Colorado State University

Soil, Water, and Plant Testing Lab
A319 NESB
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Fort Collins, CO 80523
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2-100

Soil Analysis Report

Billing: CC18769

Submitted By: [redacted]

Lab No. H1644b
Date Received: 4/6/20
Date Reported: 5/8/20
Sample Date: 4/6/20

Sample ID: compost
Amendment Type: compost

Parameter	As Received Basis		Dry Matter Basis		method*	Level
Total Solids (%)	71.4		100		03.09-A	
Moisture (%)	28.6		0		03.09-A	
Organic Matter (%)	15.2		21.3		05.07-A	
Ash (%)	56.2		78.7		05.07-A	
Soluble Salts (1:5, mmhos/cm)	3.1				04-10-A	
Soluble salts (paste, mmhos/cm)	11.5					
pH 1:5	7.9				04-11-A	
pH (paste)	7.6					
		lbs/ton		lbs/ton		
Total Nitrogen (%)	1.4251	28.5	1.996	39.9	04.02-D	
Organic Nitrogen (%)	1.4170	28.3	1.985	39.7	Calc	
Ammonium-Nitrogen (%)	0.0053		0.0075		04.02-C	
Ammonium-Nitrogen (ppm)	53.4		74.8		04.02-C	
Nitrate-Nitrogen (%)	0.0028		0.0039		04.02-B	
Nitrate-Nitrogen (ppm)	28.0		39.2		04.02-B	
Total Phosphorus as P (%)	0.1529	3.1	0.214	4.3	04.03-A	
Total Phosphorus as P2O5 (%)	0.3501	7.0	0.490	9.8	04.03-A	
Total Potassium as K (%)	0.8483	17.0	1.1881	23.8	04.04-A	
Total Potassium as K2O (%)	1.0180	20.4	1.4257	28.5	04.04-A	
total C (%)	9.8		13.73			
C/N ratio	6.9		6.9		Calc	
Ammonium-N/Nitrate-N Ratio	1.91		1.91		Calc	
Lime (% calcium carbonate)	0.212		0.30		6E1c**	
		meq/100g		meq/100g		
Extractable calcium (mg/kg)	487	2.435	682	3.4	9-3.1***	
Extractable magnesium (mg/kg)	97.3	0.811	136	1.1	9-3.1***	
Extractable sodium (mg/kg)	103	0.448	144	0.6	9-3.1***	
Extractable potassium (mg/kg)	4534	11.626	6350	16.3	9-3.1***	
water soluble Ca (mg/kg)	14.2	0.071	20	0.1	9-3.1***	
water soluble Mg (mg/kg)	5.2	0.043	7	0.1	9-3.1***	
water soluble Na (mg/kg)	21.9	0.095	31	0.1	9-3.1***	
water soluble K (mg/kg)	291	0.746	408	1.0	9-3.1***	
Exchangeable Ca (mg/kg	472.800	2.364	662	3.3	9-3.1***	
Exchangeable Mg (mg/kg	92.100	0.768	129	1.1	9-3.1***	
Exchangeable Na (mg/kg)	81.100	0.353	114	0.5	9-3.1***	
Exchangeable K (mg/kg)	4243.000	10.879	5943	15.2	9-3.1***	
CEC (meq/100g)				20	4B4b1**	
Saturated paste calcium (meq/L)	10.1				4F3b**	
Saturated paste magnesium (meq/L)	12.3				4F3b**	
Saturated paste sodium (meq/L)	34.3				4F3b**	
Saturated paste potassium (meq/L)	76.3				4F3b**	
Sodium Adsorption Ratio (SAR)	10.2				4F3b**	
Plant available phosphorus (ppm)	458		641		AB-DTPA	
Plant available potassium (ppm)	4534		6350		AB-DTPA	
Plant available zinc (ppm)	7.9		11.1		AB-DTPA	
Plant available iron (ppm)	97.5		136.6		AB-DTPA	
Plant available manganese (ppm)	40.2		56.3		AB-DTPA	
Plant available copper (ppm)	202		282.9		AB-DTPA	
total zinc (ppm)	48.5		67.9		3050/6010	
total iron (ppm)	7858		11006		3050/6010	

total manganese (ppm)	0.8	1	3050/6010	
total copper (ppm)	17.9	25.1	3050/6010	

Unless otherwise noted, methods are from "Test Methods For The Examination of Composting and Compost.2001, W.H Thompson (ed)

*From Soil Survey Laboratory Methods Manual, Soil Survey Investigations Report, No. 42,Version 3, 1996.

?A methods 3050(digestion) and 6010 (analysis)from SW-846. ***Methods of Soil Analysis. A.L. Page (ed), ASA, 1982

3-DTPA is ammonium bicarbonate-DTPA.

ıe organic matter is high, however the C/N ratio is low indicating that nitrogen should not be immobilized by high carbon.

he total nitrogen is at a moderate level, however this product will help supply some nitrogen to the soil.

he salts are high indicating that this material may present problems for salt sensitive plants if over -applied.

itrate-N is lower than ammonium-N indicating that this material has not matured completely.

ll other nutrients are at sufficient levels for plant growth.

he levels of nutrients are as follows:

Low . Medium .. High ... Very High ....

he report on the previous page is designed primarily for composts, potting soils, manures, or other organic roducts that are used as soil amendments to improve soil structure or as stand alone products such as organic potting soil rhere plants are grown in the material directly.

he following is an explanation of the parameters measured:

Total Solids (%)	: The percentage of actual solid material in the product minus the water.
Moisture (%)	: The percentage of water in the material.
Organic Matter (%)	: The percentage of carbon based material such as sticks, leaves, or plant material. Chemically, it includes carbon compounds such as cellulose, hemicelluloses, protein, and carbohydrates.
Ash (%)	: The amount of residue left over after the sample is ashed at 550C. This may be comprised of soil or anything else that is resistant to high temperatures.
Soluble Salts (1:5, mmhos/cm)	: A measure of the total salts in the soil based on a mixture of 1 part soil to 5 parts water . An acceptable range for a class I compost is 0-5 mmhos/cm. This can be used in most situations unless the soil's salts are more than 2 mmhos/cm.
Soluble salts (paste, mmhos/cm)	: A measure of the total salts in the soil based on a mixture of soil to water to create a saturated paste. A value of 2 mmhos/cm or more indicates that the salts are high and may be a problem if plants are grown in a material such as potting soil directly.
pH 1:5	: A measure of pH based on a mixture of 1 part soil to 5 parts water. An acceptable range is 6.0-8.4 for a class I compost.
pH (paste)	: A measure of pH based on a mixture of soil to water to create a saturated paste. An acceptable range is 6.0 to 8.4. A paste pH value is useful for potting mixes since it simulates what the plant will encounter when the mix is saturated with water or at field capacity.
Total Nitrogen (%)	: A measure of the inorganic nitrogen that includes ammonium-N and nitrate-N plus organic nitrogen.
Organic Nitrogen (%)	: Nitrogen that is in an organic form such as protein, amino acids, or alkaloids. It must be converted to ammonium-N and nitrate-N by microbial activity before plants can use it as a nitrogen source.
Ammonium-Nitrogen (%)	: The percent of inorganic nitrogen that is soluble in water that can be used immediately by plants. It is usually converted to nitrate-N by microbial activity as the soil temperature increases.

Ammonium-Nitrogen (ppm)	: Ammonium-nitrogen expressed as ppm.
Nitrate-Nitrogen (%)	: The percent of inorganic nitrogen that is soluble in water that can be used immediately by plants.
Nitrate-Nitrogen (ppm)	: Nitrate-nitrogen expressed as ppm.
Total Phosphorus as P (%)	: Mineral P, ortho-P and organic P. As the compost decomposes it will convert mineral P and organic P to ortho-P, which is the form of P that plants will use from the soil.
Total Phosphorus as P2O5 (%)	: Total P times 2.29 to express P as P2O5 in percent. Having P expressed as P2O5 will help in comparing this product with other fertilizer/compost products
Total Potassium as K (%)	: Mineral K, organic K, and water soluble or plant available K. As the compost decomposes the mineral K and organic K will convert to plant available K.
Total Potassium as K2O (%)	: Total K times 1.2 to express K as K2O. Having K expressed as K2O will help in comparing this product with other fertilizer/compost products.
C/N ratio	: This is the ratio of total carbon to total nitrogen. Class I composts have C/N ratios of less than 12. As the C/N ratio increases, nitrogen may become immobilized and unavailable for plant growth due to increased microbial activity. Composts with higher C/N ratios can still be used effectively if they are not over-applied.
Ammonium-N/Nitrate-N Ratio	:The ratio of ammonium-N to nitrate-N. A high ratio indicates that ammonium-N is much greater than nitrate-N and that the material has not composted long enough. A small ratio indicates that most of the ammonium-N has been converted to nitrate-N indicating that the material has significantly composted and has reached or is reaching the end of the composting process. A class I compost has an ammonium-N/nitrate-N ratio of < 4.

he following is an explanation of the parameters measured (continued):

Lime (% calcium carbonate)	: Lime usually consists of either calcium carbonate or magnesium carbonate, but is expressed as percent calcium carbonate or percent calcium carbonate equivalence. Low lime is 0-1%, medium lime is 1-2%, high lime is 2-5%, and very high lime is greater than 5% Lime can range from <1% to over 40%. Plants can still grow well in high lime composts.
Sodium Adsorption Ratio (SAR)	: This is the ratio of sodium to calcium and magnesium. The calculation is: Na/√(Ca+Mg)/2, where the values for Na, Ca, and Mg are expressed as meq/L. (Take the square root of the denominator). A compost or soil is sodic (high in sodium) if the SAR is ≥ 13. Adding a compost high in sodium can cause drainage problems due to a change in soil structure.
Plant available phosphorus (ppm) Plant available potassium (ppm) Plant available zinc (ppm) Plant available iron (ppm) Plant available manganese (ppm) Plant available copper (ppm)	Available forms of nutrients are removed from the compost or soil by plants to promote growth. These are rarely deficient in composts, but they may be deficient in soils . High phosphorus and potassium are rarely toxic, however high potassium can be associated with high salts. Potassium at levels usually greater than 1000 ppm have usually been amended with manure products than can make the compost high in salts. Composts high in salts need to be managed carefully to avoid over applications to the soil.
total zinc (ppm) total iron (ppm) total manganese (ppm) total copper (ppm)	Total nutrients include mineral forms that are associated with rocks, or organic forms that may be part of carbon compounds in plant material or manure, and plant available or soluble forms that plants readily use for growth. This represents the nutrients that are immediately available to plants and the nutrients that may eventually become plant available as the material decomposes.