US COMPOSTING COUNCIL

Seal of Testing Assurance

Metro Waste Authority- Metro Park East Landfill
Chad Dentlinger
12181 NE University Avenue
Mitchellville
IA 50169

Product Identification
Grow Gold May

Date Sampled/Received: 07 May. 24 / 09 May. 24

COMPOST TECHNICAL DATA SHEET

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

Compost Parameters	***Reported as*** ***(units of measure)***	***Test Results***	***Test Results***
Plant Nutrients:	%, weight basis	Not reported	Not reported
Moisture Content	%, wet weight basis	51.9	
Organic Matter Content	%, dry weight basis	52.6	
pH	units	8.40	
Soluble Salts *(electrical conductivity EC $_5$)*	dS/m (mmhos/cm)	3.9	
Particle Size or Sieve Size	maxium aggregate size, inches	0.38	
Stability Indicator *(respirometry)*			*Stability Rating:*
CO$_2$ Evolution	mg CO$_2$-C/g OM/day	1.5	Very Stable
	mg CO$_2$-C/g TS/day	0.77	
Maturity Indicator (bioassay)			
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	*Fecal coliform*
		Pass	*Salmonella*
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	*As,Cd,Cr,Cu,Pb,Hg*
			Mo,Ni,Se,Zn

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: May24B
Laboratory Number: 4050245-1/2

Analyst: Assaf Sadeh
www.controllabs.com

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Compost Parameters	***Reported as*** ***(units of measure)***	***Test Results***	***Test Results***
Plant Nutrients:	%, weight basis	%, wet weight basis	%, dry weight basis
Nitrogen	Total N	0.95	2.0
Phosphorus	P_2O_5	0.36	0.77
Potassium	K_2O	0.66	1.4
Calcium	Ca	2.1	4.3
Magnesium	Mg	0.29	0.61
Moisture Content	%, wet weight basis	51.9	
Organic Matter Content	%, dry weight basis	52.6	
pH	units	8.40	
Soluble Salts *(electrical conductivity EC_5)*	dS/m (mmhos/cm)	3.9	
Particle Size or Sieve Size	% under 9.5 mm, dw basis	100.0	
Stability Indicator *(respirometry)*			*Stability Rating:*
CO_2 Evolution	mg CO_2-C/g OM/day	1.5	Very Stable
	mg CO_2-C/g TS/day	0.77	
Maturity Indicator (bioassay)			
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	100.0	
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ANALYTICAL CHEMISTS
and
BACTERIOLOGISTS
Approved by State of California

SOIL CONTROL LAB

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Account #: 4050245-1/2-12316
Group: May24B #38
Reporting Date: May 22, 2024

Metro Waste Authority- Metro Park East Landfill
12181 NE University Avenue
Mitchellville, IA 50169
Attn: Chad Dentlinger

Date Received:	09 May. 24
Sample Identification:	Grow Gold May
Sample ID #:	4050245 - 1/2

Nutrients	Dry wt.	As Rcvd.	units
Total Nitrogen:	2.0	0.95	%
Ammonia (NH$_4$-N):	180	85	mg/kg
Nitrate (NO$_3$-N):	140	66	mg/kg
Org. Nitrogen (Org.-N):	2.0	0.93	%
Phosphorus (as P$_2$O$_5$):	0.78	0.38	%
Phosphorus (P):	3400	1600	mg/kg
Potassium (as K$_2$O):	1.4	0.67	%
Potassium (K):	12000	5500	mg/kg
Calcium (Ca):	4.3	2.1	%
Magnesium (Mg):	0.61	0.29	%
Sulfate (SO$_4$-S):	140	68	mg/kg
Boron (Total B):	47	23	mg/kg
Moisture:	0	51.9	%
Sodium (Na):	0.11	0.052	%
Chloride (Cl):	0.32	0.15	%
pH Value:	NA	8.40	unit
Bulk Density:	22	46	lb/cu ft
Carbonates (CaCO$_3$):	89	43	lb/ton
Conductivity (EC5):	3.9	NA	mmhos/cm
Organic Matter:	52.6	25.3	%
Organic Carbon:	25.0	12.0	%
Ash:	47.4	22.8	%
C/N Ratio	12	12	ratio
AgIndex	10	10	ratio

Stability Indicator:	
CO2 Evolution	Respirometery
mg CO$_2$-C/g OM/day	1.5
mg CO$_2$-C/g TS/day	0.77
Stability Rating	*very stable*

Maturity Indicator: Cucumber Bioassay	
Compost:Vermiculite (v:v)	1:2
Emergence (%)	100
Seedling Vigor (%)	100
Description of Plants	*healthy*

Pathogens	Results	Units	Rating
Fecal Coliform	390	MPN/g	*pass*
Salmonella	< 3	MPN/4g	*pass*

Date Tested: 09 May. 24

Physical Contaminants**	% by dry wt
Total Plastic	< 0.1
Film Plastic	< 0.1
Glass	< 0.1
Metal	< 0.1
Sharps	ND
Total	< 0.5

Metals	Dry wt.	EPA Limit	units
Aluminum (Al):	2600	-	mg/kg
Arsenic (As):	2.6	41	mg/kg
Cadmium (Cd):	< 1.0	39	mg/kg
Chromium (Cr):	8.0	-	mg/kg
Cobalt (Co)	2.0	-	mg/kg
Copper (Cu):	24	1500	mg/kg
Iron (Fe):	5700	-	mg/kg
Lead (Pb):	24	300	mg/kg
Manganese (Mn):	340	-	mg/kg
Mercury (Hg):	< 1.0	17	mg/kg
Molybdenum (Mo):	2.1	75	mg/kg
Nickel (Ni):	7.2	420	mg/kg
Selenium (Se):	< 1.0	100	mg/kg
Zinc (Zn):	86	2800	mg/kg

Size Distribution

MM	% by weight
> 50	0.0
25 to 50	0.0
16 to 25	0.0
9.5 to 16	0.0
6.3 to 9.5	6.0
4.0 to 6.3	9.8
2.0 to 4.0	17.1
< 2.0	67.1

**Greater than 4mm in size (Sharps greater than 2mm)

Analyst: Assaf Sadeh

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

Account No.:
4050245 - 1/2 - 12316
Group: May24B No. 38

Date Received 09 May. 24
Sample i.d. Grow Gold May
Sample I.d. No. 1/2 4050245

INTERPRETATION:

Is Your Compost Stable?

Respiration Rate
1.5 mg CO2-C/ g OM/day
+++++
< Stable >|<Moderately Unstable>|< Unstable >|< High For Mulch

Is Your Compost Mature?

AmmoniaN/NitrateN ratio
1.3 Ratio
+++++++++++++++++++++++++
VeryMature>|< Mature >|< Immature

Ammonia N ppm
180 mg/kg dry wt.
++++++++++++++++++++
VeryMature>|< Mature >|< Immature

Nitrate N ppm
140 mg/kg dry wt.
++
< Immature >|< Mature

Cucumber Emergence
100.0 percent
+++
< Immature >|< Mature

Is Your Compost Safe Regarding Health?

Fecal Coliform
< 1000 MPN/g dry wt.
+++++++
< Safe >|< High Fecal Coliform

Salmonella Bulk Density :
Less than 3 /4g dry wt.
+++++++
<Safe (none detected) >|< High Salmonella Count(> 3 per 4 grams)

Metals US EPA 503
Pass dry wt.
+++++++++
<All Metals Pass >|< One or more Metals Fail

Does Your Compost Provide Nutrients or Organic Matter?

Nutrients (N+P2O5+K2O)
4.2 Percent dry wt.
+++++++++++++++++++++++++++++++++
<Low >|< Average >|< High Nutrient Content

AgIndex (Nutrients / Sodium and Chloride Salts) ((N+P2O5+K2O) / (Na + Cl))
10 Ratio
+++
Na & Cl >|< Nutrient and Sodium and Chloride Provider >|< Nutrient Provider

Plant Available Nitrogen (PAN) Estimated release for first season
2 lbs/ton wet wt.
++++++++
Low Nitrogen Provider>|< Average Nitrogen Provider >|<High Nitrogen Provider

C/N Ratio
12 Ratio
+++++++++++++++++++++++
< Nitrogen Release >|< N-Neutral >|< N-Demand>|< High Nitrogen Demand

Soluble Available Nutrients & Salts (EC5 w/w dw)
3.9 mmhos/cm dry wt.
++++++++++++++++++++
SloRelease>|< Average Nutrient Release Rate >|<High Available Nutrients

Lime Content (CaCO3)
89 Lbs/ton dry wt.
++
< Low >|< Average >|< High Lime Content (as CaCO3)

What are the physical properties of your compost?

Percent Ash
47.4 Percent dry wt.
+++++++++++++++++++++++++++++++++++++
< High Organic Matter >|< Average >|< High Ash Content

Sieve Size % > 6.3 MM (0.25")
6.0 Percent dry wt.
+++
All Uses >|< Size May Restrict Uses for Potting mix and Golf Courses

INTERPRETATION:

Is Your Compost Stable?

Respiration Rate

1.5 Low: Good for all uses mg CO2-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 CO2 is released under optimized moisture and temperature conditions.

Is Your Compost Mature?

AmmoniaN:NitrateN ratio	
1.3	mature
Ammonia N ppm	
180	mature
Nitrate N ppm	
140	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.

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.

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 others 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+P2O5+K2O)

4.2 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.:		Date Received	09 May. 24
4050245 - 1/2 - 12316		Sample i.d.	Grow Gold May
Group:	May24B No. 38	Sample I.d. No.	1/2 4050245

INTERPRETATION:

AgIndex (Nutrients/Na+Cl)

10 Average 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 form 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 the respiration rate, 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

12 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. If the respiration rate is too high the transfer of Nitrogen will not be controlable.

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

3.9 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 thesodium 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)

89 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

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 minerilzation(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")

6.0 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.

Appendix:
Plant Available Nitrogen (PAN) calculations:
PAN = (X * (organic N)) + ((NH4-N) + (NO3-N))
X value = If RR < 2 then X = 0.1
If RR =2.1 to 5 then X = 0.2
If RR =5.1 to 10 then X = 0.3
If RR > 10 then X = 0.4
Note: If C/N ratio > 15 additional N should be applied.
RR = Respiration rate

Estimated available nutrients for use when calculating application rates

	lbs/ton (As Rcvd.)
Plant Available Nitrogen (PAN)	2.2
Ammonia (NH4-N)	0.17
Nitrate (NO3-N)	0.13
Available Phosphorus (P2O5*0.64)	4.8
Available Potassium (K2O)	13.2