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Compost or Manure Analysis

Sustainable Soil Management with the Mikhail Balance System

DATE ISSUED : 31/07/2019
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FILE NO : 1907144610

LANDTASIA ORGANIC FARMS P/L
PO BOX 116

BUNGENDORE, NSW 2621

CLIENT ID : LAN055
PHONE : 02 6238 0565
REFERENCE :
REFERENCE PHONE :

SAMPLE ID : 50014

ANALYSIS REQUIRED : Total, Available & CEC

CONTENTS:

Analysis

ITEM		unit	RESULT	
Basic Measures:				
pH (1:5 Water)			**8.66**	
pH (1:5 0.01M $CaCl_2$)			**8.26**	
Electrical Conductivity	EC	µS/cm	**2010**	
TOTAL SOLUBLE SALT	TSS	ppm	**6633**	
Major Nutrients:				
				(Major Nutrients in percentages)
TOTAL NITROGEN	N	kg/t	**12.4**	**1.24 %**
TOTAL PHOSPHORUS	P	kg/t	**4.9**	**0.487 %**
TOTAL POTASSIUM	K	kg/t	**10.7**	**1.07 %**
TOTAL SULPHUR	S	kg/t	**1.8**	**0.179 %**
Total Cations:				
TOTAL CALCIUM	Ca	%	**2.04**	
TOTAL MAGNESIUM	Mg	%	**0.476**	
TOTAL SODIUM	Na	%	**0.123**	
Trace Minerals:				
TOTAL COPPER	Cu	ppm	**40.1**	
TOTAL ZINC	Zn	ppm	**158**	
TOTAL IRON	Fe	ppm	**9040**	
TOTAL MANGANESE	Mn	ppm	**411**	
TOTAL COBALT	Co	ppm	**5.68**	
TOTAL MOLYBDENUM	Mo	ppm	**12.3**	
TOTAL BORON	B	ppm	**24.7**	
Carbon Content:				
TOTAL ORGANIC MATTER		%	**37.4**	
TOTAL ORGANIC CARBON		%	**18.7**	
CARBON NITROGEN RATIO	C:N		**15.1**	
MOISTURE CONTENT	MC	%	**0**	

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Plant Available Nutrients

ITEM		unit	RESULT
AVAILABLE CALCIUM	Ca	ppm	**6600**
AVAILABLE MAGNESIUM	Mg	ppm	**1956**
AVAILABLE SODIUM	Na	ppm	**1168.4**
AVAILABLE NITROGEN	N	ppm	**12.8**
AVAILABLE PHOSPHORUS	P	ppm	**434**
AVAILABLE POTASSIUM	K	ppm	**7059**
AVAILABLE SULPHUR	S	ppm	**183**
AVAILABLE COPPER	Cu	ppm	**17.6**
AVAILABLE ZINC	Zn	ppm	**116**
AVAILABLE IRON	Fe	ppm	**73**
AVAILABLE MANGANESE	Mn	ppm	**232**
AVAILABLE COBALT	Co	ppm	**1.5**
AVAILABLE MOLYBDENUM	Mo	ppm	**1.33**
AVAILABLE BORON	B	ppm	**3.62**

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

ppm (parts per million) = mg/L (milligram per litre) = mg/kg (milligram per kilogram)
1 % = 10,000 ppm

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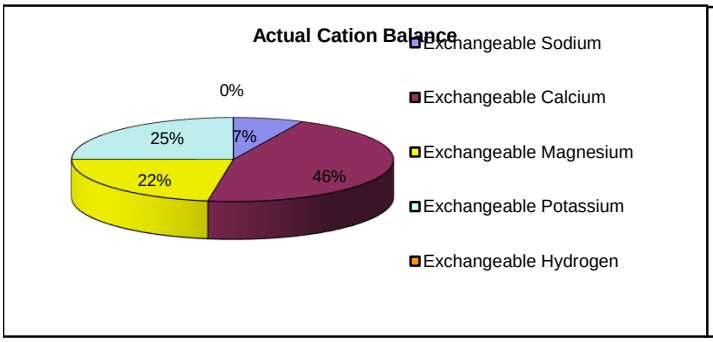
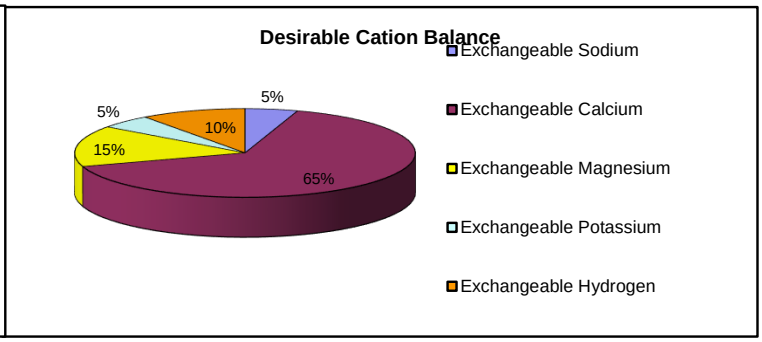
Exchangeable Cations

EXCHANGEABLE CATIONS			RESULTS
CALCIUM	Ca	meq/100g of sample	22.93
MAGNESIUM	Mg	meq/100g of sample	11.33
SODIUM	Na	meq/100g of sample	3.53
POTASSIUM	K	meq/100g of sample	12.58
HYDROGEN	H	meq/100g of sample	0.01
ADJ. EXCH. HYDROGEN	H	meq/100g of sample	0
CATION EXCHANGE CAPACITY	CEC	meq/100g of sample	50.38
ADJUSTED CEC	Adj.CEC	meq/100g of sample	50.37
SATURATION BASE PERCENTAGE	BSP		100

meq = milliequivalent

EXCHANGEABLE CATION BALANCE		% OF ADJUSTED CEC	DESIRABLE
CALCIUM PERCENTAGE		45.52	65-70%
MAGNESIUM PERCENTAGE		22.49	12-15%
SODIUM PERCENTAGE	ESP	7.01	0.5-5%
POTASSIUM PERCENTAGE		24.98	3-5%
ADJ. HYDROGEN PERCENTAGE		0	<20%
CALCIUM / MAGNESIUM RATIO	Ca/Mg	2.02	2 - 4





CATION BALANCE AMENDMENTS *(For optimum effectiveness on application)*

GYPSUM REQUIREMENT	7.7 kg/m^3			
LIME REQUIREMENT	0.0 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.

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ANALYTICAL METHODS

Items	Methods
pH (1:5 Water)	4A1
pH (1:5 CaCl2)	4B1
Electrical conductivity (1:5 Water)	3A1
Total Soluble Salts	Calculation from Electrical conductivity
Total Nitrogen	Dumas method, 7A5
Total Calcium, Magnesium, Sodium, Potassium	Acid digestion, ICPAES
Total Phosphorus, Sulphur, Copper, Zinc, Boron	Acid digestion, ICPAES
Total Iron, Manganese, Cobalt, Molbydenum	Acid digestion, ICPAES
Exchangeable Calcium, Magnesium, Sodium, Potassium	15D3 or 15A1
Exchangeable Hydrogen	Barium Chloride-Triethanolamine method*
Available Nitrogen	Copper-cadmium reductor column at a pH of 8.0
Available Phosphorus	Olsen extractable, 9C2a
Available Sulphur	KCl 40, 10D1
Available Copper, Zinc, & Cobalt	EDTA, 12B1
Available Molybdenum	Ammonium Oxalate-Oxalic acid-di-iso propyl ether
Available Iron & Manganese	method of E.H. Mikhail (1981)
Available Boron	12C2
Total Organic Carbon	Method 6B3
Total Phosphorus, Calcium, Magnesium	Acid digestion

NB. For available Iron and Manganese, SWEP uses the method developed by E.H. Mikhail (1980) due to the tendency for the standard EDTA method to produce erroneously high results.

For numbered test methods:
Rayment, G.E. & Lyons, D.J. (2011). Soil Chemical Methods - Australasia. CSIRO Publishing, 150 Oxford Street, Collingwood Vic 3066, Australia.

*Peech, M., Cowan, R.L. & Baker, J.H. (1962). Soil Science Society American Procedures, A critical studyof the Barium chloride-

AQIS Approved Quarantine Site.
Victorian DPI acccreditation to receive samples from PIZ and PCN infested zones.

Disclaimer: All results and/or recommendations in this report are made in good faith and are based on past and ongoing research by SWEP Pty Ltd. However, limitations such as the vagaries of climatic conditions mean that we cannot guarantee production of any crop by the use of this test and associated recommendations, and cannot be held responsible for any results obtained.

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Microbial Analysis

ITEM	unit	RESULT		% of Total Active Bacteria
ACTIVE LACTIC ACID BACTERIA			1,000	1.28 %
Active Fungi	cfu/g	46,000		
Cellulose Utilisers	cfu/g	10,000		
TOTAL ACTIVE FUNGI	cfu/g		56,000	71.70 %
ACTIVE YEASTS	cfu/g		1,000	1.28 %
ACTIVE ACTINOMYCETES	cfu/g		20,000	25.61 %
ACTIVE PHOTOSYNTHETIC BACTERIA	cfu/g		100	0.13 %
Total Active Population:	cfu/g		78,100	

Notes: See notes on Biology Management (page 3).
ppm = parts per million = milligrams per kilogram
1 % = 10,000 ppm
cfu/g = colony forming unit per gram of material

Trichoderma	cfu/gram	10,000

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Notes on Biology Management

The first thing to remember is that SWEP results are for ACTIVE micro-organisms only. This means only those that will immediately grow under ideal conditions (generally about 7-10% of total soil biomass). This allows us to analyse samples year round, since the microbes that are active in spring will still be present in summer or winter, but at very reduced levels of activity. Given the ideal conditions in our cultures, they will spring back to life and grow much more quickly than others.

Active Indicator Organisms

Photosynthetic bacteria like *Rhodopseudomonas spp* and *Bradyrhizobium spp* require only sunlight, carbon dioxide and mineral nutrients to survive. They are important in recycling organic matter, particularly compounds that are difficult to break down - such as pesticide and petrochemical residues. They are also important for synthesis of bio-active compounds that are known to stimulate plant growth.

Yeasts such as *Saccaromyces spp, Debaryomyces spp, Torulopis spp* and *Rhodotrula spp* synthesise plant growth substances from amino acids and sugars that are produced by photosynthetic bacteria. These substances also promote the growth of Lactic acid bacteria and Actinomycetes.

Lactic acid bacteria such as *Lactobaccillus spp, Leuconostoc spp, Lactococcus spp* and *Pediococcus spp* produce Lactic Acid from sugars and carbohydrates. Lactic acid is a strong bio-suppressive compound that helps control harmful micro-organisms. This effect, together with other trace nutrients produced by members of this group, is particularly beneficial to the growth of Photosynthetic bacteria and Yeasts.

Actinomycetes such as *Actinomyces spp* and *Streptomyces spp* produce antibiotic compounds that are effective suppressants of pathogenic organisms. They have also been shown to produce plant hormones - especially when treated with kelp extracts.

Fungi such as *Aspergillus spp, Penecillium spp, Mucor spp* and *Rhizopus spp* have many beneficial effects on plant growth. These include the production of enzymes, antibiotics and various growth regulators. They are also important in the conversion of organic matter to humic substances. Some of the less complex compounds produced from this process are also important food sources for some bacteria.

Cellulose Utilisers like *Trichoderma spp* require only minerals and cellulose for growth. These fungi break down plant remains into organic materials that are beneficial to other micro-organisms such as Protozoa.

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