

According to (G.S. 130A-309.09D(b)) completed forms must be returned by August 1, 2014 and a copy of this report must be sent to the County Manager of each county from which waste was received. If you have questions or require assistance in completing this report, contact your Regional Environmental Senior Specialist.

Facility Name: Novozymes North America Nature's Green Releaf Composting Facility Permit: 3504- Compost

Physical Address		Mailing Address	
Street 1: <u>445 Old Smith Farm Road</u>		Street 1: <u>P.O. Box 576</u>	
Street 2: _____		Street 2: _____	
City: <u>Franklinton</u>	County: <u>Franklin</u>	City: <u>Franklinton</u>	
State: <u>North Carolina</u>	Zip: <u>27525</u>	State: <u>North Carolina</u>	Zip: <u>27525</u>
Primary Facility Contact Person		Billing Contact Person	
Name: <u>Frank Franciosi</u>		Name: <u>Frank Franciosi</u>	
Phone: <u>(919) 612-9975</u>	Fax: <u>(919) 494-1472</u>	Phone: <u>(919) 612-9975</u>	Fax: <u>(919) 494-1472</u>
Email: <u>frfr@novozymes.com</u>		Email: <u>frfr@novozymes.com</u>	

1. Tipping Fee: \$30.00 per Ton (Attach a schedule of tipping fees if appropriate.)

2. Did your facility stop receiving waste during this past Fiscal Year?  Yes  No  
 If so, please report the date this occurred: \_\_\_\_\_

3. Please attach results of monthly temperature monitoring for the period of July 1, 2013 thru June 30, 2014.

4. For Type II, III, and IV facilities, attach results of tests (Waste Analysis with metals, foreign matter and pathogens) as required in Table 3 of Rule 15A NCAC 13B .1408 for the period of July 1, 2013 thru June 30, 2014. **Current Rules state that "Compost shall be analyzed at intervals of every 20,000 tons of compost produced or every six months, whichever comes first."**

5. What type and quantity of waste was composted by your facility?

Materials COMPOSTED	Check X if Received	Tons RECEIVED	Tons COMPOSTED	Unusable Tons DISPOSED
Yard Waste	<input checked="" type="checkbox"/>	6,798	6,798	0
Clean Wood	<input type="checkbox"/>			
Sawdust	<input checked="" type="checkbox"/>	489	489	0
Wooden Pallets	<input type="checkbox"/>			
Food Waste	<input checked="" type="checkbox"/>	24	24	0
Animal Waste	<input type="checkbox"/>			
Sludge and Biosolids	<input type="checkbox"/>			0
Grease Trap Waste	<input type="checkbox"/>			
Animal Mortalities	<input type="checkbox"/>			
Sheetrock	<input type="checkbox"/>			
Commingled (Describe)	<input type="checkbox"/>			
Other (Describe) Enzyme Residuals	<input checked="" type="checkbox"/>	5,337	5,337	0
Other (Describe)	<input type="checkbox"/>			
Other (Describe)	<input type="checkbox"/>			
<b>TOTAL</b>		12,648	12,648	0





**US COMPOSTING COUNCIL**

*Seal of Testing Assurance*

**Novozymes NA, Inc.**

Frank Franciosi

P.O. Box 576

Franklinton

NC 27525-0576 0

Date Sampled/Received: 07 Jul. 14 / 08 Jul. 14

<b>Product Identification</b> Compost
Nature's GREEN-RELEAF Compost

# COMPOST TECHNICAL DATA SHEET

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188

<i>Compost Parameters</i>	<i>Reported as (units of measure)</i>	<i>Test Results</i>	<i>Test Results</i>
Plant Nutrients:	%, weight basis	Not reported	Not reported
Moisture Content	%, wet weight basis	40.6	
Organic Matter Content	%, dry weight basis	60.3	
pH	units	6.26	
Soluble Salts <i>(electrical conductivity EC<sub>5</sub>)</i>	dS/m (mmhos/cm)	3.6	
Particle Size or Sieve Size	maxium aggregate size, inches	0.64	
<b>Stability Indicator (<i>respirometry</i>)</b>		<b>Stability Rating:</b>	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	1.6	Very Stable
	mg CO <sub>2</sub> -C/g TS/day	0.95	
<b>Maturity Indicator (bioassay)</b>			
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	100.0	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	<i>Fecal coliform</i>
		Pass	<i>Salmonella</i>
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	<i>As,Cd,Cr,Cu,Pb,Hg</i> <i>Mo,Ni,Se,Zn</i>

*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.*

Laboratory Group: Jul.14 B Laboratory Number: 4070261-1/1

Analyst: Assaf Sadeh

www.compostlab.com



**US COMPOSTING COUNCIL**

*Seal of Testing Assurance*

**Novozymes NA, Inc.**

Frank Franciosi

P.O. Box 576

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NC 27525-0576 0

Date Sampled/Received: 07 Jul. 14 / 08 Jul. 14

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# COMPOST TECHNICAL DATA SHEET

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188

<i>Compost Parameters</i>	<i>Reported as (units of measure)</i>	<i>Test Results</i>	<i>Test Results</i>
Plant Nutrients:	% , weight basis	% , wet weight basis	% , dry weight basis
Nitrogen	Total N	1.3	2.1
Phosphorus	P <sub>2</sub> O <sub>5</sub>	0.75	1.2
Potassium	K <sub>2</sub> O	0.42	0.71
Calcium	Ca	0.79	1.3
Magnesium	Mg	0.14	0.24
Moisture Content	% , wet weight basis	40.6	
Organic Matter Content	% , dry weight basis	60.3	
pH	units	6.26	
Soluble Salts <i>(electrical conductivity EC<sub>5</sub>)</i>	dS/m (mmhos/cm)	3.6	
Particle Size or Sieve Size	% under 9.5 mm, dw basis	99.6	
<i>Stability Indicator (respirometry)</i>		<i>Stability Rating:</i>	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	1.6	Very Stable
	mg CO <sub>2</sub> -C/g TS/day	0.95	
<i>Maturity Indicator (bioassay)</i>			
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	100.0	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	<i>Fecal coliform</i>
		Pass	<i>Salmonella</i>
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	<i>As,Cd,Cr,Cu,Pb,Hg</i>
			<i>Mo,Ni,Se,Zn</i>

*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.*

Laboratory Group: Jul.14 B Laboratory Number: 4070261-1/1

Analyst: Assaf Sadeh		www.compostlab.com
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**US COMPOSTING COUNCIL**

*Seal of Testing Assurance*



**Novozymes NA, Inc.**

Frank Franciosi

P.O. Box 576

Franklinton

NC 27525-0576

0

Date Sampled/Received: 07 Jul. 14 / 08 Jul. 14

<b>Product Identification:</b>	Compost
Nature's GREEN-RELEAF Compost	

## COMPOST TECHNICAL DATA SHEET for NORTH CAROLINA DOT

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188			
<i>Compost Parameters</i>	<i>Test Results</i>	<i>Reported as (units of measure)</i>	<i>Project Specification (Allowable Limit)</i>
Organic Matter Content	60.3	%, dry weight basis	25 - 65
pH	6.26	Unitless	5.0 - 8.5
Moisture Content	40.6	%, wet weight basis	30 - 60
Soluble Salts (electrical conductivity)	3.6	dS/m (mmhos/cm)	5.0 dS/m, maximum
Particle Size	100.0	%, dry weight passing through 3 inch screen and	100%
	100.0	1 inch screen and	90% minimum
	100.0	3/4 inch screen and	65% minimum
	96.1	1/4 inch screen	50% maximum
Stability Indicator (respirometry) CO2 Evolution	1.6	mg CO2-C/g OM/day	≤ 8
Maturity Indicator (bioassay) Percent Emergence	100.0	average % of control	80%, minimum
Relative Seedling Vigor	100.0	average % of control	80%, minimum
Select Pathogens (Fecal Coliform)	Pass	PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	Pass
Trace Metals	Pass	PASS/FAIL: Per US EPA Class A 40 CFR 503.13, tables 1 and 3.	Pass
Inert Contamination (man-made)	None Detected	%, dry weight	<1.0 %

*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.*

*For additional information pertaining to compost use, the specific compost parameters tested for within the Seal of Testing assurance Program, or the program in general, log on to the US Composting Council's TMECC web-site at <http://www.tmecc.org>.*

This compost product has been sampled and tested as required by the Seal of Testing assurance Program on the United States Composting Council (USCC), using certain methods from the "Test Methods for the Examination of Compost and Composting" manual. Test results are available upon request by contacting the compost producer (address at top of page). The USCC makes no warranties regarding this product or its content, quality, or suitability for any particular use.

Laboratory Group:	Jul.14 B	Laboratory Number:	4070261-1/1
Analyst: Assaf Sadeh		www.compostlab.com	

# SOIL CONTROL LAB

42 HANGAR WAY  
WATSONVILLE  
CALIFORNIA  
95076  
USA

Account #: 4070261-1/1-2197  
Group: Jul.14 B #9  
Reporting Date: July 25, 2014

Novozymes NA, Inc.  
P.O. Box 576  
Franklinton, NC 27525-0576  
Attn: Frank Franciosi

Date Received: 08 Jul. 14  
Sample Identification: Nature's GREEN-RELEAF Compost  
Sample ID #: 4070261 - 1/1

<b>Nutrients</b>				<b>Stability Indicator:</b>			Biologically
	Dry wt.	As Rcvd.	units	<b>CO2 Evolution</b>	Respirometry	Available C	
Total Nitrogen:	2.1	1.3	%	mg CO <sub>2</sub> -C/g OM/day	1.6	1.6	
Ammonia (NH <sub>4</sub> -N):	830	490	mg/kg	mg CO <sub>2</sub> -C/g TS/day	0.95	0.96	
Nitrate (NO <sub>3</sub> -N):	850	510	mg/kg	<i>Stability Rating</i>	<i>very stable</i>	<i>very stable</i>	
Org. Nitrogen (Org.-N):	1.9	1.1	%	<b>Maturity Indicator: Cucumber Bioassay</b>			
Phosphorus (as P <sub>2</sub> O <sub>5</sub> ):	1.2	0.74	%	Compost:Vermiculite(v:v)	1:1	1:3	
Phosphorus (P):	5500	3300	mg/kg	Emergence (%)	100	*	
Potassium (as K <sub>2</sub> O):	0.71	0.42	%	Seedling Vigor (%)	100	NA	
Potassium (K):	5900	3500	mg/kg	<i>Description of Plants</i>	<i>healthy</i>	<i>NA</i>	
Calcium (Ca):	1.3	0.79	%	*Inadequate amount of sample provided for test			
Magnesium (Mg):	0.24	0.14	%	<b>Pathogens</b>	Results	Units	Rating
Sulfate (SO <sub>4</sub> -S):	21	12	mg/kg	Fecal Coliform	41	MPN/g	<i>pass</i>
Boron (Total B):	14	8.1	mg/kg	Salmonella	< 3	MPN/4g	<i>pass</i>
Moisture:	0	40.6	%	Date Tested: 08 Jul. 14			
Sodium (Na):	0.057	0.034	%	<b>Inerts</b>	% by weight		
Chloride (Cl):	0.095	0.057	%	Plastic	< 0.5		
pH Value:	NA	6.26	unit	Glass	< 0.5		
Bulk Density :	22	36	lb/cu ft	Metal	< 0.5		
Carbonates (CaCO <sub>3</sub> ):	2.5	1.5	lb/ton	Sharps	ND		
Conductivity (EC5):	3.6	NA	mmhos/cm	<b>Size &amp; Volume Distribution</b>			
Organic Matter:	60.3	35.8	%	MM	% by weight	% by volume	BD g/cc
Organic Carbon:	31.0	18.0	%	> 50	0.0	0.0	0.00
Ash:	39.7	23.6	%	25 to 50	0.0	0.0	0.00
C/N Ratio	14	14	ratio	16 to 25	0.0	0.0	0.00
AgIndex	> 10	> 10	ratio	9.5 to 16	0.4	0.5	0.40
				6.3 to 9.5	3.5	1.9	0.83
				4.0 to 6.3	8.5	9.5	0.40
				2.0 to 4.0	16.6	19.0	0.39
				< 2.0	71.0	69.0	0.46
				Bulk Density Description:<.35 Light Materials, .35-.60 medium weight materials, >.60 Heavy Materials			
				Analyst: Assaf Sadeh			
<b>Metals</b>							
	Dry wt.	EPA Limit	units				
Aluminum (Al)	4500	-	mg/kg				
Arsenic (As):	1.7	41	mg/kg				
Cadmium (Cd):	< 1.0	39	mg/kg				
Chromium (Cr):	23	1200	mg/kg				
Cobalt (Co)	3.4	-	mg/kg				
Copper (Cu):	65	1500	mg/kg				
Iron (Fe):	6100	-	mg/kg				
Lead (Pb):	13	300	mg/kg				
Manganese (Mn):	430	-	mg/kg				
Mercury (Hg):	< 1.0	17	mg/kg				
Molybdenum (Mo):	< 1.0	75	mg/kg				
Nickel (Ni):	13	420	mg/kg				
Selenium (Se):	< 1.0	36	mg/kg				
Zinc (Zn):	100	2800	mg/kg				

\*Sample was received and handled in accordance with TMECC procedures.

*Assaf Sadeh*

Account No.:  
4070261 - 1/1 - 2197  
Group: Jul.14 B No. 9

Date Received  
Sample i.d.  
Sample I.d. No.

08 Jul. 14  
Nature's GREEN-RELEAF Compost  
1/1 4070261

**INTERPRETATION:**

**Is Your Compost Stable?**

<b>Respiration Rate</b> 1.6 mg CO <sub>2</sub> -C/ g OM/day	Biodegradation Rate of Your Pile ++++++ < Stable > < Moderately Unstable> < Unstable > < High For Mulch
<b>Biologically Available Carbon (BAC)</b> 1.6 mg CO <sub>2</sub> -C/ g OM/day	Optimum Degradation Rate ++++++ < Stable > < Moderately Unstable> < Unstable > < High For Mulch

**Is Your Compost Mature?**

<b>Ammonia/NitrateN ratio</b> 0.98 Ratio	++++++ VeryMature> < Mature > < Immature
<b>Ammonia N ppm</b> 830 mg/kg dry wt.	++++++ VeryMature> < Mature > < Immature
<b>Nitrate N ppm</b> 850 mg/kg dry wt.	++++++ < Immature > < Mature
<b>pH value</b> 6.26 units	++++++ < Immature > < Mature > < Immature
<b>Cucumber Emergence</b> 100.0 percent	++++++ < Immature > < Mature

**Is Your Compost Safe Regarding Health?**

<b>Fecal Coliform</b> < 1000 MPN/g dry wt.	++++++ < Safe > < High Fecal Coliform
<b>Salmonella</b> Less than 3 /4g dry wt.	++++++ <Safe (none detected) > < High Salmonella Count(> 3 per 4 grams)
<b>Metals</b> US EPA 503 Pass dry wt.	++++++ <All Metals Pass > < One or more Metals Fail

**Does Your Compost Provide Nutrients or Organic Matter?**

<b>Nutrients (N+P2O5+K2O)</b> 4.1 Percent dry wt.	++++++ <Low > < Average > < High Nutrient Content
<b>AgIndex (Nutrients / Sodium and Chloride Salts)</b> 15 Ratio	++++++ ((N+P2O5+K2O) / (Na + Cl)) Na & Cl > < Nutrient and Sodium and Chloride Provider > < Nutrient Provider
<b>Plant Available Nitrogen (PAN)</b> 4 lbs/ton wet wt.	Estimated release for first season ++++++ Low Nitrogen Provider> < Average Nitrogen Provider > <High Nitrogen Provider
<b>C/N Ratio</b> 14 Ratio	++++++ < Nitrogen Release > < N-Neutral > < N-Demand> < High Nitrogen Demand
<b>Soluble Available Nutrients &amp; Salts (EC5 w/w dw)</b> 3.6 mmhos/cm dry wt.	++++++ SlowRelease> < Average Nutrient Release Rate > <High Available Nutrients
<b>Lime Content (CaCO3)</b> 2.5 Lbs/ton dry wt.	++++ < Low > < Average > < High Lime Content (as CaCO3)

**What are the physical properties of your compost?**

<b>Percent Ash</b> 39.7 Percent dry wt.	++++++ < High Organic Matter > < Average > < High Ash Content
<b>Sieve Size % &gt; 6.3 MM (0.25")</b> 3.9 Percent dry wt.	++++++ All Uses > < Size May Restrict Uses for Potting mix and Golf Courses

Account No.:  
4070261 - 1/1 - 2197  
Group: Jul.14 B No. 9

Date Received  
Sample i.d.  
Sample I.d. No.

08 Jul. 14  
Nature's GREEN-RELEAF Compost  
1/1 4070261

**INTERPRETATION:**

**Is Your Compost Stable?**

Page two of three

**Respiration Rate**

1.6 Low: Good for all uses mg CO<sub>2</sub>-C/g OM/day

The respiration rate is a measurement of the biodegradation rate of the organic matter in the sample (as received). The respiration rate is determined by measuring the rate at which CO<sub>2</sub> is released under optimized moisture and temperature conditions.

**Biologically Available Carbon**

2 Low: Good for all uses mg CO<sub>2</sub>-C/g OM/day

Biologically Available Carbon (BAC) is a measurement of the rate at which CO<sub>2</sub> is released under optimized moisture, temperature, porosity, nutrients, pH and microbial conditions. If both the RR and the BAC test values are close to the same value, the pile is optimized for composting. If both values are high the compost pile just needs more time. If both values are low the compost has stabilized and should be moved to curing. BAC test values that are higher than RR indicate that the compost pile has stalled. This could be due to anaerobic conditions, lack of available nitrogen due to excessive air converting ammonia to the unavailable nitrate form, lack of nitrogen or other nutrients due to poor choice of feedstock, pH value out of range, or microbes rendered non-active.

**Is Your Compost Mature?**

**Ammonia:NitrateN ratio**

0.98 mature

Composting to stabilize carbon can occur at such a rapid rate that sometimes phytotoxins remain in the compost and must be neutralized before using in high concentrations or in high-end uses. This step is called curing. Typically ammonia is in excess with the break-down of organic materials resulting in an increase in pH. This combination results in a loss of volatile ammonia (it smells). Once this toxic ammonia has been reduced and the pH drops, the microbes convert the ammonia to nitrates. A low ammonia + high nitrate score is indicative of a mature compost, however there are many exceptions. For example, a compost with a low pH (<7) will retain ammonia, while a compost with high lime content can lose ammonia before the organic fraction becomes stable. Composts must first be stable before curing indicators apply.

**Ammonia N ppm**

830 immature

**Nitrate N ppm**

850 mature

**pH value**

6.26 immature

**Cucumber Bioassay**

100.0 Percent

Cucumbers are chosen for this test because they are salt tolerant and very sensitive to ammonia and organic acid toxicity. Therefore, we can germinate seeds in high concentrations of compost to measure phytotoxic effects without soluble salts being the limiting factor. Values above 80% for both percent emergence and vigor are indicative of a well-cured compost. Exceptions include very high salts that affect the cucumbers, excessive concentrations of nitrates and other nutrients that will be in range when formulated to make a growing media. In addition to testing a 1:1 compost: vermiculite blend, we also test a diluted 1:4 blend to indicate a more sensitive toxicity level.

**Is Your Compost Safe Regarding Health?**

**Fecal Coliform**

< 1000 / g dry wt.

Fecal coliforms can survive in both aerobic and anaerobic conditions and is common in all initial compost piles. Most human pathogens occur from fecal matter and all fecal matter is loaded in fecal coliforms. Therefore fecal coliforms are used as an indicator to determine if the chosen method for pathogen reduction (heat for compost) has met the requirements of sufficient temperature, time and mixing. If the fecal coliforms are reduced to below 1000 per gram dry wt. it is assumed all other pathogens are eliminated. Potential problems are that fecal coliform can regrow during the curing phase or during shipping. This is because the conditions are now more favorable for growth than during the composting process.

**Salmonella Bacteria**

Less than 3 3 / 4g dry wt. Salmonella is not only another indicator organism but also a toxic microbe. It has been used in the case of biosolids industry to determine adequate pathogen reduction.

**Metals**

Pass

The ten heavy metals listed in the EPA 503 regulations are chosen to determine if compost can be applied to ag land and handled without toxic effects. Most high concentrations of heavy metals are derived from woodwaste feedstock such as chrome-arsenic treated or lead painted demolition wood. Biosolids are rarely a problem.

**Does Your Compost Provide Nutrients or Organic Matter?**

**Nutrients (N+P<sub>2</sub>O<sub>5</sub>+K<sub>2</sub>O)**

4.1 Average nutrient content

This value is the sum of the primary nutrients Nitrogen, Phosphorus and Potassium. Reported units are consistent with those found on fertilizer formulations. A sum greater than 5 is indicative of a compost with high nutrient content, and best used to supply nutrients to a receiving soil. A sum below 2 indicates low nutrient content, and is best-used to improve soil structure via the addition of organic matter. Most compost falls between 2 and 5.

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4070261 - 1/1 - 2197  
Group: Jul.14 B No. 9

Date Received: 08 Jul. 14  
Sample i.d.: Nature's GREEN-RELEAF Compost  
Sample I.d. No.: 1/1 4070261

**INTERPRETATION:**

**AgIndex (Nutrients/Na+Cl)**

15 High nutrient ratio Composts with low AgIndex values have high concentrations of sodium and/or chloride compared to nutrients. Repeated use of a compost with a low AgIndex (< 2) may result in sodium and/or chloride acting as the limiting factor compared to nutrients, governing application rates. These composts may be used on well-draining soils and/or with salt-tolerant plants. Additional nutrients from another source may be needed if the application rate is limited by sodium or chloride. If the AgIndex is above 10, nutrients optimal for plant growth will be available without concern of sodium and/or chloride toxicity. Composts with an AgIndex of above 10 are good for increasing nutrient levels for all soils. Most composts score between 2 and 10. Concentrations of nutrients, sodium, and chloride in the receiving soil should be considered when determining compost application rates. The AgIndex is a product of feedstock quality. Feedstock from dairy manure, marine waste, industrial wastes, and halophytic plants are likely to produce a finished compost with a low AgIndex.

**Plant Available Nitrogen (lbs/ton)**

4 Low N Provider Plant Available Nitrogen (PAN) is calculated by estimating the release rate of Nitrogen from the organic fraction of the compost. This estimate is based on information gathered from the BAC test and measured ammonia and nitrate values. Despite the PAN value of the compost, additional sources of Nitrogen may be needed during the growing season to offset the Nitrogen demand of the microbes present in the compost. With ample nutrients these microbes can further breakdown organic matter in the compost and release bound Nitrogen. Nitrogen demand based on a high C/N ratio is not considered in the PAN calculation because additional Nitrogen should always be supplemented to the receiving soil when composts with a high C/N ratio are applied.

**C/N Ratio**

14 Indicates maturity As a guiding principal, a C/N ratio below 14 indicates maturity and above 14 indicates immaturity, however, there are many exceptions. Large woodchips (>6.3mm), bark, and redwood are slow to breakdown and therefore can result in a relatively stable product while the C/N ratio value is high. Additionally, some composts with chicken manure and/or green grass feedstocks can start with a C/N ratio below 15 and are very unstable. A C/N ratio below 10 supplies Nitrogen, while a ratio above 20 can deplete Nitrogen from the soil. The rate at which Nitrogen will be released or used by the microbes is indicated by the respiration rate (BAC). If the respiration rate is too high the transfer of Nitrogen will not be controllable.

**Soluble Nutrients & Salts (EC5 w/w dw - mmhos/cm)**

3.6 Average salts This value refers to all soluble ions including nutrients, sodium, chloride and some soluble organic compounds. The concentration of salts will change due to the release of salts from the organic matter as it degrades, volatilization of ammonia, decomposition of soluble organics, and conversion of molecular structure. High salts + high AgIndex is indicative of a compost high in readily available nutrients. The application rate of these composts should be limited by the optimum nutrient value based on soil analysis of the receiving soil. High Salts + low AgIndex is indicative of a compost low in nutrients with high concentrations of sodium and/or chloride. Limit the application rate according to the toxicity level of the sodium and/or chloride. Low salts indicates that the compost can be applied without risking salt toxicity, is likely a good source of organic matter, and that nutrients will release slowly over time.

**Lime Content (lbs. per ton)**

2.5 Low lime content Compost high in lime or carbonates are often those produced from chicken manure (layers) ash materials, and lime products. These are excellent products to use on a receiving soil where lime has been recommended by soil analysis to raise the pH. Composts with a high lime content should be closely considered for pH requirements when formulating potting mixes.

**Physical Properties**

**Percent Ash**

39.7 Average ash content Ash is the non-organic fraction of a compost. Most composts contain approximately 50% ash (dry weight basis). Compost can be high in ash content for many reasons including: excess mineralization (old compost), contamination with soil base material during turning, poor quality feedstock, and soil or mineral products added. Finding the source and reducing high ash content is often the fastest means to increasing nutrient quality of a compost.

**Particle Size % > 6.3 MM (0.25")**

3.9 May restrict use Large particles may restrict use for potting soils, golf course topdressings, seed-starter mixes, and where a fine size distribution is required. Composts with large particles can still be used as excellent additions to field soils, shrub mixes and mulches.

**Particle Size Distribution**

Each size fraction is measured by weight, volume and bulk density. These results are particularly relevant with decisions to screen or not, and if screening, which size screen to use. The bulk density indicates if the fraction screened is made of light weight organic material or heavy mineral material. Removing large mineral material can greatly improve compost quality by increasing nutrient and organic concentrations.

Appendix:	Estimated available nutrients for use when calculating application rates	
Plant Available Nitrogen (PAN) calculations:	lbs/ton (As Rec'd)	
PAN = (X * (organic N)) + ((NH4-N) + (NO3-N))	Plant Available Nitrogen (PAN)	4.4
X value = If BAC < 2 then X = 0.1	Ammonia (NH4-N)	0.98
If BAC =2.1 to 5 then X = 0.2	Nitrate (NO3-N)	1.02
If BAC =5.1 to 10 then X = 0.3	Available Phosphorus (P2O5*0.64)	9.6
If BAC > 10 then X = 0.4	Available Potassium (K2O)	8.4
Note: If C/N ratio > 15 additional N should be applied.		



**US COMPOSTING COUNCIL**

*Seal of Testing Assurance*

**Novozymes NA, Inc.**

Frank Franciosi

P.O. Box 576

Franklinton

NC 27525-0576 0

Date Sampled/Received: 02 Sep. 14 / 03 Sep. 14

<b>Product Identification</b> Compost
Nature's GREEN-RELEAF Compost

# COMPOST TECHNICAL DATA SHEET

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188

<i>Compost Parameters</i>	<i>Reported as (units of measure)</i>	<i>Test Results</i>	<i>Test Results</i>
Plant Nutrients:	% , weight basis	Not reported	Not reported
Moisture Content	% , wet weight basis	40.7	
Organic Matter Content	% , dry weight basis	54.5	
pH	units	7.32	
Soluble Salts <i>(electrical conductivity EC<sub>5</sub>)</i>	dS/m (mmhos/cm)	2.3	
Particle Size or Sieve Size	maxium aggregate size, inches	0.64	
<i>Stability Indicator (respirometry)</i>		<i>Stability Rating:</i>	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	2.0	Stable
	mg CO <sub>2</sub> -C/g TS/day	1.1	
<i>Maturity Indicator (bioassay)</i>			
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	100.0	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	<i>Fecal coliform</i>
		Pass	<i>Salmonella</i>
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	<i>As,Cd,Cr,Cu,Pb,Hg</i> <i>Mo,Ni,Se,Zn</i>

*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.*

Laboratory Group: Sep.14 A Laboratory Number: 4090099-1/1

Analyst: Assaf Sadeh

www.compostlab.com



**US COMPOSTING COUNCIL**

*Seal of Testing Assurance*

**Novozymes NA, Inc.**

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P.O. Box 576

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NC 27525-0576 0

Date Sampled/Received: 02 Sep. 14 / 03 Sep. 14

<b>Product Identification</b> Compost
Nature's GREEN-RELEAF Compost

## COMPOST TECHNICAL DATA SHEET

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188

<i>Compost Parameters</i>	<i>Reported as (units of measure)</i>	<i>Test Results</i>	<i>Test Results</i>
Plant Nutrients:	% , weight basis	% , wet weight basis	% , dry weight basis
Nitrogen	Total N	1.1	1.9
Phosphorus	P <sub>2</sub> O <sub>5</sub>	0.75	1.3
Potassium	K <sub>2</sub> O	0.43	0.73
Calcium	Ca	0.98	1.7
Magnesium	Mg	0.18	0.30
Moisture Content	% , wet weight basis	40.7	
Organic Matter Content	% , dry weight basis	54.5	
pH	units	7.32	
Soluble Salts <i>(electrical conductivity EC<sub>5</sub>)</i>	dS/m (mmhos/cm)	2.3	
Particle Size or Sieve Size	% under 9.5 mm, dw basis	98.8	
<i>Stability Indicator (respirometry)</i>		<i>Stability Rating:</i>	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	2.0	Stable
	mg CO <sub>2</sub> -C/g TS/day	1.1	
<i>Maturity Indicator (bioassay)</i>			
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	100.0	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	<i>Fecal coliform</i>
		Pass	<i>Salmonella</i>
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	<i>As,Cd,Cr,Cu,Pb,Hg</i>
			<i>Mo,Ni,Se,Zn</i>

*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.*

Laboratory Group: Sep.14 A Laboratory Number: 4090099-1/1

Analyst: Assaf Sadeh		www.compostlab.com
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**US COMPOSTING COUNCIL**

*Seal of Testing Assurance*



**Novozymes NA, Inc.**

Frank Franciosi

P.O. Box 576

Franklinton

NC 27525-0576

0

Date Sampled/Received: 02 Sep. 14 / 03 Sep. 14

<b>Product Identification:</b>	Compost
Nature's GREEN-RELEAF Compost	

## COMPOST TECHNICAL DATA SHEET for NORTH CAROLINA DOT

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188			
<i>Compost Parameters</i>	<i>Test Results</i>	<i>Reported as (units of measure)</i>	<i>Project Specification (Allowable Limit)</i>
Organic Matter Content	54.5	%, dry weight basis	25 - 65
pH	7.32	Unitless	5.0 - 8.5
Moisture Content	40.7	%, wet weight basis	30 - 60
Soluble Salts (electrical conductivity)	2.3	dS/m (mmhos/cm)	5.0 dS/m, maximum
Particle Size	100.0	%, dry weight passing through 3 inch screen and	100%
	100.0	1 inch screen and	90% minimum
	100.0	3/4 inch screen and	65% minimum
	95.6	1/4 inch screen	50% maximum
Stability Indicator (respirometry) CO2 Evolution	2.0	mg CO2-C/g OM/day	≤ 8
Maturity Indicator (bioassay) Percent Emergence	100.0	average % of control	80%, minimum
Relative Seedling Vigor	100.0	average % of control	80%, minimum
Select Pathogens (Fecal Coliform)	Pass	PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	Pass
Trace Metals	Pass	PASS/FAIL: Per US EPA Class A 40 CFR 503.13, tables 1 and 3.	Pass
Inert Contamination (man-made)	None Detected	%, dry weight	<1.0 %

*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.*

*For additional information pertaining to compost use, the specific compost parameters tested for within the Seal of Testing assurance Program, or the program in general, log on to the US Composting Council's TMECC web-site at <http://www.tmecc.org>.*

This compost product has been sampled and tested as required by the Seal of Testing assurance Program on the United States Composting Council (USCC), using certain methods from the "Test Methods for the Examination of Compost and Composting" manual. Test results are available upon request by contacting the compost producer (address at top of page). The USCC makes no warranties regarding this product or its content, quality, or suitability for any particular use.

Laboratory Group:	Sep.14 A	Laboratory Number:	4090099-1/1
Analyst: Assaf Sadeh		www.compostlab.com	

# SOIL CONTROL LAB

42 HANGAR WAY  
WATSONVILLE  
CALIFORNIA  
95076  
USA

Account #: 4090099-1/1-2197  
Group: Sep.14 A #8  
Reporting Date: September 16, 2014

Novozymes NA, Inc.  
P.O. Box 576  
Franklinton, NC 27525-0576  
Attn: Frank Franciosi

Date Received: 03 Sep. 14  
Sample Identification: Nature's GREEN-RELEAF Compost  
Sample ID #: 4090099 - 1/1

Nutrients	Dry wt.	As Rcvd.	units	Stability Indicator:	Biologically
Total Nitrogen:	1.9	1.1	%	<b>CO2 Evolution</b>	Respirometry Available C
Ammonia (NH <sub>4</sub> -N):	970	580	mg/kg	mg CO <sub>2</sub> -C/g OM/day	2.0 2.2
Nitrate (NO <sub>3</sub> -N):	260	160	mg/kg	mg CO <sub>2</sub> -C/g TS/day	1.1 1.2
Org. Nitrogen (Org.-N):	1.8	1.1	%	Stability Rating	very stable stable
Phosphorus (as P <sub>2</sub> O <sub>5</sub> ):	1.3	0.76	%		
Phosphorus (P):	5600	3300	mg/kg		
Potassium (as K <sub>2</sub> O):	0.73	0.43	%	<b>Maturity Indicator: Cucumber Bioassay</b>	
Potassium (K):	6100	3600	mg/kg	Compost:Vermiculite(v:v)	1:1 1:3
Calcium (Ca):	1.7	0.98	%	Emergence (%)	100 *
Magnesium (Mg):	0.30	0.18	%	Seedling Vigor (%)	100 NA
Sulfate (SO <sub>4</sub> -S):	120	74	mg/kg	Description of Plants	healthy NA
Boron (Total B):	19	12	mg/kg	*Inadequate amount of sample provided for test	
Moisture:	0	40.7	%	<b>Pathogens</b>	Results Units Rating
Sodium (Na):	0.044	0.026	%	Fecal Coliform	420 MPN/g pass
Chloride (Cl):	0.061	0.036	%	Salmonella	< 3 MPN/4g pass
pH Value:	NA	7.32	unit	Date Tested: 03 Sep. 14	
Bulk Density :	21	35	lb/cu ft	<b>Inerts</b>	% by weight
Carbonates (CaCO <sub>3</sub> ):	<0.1	<0.1	lb/ton	Plastic	< 0.5
Conductivity (EC5):	2.3	NA	mmhos/cm	Glass	< 0.5
Organic Matter:	54.5	32.3	%	Metal	< 0.5
Organic Carbon:	29.0	17.0	%	Sharps	ND
Ash:	45.5	27.0	%	<b>Size &amp; Volume Distribution</b>	
C/N Ratio	15	15	ratio	MM	% by weight % by volume BD g/cc
AgIndex	> 10	> 10	ratio	> 50	0.0 0.0 0.00
				25 to 50	0.0 0.0 0.00
				16 to 25	0.0 0.0 0.00
				9.5 to 16	1.2 0.8 0.70
				6.3 to 9.5	3.2 1.7 0.93
				4.0 to 6.3	6.7 6.4 0.53
				2.0 to 4.0	12.2 19.1 0.32
				< 2.0	76.7 72.0 0.53
				Bulk Density Description:<.35 Light Materials, .35-.60 medium weight materials, >.60 Heavy Materials	
				Analyst: Assaf Sadeh	

\*Sample was received and handled in accordance with TMECC procedures.

*Assaf Sadeh*

Account No.:  
4090099 - 1/1 - 2197  
Group: Sep.14 A No. 8

Date Received  
Sample i.d.  
Sample I.d. No.

03 Sep. 14  
Nature's GREEN-RELEAF Compost  
1/1 4090099

**INTERPRETATION:**

**Is Your Compost Stable?**

<b>Respiration Rate</b> 2.0 mg CO <sub>2</sub> -C/ g OM/day	Biodegradation Rate of Your Pile +++++++ < Stable > < Moderately Unstable> < Unstable > < High For Mulch
<b>Biologically Available Carbon (BAC)</b> 2.2 mg CO <sub>2</sub> -C/ g OM/day	Optimum Degradation Rate +++++++ < Stable > < Moderately Unstable> < Unstable > < High For Mulch

**Is Your Compost Mature?**

<b>Ammonia/NitrateN ratio</b> 3.7 Ratio	+++++++ VeryMature> < Mature > < Immature
<b>Ammonia N ppm</b> 970 mg/kg dry wt.	+++++++ VeryMature> < Mature > < Immature
<b>Nitrate N ppm</b> 260 mg/kg dry wt.	+++++++ < Immature > < Mature
<b>pH value</b> 7.32 units	+++++++ < Immature > < Mature > < Immature
<b>Cucumber Emergence</b> 100.0 percent	+++++++ < Immature > < Mature

**Is Your Compost Safe Regarding Health?**

<b>Fecal Coliform</b> < 1000 MPN/g dry wt.	+++++++ < Safe > < High Fecal Coliform
<b>Salmonella</b> Less than 3 /4g dry wt.	+++++++ <Safe (none detected) > < High Salmonella Count(> 3 per 4 grams)
<b>Metals</b> US EPA 503 Pass dry wt.	+++++++ <All Metals Pass > < One or more Metals Fail

**Does Your Compost Provide Nutrients or Organic Matter?**

<b>Nutrients (N+P2O5+K2O)</b> 3.9 Percent dry wt.	+++++++ <Low > < Average > < High Nutrient Content
<b>AgIndex (Nutrients / Sodium and Chloride Salts)</b> 15 Ratio	+++++++ ((N+P2O5+K2O) / (Na + Cl)) Na & Cl > < Nutrient and Sodium and Chloride Provider > < Nutrient Provider
<b>Plant Available Nitrogen (PAN)</b> 6 lbs/ton wet wt.	Estimated release for first season +++++++ Low Nitrogen Provider> < Average Nitrogen Provider > <High Nitrogen Provider
<b>C/N Ratio</b> 15 Ratio	+++++++ < Nitrogen Release > < N-Neutral > < N-Demand> < High Nitrogen Demand
<b>Soluble Available Nutrients &amp; Salts (EC5 w/w dw)</b> 2.3 mmhos/cm dry wt.	+++++++ SlORelease> < Average Nutrient Release Rate > <High Available Nutrients
<b>Lime Content (CaCO3)</b> 0 Lbs/ton dry wt.	+ < Low > < Average > < High Lime Content (as CaCO3)

**What are the physical properties of your compost?**

<b>Percent Ash</b> 45.5 Percent dry wt.	+++++++ < High Organic Matter > < Average > < High Ash Content
<b>Sieve Size % &gt; 6.3 MM (0.25")</b> 4.4 Percent dry wt.	+++++++ All Uses > < Size May Restrict Uses for Potting mix and Golf Courses

Account No.:  
4090099 - 1/1 - 2197  
Group: Sep.14 A No. 8

Date Received  
Sample i.d.  
Sample I.d. No.

03 Sep. 14  
Nature's GREEN-RELEAF Compost  
1/1 4090099

**INTERPRETATION:**

**Is Your Compost Stable?**

Page two of three

**Respiration Rate**

2.0 Low: Good for all uses mg CO<sub>2</sub>-C/g OM/day

The respiration rate is a measurement of the biodegradation rate of the organic matter in the sample (as received). The respiration rate is determined by measuring the rate at which CO<sub>2</sub> is released under optimized moisture and temperature conditions.

**Biologically Available Carbon**

2 Low: Good for all uses mg CO<sub>2</sub>-C/g OM/day

Biologically Available Carbon (BAC) is a measurement of the rate at which CO<sub>2</sub> is released under optimized moisture, temperature, porosity, nutrients, pH and microbial conditions. If both the RR and the BAC test values are close to the same value, the pile is optimized for composting. If both values are high the compost pile just needs more time. If both values are low the compost has stabilized and should be moved to curing. BAC test values that are higher than RR indicate that the compost pile has stalled. This could be due to anaerobic conditions, lack of available nitrogen due to excessive air converting ammonia to the unavailable nitrate form, lack of nitrogen or other nutrients due to poor choice of feedstock, pH value out of range, or microbes rendered non-active.

**Is Your Compost Mature?**

**Ammonia:NitrateN ratio**

3.7 immature

Composting to stabilize carbon can occur at such a rapid rate that sometimes phytotoxins remain in the compost and must be neutralized before using in high concentrations or in high-end uses. This step is called curing. Typically ammonia is in excess with the break-down of organic materials resulting in an increase in pH. This combination results in a loss of volatile ammonia (it smells). Once this toxic ammonia has been reduced and the pH drops, the microbes convert the ammonia to nitrates. A low ammonia + high nitrate score is indicative of a mature compost, however there are many exceptions. For example, a compost with a low pH (<7) will retain ammonia, while a compost with high lime content can lose ammonia before the organic fraction becomes stable. Composts must first be stable before curing indicators apply.

**Ammonia N ppm**

970 immature

**Nitrate N ppm**

260 mature

**pH value**

7.32 mature

**Cucumber Bioassay**

100.0 Percent

Cucumbers are chosen for this test because they are salt tolerant and very sensitive to ammonia and organic acid toxicity. Therefore, we can germinate seeds in high concentrations of compost to measure phytotoxic effects without soluble salts being the limiting factor. Values above 80% for both percent emergence and vigor are indicative of a well-cured compost. Exceptions include very high salts that affect the cucumbers, excessive concentrations of nitrates and other nutrients that will be in range when formulated to make a growing media. In addition to testing a 1:1 compost: vermiculite blend, we also test a diluted 1:4 blend to indicate a more sensitive toxicity level.

**Is Your Compost Safe Regarding Health?**

**Fecal Coliform**

< 1000 / g dry wt.

Fecal coliforms can survive in both aerobic and anaerobic conditions and is common in all initial compost piles. Most human pathogens occur from fecal matter and all fecal matter is loaded in fecal coliforms. Therefore fecal coliforms are used as an indicator to determine if the chosen method for pathogen reduction (heat for compost) has met the requirements of sufficient temperature, time and mixing. If the fecal coliforms are reduced to below 1000 per gram dry wt. it is assumed all other pathogens are eliminated. Potential problems are that fecal coliform can regrow during the curing phase or during shipping. This is because the conditions are now more favorable for growth than during the composting process.

**Salmonella Bacteria**

Less than 3 3 / 4g dry wt. Salmonella is not only another indicator organism but also a toxic microbe. It has been used in the case of biosolids industry to determine adequate pathogen reduction.

**Metals**

Pass

The ten heavy metals listed in the EPA 503 regulations are chosen to determine if compost can be applied to ag land and handled without toxic effects. Most high concentrations of heavy metals are derived from woodwaste feedstock such as chrome-arsenic treated or lead painted demolition wood. Biosolids are rarely a problem.

**Does Your Compost Provide Nutrients or Organic Matter?**

**Nutrients (N+P<sub>2</sub>O<sub>5</sub>+K<sub>2</sub>O)**

3.9 Average nutrient content

This value is the sum of the primary nutrients Nitrogen, Phosphorus and Potassium. Reported units are consistent with those found on fertilizer formulations. A sum greater than 5 is indicative of a compost with high nutrient content, and best used to supply nutrients to a receiving soil. A sum below 2 indicates low nutrient content, and is best-used to improve soil structure via the addition of organic matter. Most compost falls between 2 and 5.

Account No.:  
4090099 - 1/1 - 2197  
Group: Sep.14 A No. 8

Date Received: 03 Sep. 14  
Sample i.d.: Nature's GREEN-RELEAF Compost  
Sample I.d. No.: 1/1 4090099

**INTERPRETATION:**

**AgIndex (Nutrients/Na+Cl)**

15 High nutrient ratio Composts with low AgIndex values have high concentrations of sodium and/or chloride compared to nutrients. Repeated use of a compost with a low AgIndex (< 2) may result in sodium and/or chloride acting as the limiting factor compared to nutrients, governing application rates. These composts may be used on well-draining soils and/or with salt-tolerant plants. Additional nutrients from another source may be needed if the application rate is limited by sodium or chloride. If the AgIndex is above 10, nutrients optimal for plant growth will be available without concern of sodium and/or chloride toxicity. Composts with an AgIndex of above 10 are good for increasing nutrient levels for all soils. Most composts score between 2 and 10. Concentrations of nutrients, sodium, and chloride in the receiving soil should be considered when determining compost application rates. The AgIndex is a product of feedstock quality. Feedstock from dairy manure, marine waste, industrial wastes, and halophytic plants are likely to produce a finished compost with a low AgIndex.

**Plant Available Nitrogen (lbs/ton)**

6 Average N Provider Plant Available Nitrogen (PAN) is calculated by estimating the release rate of Nitrogen from the organic fraction of the compost. This estimate is based on information gathered from the BAC test and measured ammonia and nitrate values. Despite the PAN value of the compost, additional sources of Nitrogen may be needed during the growing season to offset the Nitrogen demand of the microbes present in the compost. With ample nutrients these microbes can further breakdown organic matter in the compost and release bound Nitrogen. Nitrogen demand based on a high C/N ratio is not considered in the PAN calculation because additional Nitrogen should always be supplemented to the receiving soil when composts with a high C/N ratio are applied.

**C/N Ratio**

15 Indicates immaturity As a guiding principal, a C/N ratio below 14 indicates maturity and above 14 indicates immaturity, however, there are many exceptions. Large woodchips (>6.3mm), bark, and redwood are slow to breakdown and therefore can result in a relatively stable product while the C/N ratio value is high. Additionally, some composts with chicken manure and/or green grass feedstocks can start with a C/N ratio below 15 and are very unstable. A C/N ratio below 10 supplies Nitrogen, while a ratio above 20 can deplete Nitrogen from the soil. The rate at which Nitrogen will be released or used by the microbes is indicated by the respiration rate (BAC). If the respiration rate is too high the transfer of Nitrogen will not be controllable.

**Soluble Nutrients & Salts (EC5 w/w dw - mmhos/cm)**

2.3 Average salts This value refers to all soluble ions including nutrients, sodium, chloride and some soluble organic compounds. The concentration of salts will change due to the release of salts from the organic matter as it degrades, volatilization of ammonia, decomposition of soluble organics, and conversion of molecular structure. High salts + high AgIndex is indicative of a compost high in readily available nutrients. The application rate of these composts should be limited by the optimum nutrient value based on soil analysis of the receiving soil. High Salts + low AgIndex is indicative of a compost low in nutrients with high concentrations of sodium and/or chloride. Limit the application rate according to the toxicity level of the sodium and/or chloride. Low salts indicates that the compost can be applied without risking salt toxicity, is likely a good source of organic matter, and that nutrients will release slowly over time.

**Lime Content (lbs. per ton)**

0 Low lime content Compost high in lime or carbonates are often those produced from chicken manure (layers) ash materials, and lime products. These are excellent products to use on a receiving soil where lime has been recommended by soil analysis to raise the pH. Composts with a high lime content should be closely considered for pH requirements when formulating potting mixes.

**Physical Properties**

**Percent Ash**

45.5 Average ash content Ash is the non-organic fraction of a compost. Most composts contain approximately 50% ash (dry weight basis). Compost can be high in ash content for many reasons including: excess mineralization (old compost), contamination with soil base material during turning, poor quality feedstock, and soil or mineral products added. Finding the source and reducing high ash content is often the fastest means to increasing nutrient quality of a compost.

**Particle Size % > 6.3 MM (0.25")**

4.4 May restrict use Large particles may restrict use for potting soils, golf course topdressings, seed-starter mixes, and where a fine size distribution is required. Composts with large particles can still be used as excellent additions to field soils, shrub mixes and mulches.

**Particle Size Distribution**

Each size fraction is measured by weight, volume and bulk density. These results are particularly relevant with decisions to screen or not, and if screening, which size screen to use. The bulk density indicates if the fraction screened is made of light weight organic material or heavy mineral material. Removing large mineral material can greatly improve compost quality by increasing nutrient and organic concentrations.

Appendix:	Estimated available nutrients for use when calculating application rates
Plant Available Nitrogen (PAN) calculations:	lbs/ton (As Rec'd)
PAN = (X * (organic N)) + ((NH4-N) + (NO3-N))	
X value = If BAC < 2 then X = 0.1	Plant Available Nitrogen (PAN) 5.6
If BAC =2.1 to 5 then X = 0.2	Ammonia (NH4-N) 1.16
If BAC =5.1 to 10 then X = 0.3	Nitrate (NO3-N) 0.32
If BAC > 10 then X = 0.4	Available Phosphorus (P2O5*0.64) 9.6
Note: If C/N ratio > 15 additional N should be applied.	Available Potassium (K2O) 8.7



**US COMPOSTING COUNCIL**

*Seal of Testing Assurance*

**Novozymes NA, Inc.**

Frank Franciosi

P.O. Box 576

Franklinton

NC 27525-0576 0

Date Sampled/Received: 05 Jan. 15 / 06 Jan. 15

<b>Product Identification</b> Compost
Nature's GREEN-RELEAF Compost

# COMPOST TECHNICAL DATA SHEET

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188

<i>Compost Parameters</i>	<i>Reported as (units of measure)</i>	<i>Test Results</i>	<i>Test Results</i>
Plant Nutrients:	%, weight basis	Not reported	Not reported
Moisture Content	%, wet weight basis	54.3	
Organic Matter Content	%, dry weight basis	51.5	
pH	units	6.91	
Soluble Salts <i>(electrical conductivity EC<sub>5</sub>)</i>	dS/m (mmhos/cm)	2.6	
Particle Size or Sieve Size	maximum aggregate size, inches	1.00	
<b>Stability Indicator (respirometry)</b>		<b>Stability Rating:</b>	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	1.6	Very Stable
	mg CO <sub>2</sub> -C/g TS/day	0.85	
<b>Maturity Indicator (bioassay)</b>			
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	100.0	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	<i>Fecal coliform</i>
		Pass	<i>Salmonella</i>
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	<i>As,Cd,Cr,Cu,Pb,Hg</i>
			<i>Mo,Ni,Se,Zn</i>

*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.*

Laboratory Group: Jan.15 A Laboratory Number: 5010077-1/1

Analyst: Assaf Sadeh		www.compostlab.com
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**US COMPOSTING COUNCIL**

*Seal of Testing Assurance*

**Novozymes NA, Inc.**

Frank Franciosi

P.O. Box 576

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NC 27525-0576 0

Date Sampled/Received: 05 Jan. 15 / 06 Jan. 15

<b>Product Identification</b> Compost
Nature's GREEN-RELEAF Compost

## COMPOST TECHNICAL DATA SHEET

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188

<i>Compost Parameters</i>	<i>Reported as (units of measure)</i>	<i>Test Results</i>	<i>Test Results</i>
Plant Nutrients:	% , weight basis	% , wet weight basis	% , dry weight basis
Nitrogen	Total N	0.75	1.6
Phosphorus	P <sub>2</sub> O <sub>5</sub>	0.48	1.0
Potassium	K <sub>2</sub> O	0.30	0.66
Calcium	Ca	0.53	1.2
Magnesium	Mg	0.12	0.25
Moisture Content	% , wet weight basis	54.3	
Organic Matter Content	% , dry weight basis	51.5	
pH	units	6.91	
Soluble Salts <i>(electrical conductivity EC<sub>5</sub>)</i>	dS/m (mmhos/cm)	2.6	
Particle Size or Sieve Size	% under 9.5 mm, dw basis	97.7	
<i>Stability Indicator (respirometry)</i>		<i>Stability Rating:</i>	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	1.6	Very Stable
	mg CO <sub>2</sub> -C/g TS/day	0.85	
<i>Maturity Indicator (bioassay)</i>			
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	100.0	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	<i>Fecal coliform</i>
		Pass	<i>Salmonella</i>
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	<i>As,Cd,Cr,Cu,Pb,Hg</i>
			<i>Mo,Ni,Se,Zn</i>

*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.*

Laboratory Group: Jan.15 A Laboratory Number: 5010077-1/1

Analyst: Assaf Sadeh		www.compostlab.com
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**US COMPOSTING COUNCIL**

*Seal of Testing Assurance*



**Novozymes NA, Inc.**

Frank Franciosi

P.O. Box 576

Franklinton

NC 27525-0576

0

<b>Product Identification:</b>	Compost
Nature's GREEN-RELEAF Compost	

Date Sampled/Received: 05 Jan. 15 / 06 Jan. 15

## COMPOST TECHNICAL DATA SHEET for NORTH CAROLINA DOT

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188			
<i>Compost Parameters</i>	<i>Test Results</i>	<i>Reported as (units of measure)</i>	<i>Project Specification (Allowable Limit)</i>
Organic Matter Content	51.5	%, dry weight basis	25 - 65
pH	6.91	Unitless	5.0 - 8.5
Moisture Content	54.3	%, wet weight basis	30 - 60
Soluble Salts (electrical conductivity)	2.6	dS/m (mmhos/cm)	5.0 dS/m, maximum
Particle Size	100.0	%, dry weight passing through 3 inch screen and	100%
	100.0	1 inch screen and	90% minimum
	98.8	3/4 inch screen and	65% minimum
	91.8	1/4 inch screen	50% maximum
Stability Indicator (respirometry) CO2 Evolution	1.6	mg CO2-C/g OM/day	≤ 8
Maturity Indicator (bioassay) Percent Emergence	100.0	average % of control	80%, minimum
Relative Seedling Vigor	100.0	average % of control	80%, minimum
Select Pathogens (Fecal Coliform)	Pass	PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	Pass
Trace Metals	Pass	PASS/FAIL: Per US EPA Class A 40 CFR 503.13, tables 1 and 3.	Pass
Inert Contamination (man-made)	None Detected	%, dry weight	<1.0 %

*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.*

*For additional information pertaining to compost use, the specific compost parameters tested for within the Seal of Testing assurance Program, or the program in general, log on to the US Composting Council's TMECC web-site at <http://www.tmecc.org>.*

This compost product has been sampled and tested as required by the Seal of Testing assurance Program on the United States Composting Council (USCC), using certain methods from the "Test Methods for the Examination of Compost and Composting" manual. Test results are available upon request by contacting the compost producer (address at top of page). The USCC makes no warranties regarding this product or its content, quality, or suitability for any particular use.

Laboratory Group:	Jan.15 A	Laboratory Number:	5010077-1/1
Analyst: Assaf Sadeh		www.compostlab.com	

# SOIL CONTROL LAB

42 HANGAR WAY  
WATSONVILLE  
CALIFORNIA  
95076  
USA

Account #: 5010077-1/1-2197  
Group: Jan.15 A #11  
Reporting Date: January 23, 2015

Novozymes NA, Inc.  
P.O. Box 576  
Franklinton, NC 27525-0576  
Attn: Frank Franciosi

Date Received: 06 Jan. 15  
Sample Identification: Nature's GREEN-RELEAF Compost  
Sample ID #: 5010077 - 1/1

Nutrients	Dry wt.	As Rcvd.	units	Stability Indicator:	Biologically Available C
Total Nitrogen:	1.6	0.75	%	<b>CO2 Evolution</b>	Respirometry
Ammonia (NH <sub>4</sub> -N):	520	240	mg/kg	mg CO <sub>2</sub> -C/g OM/day	1.6
Nitrate (NO <sub>3</sub> -N):	310	140	mg/kg	mg CO <sub>2</sub> -C/g TS/day	0.85
Org. Nitrogen (Org.-N):	1.5	0.69	%	Stability Rating	very stable
Phosphorus (as P <sub>2</sub> O <sub>5</sub> ):	1.0	0.47	%		very stable
Phosphorus (P):	4600	2100	mg/kg		
Potassium (as K <sub>2</sub> O):	0.66	0.30	%	<b>Maturity Indicator: Cucumber Bioassay</b>	
Potassium (K):	5500	2500	mg/kg	Compost:Vermiculite(v:v)	1:1
Calcium (Ca):	1.2	0.53	%	Emergence (%)	100
Magnesium (Mg):	0.25	0.12	%	Seedling Vigor (%)	100
Sulfate (SO <sub>4</sub> -S):	71	32	mg/kg	Description of Plants	healthy
Boron (Total B):	13	6.0	mg/kg		healthy
Moisture:	0	54.3	%	<b>Pathogens</b>	
Sodium (Na):	0.072	0.033	%	Results	Units
Chloride (Cl):	0.12	0.056	%	Fecal Coliform	< 2.0
pH Value:	NA	6.91	unit	Salmonella	< 3
Bulk Density :	17	38	lb/cu ft		MPN/g
Carbonates (CaCO <sub>3</sub> ):	6.0	2.7	lb/ton		MPN/4g
Conductivity (EC5):	2.6	NA	mmhos/cm	Date Tested: 06 Jan. 15	Rating
Organic Matter:	51.5	23.5	%		pass
Organic Carbon:	28.0	13.0	%	<b>Inerts</b>	
Ash:	48.5	22.2	%	% by weight	
C/N Ratio	17	17	ratio	Plastic	< 0.5
AgIndex	> 10	> 10	ratio	Glass	< 0.5
				Metal	< 0.5
				Sharps	ND
				<b>Size &amp; Volume Distribution</b>	
				MM	% by weight % by volume
				> 50	0.0 0.0
				25 to 50	0.0 0.0
				16 to 25	1.2 0.9
				9.5 to 16	1.1 1.1
				6.3 to 9.5	5.9 6.4
				4.0 to 6.3	10.6 12.8
				2.0 to 4.0	21.0 27.7
				< 2.0	60.2 51.2
				Bulk Density Description:<.35 Light Materials, .35-.60 medium weight materials, >.60 Heavy Materials	
				Analyst: Assaf Sadeh	

\*Sample was received and handled in accordance with TMECC procedures.

*Assaf Sadeh*

Account No.:  
 5010077 - 1/1 - 2197  
 Group: Jan.15 A No. 11

Date Received  
 Sample i.d.  
 Sample I.d. No.

06 Jan. 15  
 Nature's GREEN-RELEAF Compost  
 1/1 5010077

**INTERPRETATION:**

**Is Your Compost Stable?**

<b>Respiration Rate</b>	Biodegradation Rate of Your Pile
1.6 mg CO <sub>2</sub> -C/ g OM/day	+++++++ < Stable > < Moderately Unstable> < Unstable > < High For Mulch
<b>Biologically Available Carbon (BAC)</b>	Optimum Degradation Rate
1.7 mg CO <sub>2</sub> -C/ g OM/day	+++++++ < Stable > < Moderately Unstable> < Unstable > < High For Mulch

**Is Your Compost Mature?**

<b>Ammonia/NitrateN ratio</b>	
1.7 Ratio	+++++++ VeryMature> < Mature > < Immature
<b>Ammonia N ppm</b>	
520 mg/kg dry wt.	+++++++ VeryMature> < Mature > < Immature
<b>Nitrate N ppm</b>	
310 mg/kg dry wt.	+++++++ < Immature > < Mature
<b>pH value</b>	
6.91 units	+++++++ < Immature > < Mature > < Immature
<b>Cucumber Emergence</b>	
100.0 percent	+++++++ < Immature > < Mature

**Is Your Compost Safe Regarding Health?**

<b>Fecal Coliform</b>	
< 1000 MPN/g dry wt.	+++++++ < Safe > < High Fecal Coliform
<b>Salmonella</b>	
Less than 3 /4g dry wt.	+++++++ <Safe (none detected) > < High Salmonella Count(> 3 per 4 grams)
<b>Metals</b>	US EPA 503
Pass dry wt.	+++++++ <All Metals Pass > < One or more Metals Fail

**Does Your Compost Provide Nutrients or Organic Matter?**

<b>Nutrients (N+P2O5+K2O)</b>	
3.3 Percent dry wt.	+++++++ <Low > < Average > < High Nutrient Content
<b>AgIndex (Nutrients / Sodium and Chloride Salts)</b>	((N+P2O5+K2O) / (Na + Cl))
15 Ratio	+++++++ Na & Cl > < Nutrient and Sodium and Chloride Provider > < Nutrient Provider
<b>Plant Available Nitrogen (PAN)</b>	Estimated release for first season
2 lbs/ton wet wt.	+++++++ Low Nitrogen Provider> < Average Nitrogen Provider > <High Nitrogen Provider
<b>C/N Ratio</b>	
17 Ratio	+++++++ < Nitrogen Release > < N-Neutral > < N-Demand> < High Nitrogen Demand
<b>Soluble Available Nutrients &amp; Salts (EC5 w/w dw)</b>	
2.6 mmhos/cm dry wt.	+++++++ SlowRelease> < Average Nutrient Release Rate > <High Available Nutrients
<b>Lime Content (CaCO3)</b>	
6.0 Lbs/ton dry wt.	+++++++ < Low > < Average > < High Lime Content (as CaCO3)

**What are the physical properties of your compost?**

<b>Percent Ash</b>	
48.5 Percent dry wt.	+++++++ < High Organic Matter > < Average > < High Ash Content
<b>Sieve Size % &gt; 6.3 MM (0.25")</b>	
8.2 Percent dry wt.	+++++++ All Uses > < Size May Restrict Uses for Potting mix and Golf Courses

Account No.:  
5010077 - 1/1 - 2197  
Group: Jan.15 A No. 11

Date Received  
Sample i.d.  
Sample I.d. No.

06 Jan. 15  
Nature's GREEN-RELEAF Compost  
1/1 5010077

**INTERPRETATION:**

**Is Your Compost Stable?**

Page two of three

**Respiration Rate**

1.6 Low: Good for all uses mg CO<sub>2</sub>-C/g OM/day

The respiration rate is a measurement of the biodegradation rate of the organic matter in the sample (as received). The respiration rate is determined by measuring the rate at which CO<sub>2</sub> is released under optimized moisture and temperature conditions.

**Biologically Available Carbon**

2 Low: Good for all uses mg CO<sub>2</sub>-C/g OM/day

Biologically Available Carbon (BAC) is a measurement of the rate at which CO<sub>2</sub> is released under optimized moisture, temperature, porosity, nutrients, pH and microbial conditions. If both the RR and the BAC test values are close to the same value, the pile is optimized for composting. If both values are high the compost pile just needs more time. If both values are low the compost has stabilized and should be moved to curing. BAC test values that are higher than RR indicate that the compost pile has stalled. This could be due to anaerobic conditions, lack of available nitrogen due to excessive air converting ammonia to the unavailable nitrate form, lack of nitrogen or other nutrients due to poor choice of feedstock, pH value out of range, or microbes rendered non-active.

**Is Your Compost Mature?**

**Ammonia:NitrateN ratio**

1.7 mature

Composting to stabilize carbon can occur at such a rapid rate that sometimes phytotoxins remain in the compost and must be neutralized before using in high concentrations or in high-end uses. This step is called curing. Typically ammonia is in excess with the break-down of organic materials resulting in an increase in pH. This combination results in a loss of volatile ammonia (it smells). Once this toxic ammonia has been reduced and the pH drops, the microbes convert the ammonia to nitrates. A low ammonia + high nitrate score is indicative of a mature compost, however there are many exceptions. For example, a compost with a low pH (<7) will retain ammonia, while a compost with high lime content can lose ammonia before the organic fraction becomes stable. Composts must first be stable before curing indicators apply.

**Ammonia N ppm**

520 immature

**Nitrate N ppm**

310 mature

**pH value**

6.91 mature

**Cucumber Bioassay**

100.0 Percent

Cucumbers are chosen for this test because they are salt tolerant and very sensitive to ammonia and organic acid toxicity. Therefore, we can germinate seeds in high concentrations of compost to measure phytotoxic effects without soluble salts being the limiting factor. Values above 80% for both percent emergence and vigor are indicative of a well-cured compost. Exceptions include very high salts that affect the cucumbers, excessive concentrations of nitrates and other nutrients that will be in range when formulated to make a growing media. In addition to testing a 1:1 compost: vermiculite blend, we also test a diluted 1:4 blend to indicate a more sensitive toxicity level.

**Is Your Compost Safe Regarding Health?**

**Fecal Coliform**

< 1000 / g dry wt.

Fecal coliforms can survive in both aerobic and anaerobic conditions and is common in all initial compost piles. Most human pathogens occur from fecal matter and all fecal matter is loaded in fecal coliforms. Therefore fecal coliforms are used as an indicator to determine if the chosen method for pathogen reduction (heat for compost) has met the requirements of sufficient temperature, time and mixing. If the fecal coliforms are reduced to below 1000 per gram dry wt. it is assumed all other pathogens are eliminated. Potential problems are that fecal coliform can regrow during the curing phase or during shipping. This is because the conditions are now more favorable for growth than during the composting process.

**Salmonella Bacteria**

Less than 3 3 / 4g dry wt. Salmonella is not only another indicator organism but also a toxic microbe. It has been used in the case of biosolids industry to determine adequate pathogen reduction.

**Metals**

Pass

The ten heavy metals listed in the EPA 503 regulations are chosen to determine if compost can be applied to ag land and handled without toxic effects. Most high concentrations of heavy metals are derived from woodwaste feedstock such as chrome-arsenic treated or lead painted demolition wood. Biosolids are rarely a problem.

**Does Your Compost Provide Nutrients or Organic Matter?**

**Nutrients (N+P<sub>2</sub>O<sub>5</sub>+K<sub>2</sub>O)**

3.3 Average nutrient content

This value is the sum of the primary nutrients Nitrogen, Phosphorus and Potassium. Reported units are consistent with those found on fertilizer formulations. A sum greater than 5 is indicative of a compost with high nutrient content, and best used to supply nutrients to a receiving soil. A sum below 2 indicates low nutrient content, and is best-used to improve soil structure via the addition of organic matter. Most compost falls between 2 and 5.

Account No.:  
5010077 - 1/1 - 2197  
Group: Jan.15 A No. 11

Date Received: 06 Jan. 15  
Sample i.d.: Nature's GREEN-RELEAF Compost  
Sample I.d. No.: 1/1 5010077

**INTERPRETATION:**

**AgIndex (Nutrients/Na+Cl)**

15 High nutrient ratio Composts with low AgIndex values have high concentrations of sodium and/or chloride compared to nutrients. Repeated use of a compost with a low AgIndex (< 2) may result in sodium and/or chloride acting as the limiting factor compared to nutrients, governing application rates. These composts may be used on well-draining soils and/or with salt-tolerant plants. Additional nutrients from another source may be needed if the application rate is limited by sodium or chloride. If the AgIndex is above 10, nutrients optimal for plant growth will be available without concern of sodium and/or chloride toxicity. Composts with an AgIndex of above 10 are good for increasing nutrient levels for all soils. Most composts score between 2 and 10. Concentrations of nutrients, sodium, and chloride in the receiving soil should be considered when determining compost application rates. The AgIndex is a product of feedstock quality. Feedstock from dairy manure, marine waste, industrial wastes, and halophytic plants are likely to produce a finished compost with a low AgIndex.

**Plant Available Nitrogen (lbs/ton)**

2 Low N Provider Plant Available Nitrogen (PAN) is calculated by estimating the release rate of Nitrogen from the organic fraction of the compost. This estimate is based on information gathered from the BAC test and measured ammonia and nitrate values. Despite the PAN value of the compost, additional sources of Nitrogen may be needed during the growing season to offset the Nitrogen demand of the microbes present in the compost. With ample nutrients these microbes can further breakdown organic matter in the compost and release bound Nitrogen. Nitrogen demand based on a high C/N ratio is not considered in the PAN calculation because additional Nitrogen should always be supplemented to the receiving soil when composts with a high C/N ratio are applied.

**C/N Ratio**

17 Indicates immaturity As a guiding principal, a C/N ratio below 14 indicates maturity and above 14 indicates immaturity, however, there are many exceptions. Large woodchips (>6.3mm), bark, and redwood are slow to breakdown and therefore can result in a relatively stable product while the C/N ratio value is high. Additionally, some composts with chicken manure and/or green grass feedstocks can start with a C/N ratio below 15 and are very unstable. A C/N ratio below 10 supplies Nitrogen, while a ratio above 20 can deplete Nitrogen from the soil. The rate at which Nitrogen will be released or used by the microbes is indicated by the respiration rate (BAC). If the respiration rate is too high the transfer of Nitrogen will not be controllable.

**Soluble Nutrients & Salts (EC5 w/w dw - mmhos/cm)**

2.6 Average salts This value refers to all soluble ions including nutrients, sodium, chloride and some soluble organic compounds. The concentration of salts will change due to the release of salts from the organic matter as it degrades, volatilization of ammonia, decomposition of soluble organics, and conversion of molecular structure. High salts + high AgIndex is indicative of a compost high in readily available nutrients. The application rate of these composts should be limited by the optimum nutrient value based on soil analysis of the receiving soil. High Salts + low AgIndex is indicative of a compost low in nutrients with high concentrations of sodium and/or chloride. Limit the application rate according to the toxicity level of the sodium and/or chloride. Low salts indicates that the compost can be applied without risking salt toxicity, is likely a good source of organic matter, and that nutrients will release slowly over time.

**Lime Content (lbs. per ton)**

6.0 Average lime content Compost high in lime or carbonates are often those produced from chicken manure (layers) ash materials, and lime products. These are excellent products to use on a receiving soil where lime has been recommended by soil analysis to raise the pH. Composts with a high lime content should be closely considered for pH requirements when formulating potting mixes.

**Physical Properties**

**Percent Ash**

48.5 Average ash content Ash is the non-organic fraction of a compost. Most composts contain approximately 50% ash (dry weight basis). Compost can be high in ash content for many reasons including: excess mineralization (old compost), contamination with soil base material during turning, poor quality feedstock, and soil or mineral products added. Finding the source and reducing high ash content is often the fastest means to increasing nutrient quality of a compost.

**Particle Size % > 6.3 MM (0.25")**

8.2 May restrict use Large particles may restrict use for potting soils, golf course topdressings, seed-starter mixes, and where a fine size distribution is required. Composts with large particles can still be used as excellent additions to field soils, shrub mixes and mulches.

**Particle Size Distribution**

Each size fraction is measured by weight, volume and bulk density. These results are particularly relevant with decisions to screen or not, and if screening, which size screen to use. The bulk density indicates if the fraction screened is made of light weight organic material or heavy mineral material. Removing large mineral material can greatly improve compost quality by increasing nutrient and organic concentrations.

Appendix:	Estimated available nutrients for use when calculating application rates
Plant Available Nitrogen (PAN) calculations:	lbs/ton (As Rec'd)
PAN = (X * (organic N)) + ((NH4-N) + (NO3-N))	
X value = If BAC < 2 then X = 0.1	Plant Available Nitrogen (PAN) 2.2
If BAC =2.1 to 5 then X = 0.2	Ammonia (NH4-N) 0.48
If BAC =5.1 to 10 then X = 0.3	Nitrate (NO3-N) 0.28
If BAC > 10 then X = 0.4	Available Phosphorus (P2O5*0.64) 6.1
Note: If C/N ratio > 15 additional N should be applied.	Available Potassium (K2O) 6.0



**US COMPOSTING COUNCIL**

*Seal of Testing Assurance*

**Novozymes NA, Inc.**

Frank Franciosi

P.O. Box 576

Franklinton

NC 27525-0576 0

Date Sampled/Received: 09 Mar. 15 / 10 Mar. 15

<b>Product Identification</b> Compost
Nature's GREEN-RELEAF Compost

# COMPOST TECHNICAL DATA SHEET

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188

<i>Compost Parameters</i>	<i>Reported as (units of measure)</i>	<i>Test Results</i>	<i>Test Results</i>
Plant Nutrients:	%, weight basis	Not reported	Not reported
Moisture Content	%, wet weight basis	31.2	
Organic Matter Content	%, dry weight basis	52.6	
pH	units	5.90	
Soluble Salts <i>(electrical conductivity EC<sub>5</sub>)</i>	dS/m (mmhos/cm)	2.7	
Particle Size or Sieve Size	maximum aggregate size, inches	0.38	
<i>Stability Indicator (respirometry)</i>		<i>Stability Rating:</i>	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	1.5	Very Stable
	mg CO <sub>2</sub> -C/g TS/day	0.76	
<i>Maturity Indicator (bioassay)</i>			
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	100.0	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	<i>Fecal coliform</i>
		Pass	<i>Salmonella</i>
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	<i>As,Cd,Cr,Cu,Pb,Hg</i> <i>Mo,Ni,Se,Zn</i>

*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.*

Laboratory Group: Mar.15 B Laboratory Number: 5030323-1/1

Analyst: Assaf Sadeh

www.compostlab.com



**US COMPOSTING COUNCIL**

*Seal of Testing Assurance*

**Novozymes NA, Inc.**

Frank Franciosi

P.O. Box 576

Franklinton

NC 27525-0576 0

Date Sampled/Received: 09 Mar. 15 / 10 Mar. 15

<b>Product Identification</b> Compost
Nature's GREEN-RELEAF Compost

## COMPOST TECHNICAL DATA SHEET

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188

<i>Compost Parameters</i>	<i>Reported as (units of measure)</i>	<i>Test Results</i>	<i>Test Results</i>
Plant Nutrients:	% , weight basis	% , wet weight basis	% , dry weight basis
Nitrogen	Total N	1.2	1.8
Phosphorus	P <sub>2</sub> O <sub>5</sub>	0.66	0.98
Potassium	K <sub>2</sub> O	0.46	0.66
Calcium	Ca	0.78	1.1
Magnesium	Mg	0.16	0.23
Moisture Content	% , wet weight basis	31.2	
Organic Matter Content	% , dry weight basis	52.6	
pH	units	5.90	
Soluble Salts <i>(electrical conductivity EC<sub>5</sub>)</i>	dS/m (mmhos/cm)	2.7	
Particle Size or Sieve Size	% under 9.5 mm, dw basis	100.0	
<i>Stability Indicator (respirometry)</i>		<i>Stability Rating:</i>	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	1.5	Very Stable
	mg CO <sub>2</sub> -C/g TS/day	0.76	
<i>Maturity Indicator (bioassay)</i>			
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	100.0	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	<i>Fecal coliform</i>
		Pass	<i>Salmonella</i>
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	<i>As,Cd,Cr,Cu,Pb,Hg</i>
			<i>Mo,Ni,Se,Zn</i>

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Laboratory Group: Mar.15 B Laboratory Number: 5030323-1/1

Analyst: Assaf Sadeh		www.compostlab.com
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**US COMPOSTING COUNCIL**

*Seal of Testing Assurance*



**Novozymes NA, Inc.**

Frank Franciosi

P.O. Box 576

Franklinton

NC 27525-0576

0

<b>Product Identification:</b>	Compost
	Nature's GREEN-RELEAF Compost

Date Sampled/Received: 09 Mar. 15 / 10 Mar. 15

## COMPOST TECHNICAL DATA SHEET for NORTH CAROLINA DOT

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188			
<i>Compost Parameters</i>	<i>Test Results</i>	<i>Reported as (units of measure)</i>	<i>Project Specification (Allowable Limit)</i>
Organic Matter Content	52.6	%, dry weight basis	25 - 65
pH	5.90	Unitless	5.0 - 8.5
Moisture Content	31.2	%, wet weight basis	30 - 60
Soluble Salts (electrical conductivity)	2.7	dS/m (mmhos/cm)	5.0 dS/m, maximum
Particle Size	100.0	%, dry weight passing through 3 inch screen and	100%
	100.0	1 inch screen and	90% minimum
	100.0	3/4 inch screen and	65% minimum
	96.4	1/4 inch screen	50% maximum
Stability Indicator (respirometry) CO2 Evolution	1.5	mg CO2-C/g OM/day	≤ 8
Maturity Indicator (bioassay) Percent Emergence	100.0	average % of control	80%, minimum
Relative Seedling Vigor	100.0	average % of control	80%, minimum
Select Pathogens (Fecal Coliform)	Pass	PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	Pass
Trace Metals	Pass	PASS/FAIL: Per US EPA Class A 40 CFR 503.13, tables 1 and 3.	Pass
Inert Contamination (man-made)	None Detected	%, dry weight	<1.0 %

*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.*

*For additional information pertaining to compost use, the specific compost parameters tested for within the Seal of Testing assurance Program, or the program in general, log on to the US Composting Council's TMECC web-site at <http://www.tmecc.org>.*

This compost product has been sampled and tested as required by the Seal of Testing assurance Program on the United States Composting Council (USCC), using certain methods from the "Test Methods for the Examination of Compost and Composting" manual. Test results are available upon request by contacting the compost producer (address at top of page). The USCC makes no warranties regarding this product or its content, quality, or suitability for any particular use.

Laboratory Group:	Mar.15 B	Laboratory Number:	5030323-1/1
Analyst: Assaf Sadeh		www.compostlab.com	

# SOIL CONTROL LAB

42 HANGAR WAY  
WATSONVILLE  
CALIFORNIA  
95076  
USA

Account #: 5030323-1/1-2197  
Group: Mar.15 B #10  
Reporting Date: March 26, 2015

Novozymes NA, Inc.  
P.O. Box 576  
Franklinton, NC 27525-0576  
Attn: Frank Franciosi

Date Received: 10 Mar. 15  
Sample Identification: Nature's GREEN-RELEAF Compost  
Sample ID #: 5030323 - 1/1

Nutrients	Dry wt.	As Rcvd.	units	Stability Indicator:	Biologically	
Total Nitrogen:	1.8	1.2	%	<b>CO2 Evolution</b>	Respirometry Available C	
Ammonia (NH <sub>4</sub> -N):	140	96	mg/kg	mg CO <sub>2</sub> -C/g OM/day	1.5 1.5	
Nitrate (NO <sub>3</sub> -N):	770	530	mg/kg	mg CO <sub>2</sub> -C/g TS/day	0.76 0.80	
Org. Nitrogen (Org.-N):	1.7	1.2	%	Stability Rating	very stable very stable	
Phosphorus (as P <sub>2</sub> O <sub>5</sub> ):	0.97	0.67	%			
Phosphorus (P):	4300	2900	mg/kg			
Potassium (as K <sub>2</sub> O):	0.67	0.46	%	<b>Maturity Indicator: Cucumber Bioassay</b>		
Potassium (K):	5500	3800	mg/kg	Compost:Vermiculite(v:v)	1:1 1:3	
Calcium (Ca):	1.1	0.78	%	Emergence (%)	100 100	
Magnesium (Mg):	0.23	0.16	%	Seedling Vigor (%)	100 100	
Sulfate (SO <sub>4</sub> -S):	9.8	6.7	mg/kg	Description of Plants	healthy healthy	
Boron (Total B):	17	12	mg/kg			
Moisture:	0	31.2	%	<b>Pathogens</b>	Results Units Rating	
Sodium (Na):	0.048	0.033	%	Fecal Coliform	< 2.0 MPN/g pass	
Chloride (Cl):	0.098	0.068	%	Salmonella	< 3 MPN/4g pass	
pH Value:	NA	5.90	unit	Date Tested: 10 Mar. 15		
Bulk Density :	20	28	lb/cu ft	<b>Inerts</b>	% by weight	
Carbonates (CaCO <sub>3</sub> ):	<0.1	<0.1	lb/ton	Plastic	< 0.5	
Conductivity (EC5):	2.7	NA	mmhos/cm	Glass	< 0.5	
Organic Matter:	52.6	36.2	%	Metal	< 0.5	
Organic Carbon:	25.0	17.0	%	Sharps	ND	
Ash:	47.4	32.6	%	<b>Size &amp; Volume Distribution</b>		
C/N Ratio	14	14	ratio	MM	% by weight % by volume BD g/cc	
AgIndex	> 10	> 10	ratio	> 50	0.0 0.0 0.00	
				25 to 50	0.0 0.0 0.00	
				16 to 25	0.0 0.0 0.00	
				9.5 to 16	0.0 0.0 0.00	
				6.3 to 9.5	3.6 4.1 0.38	
				4.0 to 6.3	8.0 10.2 0.34	
				2.0 to 4.0	17.3 22.4 0.34	
				< 2.0	71.2 63.3 0.49	
				Bulk Density Description:<.35 Light Materials, .35-.60 medium weight materials, >.60 Heavy Materials		
				Analyst: Assaf Sadeh		

\*Sample was received and handled in accordance with TMECC procedures.

Account No.:  
 5030323 - 1/1 - 2197  
 Group: Mar.15 B No. 10

Date Received  
 Sample i.d.  
 Sample I.d. No.

10 Mar. 15  
 Nature's GREEN-RELEAF Compost  
 1/1 5030323

**INTERPRETATION:**

**Is Your Compost Stable?**

<b>Respiration Rate</b>	Biodegradation Rate of Your Pile
1.5 mg CO <sub>2</sub> -C/ g OM/day	+++++ < Stable > < Moderately Unstable> < Unstable > < High For Mulch
<b>Biologically Available Carbon (BAC)</b>	Optimum Degradation Rate
1.5 mg CO <sub>2</sub> -C/ g OM/day	+++++ < Stable > < Moderately Unstable> < Unstable > < High For Mulch

**Is Your Compost Mature?**

<b>Ammonia/NitrateN ratio</b>	
0.18 Ratio	+++ VeryMature> < Mature > < Immature
<b>Ammonia N ppm</b>	
140 mg/kg dry wt.	+++++ VeryMature> < Mature > < Immature
<b>Nitrate N ppm</b>	
770 mg/kg dry wt.	+++++ < Immature > < Mature
<b>pH value</b>	
5.90 units	+++++ < Immature > < Mature > < Immature
<b>Cucumber Emergence</b>	
100.0 percent	+++++ < Immature > < Mature

**Is Your Compost Safe Regarding Health?**

<b>Fecal Coliform</b>	
< 1000 MPN/g dry wt.	+++++ < Safe > < High Fecal Coliform
<b>Salmonella</b>	
Less than 3 /4g dry wt.	+++++ <Safe (none detected) > < High Salmonella Count(> 3 per 4 grams)
<b>Metals</b>	US EPA 503
Pass dry wt.	+++++ <All Metals Pass > < One or more Metals Fail

**Does Your Compost Provide Nutrients or Organic Matter?**

<b>Nutrients (N+P2O5+K2O)</b>	
3.4 Percent dry wt.	+++++ <Low > < Average > < High Nutrient Content
<b>AgIndex (Nutrients / Sodium and Chloride Salts)</b>	((N+P2O5+K2O) / (Na + Cl))
15 Ratio	+++++ Na & Cl > < Nutrient and Sodium and Chloride Provider > < Nutrient Provider
<b>Plant Available Nitrogen (PAN)</b>	Estimated release for first season
4 lbs/ton wet wt.	+++++ Low Nitrogen Provider> < Average Nitrogen Provider > <High Nitrogen Provider
<b>C/N Ratio</b>	
14 Ratio	+++++ < Nitrogen Release > < N-Neutral > < N-Demand> < High Nitrogen Demand
<b>Soluble Available Nutrients &amp; Salts (EC5 w/w dw)</b>	
2.7 mmhos/cm dry wt.	+++++ Sl0Release> < Average Nutrient Release Rate > <High Available Nutrients
<b>Lime Content (CaCO3)</b>	
0 Lbs/ton dry wt.	+ < Low > < Average > < High Lime Content (as CaCO3)

**What are the physical properties of your compost?**

<b>Percent Ash</b>	
47.4 Percent dry wt.	+++++ < High Organic Matter > < Average > < High Ash Content
<b>Sieve Size % &gt; 6.3 MM (0.25")</b>	
3.6 Percent dry wt.	+++++ All Uses > < Size May Restrict Uses for Potting mix and Golf Courses

Account No.:  
5030323 - 1/1 - 2197  
Group: Mar.15 B No. 10

Date Received  
Sample i.d.  
Sample I.d. No.

10 Mar. 15  
Nature's GREEN-RELEAF Compost  
1/1 5030323

**INTERPRETATION:**

**Is Your Compost Stable?**

Page two of three

**Respiration Rate**

1.5 Low: Good for all uses mg CO<sub>2</sub>-C/g OM/day

The respiration rate is a measurement of the biodegradation rate of the organic matter in the sample (as received). The respiration rate is determined by measuring the rate at which CO<sub>2</sub> is released under optimized moisture and temperature conditions.

**Biologically Available Carbon**

2 Low: Good for all uses mg CO<sub>2</sub>-C/g OM/day

Biologically Available Carbon (BAC) is a measurement of the rate at which CO<sub>2</sub> is released under optimized moisture, temperature, porosity, nutrients, pH and microbial conditions. If both the RR and the BAC test values are close to the same value, the pile is optimized for composting. If both values are high the compost pile just needs more time. If both values are low the compost has stabilized and should be moved to curing. BAC test values that are higher than RR indicate that the compost pile has stalled. This could be due to anaerobic conditions, lack of available nitrogen due to excessive air converting ammonia to the unavailable nitrate form, lack of nitrogen or other nutrients due to poor choice of feedstock, pH value out of range, or microbes rendered non-active.

**Is Your Compost Mature?**

**Ammonia:NitrateN ratio**

0.18 very mature

Composting to stabilize carbon can occur at such a rapid rate that sometimes phytotoxins remain in the compost and must be neutralized before using in high concentrations or in high-end uses. This step is called curing. Typically ammonia is in excess with the break-down of organic materials resulting in an increase in pH. This combination results in a loss of volatile ammonia (it smells). Once this toxic ammonia has been reduced and the pH drops, the microbes convert the ammonia to nitrates. A low ammonia + high nitrate score is indicative of a mature compost, however there are many exceptions. For example, a compost with a low pH (<7) will retain ammonia, while a compost with high lime content can lose ammonia before the organic fraction becomes stable. Composts must first be stable before curing indicators apply.

**Ammonia N ppm**

140 mature

**Nitrate N ppm**

770 mature

**pH value**

5.90 immature

**Cucumber Bioassay**

100.0 Percent

Cucumbers are chosen for this test because they are salt tolerant and very sensitive to ammonia and organic acid toxicity. Therefore, we can germinate seeds in high concentrations of compost to measure phytotoxic effects without soluble salts being the limiting factor. Values above 80% for both percent emergence and vigor are indicative of a well-cured compost. Exceptions include very high salts that affect the cucumbers, excessive concentrations of nitrates and other nutrients that will be in range when formulated to make a growing media. In addition to testing a 1:1 compost: vermiculite blend, we also test a diluted 1:4 blend to indicate a more sensitive toxicity level.

**Is Your Compost Safe Regarding Health?**

**Fecal Coliform**

< 1000 / g dry wt.

Fecal coliforms can survive in both aerobic and anaerobic conditions and is common in all initial compost piles. Most human pathogens occur from fecal matter and all fecal matter is loaded in fecal coliforms. Therefore fecal coliforms are used as an indicator to determine if the chosen method for pathogen reduction (heat for compost) has met the requirements of sufficient temperature, time and mixing. If the fecal coliforms are reduced to below 1000 per gram dry wt. it is assumed all other pathogens are eliminated. Potential problems are that fecal coliform can regrow during the curing phase or during shipping. This is because the conditions are now more favorable for growth than during the composting process.

**Salmonella Bacteria**

Less than 3 3 / 4g dry wt. Salmonella is not only another indicator organism but also a toxic microbe. It has been used in the case of biosolids industry to determine adequate pathogen reduction.

**Metals**

Pass

The ten heavy metals listed in the EPA 503 regulations are chosen to determine if compost can be applied to ag land and handled without toxic effects. Most high concentrations of heavy metals are derived from woodwaste feedstock such as chrome-arsenic treated or lead painted demolition wood. Biosolids are rarely a problem.

**Does Your Compost Provide Nutrients or Organic Matter?**

**Nutrients (N+P<sub>2</sub>O<sub>5</sub>+K<sub>2</sub>O)**

3.4 Average nutrient content

This value is the sum of the primary nutrients Nitrogen, Phosphorus and Potassium. Reported units are consistent with those found on fertilizer formulations. A sum greater than 5 is indicative of a compost with high nutrient content, and best used to supply nutrients to a receiving soil. A sum below 2 indicates low nutrient content, and is best-used to improve soil structure via the addition of organic matter. Most compost falls between 2 and 5.

Account No.:  
5030323 - 1/1 - 2197  
Group: Mar.15 B No. 10

Date Received: 10 Mar. 15  
Sample i.d.: Nature's GREEN-RELEAF Compost  
Sample I.d. No.: 1/1 5030323

**INTERPRETATION:**

**AgIndex (Nutrients/Na+Cl)**

15 High nutrient ratio Composts with low AgIndex values have high concentrations of sodium and/or chloride compared to nutrients. Repeated use of a compost with a low AgIndex (< 2) may result in sodium and/or chloride acting as the limiting factor compared to nutrients, governing application rates. These composts may be used on well-draining soils and/or with salt-tolerant plants. Additional nutrients from another source may be needed if the application rate is limited by sodium or chloride. If the AgIndex is above 10, nutrients optimal for plant growth will be available without concern of sodium and/or chloride toxicity. Composts with an AgIndex of above 10 are good for increasing nutrient levels for all soils. Most composts score between 2 and 10. Concentrations of nutrients, sodium, and chloride in the receiving soil should be considered when determining compost application rates. The AgIndex is a product of feedstock quality. Feedstock from dairy manure, marine waste, industrial wastes, and halophytic plants are likely to produce a finished compost with a low AgIndex.

**Plant Available Nitrogen (lbs/ton)**

4 Low N Provider Plant Available Nitrogen (PAN) is calculated by estimating the release rate of Nitrogen from the organic fraction of the compost. This estimate is based on information gathered from the BAC test and measured ammonia and nitrate values. Despite the PAN value of the compost, additional sources of Nitrogen may be needed during the growing season to offset the Nitrogen demand of the microbes present in the compost. With ample nutrients these microbes can further breakdown organic matter in the compost and release bound Nitrogen. Nitrogen demand based on a high C/N ratio is not considered in the PAN calculation because additional Nitrogen should always be supplemented to the receiving soil when composts with a high C/N ratio are applied.

**C/N Ratio**

14 Indicates maturity As a guiding principal, a C/N ratio below 14 indicates maturity and above 14 indicates immaturity, however, there are many exceptions. Large woodchips (>6.3mm), bark, and redwood are slow to breakdown and therefore can result in a relatively stable product while the C/N ratio value is high. Additionally, some composts with chicken manure and/or green grass feedstocks can start with a C/N ratio below 15 and are very unstable. A C/N ratio below 10 supplies Nitrogen, while a ratio above 20 can deplete Nitrogen from the soil. The rate at which Nitrogen will be released or used by the microbes is indicated by the respiration rate (BAC). If the respiration rate is too high the transfer of Nitrogen will not be controllable.

**Soluble Nutrients & Salts (EC5 w/w dw - mmhos/cm)**

2.7 Average salts This value refers to all soluble ions including nutrients, sodium, chloride and some soluble organic compounds. The concentration of salts will change due to the release of salts from the organic matter as it degrades, volatilization of ammonia, decomposition of soluble organics, and conversion of molecular structure. High salts + high AgIndex is indicative of a compost high in readily available nutrients. The application rate of these composts should be limited by the optimum nutrient value based on soil analysis of the receiving soil. High Salts + low AgIndex is indicative of a compost low in nutrients with high concentrations of sodium and/or chloride. Limit the application rate according to the toxicity level of the sodium and/or chloride. Low salts indicates that the compost can be applied without risking salt toxicity, is likely a good source of organic matter, and that nutrients will release slowly over time.

**Lime Content (lbs. per ton)**

0 Low lime content Compost high in lime or carbonates are often those produced from chicken manure (layers) ash materials, and lime products. These are excellent products to use on a receiving soil where lime has been recommended by soil analysis to raise the pH. Composts with a high lime content should be closely considered for pH requirements when formulating potting mixes.

**Physical Properties**

**Percent Ash**

47.4 Average ash content Ash is the non-organic fraction of a compost. Most composts contain approximately 50% ash (dry weight basis). Compost can be high in ash content for many reasons including: excess mineralization (old compost), contamination with soil base material during turning, poor quality feedstock, and soil or mineral products added. Finding the source and reducing high ash content is often the fastest means to increasing nutrient quality of a compost.

**Particle Size % > 6.3 MM (0.25")**

3.6 May restrict use Large particles may restrict use for potting soils, golf course topdressings, seed-starter mixes, and where a fine size distribution is required. Composts with large particles can still be used as excellent additions to field soils, shrub mixes and mulches.

**Particle Size Distribution**

Each size fraction is measured by weight, volume and bulk density. These results are particularly relevant with decisions to screen or not, and if screening, which size screen to use. The bulk density indicates if the fraction screened is made of light weight organic material or heavy mineral material. Removing large mineral material can greatly improve compost quality by increasing nutrient and organic concentrations.

Appendix:	Estimated available nutrients for use when calculating application rates
Plant Available Nitrogen (PAN) calculations:	lbs/ton (As Rec'd)
PAN = (X * (organic N)) + ((NH4-N) + (NO3-N))	
X value = If BAC < 2 then X = 0.1	Plant Available Nitrogen (PAN) 3.5
If BAC =2.1 to 5 then X = 0.2	Ammonia (NH4-N) 0.19
If BAC =5.1 to 10 then X = 0.3	Nitrate (NO3-N) 1.06
If BAC > 10 then X = 0.4	Available Phosphorus (P2O5*0.64) 8.4
Note: If C/N ratio > 15 additional N should be applied.	Available Potassium (K2O) 9.2



**US COMPOSTING COUNCIL**

*Seal of Testing Assurance*

**Novozymes NA, Inc.**  
Frank Franciosi  
P.O. Box 576  
Franklinton  
NC 27525-0576

Date Sampled/Received: 04 May. 15 / 05 May. 15

<b>Product Identification</b> Compost
Nature's GREEN-RELEAF Compost

# COMPOST TECHNICAL DATA SHEET

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188

<i>Compost Parameters</i>	<i>Reported as (units of measure)</i>	<i>Test Results</i>	<i>Test Results</i>
Plant Nutrients:	%, weight basis	Not reported	Not reported
Moisture Content	%, wet weight basis	29.0	
Organic Matter Content	%, dry weight basis	49.9	
pH	units	7.54	
Soluble Salts <i>(electrical conductivity EC<sub>5</sub>)</i>	dS/m (mmhos/cm)	2.8	
Particle Size or Sieve Size	maxium aggregate size, inches	0.64	
<i>Stability Indicator (respirometry)</i>		<i>Stability Rating:</i>	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	2.0	Stable
	mg CO <sub>2</sub> -C/g TS/day	1.0	
<i>Maturity Indicator (bioassay)</i>			
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	85.0	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	<i>Fecal coliform</i>
		Pass	<i>Salmonella</i>
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	<i>As,Cd,Cr,Cu,Pb,Hg</i> <i>Mo,Ni,Se,Zn</i>

*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.*

Laboratory Group: May.15 B Laboratory Number: 5050136-1/1

Analyst: Assaf Sadeh

www.compostlab.com



**US COMPOSTING COUNCIL**

*Seal of Testing Assurance*

**Novozymes NA, Inc.**

Frank Franciosi

P.O. Box 576

Franklinton

NC 27525-0576

Date Sampled/Received: 04 May. 15 / 05 May. 15

<b>Product Identification</b> Compost
Nature's GREEN-RELEAF Compost

# COMPOST TECHNICAL DATA SHEET

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188

<i>Compost Parameters</i>	<i>Reported as (units of measure)</i>	<i>Test Results</i>	<i>Test Results</i>
Plant Nutrients:	% , weight basis	% , wet weight basis	% , dry weight basis
Nitrogen	Total N	1.3	1.9
Phosphorus	P <sub>2</sub> O <sub>5</sub>	0.61	0.86
Potassium	K <sub>2</sub> O	0.60	0.84
Calcium	Ca	1.1	1.6
Magnesium	Mg	0.21	0.29
Moisture Content	% , wet weight basis	29.0	
Organic Matter Content	% , dry weight basis	49.9	
pH	units	7.54	
Soluble Salts <i>(electrical conductivity EC<sub>5</sub>)</i>	dS/m (mmhos/cm)	2.8	
Particle Size or Sieve Size	% under 9.5 mm, dw basis	99.4	
<i>Stability Indicator (respirometry)</i>		<i>Stability Rating:</i>	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	2.0	Stable
	mg CO <sub>2</sub> -C/g TS/day	1.0	
<i>Maturity Indicator (bioassay)</i>			
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	85.0	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	<i>Fecal coliform</i>
		Pass	<i>Salmonella</i>
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	<i>As,Cd,Cr,Cu,Pb,Hg</i>
			<i>Mo,Ni,Se,Zn</i>

*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.*

Laboratory Group: May.15 B Laboratory Number: 5050136-1/1

Analyst: Assaf Sadeh		www.compostlab.com
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**US COMPOSTING COUNCIL**

*Seal of Testing Assurance*



**Novozymes NA, Inc.**

Frank Franciosi

P.O. Box 576

Franklinton

NC 27525-0576

Date Sampled/Received: 04 May. 15 / 05 May. 15

<b>Product Identification:</b>	Compost
	Nature's GREEN-RELEAF Compost

## COMPOST TECHNICAL DATA SHEET for NORTH CAROLINA DOT

LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188			
<i>Compost Parameters</i>	<i>Test Results</i>	<i>Reported as (units of measure)</i>	<i>Project Specification (Allowable Limit)</i>
Organic Matter Content	49.9	%, dry weight basis	25 - 65
pH	7.54	Unitless	5.0 - 8.5
Moisture Content	29.0	%, wet weight basis	30 - 60
Soluble Salts (electrical conductivity)	2.8	dS/m (mmhos/cm)	5.0 dS/m, maximum
Particle Size	100.0	%, dry weight passing through 3 inch screen and	100%
	100.0	1 inch screen and	90% minimum
	100.0	3/4 inch screen and	65% minimum
	95.9	1/4 inch screen	50% maximum
Stability Indicator (respirometry) CO2 Evolution	2.0	mg CO2-C/g OM/day	≤ 8
Maturity Indicator (bioassay) Percent Emergence	100.0	average % of control	80%, minimum
Relative Seedling Vigor	85.0	average % of control	80%, minimum
Select Pathogens (Fecal Coliform)	Pass	PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	Pass
Trace Metals	Pass	PASS/FAIL: Per US EPA Class A 40 CFR 503.13, tables 1 and 3.	Pass
Inert Contamination (man-made)	None Detected	%, dry weight	<1.0 %

*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.*

*For additional information pertaining to compost use, the specific compost parameters tested for within the Seal of Testing assurance Program, or the program in general, log on to the US Composting Council's TMECC web-site at <http://www.tmecc.org>.*

This compost product has been sampled and tested as required by the Seal of Testing assurance Program on the United States Composting Council (USCC), using certain methods from the "Test Methods for the Examination of Compost and Composting" manual. Test results are available upon request by contacting the compost producer (address at top of page). The USCC makes no warranties regarding this product or its content, quality, or suitability for any particular use.

Laboratory Group:	May.15 B	Laboratory Number:	5050136-1/1
Analyst: Assaf Sadeh		www.compostlab.com	

# SOIL CONTROL LAB

42 HANGAR WAY  
WATSONVILLE  
CALIFORNIA  
95076  
USA

Account #: 5050136-1/1-2197  
Group: May.15 B #7  
Reporting Date: May 19, 2015

Novozymes NA, Inc.  
P.O. Box 576  
Franklinton, NC 27525-0576  
Attn: Frank Franciosi

Date Received: 05 May. 15  
Sample Identification: Nature's GREEN-RELEAF Compost  
Sample ID #: 5050136 - 1/1

Nutrients	Dry wt.	As Rcvd.	units	Stability Indicator:	Biologically	
Total Nitrogen:	1.9	1.3	%	<b>CO2 Evolution</b>	Respirometry Available C	
Ammonia (NH <sub>4</sub> -N):	780	550	mg/kg	mg CO <sub>2</sub> -C/g OM/day	2.0 2.1	
Nitrate (NO <sub>3</sub> -N):	190	140	mg/kg	mg CO <sub>2</sub> -C/g TS/day	1.0 1.1	
Org. Nitrogen (Org.-N):	1.8	1.3	%	Stability Rating	very stable stable	
Phosphorus (as P <sub>2</sub> O <sub>5</sub> ):	0.87	0.62	%			
Phosphorus (P):	3800	2700	mg/kg			
Potassium (as K <sub>2</sub> O):	0.84	0.60	%	<b>Maturity Indicator: Cucumber Bioassay</b>		
Potassium (K):	7000	5000	mg/kg	Compost:Vermiculite(v:v)	1:1 1:3	
Calcium (Ca):	1.6	1.1	%	Emergence (%)	100 100	
Magnesium (Mg):	0.29	0.21	%	Seedling Vigor (%)	85 87	
Sulfate (SO <sub>4</sub> -S):	170	120	mg/kg	Description of Plants	healthy healthy	
Boron (Total B):	23	16	mg/kg			
Moisture:	0	29.0	%	<b>Pathogens</b>	Results Units Rating	
Sodium (Na):	0.041	0.029	%	Fecal Coliform	< 2.0 MPN/g pass	
Chloride (Cl):	0.097	0.069	%	Salmonella	< 3 MPN/4g pass	
pH Value:	NA	7.54	unit	Date Tested: 05 May. 15		
Bulk Density :	22	30	lb/cu ft	<b>Inerts</b>	% by weight	
Carbonates (CaCO <sub>3</sub> ):	65	46	lb/ton	Plastic	< 0.5	
Conductivity (EC5):	2.8	NA	mmhos/cm	Glass	< 0.5	
Organic Matter:	49.9	35.4	%	Metal	< 0.5	
Organic Carbon:	29.0	20.0	%	Sharps	ND	
Ash:	50.1	35.6	%	<b>Size &amp; Volume Distribution</b>		
C/N Ratio	16	16	ratio	MM	% by weight % by volume BD g/cc	
AgIndex	> 10	> 10	ratio	> 50	0.0 0.0 0.00	
				25 to 50	0.0 0.0 0.00	
				16 to 25	0.0 0.0 0.00	
				9.5 to 16	0.6 0.7 0.43	
				6.3 to 9.5	3.5 3.3 0.47	
				4.0 to 6.3	6.4 8.7 0.33	
				2.0 to 4.0	11.0 15.3 0.32	
				< 2.0	78.4 72.1 0.49	
				Bulk Density Description:<.35 Light Materials, .35-.60 medium weight materials, >.60 Heavy Materials		
				Analyst: Assaf Sadeh		

\*Sample was received and handled in accordance with TMECC procedures.

Account No.:  
 5050136 - 1/1 - 2197  
 Group: May.15 B No. 7

Date Received  
 Sample i.d.  
 Sample I.d. No.

05 May. 15  
 Nature's GREEN-RELEAF Compost  
 1/1 5050136

**INTERPRETATION:**

**Is Your Compost Stable?**

<b>Respiration Rate</b>	Biodegradation Rate of Your Pile
2.0 mg CO <sub>2</sub> -C/ g OM/day	+++++++ < Stable > < Moderately Unstable> < Unstable > < High For Mulch
<b>Biologically Available Carbon (BAC)</b>	Optimum Degradation Rate
2.1 mg CO <sub>2</sub> -C/ g OM/day	+++++++ < Stable > < Moderately Unstable> < Unstable > < High For Mulch

**Is Your Compost Mature?**

<b>Ammonia/NitrateN ratio</b>	
4.1 Ratio	+++++++ VeryMature> < Mature > < Immature
<b>Ammonia N ppm</b>	
780 mg/kg dry wt.	+++++++ VeryMature> < Mature > < Immature
<b>Nitrate N ppm</b>	
190 mg/kg dry wt.	+++++++ < Immature > < Mature
<b>pH value</b>	
7.54 units	+++++++ < Immature > < Mature > < Immature
<b>Cucumber Emergence</b>	
100.0 percent	+++++++ < Immature > < Mature

**Is Your Compost Safe Regarding Health?**

<b>Fecal Coliform</b>	
< 1000 MPN/g dry wt.	+++++++ < Safe > < High Fecal Coliform
<b>Salmonella</b>	
Less than 3 /4g dry wt.	+++++++ <Safe (none detected) > < High Salmonella Count(> 3 per 4 grams)
<b>Metals</b>	US EPA 503
Pass dry wt.	+++++++ <All Metals Pass > < One or more Metals Fail

**Does Your Compost Provide Nutrients or Organic Matter?**

<b>Nutrients (N+P2O5+K2O)</b>	
3.6 Percent dry wt.	+++++++ <Low > < Average > < High Nutrient Content
<b>AgIndex (Nutrients / Sodium and Chloride Salts)</b>	((N+P2O5+K2O) / (Na + Cl))
15 Ratio	+++++++ Na & Cl > < Nutrient and Sodium and Chloride Provider > < Nutrient Provider
<b>Plant Available Nitrogen (PAN)</b>	Estimated release for first season
6 lbs/ton wet wt.	+++++++ Low Nitrogen Provider> < Average Nitrogen Provider > <High Nitrogen Provider
<b>C/N Ratio</b>	
16 Ratio	+++++++ < Nitrogen Release > < N-Neutral > < N-Demand> < High Nitrogen Demand
<b>Soluble Available Nutrients &amp; Salts (EC5 w/w dw)</b>	
2.8 mmhos/cm dry wt.	+++++++ Sl0Release> < Average Nutrient Release Rate > <High Available Nutrients
<b>Lime Content (CaCO3)</b>	
65 Lbs/ton dry wt.	+++++++ < Low > < Average > < High Lime Content (as CaCO3)

**What are the physical properties of your compost?**

<b>Percent Ash</b>	
50.1 Percent dry wt.	+++++++ < High Organic Matter > < Average > < High Ash Content
<b>Sieve Size % &gt; 6.3 MM (0.25")</b>	
4.1 Percent dry wt.	+++++++ All Uses > < Size May Restrict Uses for Potting mix and Golf Courses

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**INTERPRETATION:**

**Is Your Compost Stable?**

Page two of three

**Respiration Rate**

2.0 Low: Good for all uses mg CO<sub>2</sub>-C/g OM/day

The respiration rate is a measurement of the biodegradation rate of the organic matter in the sample (as received). The respiration rate is determined by measuring the rate at which CO<sub>2</sub> is released under optimized moisture and temperature conditions.

**Biologically Available Carbon**

2 Low: Good for all uses mg CO<sub>2</sub>-C/g OM/day

Biologically Available Carbon (BAC) is a measurement of the rate at which CO<sub>2</sub> is released under optimized moisture, temperature, porosity, nutrients, pH and microbial conditions. If both the RR and the BAC test values are close to the same value, the pile is optimized for composting. If both values are high the compost pile just needs more time. If both values are low the compost has stabilized and should be moved to curing. BAC test values that are higher than RR indicate that the compost pile has stalled. This could be due to anaerobic conditions, lack of available nitrogen due to excessive air converting ammonia to the unavailable nitrate form, lack of nitrogen or other nutrients due to poor choice of feedstock, pH value out of range, or microbes rendered non-active.

**Is Your Compost Mature?**

**Ammonia:NitrateN ratio**

4.1 immature

Composting to stabilize carbon can occur at such a rapid rate that sometimes phytotoxins remain in the compost and must be neutralized before using in high concentrations or in high-end uses. This step is called curing. Typically ammonia is in excess with the break-down of organic materials resulting in an increase in pH. This combination results in a loss of volatile ammonia (it smells). Once this toxic ammonia has been reduced and the pH drops, the microbes convert the ammonia to nitrates. A low ammonia + high nitrate score is indicative of a mature compost, however there are many exceptions. For example, a compost with a low pH (<7) will retain ammonia, while a compost with high lime content can lose ammonia before the organic fraction becomes stable. Composts must first be stable before curing indicators apply.

**Ammonia N ppm**

780 immature

**Nitrate N ppm**

190 mature

**pH value**

7.54 mature

**Cucumber Bioassay**

100.0 Percent

Cucumbers are chosen for this test because they are salt tolerant and very sensitive to ammonia and organic acid toxicity. Therefore, we can germinate seeds in high concentrations of compost to measure phytotoxic effects without soluble salts being the limiting factor. Values above 80% for both percent emergence and vigor are indicative of a well-cured compost. Exceptions include very high salts that affect the cucumbers, excessive concentrations of nitrates and other nutrients that will be in range when formulated to make a growing media. In addition to testing a 1:1 compost: vermiculite blend, we also test a diluted 1:4 blend to indicate a more sensitive toxicity level.

**Is Your Compost Safe Regarding Health?**

**Fecal Coliform**

< 1000 / g dry wt.

Fecal coliforms can survive in both aerobic and anaerobic conditions and is common in all initial compost piles. Most human pathogens occur from fecal matter and all fecal matter is loaded in fecal coliforms. Therefore fecal coliforms are used as an indicator to determine if the chosen method for pathogen reduction (heat for compost) has met the requirements of sufficient temperature, time and mixing. If the fecal coliforms are reduced to below 1000 per gram dry wt. it is assumed all other pathogens are eliminated. Potential problems are that fecal coliform can regrow during the curing phase or during shipping. This is because the conditions are now more favorable for growth than during the composting process.

**Salmonella Bacteria**

Less than 3 3 / 4g dry wt. Salmonella is not only another indicator organism but also a toxic microbe. It has been used in the case of biosolids industry to determine adequate pathogen reduction.

**Metals**

Pass

The ten heavy metals listed in the EPA 503 regulations are chosen to determine if compost can be applied to ag land and handled without toxic effects. Most high concentrations of heavy metals are derived from woodwaste feedstock such as chrome-arsenic treated or lead painted demolition wood. Biosolids are rarely a problem.

**Does Your Compost Provide Nutrients or Organic Matter?**

**Nutrients (N+P<sub>2</sub>O<sub>5</sub>+K<sub>2</sub>O)**

3.6 Average nutrient content

This value is the sum of the primary nutrients Nitrogen, Phosphorus and Potassium. Reported units are consistent with those found on fertilizer formulations. A sum greater than 5 is indicative of a compost with high nutrient content, and best used to supply nutrients to a receiving soil. A sum below 2 indicates low nutrient content, and is best-used to improve soil structure via the addition of organic matter. Most compost falls between 2 and 5.

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**INTERPRETATION:**

**AgIndex (Nutrients/Na+Cl)**

15 High nutrient ratio Composts with low AgIndex values have high concentrations of sodium and/or chloride compared to nutrients. Repeated use of a compost with a low AgIndex (< 2) may result in sodium and/or chloride acting as the limiting factor compared to nutrients, governing application rates. These composts may be used on well-draining soils and/or with salt-tolerant plants. Additional nutrients from another source may be needed if the application rate is limited by sodium or chloride. If the AgIndex is above 10, nutrients optimal for plant growth will be available without concern of sodium and/or chloride toxicity. Composts with an AgIndex of above 10 are good for increasing nutrient levels for all soils. Most composts score between 2 and 10. Concentrations of nutrients, sodium, and chloride in the receiving soil should be considered when determining compost application rates. The AgIndex is a product of feedstock quality. Feedstock from dairy manure, marine waste, industrial wastes, and halophytic plants are likely to produce a finished compost with a low AgIndex.

**Plant Available Nitrogen (lbs/ton)**

6 Average N Provider Plant Available Nitrogen (PAN) is calculated by estimating the release rate of Nitrogen from the organic fraction of the compost. This estimate is based on information gathered from the BAC test and measured ammonia and nitrate values. Despite the PAN value of the compost, additional sources of Nitrogen may be needed during the growing season to offset the Nitrogen demand of the microbes present in the compost. With ample nutrients these microbes can further breakdown organic matter in the compost and release bound Nitrogen. Nitrogen demand based on a high C/N ratio is not considered in the PAN calculation because additional Nitrogen should always be supplemented to the receiving soil when composts with a high C/N ratio are applied.

**C/N Ratio**

16 Indicates immaturity As a guiding principal, a C/N ratio below 14 indicates maturity and above 14 indicates immaturity, however, there are many exceptions. Large woodchips (>6.3mm), bark, and redwood are slow to breakdown and therefore can result in a relatively stable product while the C/N ratio value is high. Additionally, some composts with chicken manure and/or green grass feedstocks can start with a C/N ratio below 15 and are very unstable. A C/N ratio below 10 supplies Nitrogen, while a ratio above 20 can deplete Nitrogen from the soil. The rate at which Nitrogen will be released or used by the microbes is indicated by the respiration rate (BAC). If the respiration rate is too high the transfer of Nitrogen will not be controllable.

**Soluble Nutrients & Salts (EC5 w/w dw - mmhos/cm)**

2.8 Average salts This value refers to all soluble ions including nutrients, sodium, chloride and some soluble organic compounds. The concentration of salts will change due to the release of salts from the organic matter as it degrades, volatilization of ammonia, decomposition of soluble organics, and conversion of molecular structure. High salts + high AgIndex is indicative of a compost high in readily available nutrients. The application rate of these composts should be limited by the optimum nutrient value based on soil analysis of the receiving soil. High Salts + low AgIndex is indicative of a compost low in nutrients with high concentrations of sodium and/or chloride. Limit the application rate according to the toxicity level of the sodium and/or chloride. Low salts indicates that the compost can be applied without risking salt toxicity, is likely a good source of organic matter, and that nutrients will release slowly over time.

**Lime Content (lbs. per ton)**

65 High lime content Compost high in lime or carbonates are often those produced from chicken manure (layers) ash materials, and lime products. These are excellent products to use on a receiving soil where lime has been recommended by soil analysis to raise the pH. Composts with a high lime content should be closely considered for pH requirements when formulating potting mixes.

**Physical Properties**

**Percent Ash**

50.1 Average ash content Ash is the non-organic fraction of a compost. Most composts contain approximately 50% ash (dry weight basis). Compost can be high in ash content for many reasons including: excess mineralization (old compost), contamination with soil base material during turning, poor quality feedstock, and soil or mineral products added. Finding the source and reducing high ash content is often the fastest means to increasing nutrient quality of a compost.

**Particle Size % > 6.3 MM (0.25")**

4.1 May restrict use Large particles may restrict use for potting soils, golf course topdressings, seed-starter mixes, and where a fine size distribution is required. Composts with large particles can still be used as excellent additions to field soils, shrub mixes and mulches.

**Particle Size Distribution**

Each size fraction is measured by weight, volume and bulk density. These results are particularly relevant with decisions to screen or not, and if screening, which size screen to use. The bulk density indicates if the fraction screened is made of light weight organic material or heavy mineral material. Removing large mineral material can greatly improve compost quality by increasing nutrient and organic concentrations.

Appendix:	Estimated available nutrients for use when calculating application rates
Plant Available Nitrogen (PAN) calculations:	lbs/ton (As Rec'd)
PAN = (X * (organic N)) + ((NH4-N) + (NO3-N))	
X value = If BAC < 2 then X = 0.1	Plant Available Nitrogen (PAN) 6.3
If BAC =2.1 to 5 then X = 0.2	Ammonia (NH4-N) 1.10
If BAC =5.1 to 10 then X = 0.3	Nitrate (NO3-N) 0.28
If BAC > 10 then X = 0.4	Available Phosphorus (P2O5*0.64) 7.9
Note: If C/N ratio > 15 additional N should be applied.	Available Potassium (K2O) 12.0