

Organic Compost or Manure Analysis

Sustainable Soil Management with the Mikhail Balance System

FILE NO : **EXAMPLE**

SAMPLE ID : COMPOST ROW 1

DATE ISSUED : 24/07/2008
DATE RECEIVED :

CLIENT ID :
PHONE :
REFERENCE :
REFERENCE PHONE :

ANALYSIS REQUIRED : Organic Compost
Analysis

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Analysis & Bio-Hazard Potential

ITEM	unit	RESULT
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Basic Measures:

pH (1:5 Water)		6.4
pH (1:5 0.01M CaCl ₂)		5.9
Electrical Conductivity	EC μS/cm	4615
TOTAL SOLUBLE SALT	TSS ppm	15230

Major Nutrients:

				(Major Nutrients in percentages)
TOTAL NITROGEN	N	kg/t	9.9	0.99 %
TOTAL PHOSPHORUS	P	kg/t	13	1.3 %
TOTAL POTASSIUM	K	kg/t	7	0.7 %
TOTAL SULPHUR	S	kg/t	2.3	0.23 %

Total Cations:

TOTAL CALCIUM	Ca	ppm	1.92
TOTAL MAGNESIUM	Mg	ppm	0.99
TOTAL SODIUM	Na	ppm	0.16

Trace Minerals:

TOTAL COPPER	Cu	ppm	195
TOTAL ZINC	Zn	ppm	677.3
TOTAL IRON	Fe	ppm	14602
TOTAL MANGANESE	Mn	ppm	600
TOTAL COBALT	Co	ppm	7.97
TOTAL MOLYBDENUM	Mo	ppm	1.36
TOTAL BORON	B	ppm	24.7

Carbon Content:

TOTAL ORGANIC MATTER	%	4.5
TOTAL ORGANIC CARBON	%	8.9

* Bio-Hazard Indicators

E. coli	cfu per gram	<3.0
Legionella spp.	cfu per gram	<10
Listeria spp.	per 25 gram	n/d
Salmonella spp.	per 25 gram	n/d

cfu = colony forming unit

n/d = not detected

* These tests, calibrations or measurements have been performed by EML Consulting Services in accordance with NATA requirements. EML Ref No: 303848

* The presence of these organisms may indicate incomplete composting and suggest the need for precautions in handling the material. For notes on making a proper assessment of the results, please see page 6 of this report.

Plant Available Nutrients

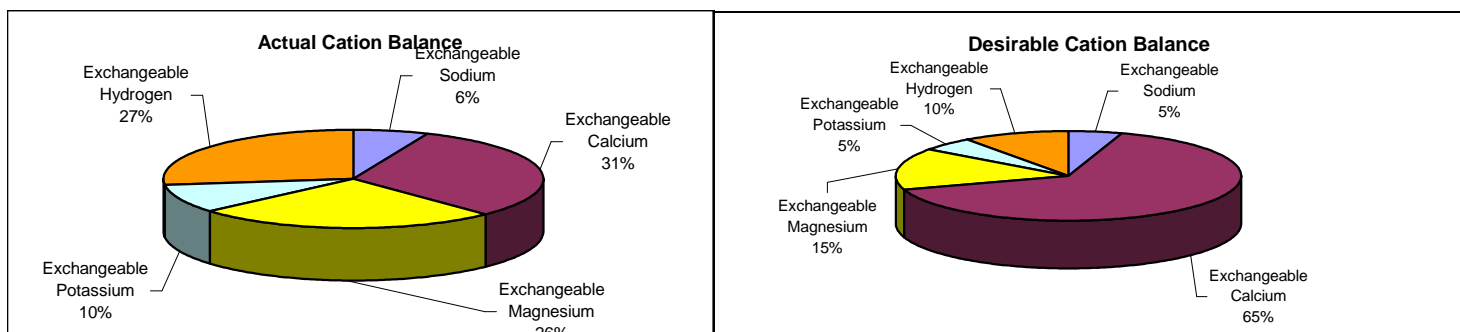
ITEM		unit	RESULT
AVAILABLE CALCIUM	Ca	ppm	4282
AVAILABLE MAGNESIUM	Mg	ppm	2097.6
AVAILABLE SODIUM	Na	ppm	991.3
AVAILABLE NITROGEN	N	ppm	420.8
AVAILABLE PHOSPHORUS	P	ppm	3454
AVAILABLE POTASSIUM	K	ppm	2542.8
AVAILABLE SULPHUR	S	ppm	43.2
AVAILABLE COPPER	Cu	ppm	57.1
AVAILABLE ZINC	Zn	ppm	253.6
AVAILABLE IRON	Fe	ppm	41
AVAILABLE MANGANESE	Mn	ppm	1174
AVAILABLE COBALT	Co	ppm	1.1
AVAILABLE MOLYBDENUM	Mo	ppm	1
AVAILABLE BORON	B	ppm	1

Notes: - These results represent the proportion of the Total nutrients (page 2) that will be immediately available for plant uptake.

Exchangeable Cations

EXCHANGEABLE CATIONS			RESULTS	
CALCIUM	Ca	me/100g	19.46	
MAGNESIUM	Mg	me/100g	15.89	
SODIUM	Na	me/100g	3.92	
POTASSIUM	K	me/100g	5.93	
HYDROGEN	H	me/100g	16.60	
ADJ. EXCH. HYDROGEN	H	me/100g	7.7	
CATION EXCHANGE CAPACITY			CEC	61.8
ADJUSTED CEC			Adj.CEC	52.9
SATURATION BASE PERCENTAGE			BSP	75

EXCHANGEABLE CATION BALANCE		% OF ADJUSTED CEC	DESIRABLE
CALCIUM PERCENTAGE		36.79	65-70%
MAGNESIUM PERCENTAGE		30.04	12-15%
SODIUM PERCENTAGE	ESP	7.41	0.5-5%
POTASSIUM PERCENTAGE		11.21	3-5%
ADJ. HYDROGEN PERCENTAGE		14.56	<20%
CALCIUM / MAGNESIUM RATIO	Ca/Mg	1.22	2 - 4



CATION BALANCE AMENDMENTS (For optimum effectiveness on application)

GYPSUM REQUIREMENT	14.8 kg/m ³			
LIME REQUIREMENT	0.3 kg/m ³			
DOLOMITE REQUIREMENT	0.0 kg/m ³			
MAGNESIUM SULPHATE	0.0 kg/m ³	OR	MAGNESIUM OXIDE	0.0 kg/m ³

NB. The effectiveness of the compost may be improved by mixing in the suggested materials (above) prior to application.

POTENTIAL CONTAMINANTS

TOTAL HEAVY METALS

* Lowest of either NASAA or ACO standards.

		Result (ppm)	Limit for Organic Production* (ppm)
Copper	Cu	195	375
Zinc	Zn	677.3	700
Cadmium	Cd	0.21	5
Lead	Pb	12.63	150
Mercury	Hg	0.18	2
Chromium	Cr	32.16	250
Nickel	Ni	11.87	100
Arsenic	As	4.88	20

* CONTAMINANT PESTICIDES

ORGANO-CHLORINE PESTICIDES:

Result (ppm)		Result (ppm)	
alpha-BHC	n/d	Dieldrin	n/d
Hexachlorobenzene	n/d	4,4-DDE	n/d
beta-BHC	n/d	Endrin	n/d
gamma-BHC (Lindane)	n/d	beta-endosulphan	n/d
delta-BHC	n/d	4,4-DDD	n/d
Heptachlor	n/d	Endrin aldehyde	n/d
Aldrin	n/d	Endosulphan sulphate	n/d
Heptachlor epoxide	n/d	4,4-DDT	n/d
trans-chlordane	n/d	Endrin ketone	n/d
alpha-endosulphan	n/d	Methoxychlor	n/d
cis-chlordane	n/d		

n/d = not detected

ORGANO-PHOSPHATE PESTICIDES:

Result (ppm)		Result (ppm)	
Dichlorvos	n/d	Parathion	n/d
Demeton-S-methyl	n/d	Pirimphos ethyl	n/d
Monocrotophos	n/d	Chlorfenvinphos	n/d
Dimethoate	n/d	Bromophos ethyl	n/d
Diazinon	n/d	Fenamiphos	n/d
Chlorpyrifos methyl	n/d	Prothiofos	n/d
Parathion methyl	n/d	Ethion	n/d
Malathion	n/d	Carbophenothion	n/d
Fenthion	n/d	Azinphos methyl	n/d
Chlorpyrifos	n/d		

n/d = not detected

- Compounds tested are those included in the USEPA 8270 analyte list.
- Composts and Manures should show no detectable levels of any pesticide compound.
- The Organic Soil Maximum is an indicator only, set at 10% of the lowest FSANZ Australian MRL. Refer to your auditor for further details and tissue test follow up in the event of a detection.
- Some MRLs are defined as the sum of two or more compounds. Here the same standard is applied to each of the component compounds.
- Where no Human Food MRL is set, Animal Feedstuff MRLs are applied.
- Where no MRL is defined at all, the Organic Soil Maximum level has been set as "nil".
- All results are given on a 'dry weight' basis.

* Organo-chloride and Organo-phosphate pesticides have been tested by ALS Laboratory Group work order: EM0805490

Assessment of Potential Bio-Hazard

Composts and manures may contain harmful bacteria that could present a danger to human health. For this reason, it is important to take sensible precautions when handling these materials - even if the potential bio-hazard is low.

The first thing to bear in mind about the bio-hazard results is that they are only "Indicators" of any potential hazard. That is, the organisms tested are those most likely to remain after composting. This means that low numbers may still be present after even the best preparation, but high numbers may be an indication that other more sensitive (and perhaps more harmful) bacteria may also have survived composting.

Uncomposted manures will naturally have higher levels of these organisms and in this case, they should indicate only the level of care required in handling.

Unfortunately, there are no clear guidelines as to what level of these organisms can be taken as a sign of poor composting. In all cases, it is advisable to wear a dust mask, eye protection and to properly cover any cuts or abrasions prior to handling any compost or manure.

Indicator Organisms

E. coli - This is the least harmful of the indicator organisms and is also the most sensitive to heat during the composting process. It is an absolute indicator of the presence of mammalian manure in the compost and its presence, even in low numbers, may be a sign that there was either insufficient heat during composting or the heating period may have been too short. On the other hand, high numbers in uncomposted manure would be considered normal.

Salmonella - This is an organism typically indicative of the presence of poultry manure in the compost. It is somewhat more tolerant of heat than E. coli and also presents a significant health risk in its own right. Otherwise the comments above will also apply to this organism. Uncomposted poultry manure would be expected to return a high result for this organism.

Listeria - This is a very serious pathogen, with the disease Listeriosis having a mortality rate of 25%. It is most dangerous to people with compromised immune systems (including pregnant women). In nature, Listeria is a common soil organism and is also associated with ruminants (cattle and sheep) and rodents. This organism can survive quite high temperatures, so its presence in compost may indicate either that the heating period of the composting process was too short, or that the material was contaminated by soil after composting. Either way, a high number of Listeria bacteria would indicate the need for careful handling of the material.

Legionella - There are about 50 species in this group and not all are harmful. However, it is fairly common to find these bacteria in even well made compost, although compost is also seldom a cause of Legionnaires disease in people. Nevertheless, given that the main way of contracting disease associated with this organism is via aerosols or dust, it does indicate a need for care in handling of composts.