assessment of the compost material. The laboratory will blend your compost 50:50 with vermiculite to make a germination media, which is placed in seedling flats. Marketmore 76 cucumber seeds are added to the compost media. A negative control of straight vermiculate and a positive control of a potting soil are set up at the same time, and cucumber seeds are planted in these controls. The flats are placed in our germination chamber, which has 16 hours of light and high relative humidity. The moisture level of each flat is checked, and additional moisture is added as necessary. After ~ 14 days (or when the first true leaves appear on the cucumber seedlings) the samples are removed from the growth chamber, and the height of each seedling is measured. The average height of the seedlings in the positive control is calculated, and the height of each compost media seedling is compared to the positive control average. If the height of the seedling is equal to or greater than the positive control it is considered a “vigorous” seedling. If the height of the seedling grown in the compost media is less than the average height of the positive control seedling, it is considered “non-vigorous”. The percentage of seeds that germinated in the compost:vermiculite media and the percentage of vigorous seedlings is calculated and reported.

DISCUSSION: *Assuming a normal bell curve distribution of seedling height, if the positive control seedlings were compared to the average height of the positive control, you would expect that half of the seedlings would be shorter than the average, and half of the seedlings would be taller than the average. This would mean that the positive control would have a Vigor Rating of 50%.*



If the seedlings in the compost media were shorter than the seedlings in the positive control (potting soil) we could expect a vigor rating of <50%. IF the seedlings in the compost media were taller than the seedlings in the positive control, we would expect a vigor rating of >50%. A vigor rating of 50% means the seedlings grown in the compost vermiculite media were equivalent to the seedlings grown in the potting soil.

A & L Great Lakes Laboratories reports both the % Germination and % Vigor, and also reports the average height of the seedlings grown in both the compost media and the potting soil mixtures for comparison.

WHAT DO THE RESPIRATION NUMBERS MEAN?

The respiration test is used to determine the compost stability. A portion of the compost is brought to optimum conditions, and the compost is placed in a sealed container with a container of chemical solution to catch any carbon dioxide that is given off of the compost. Carbon Dioxide respiration is an indication that the bacteria are still actively decomposing the compost. The test is conducted over five days, and each day the amount of carbon dioxide is determined. An average CO₂ respiration is calculated for the five days. The results are reported as mg Carbon Dioxide-Carbon (CO₂-C) per gram of Total Solid per day and as mg Carbon Dioxide-Carbon (CO₂-C) per gram of Organic Matter per day. A low number means that the compost is very stable. Higher numbers mean that the bacteria are active, and the compost is not fully composted. A Compost Stability Index is reported based on the analysis.

WHAT DOES THE SIEVE TEST MEAN?

The laboratory sieves an aliquot of the compost to determine how much is caught on each sieve. The test just shows what percentage of compost was caught on each sieve. Some compost uses require a very fine product, while others require larger particle sizes.