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ANALYSIS REPORT - COMPOSTED MATERIAL

CUSTOMER INFORMATION

Composting Site Ansons Farm
Grade 0-10mm
Grade Type
Date Sampled
Batch Age 12 weeks
Producer's Sample Code 81104-10

LABORATORY INFORMATION

Received Date 24/02/2009
Lab Sample Number 09B014
Lab Batch Number
Lab Report
Reported By S Davies
Report Date 25/03/2009

SUMMARY - PAS 100 "PASS" OR "FAIL"

Parameter	Result	PAS 100 upper limit	Unit	Pass or Fail	Method Reference
E. coli	240	1000	CFU/g	Pass	BS ISO 11866-3
Salmonella spp	Absent	Absent	Absent/Present in 25 g		
Cadmium as Cd	0.49	1.50	mg/kg	Pass	BS EN 13650
Chromium as Cr	14.00	100.00	mg/kg	Pass	BS EN 13650
Copper as Cu	28.00	200.00	mg/kg	Pass	BS EN 13650
Lead as Pb	52.90	200.00	mg/kg	Pass	BS EN 13650
Mercury as Hg	0.08	1.00	mg/kg	Pass	BS EN 13650
Nickel as Ni	8.90	50.00	mg/kg	Pass	BS EN 13650
Zinc as Zn	161.00	400.00	mg/kg	Pass	BS EN 13650
CO ₂ (stability)	9.40	16.00	mg CO ₂ /g OM/d	Pass	WRAP ORG0020
Weed plants	0	0	number/l compost as received	Pass	PAS100:2005, Annex D
Glass, metal, plastic & other ¹	0.04	0.50	% of 'air-dry' sample >	Pass	PAS100:2005, Annex E
Plastic	0.00	0.25	2 mm	Pass	
Stones in "mulch"	6.19	16.00	% of 'air-dry' sample >	Pass	
Stones in other than "mulch"	6.19	8.00	4 mm	Pass	

Parameter	Result	PAS 100 min.	Unit	Pass or Fail	Method Reference
Tomato plants germinated	96.67	80.00	no. of plants, tests as % of controls	Pass	PAS100:2005, Annex D
Tomato plant top growth	128.43	80.00	average g / plant, tests as % of controls	Pass	

¹ Excluding stones

OVERALL ASSESSMENT

Pass if all of above results are 'pass'. Fail if any of above results are 'fail'.

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WATER EXTRACTABLE NUTRIENTS¹

Parameter	As Received (Fresh)		In Dry Matter		Method Reference	Plant Significance
	Result	Units	Result	Units		
NH ₄ -N (ammonium-N)	1.00	mg/l	3.68	mg/kg	BS EN 13652	Primary nutrients
NO ₃ -N (nitrate-N)	5.90	mg/l	21.69	mg/kg	BS EN 13652	
NH ₄ -N plus NO ₃ -N	6.90	mg/l	25.37	mg/kg	Calculated	
Phosphorus as P	24.00	mg/l	88.25	mg/kg	BS EN 13652	
Potassium as K	1460.00	mg/l	5368.40	mg/kg	BS EN 13652	
Calcium as Ca	89.00	mg/l	327.25	mg/kg	BS EN 13652	Secondary nutrients
Magnesium as Mg	23.00	mg/l	84.57	mg/kg	BS EN 13652	
Sulphur as S	40.70	mg/l	149.65	mg/kg	BS EN 13652	
Boron as B	0.95	mg/l	3.49	mg/kg	BS EN 13652	Trace nutrients
Copper as Cu	0.14	mg/l	0.51	mg/kg	BS EN 13652	
Iron as Fe	3.10	mg/l	11.40	mg/kg	BS EN 13652	
Manganese as Mn	0.20	mg/l	0.74	mg/kg	BS EN 13652	
Molybdenum as Mo		mg/l		mg/kg	BS EN 13652	
Zinc as Zn	0.25	mg/l	0.92	mg/kg	BS EN 13652	
Chloride as Cl	634.00	mg/l	2331.21	mg/kg	BS EN 13652	
Sodium as Na	100.00	mg/l	367.70	mg/kg	BS EN 13652	See footnote 2

1 Water extractable values are a measure of nutrient concentrations immediately available to plants.
2 Sodium 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		
NH ₄ -N (ammonium-N)		mg/l		mg/kg	BS EN 13651	Primary nutrients
NO ₃ -N (nitrate-N)		mg/l		mg/kg	BS EN 13651	
NH ₄ -N plus NO ₃ -N		mg/l		mg/kg	BS EN 13651	
		% m/m		% m/m	Calculated	
Phosphorus as P	72.00	mg/l	264.74	mg/kg	BS EN 13651	Secondary nutrients
Potassium as K	1,032.00	mg/l	3794.65	mg/kg	BS EN 13651	
Magnesium as Mg	194.00	mg/l	713.33	mg/kg	BS EN 13651	Trace nutrients
Sulphur S	26.00	mg/l	95.60	mg/kg	BS EN 13651	
Boron as B	1.42	mg/l	5.22	mg/kg	BS EN 13651	
Copper as Cu	1.00	mg/l	3.68	mg/kg	BS EN 13651	
Iron as Fe	76.00	mg/l	279.45	mg/kg	BS EN 13651	
Manganese as Mn	27.40	mg/l	100.75	mg/kg	BS EN 13651	
Molybdenum as Mo	0.07	mg/l	0.26	mg/kg	BS EN 13651	
Zinc as Zn	9.80	mg/l	36.03	mg/kg	BS EN 13651	
Sodium as Na	279.00	mg/l	1025.88	mg/kg	BS EN 13651	See footnote 3

1 See note k to Table C.1 in Annex C of PAS100:2005, for information about CAT-extractable nutrients 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 NUTRIENTS¹

Parameter	As Received (Fresh)		In Dry Matter		Method Reference	Plant Significance
	Result	Units	Result	Units		
Nitrogen as N		mg/l		mg/kg	Modified Kjeldahl, BS EN 13654-1 Dumas, BS EN 13654-2 ²	Primary nutrients
		% m/m		% m/m		
	ND	mg/l	11300.00	mg/kg		
	ND	% m/m	1.13	% m/m		
Phosphorus as P	571.12	mg/l	2100	mg/kg	BS EN 13650	
	0.10	% m/m	0.21	% m/m	BS EN 13650	
Potassium as K	2284.48	mg/l	8400	mg/kg	BS EN 13650	
	0.39	% m/m	0.84	% m/m	BS EN 13650	
Calcium as Ca	7560.54	mg/l	27800	mg/kg	BS EN 13650	Secondary nutrients
Magnesium as Mg	707.10	mg/l	2600	mg/kg	BS EN 13650	
Sulphur as S	489.53	mg/l	1800	mg/kg	BS EN 13650	
Boron as B	6.50	mg/l	24	mg/kg	BS EN 13650	Trace nutrients
Copper as Cu	7.61	mg/l	28	mg/kg	BS EN 13650	
Iron as Fe	3508.31	mg/l	12900	mg/kg	BS EN 13650	
Manganese as Mn	70.71	mg/l	260	mg/kg	BS EN 13650	
Molybdenum as Mo		mg/l		mg/kg	BS EN 13650	
Zinc as Zn	43.79	mg/l	161	mg/kg	BS EN 13650	
Sodium as Na	135.98	mg/l	500	mg/kg	BS EN 13650	See footnote 3

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

2 Unsuitable for materials containing free ammonia because this may be lost when samples are flushed with oxygen during the procedure, e.g. if compost sample contains > 500 mg/l ammonium.

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POTENTIALLY TOXIC ELEMENTS¹

Parameter	As Received (Fresh)		In Dry Matter				Method Reference
	Result	Unit	Result	PAS 100 upper limit	Unit	Pass or Fail	
Arsenic as As	#VALUE!	mg/l	N/D	N/A	mg/kg	N/A	
Cadmium as Cd	0.13	mg/l	0.49	1.50	mg/kg	Pass	BS EN 13650
Chromium as Cr	3.81	mg/l	14.00	100.00	mg/kg	Pass	BS EN 13650
Copper as Cu	7.61	mg/l	28.00	200.00	mg/kg	Pass	BS EN 13650
Fluoride as F _I	#VALUE!	mg/l	N/D	N/A	mg/kg	N/A	
Lead as Pb	14.39	mg/l	52.90	200.00	mg/kg	Pass	BS EN 13650
Mercury as Hg	0.02	mg/l	0.08	1.00	mg/kg	Pass	BS ISO 16772
Molybdenum as Mo	#VALUE!	mg/l	N/D	N/A	mg/kg	N/A	BS EN 13650
Nickel as Ni	2.42	mg/l	8.90	50.00	mg/kg	Pass	BS EN 13650
Selenium as Se	#VALUE!	mg/l	N/D	N/A	mg/kg	N/A	
Zinc as Zn	43.79	mg/l	161.00	400.00	mg/kg	Pass	BS EN 13650

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 results for any toxic effects.

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PHYSICO-CHEMICAL PROPERTIES

Parameter	As Received (Fresh)		In Dry Matter		Method Reference
	Result	Unit	Result	Unit	
Bulk Density ¹	580.00	g/l	271.96	g/l	BS EN 12540
Dry Matter	N/A		46.89	% m/m	BS EN 13040
Moisture	308.04	g/l	N/A		BS EN 13040
	53.11	% m/m	N/A		
Organic Matter (Loss On Ignition)	N/A	% m/m	34.00	% m/m	BS EN 13039
Organic Carbon (LOI ÷ 1.72)	N/A		19.77	% m/m	Calculated
pH	8.02	N/A	N/A		BS EN 13037
Electrical Conductivity	944	µS/cm @ 20 °C	N/A		BS EN 13038
	94	mS/m @ 20 °C	N/A		
Liming potential	2.32	% m/m CaO	N/A		See footnote 2

1 Bulk density in dry matter is termed 'Dry Weight Density' and expressed in (g/l).
DWD = fresh bulk density (g/l) - volumetric moisture content (g/l)

2 'The Fertilisers (Sampling and Analysis) Regulations 1996' Schedule 2, Part II Section 6 - 'Determination of the neutralising value of liming materials.' Method adaptation: the stage of passing the sample through a 1 mm sieve is omitted and results are expressed as % by weight of CaO on the undried sample, as received.

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PATHOGENS

Parameter	As Received (Fresh)				Method Reference
	Result	PAS 100 upper limit	Unit	Pass or Fail	
<i>E. coli</i> at 44 °C	240	1000	CFU/g	Pass	BS ISO 11866-3
<i>Salmonella spp</i> at 37 °C	Absent	Absent	Absent / Present in 25 g		

STABILITY / MATURITY

Parameter	As Received (Fresh)				Method Reference
	Result	PAS 100 Upper Limit	Unit	Pass or Fail	
Carbon dioxide (evolution rate)	9.4	16.0	mg CO ₂ / g organic matter / day	Pass	WRAP ORG0020
Proportion of particles < 20 mm	100	N/A	% g/g	N/A	

Parameter	As Received (Fresh)		In Dry Matter		Method Reference
	Result	Units	Result	Units	
NH ₄ -N : NO ₃ -N (ratio)	0.17	:1	0.17	:1	Calculated
Carbon : Nitrogen (ratio)	N/A		17.5	:1	Calculated
Self-heating (Dewar flask)		Max °C increase	N/A		See footnote 1
Nitrogen Drawdown Index		None	N/A		AS 3743-2003 ²

1 Methods book for the analysis of compost, Bundesgütegemeinschaft Kompost e. V., 2002.

2 Australian standard - potting mixes, appendix E. Indicates likelihood of nitrogen lock-up.

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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			Unit		
Quantity 'Selected before sieving'						g		
Quantity 'Sieved, particles < 10 mm'						g		
Proportion of particles < 10 mm			100.00			% g/g		
Electrical conductivity	25		944			µS cm ⁻¹		
Parameter	Peat Control For 3 trays			Compost-Peat Test For 3 trays			Unit	
Quantity of sieved peat	6.00			2.80			litres prepared	
Quantity of sieved compost	0.00			1.20			litres prepared	
Substrate(s) ratio (vol : vol)	1.00 : 0			2.33 : 1			peat:compost	
Parameter	Peat Control			Compost-Peat Test			Overall	Unit
	Tray 1	Tray 2	Tray 3	Tray 1	Tray 2	Tray 3		
Weed Plants	0	0	0	0	0	0	0.00	per litre
PAS 100 upper limit							0.00	compost as
Pass or Fail							Pass	received
Germinated Tomato Plants								
7 days after sowing	10	10	10	10	9	9	93.33	tests as % of
14 days after sowing	10	10	10	10	10	9	96.67	controls
28 days after sowing	10	10	10	10	10	9	96.67	
PAS 100 minimum performance							80.00	
Pass or Fail							Pass	
Tomato Plant Top Growth 28 Days After Sowing								
Total mass per tray (g)	37.54	35.27	58.49	56.64	53.91	52.26	124.00	tests as % of
Average mass per plant (g)	3.75	3.53	5.85	5.66	5.39	5.81	128.43	controls
PAS 100 minimum performance							80.00	
Pass or Fail							Pass	
Observations At Any Time During Test								
Abnormalities / disease symptoms								
Healthy control and test seedlings recorded								
Additional factors None								

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PHYSICAL CONTAMINANTS (air-dry sample)

Sieve Apertures	Glass	Metal	Plastic	Other ²	Description	Total ³	of which sharps ⁴	Stones ⁵	Method Reference
mm	g	g	g	g		g	g	g	
31.50	0.00	0.00	0.00	0.00		0.00	0.00	0.00	PAS 100:2005, Annex E ¹
16.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	
8.00	0.00	0.00	0.00	0.00		0.00	0.00	0.74	
4.00	0.06	0.00	0.00	0.00		0.06	0.00	7.79	
2.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	
1.00	ND	ND	ND	ND	N/A	ND	ND	ND	
Pan	ND	ND	ND	ND	N/A	ND	ND	ND	
% of total sample > 2 mm	0.04	0.00	0.00	0.00		0.04	0.00	N/A	
% of total sample > 4 mm	N/A	N/A	N/A	N/A		N/A	N/A	6.19	
PAS 100 upper limit for "mulch"			0.25			0.50		16.00	
Pass or Fail			Pass			Pass		Pass	
for other than "mulch"			0.25			0.50		8.00	
Pass or Fail			Pass			Pass		Pass	

- 1 State whether with modification, i.e. sieves added or omitted
 - 2 Any different physical contaminant type; name in 'Description'
 - 3 'Total' is for glass, metal, plastic and 'other'. N.B.: excludes stones
 - 4 Sharps > 2 mm, of any inorganic physical contaminant type (excludes woody fragments)
 - 5 Stones and other consolidated mineral contaminants
- ND = 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 %	
31.50	0.00	0.00	0.00	100.00	PAS 100:2005, Annex E ¹
16.00	0.72	0.72	0.52	99.48	
8.00	10.00	10.00	7.79	92.21	
4.00	44.54	44.48	40.09	59.91	
2.00	42.29	42.29	70.80	29.20	
1.00	25.78	25.78	89.53	10.47	
Pan	14.42	14.42	100.00	0.00	
Total	137.75	137.69			

1 State whether with modification, i.e. which sieves added or omitted
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