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Complete Fertiliser Analysis

Sustainable Soil Management with the Mikhail Balance System

DATE ISSUED : 3/05/2023
DATE RECEIVED : 21/04/2023

FILE NO : 2304176827

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SAMPLE ID : 50029

ANALYSIS REQUIRED : Complete Fertiliser Analysis

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Total Analysis

ITEM		UNIT	RESULT	
Basic Measures:				
pH (1:5 Water)			7.93	
Electrical Conductivity	EC	µS/cm	1320	
TOTAL SOLUBLE SALT	TSS	ppm	4360	
MOISTURE CONTENT	MC %	%	52.6	
Major Nutrients:				(Major Nutrients in percentages)
TOTAL NITROGEN	N	kg/t	13.7	1.37 %
TOTAL PHOSPHORUS	P	kg/t	3.9	0.389 %
TOTAL POTASSIUM	K	kg/t	8	0.799 %
TOTAL SULPHUR	S	kg/t	2.4	0.243 %
Total Cations:				
TOTAL CALCIUM	Ca	%	1.77	
TOTAL MAGNESIUM	Mg	%	0.376	
TOTAL SODIUM	Na	%	0.0692	
Trace Minerals:				
TOTAL COPPER	Cu	ppm	66.9	
TOTAL ZINC	Zn	ppm	149	
TOTAL IRON	Fe	ppm	14900	
TOTAL MANGANESE	Mn	ppm	381	
TOTAL COBALT	Co	ppm	3.44	
TOTAL MOLYBDENUM	Mo	ppm	2.35	
TOTAL BORON	B	ppm	25.8	
Carbon Content:				
TOTAL ORGANIC MATTER		%	35.8	
TOTAL ORGANIC CARBON		%	17.9	
CARBON/NITROGEN RATIO	C/N		13.1	

Microbial Analysis

ITEM	UNIT	RESULT		% of Total Active Bacteria
ACTIVE LACTIC ACID BACTERIA			1,000	3.21 %
Active Fungi	cfu/g	17,000		
Cellulose Utilisers	cfu/g	3,000		
TOTAL ACTIVE FUNGI	cfu/g		20,000	64.10 %
ACTIVE YEASTS	cfu/g		100	0.32 %
ACTIVE ACTINOMYCETES	cfu/g		10,000	32.05 %
ACTIVE PHOTOSYNTHETIC BACTERIA	cfu/g		100	0.32 %
Total Active Population:	cfu/g		31,200	

See notes on Biology Management (page 3).

No bacterial colonies were detected on the culture media, if the result is 1000 cfu/g for Lactic Acid Bacteria and Actinomycetes or 100 cfu/g for Yeast, Fungi, Cellulose and Photosynthetic Bacteria.

ppm = parts per million = milligrams per kilogram cfu/g = colony forming unit per gram of material
1 % = 10,000 ppm

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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.

ANALYTICAL METHODS

TOTAL NITROGEN	Dumas method, LECO	TOTAL COBALT	Acid digestion, ICPAES
TOTAL PHOSPHORUS	Acid digestion, ICPAES	TOTAL BORON	Acid digestion, ICPAES
TOTAL POTASSIUM	Acid digestion, ICPAES	TOTAL MOLYBDENUM	Acid digestion, ICPAES
TOTAL SULPHUR	Acid digestion, ICPAES	pH	Method 4A1, water supension*
TOTAL CALCIUM	Acid digestion, ICPAES	Electrical Conductivity	Method 3A1, water extract*
TOTAL MAGNESIUM	Acid digestion, ICPAES	TOTAL ORGANIC CARBON	Method 6B2b*
TOTAL SODIUM	Acid digestion, ICPAES	MOISTURE CONTENT	Gravimetric method
TOTAL IRON	Acid digestion, ICPAES	CARBON / NITROGEN RATIO	Calculation
TOTAL MANGANESE	Acid digestion, ICPAES		
TOTAL ZINC	Acid digestion, ICPAES	Microbial Analysis	SWEP Methods
TOTAL COPPER	Acid digestion, ICPAES		

* Rayment, G.E. & Higginson, F.R. (1992). Australian Laboratory Handbook for Soil and Water Chemical Methods. Inkata Press, Port Melbourne, Australia.