PENNSTATE

(814) 863-0841 Fax: (814) 863-4540

Agricultural Analytical Services Laboratory
The Pennsylvania State University
University Park, PA 16802
www.aasl.psu.edu

Analysis Report For:	Copy To:
Merlyn Akhtar Ulster County Resource Recovery Agency 999 Flatbush Rd, PO Box 6219 Kingston NY 12402	

LAB ID:	SAMPLE ID:	REPORT DATE:	SAMPLE TYPE:	FEEDSTOCKS	COMPOSTING METHOD	COUNTY
C08177		11/18/2015	Finished Compost		Static Pile-Forced aeration	

COMPOST ANALYSIS REPORT

Compost Test 3A

Analyte	Results (As is basis)	Results (Dry weight basis)
pH	7.1	—
Soluble Salts (1:5 w:w)	3.34 mmhos/cm	—
Solids	73.0 %	—
Moisture	27.0 %	
Organic Matter	29.9 %	41.0 %
Total Nitrogen (N)	1.2 %	1.6 %
Organic Nitrogen[1]	1.1 %	1.5 %
Ammonium N (NH_4-N)	638.9 mg/kg *or* 0.0639 **%**	856.5 mg/kg *or* 0.0875 **%**
Carbon (C)	16.1 %	22.1 %
Carbon:Nitrogen (C:N) Ratio	13.70	13.70
Phosphorus (as P_2O_5)[2]	0.53 %	0.72 %
Potassium (as K_2O)[2]	0.35 %	0.48 %
Calcium (Ca)	4.35 %	5.96 %
Magnesium (Mg)	0.30 %	0.41 %
Particle size (< 9.5 mm)	99.84 %	—

[1] See comments on back of report .

[2] To convert phosphorus (as P_2O_5) into elemental phosphorus (P), divide by 2.29. To convert potassium (as K_2O) into elemental potassium (K), divide by 1.20.

Sample was shipped overnight on ice. Sampled 11/3/2015 at 10:30 AM

INTERPRETATION

pH pH is a measure of active acidity in the feedstock or compost. The pH scale is 0 (acidic) to 14 (basic) with 7 being neutral. Most finished composts will have pH values in the range of 5.0 to 8.5. Ideal pH depends on compost use. A lower pH is preferred for certain ornamental plants while a neutral pH is suitable for most other applications. pH is not a measure of the total acidity or alkalinity and cannot be used to predict the effect of compost on soil pH.

Soluble Salts Soluble salts are determined by measuring electrical conductivity (EC) in a 1:5 (compost:water, weight ratio) slurry. EC is related to the total soluble salts dissolved in the slurry and is measured in units of millimhos/cm (mmhos/cm). Compost soluble salt levels typically range from 1 to 10 mmhos/cm. High salinity may be toxic to plants. Ideal soluble salt levels will depend on the end use of the compost. Final compost blends with soil or container media/potting mixes should be tested for soluble salts.

% Solids, % Moisutre The ideal moisture content for composting will depend on the water holding capacity of the materials being composted. In general, high organic matter materials have a higher water holding capacity and a higher ideal moisture content. A typical starting compost mix will have an ideal % solids content of 35-55 % (65-45 % moisture). Finished compost should have a % solids content of 50-60 % (50-40 % moisture).

% Organic Matter There is no ideal organic matter level for feedstocks or finished compost. Organic matter content will decrease during composting. The organic matter content (dry weight basis) of typical feedstocks and starting mixes will be greater than 60 % while that of finished compost will be in the range of 30-70 %. An organic matter content (dry weight basis) of 50-60 % is desirable for most compost uses.

Nitrogen : Total, Organic, Ammonium, and Nitrate Total nitrogen (N) includes all forms of nitrogen: organic N, ammonium N (NH_4-N), and nitrate N (NO_3-N). Total N will normally range from less than 1 % to around 5 % (dry weight basis) in most feedstocks and from 0.5 to 2.5 % (dry weight basis) in finished composts. NO_3-N (an optional test) is generally present in only low concentrations in immature composts, although it may increase as the compost matures. NH_4-N levels may be high during initial stages of the composting process, but decrease as maturity increases. Organic N is determined by subtracting the inorganic N forms, NH_4-N and NO_3-N, from total N. However, because NO_3-N levels are generally very low, total nitrogen minus NH_4-N provides a good estimate of organic N in most composts and is the value shown on the front of this report. In stable, finished composts, most of the N should be in the organic form. While NH_4-N and NO_3-N are immediately available to plants, organic N is only slowly available, approximately 10 to 20 % per year. However, mineralization or break-down of organic N into available inorganic forms depends on the C: N ratio (see below) as well as factors such as soil moisture and temperature.

Total Carbon Total carbon (C) is a direct measurement of all organic and inorganic carbon in the compost sample. Unless the sample has a high pH (> 8.3) or is known to contain carbonates, essentially all carbon will be in the organic form. Compost organic matter typically contains around 54 % organic carbon by weight. The carbon content of individual feedstocks may vary from this ratio.

Carbon: Nitrogen Ratio This is the ratio of total carbon (C) to total nitrogen (N) in the compost sample provided. C:N ratio may be used as an indicator of compost stability and N availability. Compost C:N ratio typically decreases during composting if the starting C:N ratio is > 25, but may increase if the starting C:N ratio is low (< 15) and N is lost during the composting process. Composts with high C:N ratios (> 30) will likely immobilize or tie-up N if applied to soil, while those with low C:N ratios (< 20) will mineralize or break-down organic N to inorganic (plant-available) N.

Phosphorus, Potassium Phosphorus (P) and potassium (K) are plant macronutrients. Values reported are for total amounts given in the oxide forms (P_2O_5 and K_2O). These results provide an indication of the nutrient value of the compost sample. However, plant availability of total phosphorus and potassium in compost has not yet been established.

Nitrogen, Phosphorus, Potassium Balance When compost is applied on the basis of nitrogen (N), most composts will have an excess of phosphorus (P) and potassium (K) relative to crop demand. These mineral elements and salts can accumulate to above optimum levels with repeated application. Growers using compost should regularly soil test to monitor P, K and salt accumulation and should consider using other nutrient sources or nitrogen fixing legumes in their crop rotation especially when P and K levels are above optimum.

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COMPOST ANALYSIS REPORT

EPA 503 Pollutants

Analyte	Results (As is Basis)	Results (Dry Weight Basis)	EPA SW 846 Method
Arsenic (As)	4.5 mg/kg	6.1 mg/kg	3050B + 6010
Cadmium (Cd)	< 0.3 mg/kg	< 0.5 mg/kg	3050B + 6010
Copper (Cu)	46.7 mg/kg	63.9 mg/kg	3050B + 6010
Lead (Pb)	43.7 mg/kg	59.9 mg/kg	3050B + 6010
Mercury (Hg)	0.059 mg/kg	0.081 mg/kg	7473
Molybdenum (Mo)	< 1.0 mg/kg	< 1.4 mg/kg	3050B + 6010
Nickel (Ni)	8.7 mg/kg	11.9 mg/kg	3050B + 6010
Selenium (Se)	< 1.7 mg/kg	< 2.4 mg/kg	3050B + 6010
Zinc (Zn)	82.2 mg/kg	112.6 mg/kg	3050B + 6010

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COMPOST BIOASSAY
Seedling Emergence and Relative Growth

TEST PARAMETERS

Test Dates:	11/06/2015 to 11/13/2015
Seed Type:	Cucumber-Marketmore 76 Variety
Media Type: *(Control)*	Miracle Gro Moisture Control
Vermiculite:	NK Professional Grade

TEST RESULTS

Emergence: (% of control)	87.50
Seedling Vigor: (%):	100.00

COMMENTS

INTERPRETATION

The bioassay test provides a screen for the presence of phytotoxins in compost based on seedling emergence and seedling vigor relative to a control. It provides an assessment of compost maturity although should not be used as a stand-alone indicator. The U.S. Compost Council Test Methods for the Examination of Composting and Compost provides the following Maturity Indicator Ratings based on this test.

	Maturity Indicator Rating[1]		
Test Parameter	Very Mature	Mature	Immature
Emergence %	> 90	80-90	< 80
Seedling Vigor %	> 95	85-95	< 85

[1] Test Methods for the Examination of Composting and Composts

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RESPIROMETRY
Carbon Dioxide (CO_2) Evolution Rate

TEST RESULTS	
mg CO_2-C/g solids/day:	3.7
mg CO_2-C/g organic matter/day:	10.4

INTERPRETATION

Respirometry (CO_2 Evolution) provides a measurement of the relative microbial activity in a compost and, hence can be used as an estimate of compost stability. The intrepretive index below from the U.S. Compost Council Test Methods for the Examination of Composting and Compost assumes optimal conditions for microbial activity are present including temperature, mositure and nutrients and that toxic components that would inhibit microbial respiration are absent.

Result*	Stability Rating	General Characteristics
< 2	Very Stable	Well cured Compost No continued decomposition No odors No potential for volatile fatty acid phytotoxicity and odor
2-8	Stable	Cured Compost Odor production not likely Limited potential for volatile fatty acid phytotoxicity and odor Minimal impact on soil carbon and nitrogen dynamics
8-15	Moderately unstable, raw compost	Uncured compost Minimal odor production Moderate to high potential for volatile fatty acid phytotoxicity Moderate potential for negative impact on soil carbon and nitrogen dynamics
15-40	Raw compost or raw organic products	Uncured Compost Odor production likely High potential for volatile fatty acid phytotoxicity and odor High potential for negative impact on soil carbon and soil nitrogen dynamics
> 40	Raw feedstocks, unstable material	Raw, extremely unstable material Odor production expected Probably volatile fatty acid phytotoxicity with most materials Negative impact on soil carbon and nitrogen dynamics expected Generally not recommended for use as compost

* Units in mg CO_2-C/g organic matter/day

US COMPOSTING COUNCIL

Seal of Testing Assurance

Ulster County Resource Recovery Agency
999 Flatbush Rd, PO Box 6219
Kingston NY 12402
Tel: 845-336-0600
Fax: 845-336-4129

Product Name:

Lab ID: C08177

Report Date: 11/18/2015

Compost Technical Data Sheet

Compost Parameters	***Reported as** (units of measure)*	***Test Results***	***Test Results***
Plant Nutrients:	*%, weight basis*	*% wet weight basis*	*% dry weight basis*
Nitrogen	Total N	1.18	1.62
Phosphorus	P_2O_5	0.53	0.72
Potassium	K_2O	0.35	0.48
Calcium	Ca	4.35	5.96
Magnesium	Mg	0.30	0.41
Moisture Content	%, wet weight basis	27.00	
Organic Matter Content	%, dry weight basis	41.00	
pH	unitless	7.06	
Soluble Salts *(electrical conductivity)*	dS/m (mmhos/cm)	3.34	
Particle Size	< 9.5 mm	99.84	
Stability Indicator *(respirometry)* CO_2 Evolution	mg CO_2-C/G TS/day, AND mg CO_2-C/G OM/day	3.72 10.41	
Maturity Indicator *(bioassay)* Percent Emergence, AND Percent Seedling Vigor	% of control %	87.50 100.00	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)		
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3	PASS: As, Cd, Cu, Pb, Hg, Mo, Ni, Se, and Zn are less than limits specifed by US EPA Class A Standard 40 CFR § 503.13, Tables 1 and 3	

Participants in the US Composting Council's Seal of Testing Assurance Program have shown the commitment to test their compost products on a prescribed basis and provide this data, along with compost end use instructions, as a means to better serve the needs of their compost customers.

US COMPOSTING COUNCIL

Seal of Testing Assurance

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Fax: 845-336-4129

Product Name:

Lab ID: C08177

Report Date: 11/18/2015

Compost Technical Data Sheet

Compost Parameters	***Reported as*** *(units of measure)*	***Test Results***
Plant Nutrients:		Not reported
Moisture Content	%, wet weight basis	27.00
Organic Matter Content	%, dry weight basis	41.00
pH	unitless	7.06
Soluble Salts *(electrical conductivity)*	dS/m (mmhos/cm)	3.34
Particle Size	< 9.5 mm	99.84
Stability Indicator *(respirometry)* CO_2 Evolution	mg CO_2-C/G TS/day, AND mg CO_2-C/G OM/day	3.72 10.41
Maturity Indicator *(bioassay)* Percent Emergence, AND Percent Seedling Vigor	% of control %	87.50 100.00
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3	PASS: As, Cd, Cu, Pb, Hg, Mo, Ni, Se, and Zn are less than limits specifed by US EPA Class A Standard 40 CFR § 503.13, Tables 1 and 3

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