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Lab # 2623513 **Report of Analysis** Report Number: 17-038-4012

Account: 14285	HUGHES MULCH PRODUCTS HUGHES MULCH PRODUCTS 3211 KEYSTONE DR OMAHA NE 68134
Date Sampled:	2017-01-24
Date Received:	2017-01-24
Sample ID:	JAN 2017

Robert Ferris
Account Manager
402-829-9871

NUTRIENT ANALYSIS

		Analysis (as rec'd)	Analysis (dry weight)	Total content, lbs per ton (as rec'd)
NUTRIENTS				
Nitrogen				
Total Nitrogen	%	0.64	1.15	12.8
Organic Nitrogen	%	0.62	1.11	12.4
Ammonium Nitrogen	%	0.001	0.002	----
Nitrate Nitrogen	%	0.02	0.04	0.4
Major and Secondary Nutrients				
Phosphorus	%	0.09	0.16	1.8
Phosphorus as P2O5	%	0.21	0.38	4.2
Potassium	%	0.29	0.52	5.8
Potassium as K2O	%	0.35	0.63	7.0
Sulfur	%	0.08	0.14	1.6
Calcium	%	2.03	3.64	40.6
Magnesium	%	0.26	0.47	5.2
Sodium	%	0.040	0.072	0.8
Micronutrients				
Iron	ppm	4960	8905	9.9
Manganese	ppm	311	558	0.6
Boron	ppm	< 100	----	----
OTHER PROPERTIES				
Moisture	%	44.30		
Total Solids	%	55.70		1114.0
Organic Matter	%	13.10	23.52	262.0
Ash	%	42.60	76.48	852.0
Total Carbon	%	10.09	18.11	
Chloride	%	0.05	0.09	
pH		7.4		
Conductivity 1:5 (Soluble Salts)	mS/cm	1.53		

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Lab # 2623513 **Biological & Physical Properties** Report Number: 17-038-4012

Account: 14285	HUGHES MULCH PRODUCTS HUGHES MULCH PRODUCTS 3211 KEYSTONE DR OMAHA NE 68134
Date Sampled:	2017-01-24
Date Received:	2017-01-24
Sample ID:	JAN 2017

Robert Ferris
Client Service Representative
402-829-9871

NUTRIENT ANALYSIS

	Analysis (as rec'd)	Analysis (dry weight)	Units	Detection Limit	Method
Biological Properties					
Germination	100		%	1	TMECC 05.05A
Germination Vigor	100		%	1	TMECC 05.05A
CO_2 OM Evolution	0.35		$mgCO_2$-C/gOM/day	0.01	TMECC 05.08B
CO_2 Solids Evolution	0.29		$mgCO_2$-C/gTS/day	0.01	TMECC 05.08B
Fecal Coliform		23	mpn/g	0.2	EPA 1681
Salmonella		< 0.01	mpn/4g	0.01	EPA 1682
Stability Rating	stable		N/A	N/A	TMECC 05.08B
Physical Properties					
Bulk Density (Loose)	1230		lbs/cu yard	1	WT/VOL
Bulk Density (Packed)	1921		lbs/cu yard	1	WT/VOL
Film Plastics	n.d.		%	0.25	Microscopic
Glass Fragments	n.d.		%	0.25	Microscopic
Hard Plastics	n.d.		%	0.25	Microscopic
Metal Fragment	n.d.		%	0.25	Microscopic
Sharps	absent		---	---	Microscopic
Max. Particle Length		1.3	inches	N/A	TMECC Sieve
Sieve % Passing 3"		100	%	0.01	TMECC Sieve
Sieve % Passing 2"		100	%	0.01	TMECC Sieve
Sieve % Passing 1.5"		100	%	0.01	TMECC Sieve
Sieve % Passing 1"		100	%	0.01	TMECC Sieve
Sieve % Passing 3/4"		100	%	0.01	TMECC Sieve
Sieve % Passing 5/8"		100	%	0.01	TMECC Sieve
Sieve % Passing 3/8"		100	%	0.01	TMECC Sieve
Sieve % Passing 1/4"		12	%	0.01	TMECC Sieve

Compost Results Interpretations

Page 1

Report #:	17-038-4012
DATE RECEIVED:	2017-01-24

Organic Matter %

13.10 As Received

23.52 Dry Weight

Greater than 20% indicates a desirable range for compost on a dry weight basis.

Compost is a significant source of Organic Matter, which is an important supplier of carbon. Organic Matter improves soil and plant efficiency by improving soil physical properties, providing a source of energy to beneficial organisms, and enhancing the reservoir of soil nutrients.

C/N Ratio

15.8:1

20-30 indicates an ideal range for the initial compost process.

10-20 indicates an ideal range for a finished compost.

All organic matter is made up of substantial amounts of carbon with lesser amounts of nitrogen. The balance of these two elements is called the Carbon/Nitrogen Ratio. For the best performance, the compost pile requires the correct proportion of carbon for energy and nitrogen for protein production. If the C:N ratio is too high (excess carbon) decomposition slows down. If the C:N ratio is too low (excess Nitrogen) the compost pile could be difficult to manage.

Moisture %

44.30

<35% = Indicates overly dry compost

>55% = Indicates overly wet compost

Moisture Percent is the measure of water present in the compost and expressed as a percentage of total weight. Moisture present affects handling and transport. Overly dry will be light and dusty while overly wet will be heavy and clumpy. A desirable moisture content of finished compost will range between 40 to 50%.

Compost Results Interpretations

Page 2

Report #:	17-038-4012
DATE RECEIVED:	2017-01-24

Conductivity or Soluble Salts measures the conductance of electrical current in a liquid compost slurry. Excessive soluble salt content in a compost can prevent or delay seed germination and proper root growth. Conductivity analysis is done on a 1:5 basis.

Conductivity 1:5
1.5

Conductivity Level	**Interpretation**
Greater than 10	Very High nutrient content. Use for Ag Applications
5 - 10	High nutrient content. Use for Ag Applications
3 - 5	Higher than desirable for salt sensitive plants, some loss of vigor
0.6 - 3	Desirable range for most plants
0.3 - 0.6	Ideal range for greenhouse growth media
0.0 - 0.3	Very Low: Indicates very low nutrient status: plants may show deficiencies.

Compost Results Interpretations

Page 3

Report #: 17-038-4012

DATE RECEIVED: 2017-01-24

pH Value

7.4

0 to 14 scale with 6 to 8 as normal pH levels for compost

A pH in the 6 to 8 pH range indicates a more mature compost

pH measures the acidity or alkalinity of the compost, and is a measurement of the hydrogen ion activity of a soil or compost on a logarithmic scale. The pH scale ranges from 0 to 14 and 7 indicates a neutral pH. Growing media with a higher pH or pH greater than 7 can benefit from a compost that has a more acidic pH or pH below 7. This type of application will possibly lower the soil pH making the soil more conducive to plants that thrive in a more acidic soil condition.

Nutrient Index (Ag Index)

>10

The Nutrient Index normally runs between 1 and 10.

The Nutrient Index is obtained by dividing the total nutrients (N,P,K) by the amount of salt (Sodium and Chloride). The higher the Nutrient Index the less chance of having a toxic buildup of Sodium (salt) in the soil.

AG INDEX CHART

salt injury possible	*use on soils with excellent drainage characteristics, good water quality and low salts*				*you may use on soils with poor drainage, poor water quality, or high salts*					*for all soils*
1	2	3	4	5	6	7	8	9	10	> 10

Nutrients (N+P205+K20)

2.15 Average Nutrient Content Dry Weight <2 = Low, >5 = High

0.5-0-0.5 Rating As Received

The most commonly used compost data is the amount of Nitrogen, Phosphate, and Potash (abbreviated as N,P,K) present and the information is similar to that found in common fertilizers. If a compost result has the rating 1-2-2 it means that the compost has 1% Nitrogen, 2% Phosphate and 2% Potash. Most compost tests will have a average nutrient level (N+P+K) of < 5%.

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HUGHES MULCH PRODUCTS
3211 KEYSTONE DR
OMAHA NE 68134

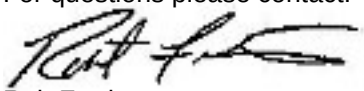
REPORT OF ANALYSIS

For: (14285) HUGHES MULCH PRODUCTS
NUTRIENT ANALYSIS

Analysis	Level Found As Received	Level Found Dry Weight	Units	Reporting Limit	Method	Analyst-Date	Verified-Date
Sample ID: **JAN 2017** Lab Number: **2623513** Date Sampled: **2017-01-24**							
Cadmium (total)	n.d.	n.d.	mg/kg	0.50	EPA 6010	ras7-2017/01/25	bab2-2017/01/30
Chromium (total)	5.14	9.23	mg/kg	1.00	EPA 6010	ras7-2017/01/25	bab2-2017/01/30
Mercury (total)	n.d.	n.d.	mg/kg	0.05	EPA 7471	ccm2-2017/01/26	bab2-2017/01/30
Lead (total)	7.4	13.3	mg/kg	5.0	EPA 6010	ras7-2017/01/25	bab2-2017/01/30
Molybdenum (total)	n.d.	n.d.	mg/kg	1.0	EPA 6010	ras7-2017/01/25	bab2-2017/01/30
Nickel (total)	5.0	9.0	mg/kg	1.0	EPA 6010	ras7-2017/01/27	bab2-2017/01/30
Selenium (total)	n.d.	n.d.	mg/kg	10.0	EPA 6010	ras7-2017/01/25	bab2-2017/01/30
Zinc (total)	36.0	64.6	mg/kg	2.0	EPA 6010	ras7-2017/01/25	bab2-2017/01/30
Copper (total)	9.6	17.2	mg/kg	1	EPA 6010	ras7-2017/01/27	bab2-2017/01/30
Arsenic (total)	2.38	4.27	mg/kg	0.5	EPA 6020	akj2-2017/01/26	bab2-2017/01/30

n.d. = not detected , ppm = parts per million, ppm = mg/kg

For questions please contact:



Rob Ferris
Account Manager
raf4@midwestlabs.com (402)829-9871

US COMPOSTING COUNCIL

OFFICIAL Seal of Testing Assurance Compost Sample Chain of Custody Form

STA Laboratory:
Address:
City, State Zip code:
Tel:
FAX:
Email:

LABORATORY USE ONLY — Storage Locations
Freezer ____ Cold Room ____ Storage Shelf ____
Sample Condition: ____
Temperature: ____ Malodor: ____ Moisture: ____

Client/Reporting Company: Hughes Mill & Products Tel: 712-991-7900
Contact Name: Stacy Hughes FAX:
Billing Address: 3211 Keystone Dr Email: StacyE@hughestech.com
City, State Zip code: Omaha, NE 68134

Sample Type: O POINT O COMPOSITE O STRATIFIED O INTERVAL
P.O. Number: ____
USCC Member: X YES O NO

Send Results to: 4
City, State Zip code: See above
Name or Source of Sample(s):
Name of Person(s), Sample Collector(s):

SELECTION OF ANALYSIS. Refer to http://www.tmecc.org/cap/methods.html for details. STA Suite; State DOT Tests (indicate State); A, B, C – Specify other tests in fields A through C, (e.g., tests required for regulated samples, etc.). NOTE! STA analytical results via the STA Compost Technical Data Sheet and this Chain of Custody form are submitted to STA program management.

A	B	C

Client Sample ID and Special Instructions	1. List Feedstocks 2. Check all that apply 3. List % by volume. (Optional)	Collection Date/Time	Sample Matrix	Composting Operation Type	Shipping Temperature	Indicate Compost Analysis Requirements (*identify state)	LAB USE ONLY Job Number & Sample Status
Jan 2017	X Green waste; Manure; Food; Biosolids; MSW; Wood; Carcass; Fish Waste; Grease, Fats	Date: 1/24/17 Time: Initials: SP.H	Compost; Feedstock; Mulch; ____ ____	Windrow; Static pile; In-Vessel; ____ ____	Ambient; Wet Ice; Dry Ice	STA Suite; State DOT; Identify State	

INFORM THE STA LABORATORY AND SPECIFY THE REQUIRED LABORATORY TESTS WHEN SUBMITTING REGULATED COMPOST SAMPLES (please use spaces A, B and C provided above).

PLEASE PROVIDE SPECIFIC FEEDSTOCK AND OPERATIONAL DETAIL IN THE SPACE PROVIDED.
YOUR VOLUNTEERED INFORMATION PROVIDES USCC STANDARDS AND PRACTICES COMMITTEE WITH CRUTIAL DATA NEEDED TO BETTER UNDERSTAND THE COMPOSTING PROCESS AND COMPOST END USES.

Trees, Shrubs, Grass

		Date	Time			Date	Time
Releasing Signature 1	[signature]	1/24/17	9:20	Receiving Signature 1	Heather Ray	1/24/17	0920
Releasing Signature 2		Date	Time	Receiving Signature 2		Date	Time
Releasing Signature 3		Date	Time	Receiving Signature 3		Date	Time
Releasing Signature 4		Date	Time	Receiving Signature 4		Date	Time

2623513

2623513-513
Samples: 1 Page: 1/2
Calvin J Sterkel Colombo
2017 01 24 09:56

10 ct

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COMPOST SAMPLE SUBMITTAL FORM

ACCOUNT NUMBER 14285

REPORT & BILL TO	IDENTIFICATION	COPY TO
ZIP		ZIP
PHONE ( )		

PO# _____

Client SAMPLE ID	C:N RATIO PACKAGE	COMPOST PLUS PKG	STA Package	HEAVY METALS PACKAGE	PATHOGENS	Comments (Other Analysis)
Jan 2017			X		Fecal Coliform ☐ Salmonella ☐ Ecoli ☐	2623513-513 Samples: 1 Page: 2/2 Calvin J Sterkel Colombo 2017 01 24 09:56
					Fecal Coliform ☐ Salmonella ☐ Ecoli ☐	
					Fecal Coliform ☐ Salmonella ☐ Ecoli ☐	
					Fecal Coliform ☐ Salmonella ☐ Ecoli ☐	
					Fecal Coliform ☐ Salmonella ☐ Ecoli ☐	

COMPOST PLUS PACKAGE WITH INTERPRETATIONS: Moisture/Total Solids, Total Nitrogen, Phosphate, Potash, Sulfur, Calcium, Magnesium, Sodium, Iron, Manganese, Copper, Zinc, pH, Total Carbon, Total Salts, C/N Ratio, Ammonical Nitrogen, and Nitrate Nitrogen

SEAL OF TESTING ASSURANCE (STA) COMPOST COUNCIL PACKAGE *(USCC Registration requires STA Chain of Custody)*
Man made materials, Boron, Chloride, Total Carbon, Loss on Ignition, Zinc, Copper, Manganese, Iron, Sodium, Magnesium, Calcium, Sulfur, Potash, Phosphate, Total Nitrogen, Moisture, Ammoniacal Nitrogen, pH, Nitrate Nitrogen, Arsenic, Cadmium, Chromium, Lead, Mercury, Molybdenum, Nickel, Selenium, Salmonella, Fecal Coliform, Germination (7 day), 14 day Vigor, Stability Index, Sieves (3, 1 1/2, 1, 3/4, 5/8, 3/8, 1/4), Conductivity

SUBMIT TO:
Midwest Laboratories, Inc.
13611 "B" Street, Omaha, NE 68144-3693

HEAVY METALS PACKAGE: Arsenic, Cadmium, Cobalt, Lead, Mercury, Molybdenum, Nickel, Selenium, and Zinc

FOR A COMPLETE LISTING OF ANALYTICAL PROCEDURES AVAILABLE, SEE FEE SCHEDULE AT WWW.MIDWESTLABS.COM
In the absence of specific instructions to the contrary, Midwest Laboratories will analyze your sample(s) using accredited test methods (when available).

RC FORM 03 - EFFECTIVE 5/22/