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Analytical Report Code AR-11-UD-035042-01

Report validated on 30/03/2011

Certificate of Analysis

Laboratory sample number **400-2011-40005891** Received on **22/02/2011**
Client sample description **Compost** Client sample code **NRLPAS3**

SUMMARY SECTION

Parameter	Result	PAS 100 Upper Limit	Units	Pass / Fail	Method Reference
<i>E. coli</i>	<10	1000	CFU/g	Pass	EUMM3.02
<i>Salmonella spp</i>	Not Detected	0	MPN in 25g	Pass	Micro/190
Cadmium as Cd	1.1	1.50	mg/kg	Pass	ICP/003
Chromium as Cr	80.2	100.00	mg/kg	Pass	ICP/003
Copper as Cu	62.2	200.00	mg/kg	Pass	ICP/003
Lead as Pb	72.6	200.00	mg/kg	Pass	ICP/003
Mercury as Hg	0.07	1.00	mg/kg	Pass	I/052
Nickel as Ni	23.	50.00	mg/kg	Pass	ICP/003
Zinc as Zn	152	400.00	mg/kg	Pass	ICP/003
CO2 (stability)	6.07	16.0	mg CO2/g organic matter/day	Pass	
Weed plants	0.00	0	number growing	Pass	BIO/001
Glass / metal / plastic / other ¹	0.00	0.50	% of 'air-dry' sample > 2mm	Pass	CALC/001
Plastic	0.00	0.25	% of 'air-dry' sample > 2mm	Pass	CALC/001
Stones in 'mulch'	1.70	16	% of 'air-dry' sample > 4mm	Pass	CALC/001
Stones in other than 'mulch'	1.70	8	% of 'air-dry' sample > 4mm	Pass	CALC/001
		PAS 100 Lower Limit			
Plants germinated	100.00	80	number of plants, tests as % of controls	Pass	CALC/001
Plant top growth	143.07	80	average g/plants, tests as % of controls	Pass	CALC/001

¹ Excluding stones.

Overall Assessment

Pass if all the above are 'Pass'. Fail if any of the above results are 'Fail'. - **Pass**

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WATER EXTRACTABLE NUTRIENTS ¹

Parameter	As received (fresh)		In dry matter		Method Reference	Plant Significance
	Result	Units	Result	Units		
NH4-N (ammonium-N)	79.7	mg/l	265.67	mg/kg	AQUA/001	Primary nutrients
NO3-N (nitrate-N)	<5	mg/l	0.00	mg/kg	AQUA/003	
NH4-N plus NO3-N	79.70	mg/l	265.67	mg/kg	CALC/001	
Phosphorus as P	4.59	mg/l	15.30	mg/kg	ICP/007	
Potassium as K	854	mg/l	2846.67	mg/kg	ICP/007	
Calcium as Ca	136	mg/l	453.33	mg/kg	ICP/007	Secondary nutrients
Magnesium as Mg	48.8	mg/l	162.67	mg/kg	ICP/007	
Sulphur as S	360	mg/l	1200.00	mg/kg	ICP/007	
Boron as B	0.918	mg/l	3.06	mg/kg	ICP/007	Trace nutrients
Copper as Cu	<0.5	mg/l	0.00	mg/kg	ICP/007	
Iron as Fe	1.79	mg/l	5.97	mg/kg	ICP/007	
Manganese as Mn	0.584	mg/l	1.95	mg/kg	ICP/007	
Molybdeum as Mo	0.167	mg/l	0.56	mg/kg	ICP/007	
Zinc as Zn	0.106	mg/l	0.35	mg/kg	ICP/007	
Chloride as Cl	509	mg/l	1696.67	mg/kg	AQUA/002	See footnote 2
Sodium as Na	166	mg/l	553.33	mg/kg	ICP/007	

1 Water extractable values are a measure of nutrient concentrations immediately available to plants

2 Together with chloride, influences nutrient uptake by plants and can inhibit this at high concentrations

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CAT EXTRACTABLE NUTRIENTS 1, 2

Parameter	As received (fresh)		In dry matter		Method Reference	Plant Significance
	Result	Units	Result	Units		
Phosphorus as P	16.7	mg/l	55.67	mg/kg	ICP/037	Primary nutrients
Potassium as K	1390	mg/l	4633.33	mg/kg	ICP/037	
Magnesium as Mg	207	mg/l	690.00	mg/kg	ICP/037	Secondary
Sulphur as S	418	mg/l	1393.33	mg/kg	ICP/037	
Boron as B	1.45	mg/l	4.83	mg/kg	ICP/037	Trace nutrients
Copper as Cu	1.85	mg/l	6.17	mg/kg	ICP/037	
Iron as Fe	68.9	mg/l	229.67	mg/kg	ICP/037	
Manganese as Mn	43.2	mg/l	144.00	mg/kg	ICP/037	
Molybdeum as Mo	<0.1	mg/l	0.00	mg/kg	ICP/037	
Zinc as Zn	15.8	mg/l	52.67	mg/kg	ICP/037	
Sodium as Na	203	mg/l	676.67	mg/kg	ICP/037	See footnote 3

1 See note 'k' to table C.1 in Annex C of PAS100:2005, for information about CAT-extractable nutrient results.

2 Calcium and chloride are not determined as these are in the extractant and would affect corresponding results.

3 Together with chloride, influences nutrient uptake by plants and can inhibit this at high concentrations

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TOTAL NUTRIENTS ¹

Parameter	As received (fresh)		In dry matter		Method Reference	Plant Significance
	Result	Units	Result	Units		
Nitrogen as N	2766	mg/l	9220	mg/kg	CALC/001 Z/002	Primary nutrients
	0.50	% m/m	0.92	% m/m		
Phosphorus as P	399.00	mg/l	1330	mg/kg	ICP/003 CALC/001	
	0.07	% m/m	0.13	% m/m		
Potassium as K	1725.00	mg/l	5750	mg/kg	ICP/003 CALC/001	
	0.31	% m/m	0.58	% m/m		
Calcium as Ca	11400.00	mg/l	38000	mg/kg	ICP/003	Secondary
Magnesium as Mg	2085.00	mg/l	6950	mg/kg	ICP/003	
Sulphur as S	918.00	mg/l	3060	mg/kg	ICP/003	
Boron as B	5.40	mg/l	18.0	mg/kg	ICP/003	Trace nutrients
Copper as Cu	18.66	mg/l	62.2	mg/kg	ICP/003	
Iron as Fe	7980.00	mg/l	26600	mg/kg	ICP/003	
Manganese as Mn	260.70	mg/l	869	mg/kg	ICP/003	
Molybdeum as Mo	3.48	mg/l	11.6	mg/kg	ICPMS/005	
Zinc as Zn	45.60	mg/l	152	mg/kg	ICP/003	
Sodium as Na	194.10	mg/l	647	mg/kg	ICP/003	See footnote 2

1 This method uses a hydrochloric and nitric acid extractant ("aqua regia") and approximates "total" rather than "bioavailable" concentrations of the above elements.

2 Together with chloride, influences nutrient uptake by plants and can inhibit this at high concentrations.

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POTENTIALLY TOXIC ELEMENTS ¹

Parameter	As received (fresh)	In dry matter			Pass/Fail	Method Reference
	Result Units	Result	PAS 100 Upper Limit	Units		
Cadmium as Cd	0.32 mg/l	1.06	1.50	mg/kg	Pass	ICP/003
Chromium as Cr	24.06 mg/l	80.2	100.00	mg/kg	Pass	ICP/003
Copper as Cu	18.66 mg/l	62.2	200.00	mg/kg	Pass	ICP/003
Lead as Pb	21.78 mg/l	72.60	200.00	mg/kg	Pass	ICP/003
Mercury as Hg	0.02 mg/l	0.07	1.00	mg/kg	Pass	I/052
Nickel as Ni	7.11 mg/l	23.7	50.00	mg/kg	Pass	ICP/003
Zinc as Zn	45.60 mg/l	152	400.00	mg/kg	Pass	ICP/003

¹ Zinc and copper are required by plants but, similarly as with other PTEs, can be toxic to some plant species at high concentrations. Such effects are influenced by other factors, so may not necessarily occur if corresponding PTE upper limits are exceeded. Check plant response test for any toxic effects.

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PHYSIO-CHEMICAL PROPERTIES

Parameter	As received (fresh)		In dry matter		Method Reference
	Result	Units	Result	Units	
Bulk Density	551	g/l	N/A		B/006
Dry Matter	54.60	% m/m	N/A		H/071
Moisture	45.40	% m/m	N/A		CALC/001
Organic Matter (loss on ignition)	19.93	% m/m	36.5	% m/m	H/012
Organic Carbon (LOI / 1.72)	11.59	% m/m	21.22	% m/m	H/012
pH	8.30		N/A		B/011
Electrical Conductivity	923	µS/cm @ 20°C	N/A		B/027
	92	mS/m @ 20°C	N/A		B/027

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PATHOGENS

As received (fresh)					
Parameter	Result	PAS 100 Upper Limit	Units	Pass / Fail	Method Reference
<i>E.coli</i> @ 44°C	<10	1000	CFU / g	Pass	EUMM3.02
<i>Salmonella spp</i> @ 37 °C	Not Detected	0	MPN in 25g	Pass	Micro/190

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STABILITY / MATURITY

As received (fresh)					
Parameter	Result	PAS 100 Upper Limit	Units	Pass / Fail	Method Reference
Carbon dioxide (evolution rate)	6.07	16.0	mg CO ₂ /g organic matter / day	Pass	PHYS/019
Proportion of particles < 20 mm	100.00	N/A	% g / g	N/A	

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PLANT RESPONSE - GERMINATION AND GROWTH OF TOMATO PLANTS AND WEEDS

Method as per PAS 100 : 2005. Annex D

Parameter	Peat unamended		Compost unamended		Units				
Proportion of particles < 10mm	N/D		100		% g/g				
Electrical conductivity	54.0		1120		µS/cm				
Parameter	Compost-peat Test For 3 trays				Units				
Quantity of sieved peat	3.46				prepared litres				
Quantity of sieved compost	1.04				prepared litres				
Substrate(s) ratio (vol:vol)	3.33 : 1				peat : compost				
Parameter	Peat Control		Compost - Peat		Units				
Mass of compost	N/A		571		g				
Mass of peat	1760		1350		g				
Mass of dolomitic limestone	18.0		13.9		g				
Mass of fertiliser	4.50		4.50		g				
Parameter	Peat Control				Compost-peat Test			Overall	Units
	Tray 1	Tray 2	Tray 3	Valid	Tray 1	Tray 2	Tray 3		
Weed plants PAS100 Upper Limit Pass / Fail	0	0	0	N/A	0	0	0	0.00 Pass	per litre compost as received
Germinated tomato plants 10 days after sowing 14 days after sowing 28 days after sowing PAS100 Minimum Performance Pass / Fail	10	10	10	N/A PASS PASS	10	10	10	100.00 100.00 100.00 80.0 Pass	tests as % of controls
Tomato plant top growth 28 days after sowing Total mass per tray (g) Average mass per plant (g) PAS100 Minimum Performance Pass / Fail	99.0	90.0	85.0		131	138	123	143.07 143.07 80.0 Pass	tests as % of controls
	9.90	9.00	8.50		13.10	13.80	12.30		
	PASS	PASS	PASS						

N/A = Not applicable

Observations at any time during test

There were no visible problems

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PHYSICAL CONTAMINANTS (air-dry sample)

Sieve Apertures mm	Glass g	Metal g	Plastic g	Other ¹ g	Description	Total ² g	of which ³ sharps g	Stones g	Method Ref ⁴
31.5	0.00	0.00	0.00	0.00		0.0	0.00	0.00	PHYS/019
20.0	0.00	0.00	0.00	0.00		0.0	0.00	0.00	
16.0	0.00	0.00	0.00	0.00		0.0	0.00	0.00	
12.0	0.00	0.00	0.00	0.00		0.0	0.00	0.00	
8.0	0.00	0.00	0.00	0.00		0.0	0.00	0.00	
4.0	0.00	0.00	0.00	0.00		0.0	0.00	2.10	
2.0	0.00	0.00	0.00	0.00		0.0	0.00	0.800	
1.0	N/D	N/D	N/D	N/D	N/A	N/D	N/D	N/D	
Pan	N/D	N/D	N/D	N/D	N/A	N/D	N/D	N/D	
% of total sample > 2 mm	0.00	0.00	0.00	0.00		0.00		N/A	
% of total sample > 4 mm	N/A	N/A	N/A	N/A		N/A		1.70	
PAS 100 upper limit for "mulch" Pass/Fail			0.25 Pass			0.50 Pass		16.0 Pass	
PAS 100 upper limit for other than "mulch" Pass/Fail			0.25 Pass			0.50 Pass		8.0 Pass	

1 Any different physical contaminant type; name in 'Description'

2 'Total' for glass, metal, plastic and 'other'. NB: excludes stones

3 Sharps > 2 mm, of any inorganic physical contaminant type (excludes woody fragments)

4 Stones and other consolidated mineral contaminants

N/D = Not determined N/A = Not applicable

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PARTICLE SIZE DISTRIBUTION (air-dry sample)

Sieve apertures mm	Sample Retained g	of which compost Retained g	Cumulative		Method Reference
			Retained %	Passing %	
31.5	0.00	0.00	0.00	100.00	PHYS/019
20.0	0.00	0.00	0.00	100.00	
16.0	0.00	0.00	0.00	100.00	
12.0	0.700	0.70	0.57	99.43	
8.0	1.50	1.50	1.79	98.21	
4.0	17.8	17.80	16.23	83.77	
2.0	38.0	38.00	47.08	52.92	
1.0	34.8	34.80	75.32	24.68	
Pan	30.4	30.40	100.00	0.00	
Total	123.20	123.20			