

Client: Madison Valley Ranchlands Group Attn: Linda Owens P.O. Box 330 Ennis, MT 59729 406-682-3259	Product: Norris 2019-2020 Compost Date Sampled: 04/18/23 Date Received: 05/02/23 Invoice #: C23-587	Date Reported: 05/15/23 Laboratory # C23-587 Reveiwed by Brent Thyssen, CPSSc PO#: C23-587 Amount: \$350.00
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Nutrients

	Method	As Received	Dry Wt.	Units	Low	Normal	High	Typical Range
Moisture	70 C	17		%	*****			15 to 40
Solids	70 C	83		%	*****			60 to 85
pH	1:5	8.2	NA	SU	*****			5.5 to 8.5
E.C. (Sol. Salts)	1:5	0.25	0.30	mmhos/cm	*****			below 5.0
Total N	TMECC 04.02D	0.12	0.14	%	**			1 to 5
Organic C	TMECC 04.01A	0.9	1.1	%	****			18 to 45
Organic Matter	TMECC 05.07A	3.5	4.2	%	**			40 to 60
Ash	550 C	79.4	95.8	%	*****			40 to 60
Ammonium -N	TMECC 05.02C	16	19	mg/kg	**			90 to 450
Nitrate-N	TMECC 04.02B	101	122	mg/kg	*****			50 to 250
Chloride	TMECC 04.12D	73	88	mg/kg	**			500 to 5000
Sulfate-S	TMECC 04.12D	16	19	mg/kg				
CaCO₃	TMECC 04.08A	17	20	lbs/T	*****			20 to 80
Phosphorous	TMECC 04.12B/04.14A	0.06	0.07	%				
P₂O₅	calculation	0.13	0.16	%	**			1 to 8
Potassium	TMECC 04.12B/04.14A	0.21	0.26	%				
K₂O	calculation	0.26	0.31	%	****			3 to 12
Calcium	TMECC 04.12B/04.14A	0.42	0.5	%	*****			0.5 to 10
Magnesium	TMECC 04.12B/04.14A	0.22	0.26	%	*****			0.05 to 0.7
Sodium	TMECC 04.12B/04.14A	0.01	0.01	%	**			0.05 to 0.7
Sulfur	TMECC 04.12B/04.14A	0.02	0.02	%	**			0.1 to 1.0
Boron	TMECC 04.12B/04.14A	0.8	1.0	mg/kg	**			25 to 150
Zinc	TMECC 04.12B/04.14A	250	301	mg/kg	*****			100 to 600
Manganese	TMECC 04.12B/04.14A	250	302	mg/kg	*****			250 to 750
Copper	TMECC 04.12B/04.14A	10	12	mg/kg	**			100 to 500
Iron	TMECC 04.12B/04.14A	9736	11740	mg/kg	*****			1000 to 25000
C/N ratio			8	ratio	**			18 to 24
C/P Ratio			16	ratio	**			80 to 140
Ag Index			21	ratio	*****			3 to 10

Respiration & Stability

	Method		Units		Normal
CO₂ Evolution	TMECC 05.08	0.6	mg CO ₂ -C/g OM/day	*****	1 to 7
	TMECC 05.08	0.0	mg CO ₂ -C/g TS/day	****	0.5 to 5
Stability Rating	Very Stable				

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Cucumber Bioassay

Method	Units	Low	Normal	Normal
Emergence TMECC 05.05A	93 %	*****		80 to 100
Vigor TMECC 05.05A	100 %	*****		85 to 100
Maturity Very Mature: safe for use in containers				

Pathogens

Method	Date Tested	5/3/2023	units	Low	Normal	High	Normal
Fecal Coliforms TMECC 07.01AB	< 2.8		MPN/g	Pass	*		Less than 1000
Salmonella TMECC 07.02A	ND		MPN/4g	Pass	*		Less than 3
ND = None Detected Fecal Coliforms MDL 2.8 MPN/g Salmonella MDL 1 MPN/4g							

EPA 503 Metals

Method	Dry Wt.	Units	Low	Normal	High	MDL	EPA Limit
Arsenic TMECC 04.12B/04.14A	2.5	mg/kg	***			1.05	41
Cadmium TMECC 04.12B/04.14A	<MDL	mg/kg				0.19	39
Chromium TMECC 04.12B/04.14A	11.8	mg/kg				0.17	-
Cobalt TMECC 04.12B/04.14A	3.4	mg/kg	***			0.11	1200
Copper TMECC 04.12B/04.14A	12	mg/kg	***			0.25	1500
Mercury TMECC 04.12B/04.14A	0.01	mg/kg	***			0.002	17
Molybdenum TMECC 04.12B/04.14A	0.3	mg/kg	**			0.08	75
Nickel TMECC 04.12B/04.14A	7.3	mg/kg	***			0.23	420
Lead TMECC 04.12B/04.14A	6.6	mg/kg	***			0.87	300
Selenium TMECC 04.12B/04.14A	<MDL	mg/kg				0.59	100
Zinc TMECC 04.12B/04.14A	301	mg/kg	*****			0.74	2800
Metals Assay Pass							

Particle Size Distribution TMECC 2.02 B & C

inches	mm	% Passing	Inerts	% by wt.
3	76.2	100		
2	50	100	Total Plastic	0.00
1	25	94	Film Plastic	0.00
3/4	19.1	70	Glass	0.00
5/8	16	61	Metal	0.00
1/2	12.5	49		0.00
3/8	9.5	30		
1/4	6.3	12		

Sample was received, handled and tested in accordance with TMECC procedures



Madison Valley Ranchlands Group
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Ennis, MT 59729
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DATE REC 2-May-23
 INVOICE # C23-587
 LAB # C23-587
 Date Reported: 05/15/23

NUTRIENT REPORT

SAMPLE I.D.: Norris 2019-2020 Compost

As Received: %SOLIDS %WATER
 82.93 17.07

TOTAL ELEMENTS	-----100%DRY-----		----AS RECEIVED-----	
	%	lbs/ton	%	lbs/ton
TN	0.14	2.80	0.12	2.3
P	0.07	1.38	0.06	1.1
P205	0.16	3.18	0.13	2.6
K	0.26	5.16	0.21	4.3
K20	0.31	6.19	0.26	5.1
S	0.02	0.48	0.02	0.4
Ca	0.51	10.2	0.42	8.4
Mg	0.26	5.29	0.22	4.4
Na	0.01	0.27	0.01	0.2
C	1.12	22	0.9	19
	<u>mg/kg</u>	<u>lbs/ton</u>	<u>mg/kg</u>	<u>lbs/ton</u>
Zn	301	0.60	250	0.50
Mn	302	0.60	250	0.50
Cu	12	0.02	10	0.02
Fe	11740	23.48	9736	19
B	1	0.00	0.83	0.00
Nitrate N	122	0.24	101.0	0.20
Ammonium N	19	0.04	16	0.03
C:N Ratio			8	
pH			8.2	
E.C.	0.30		0.25	



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INTERPRETATION GUIDE	

SAFETY INTERPRETATIONS

Pathogens

Fecal coliform bacteria are present in the gut and fecal mater of warm-blooded animals. Their presence is used as an indicator of the presence of possible human pathogens. The heat generated during proper composting is lethal to fecal coliform and other human pathogens. A test value below 1,000 per gram of compost is considered generally safe for human contact. As the compost is stored or transported, the temperature is no longer lethal for coliform bacteria and there is the possibility for regrowth or contamination by birds or other animals.

Your compost was tested for fecal coliform and found to be: VERY SAFE

Salmonella is a human pathogenic bacteria and a good indicator of other human pathogens. It is regularly used to monitor the likelihood of human pathogen presence in biosolids.

Your compost was tested for salmonella bacteria and found to be: VERY SAFE

Heavy Metals

9 heavy metals were identified with maximum concentration limits for land application in biosolids by USEPA in 40 CFR Part 503.B. Ongoing applications to the land are prohibited if any metal concentration exceed the limits in Table 3 of Part 503.13.

If the bars on the "Heavy Metals" for your compost are within or below the "Normal" range, your compost is safe to use as a soil amendment.

COMPOST STABILITY AND MATURITY

Respiration

Respiration is the measurement of microbially generated CO₂ from the compost when incubated at optimal temperature and moisture. It provides an indication of whether the composting process is complete and whether the compost is mature and ready for use. However, other factors may be limiting microbial activity (see C:N Ratio below)

Your Compost was rated as Very Stable: well cured, finished compost; no odors or plant toxicity

Maturity

Bioassay

Cucumbers are grown in a fixed blend of your compost and a commercial potting mix maintained at optimum moisture and temperature. Cucumbers are relatively insensitive to salinity, but very sensitive to ammonia, organic acids and herbicide residue. Emergence and Vigor are rated: results greater than 80% indicate that your compost is mature and/or contains no herbicide carryover. Very high salinity can also reduce assay results.

Your Compost Emergence % 93 Your Compost vigor % 100

Total Nitrogen, Nitrate & Ammonium

Ammonia is produced as a gas in the early stages of composting. The ammonium is nitrified to nitrate as the compost matures. Ammonia is toxic to plants at relatively low concentrations but under moist conditions is converted to ammonium which is less toxic. Nitrate is not toxic, but does contribute to overall salinity if very high. The pH of the compost typically starts out low as organic acids are released, then increases as ammonia is produced, then settles back towards neutral (7.0) as ammonium is nitrified and the compost matures.

Your Compost Ammonium level was 19 Your Compost Ammonium:Nitrate ratio was 0
Your Compost Ammonium:Total N ratio was 0.01 Your Compost pH was 8.2

Considering all the factors above, your Compost is Very Mature: safe for use in containers

FERTILITY INTERPRETATIONS

C:N Ratio

The carbon to nitrogen ratio is important to determine 1) if the composting process is complete or simply stalled out because of lack of nitrogen and 2) whether the compost, when applied to the soil, will act as a source of nitrogen for the crop or become a sink causing the crops to starve for nitrogen.

Your C:N ratio was 8 Your compost is likely high in soluble N, watch for high ammonia levels as they can injure crops.

Ag Index

The Ag Index is the sum of nutrients N, P & K divided by the sum of non-nutrient salts Na & Cl. It provides an indication of whether your compost is a reasonable source of nutrients or primarily a source of organic matter for your soil.

Your Ag index was 21 Your compost is a good source of nutrients and organic matter

Electrical Conductivity/Salinity

Electrical Conductivity is a convenient way to evaluate the soluble salts or salinity of a compost. High salinity is damaging to plants.

The EC of your Compost was 0.3 V. Low: safe undiluted and in pots