Hill Laboratories
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Certificate of Analysis

Client:	BioRich Limited 103 Valley Road RD 4 Hastings 4174	**Lab No:** **Date Received:** **Date Reported:** **Quote No:** **Order No:** **Client Reference:** **Submitted By:**	3239098 CPv1.1 13-Apr-2023 09-May-2023 84077 Awatoto Biogro Compost Craig Burns

Sample Type: COMPOST, General

		Sample Name:	Guideline NZS 4454:2005*	BioGro Std 2009 Appendix A**
		Lab Number:		
Water Extractable Results				
pH	pH Units	8.7	5.0 - 8.5	-
Electrical Conductivity (EC)	mS/cm	2.4	-	-
Nitrate-N	mg/L	< 1	-	-
Ammonium-N	mg/L	164	-	-
Phosphorus	mg/L	5	-	-
Potassium	mg/L	263	-	-
Sulphur	mg/L	30	-	-
Calcium	mg/L	25	-	-
Magnesium	mg/L	3	-	-
Sodium	mg/L	70	-	-
Total Analysis Results - Dry Weight Basis				
Organic Matter*	%	45.5	Greater than 25	-
Total Carbon*	%	26.4	-	-
Total Nitrogen*	%	1.93	Greater than 0.6 (if a contribution to plant nutrition is claimed)	-
C/N Ratio*		13.6	-	-
Dry Matter*	%	45.7	-	-
'Total' Phosphorus*	mg/kg	8,200	-	-
'Total' Phosphorus*	%	0.82	Greater than 0.1 (if a contribution to plant nutrition is claimed)	-
'Total' Sulphur*	mg/kg	2,150	-	-
'Total' Sulphur*	%	0.21	-	-
'Total' Potassium*	mg/kg	5,570	-	-
'Total' Potassium*	%	0.56	-	-
'Total' Calcium*	mg/kg	36,000	-	-
'Total' Calcium*	%	3.60	-	-
'Total' Magnesium*	mg/kg	2,640	-	-
'Total' Magnesium*	%	0.26	-	-
'Total' Sodium*	mg/kg	1,223	-	-
'Total' Sodium*	%	0.12	-	-
'Total' Iron*	mg/kg	7,900	-	-
'Total' Manganese*	mg/kg	193	-	-
'Total' Zinc*	mg/kg	96	Less than 600	Less than 300
'Total' Copper*	mg/kg	32	Less than 300	Less than 60

Sample Type: COMPOST, General				
	Sample Name:	Awatoto Biogro Compost	**Guideline NZS 4454:2005***	**BioGro Std 2009 Appendix A****
	Lab Number:	3239098.1		
'Total' Boron*	mg/kg	14	Less than 200	-

* New Zealand Standard Composts, Soil Conditioners and Mulches: NZS 4454:2005, Table 3.1. Test results apply to the sample(s) submitted for analysis and do not necessarily imply that the product meets all the requirements of the standard. Note that the laboratory methods used for these test results may differ slightly to those referred to in the standard.

** Bio-Gro NZ Organic Standards 2009, Appendix A, Table A3: Limits for Heavy Metals in Soils and Composts: BioGro Standard for compost - ingredients other than household waste. Other limits apply for compost with ingredients including household waste.

Analyst's Comments

Sample 1 Comment:
Note 1: Reporting Units.
% = g/100g = g analyte/100g compost (dry weight basis)
mg/kg = ppm = mg analyte/kg compost (dry weight basis)
Electrical Conductivity units mS/cm = dS/m

Note 2: % x 10 = kg/T

Note 3: To calculate results to a fresh weight basis:
Result (dry matter basis) x (Dry Matter % / 100) = Result (fresh weight basis)

Sample 1 Comment:
Organic Matter Note: The relationship between carbon and organic matter varies according to organic matter type and soil type if soil is present in the product. Commonly used conversion factors range from 1.65 to 2.2 (Ref: NZS 445:2005). A Loss on Ignition (LOI) test may be requested if a more accurate organic matter value is required.

This certificate of analysis contains information extracted from 3239098-CPv1 issued on 24-Apr-2023 at 1:46 pm.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: COMPOST, General			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
'Total' Sulphur*	Nitric/hydrochloric digestion (based on US EPA 200.2) followed by ICP-OES. (Total recoverable nutrients reported on a dry weight basis) The levels from this method are referred to as 'Totals' in quotation marks, as they will be a slight under-estimation of the true Totals for some elements.	45 mg/kg	1
'Total' Sulphur*	Calculated from 'Total' Sulphur result for mg/kg (reported on a dry weight basis).	0.01 %	1
pH	1:1.5 (v/v) Water extraction followed by potentiometric pH determination. In-house.	0.1 pH Units	1
Electrical Conductivity (EC)	1:1.5 (v/v) Water extraction followed by potentiometric conductivity determination (25°C). In-house.	0.1 mS/cm	1
Nitrate-N	1:1.5 (v/v) Water extraction followed by Salicylate colorimetry. In-house.	1 mg/L	1
Ammonium-N	1:1.5 (v/v) Water extraction followed by Berthelot colorimetry. In-house.	1 mg/L	1
Phosphorus	1:1.5 (v/v) Water extraction followed by ICP-OES. In-house.	1 mg/L	1
Sulphur	1:1.5 (v/v) Water extraction followed by ICP-OES. In-house.	1 mg/L	1
Potassium	1:1.5 (v/v) Water extraction followed by ICP-OES. In-house.	1 mg/L	1
Calcium	1:1.5 (v/v) Water extraction followed by ICP-OES. In-house.	1 mg/L	1
Magnesium	1:1.5 (v/v) Water extraction followed by ICP-OES. In-house.	1 mg/L	1
Sodium	1:1.5 (v/v) Water extraction followed by ICP-OES. In-house.	1 mg/L	1
Total Carbon*	Sample dried and ground and analysed by Dumas combustion. Results expressed on a dry weight basis.	0.2 %	1
Total Nitrogen*	Sample dried and ground and analysed by Dumas combustion. Results expressed on a dry weight basis.	0.04 %	1
Organic Matter*	Dumas combustion. Organic Matter is 1.72 x Total Carbon.	0.2 %	1
Dry Matter*	Weight loss on drying at 105°C for 24 hours.	0.5 %	1
'Total' Phosphorus*	Calculated from 'Total' Phosphorus result for mg/kg (reported on a dry weight basis).	0.01 %	1

Sample Type: COMPOST, General			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
'Total' Phosphorus*	Nitric/hydrochloric digestion (based on US EPA 200.2) followed by ICP-OES. (Total recoverable nutrients reported on a dry weight basis) The levels from this method are referred to as 'Totals' in quotation marks, as they will be a slight under-estimation of the true Totals for some elements. In-house.	65 mg/kg	1
'Total' Potassium*	Calculated from 'Total' Potassium result for mg/kg (reported on a dry weight basis).	0.01 %	1
'Total' Potassium*	Nitric/hydrochloric digestion (based on US EPA 200.2) followed by ICP-OES. (Total recoverable nutrients reported on a dry weight basis) The levels from this method are referred to as 'Totals' in quotation marks, as they will be a slight under-estimation of the true Totals for some elements.	70 mg/kg	1
'Total' Calcium*	Calculated from 'Total' Calcium result for mg/kg (reported on a dry weight basis).	0.01 %	1
'Total' Calcium*	Nitric/hydrochloric digestion (based on US EPA 200.2) followed by ICP-OES. (Total recoverable nutrients reported on a dry weight basis) The levels from this method are referred to as 'Totals' in quotation marks, as they will be a slight under-estimation of the true Totals for some elements.	100 mg/kg	1
'Total' Magnesium*	Calculated from 'Total' Magnesium result for mg/kg (reported on a dry weight basis).	0.01 %	1
'Total' Magnesium*	Nitric/hydrochloric digestion (based on US EPA 200.2) followed by ICP-OES. (Total recoverable nutrients reported on a dry weight basis) The levels from this method are referred to as 'Totals' in quotation marks, as they will be a slight under-estimation of the true Totals for some elements.	40 mg/kg	1
'Total' Sodium*	Calculated from 'Total' Sodium result for mg/kg (reported on a dry weight basis).	0.01 %	1
'Total' Sodium*	Nitric/hydrochloric digestion (based on US EPA 200.2) followed by ICP-OES. (Total recoverable nutrients reported on a dry weight basis) The levels from this method are referred to as 'Totals' in quotation marks, as they will be a slight under-estimation of the true Totals for some elements.	20 mg/kg	1
'Total' Iron*	Nitric/hydrochloric digestion (based on US EPA 200.2) followed by ICP-OES. (Total recoverable nutrients reported on a dry weight basis) The levels from this method are referred to as 'Totals' in quotation marks, as they will be a slight under-estimation of the true Totals for some elements.	80 mg/kg	1
'Total' Manganese*	Nitric/hydrochloric digestion (based on US EPA 200.2) followed by ICP-OES. (Total recoverable nutrients reported on a dry weight basis) The levels from this method are referred to as 'Totals' in quotation marks, as they will be a slight under-estimation of the true Totals for some elements.	4 mg/kg	1
'Total' Zinc*	Nitric/hydrochloric digestion (based on US EPA 200.2) followed by ICP-OES. (Total recoverable nutrients reported on a dry weight basis) The levels from this method are referred to as 'Totals' in quotation marks, as they will be a slight under-estimation of the true Totals for some elements.	4 mg/kg	1
'Total' Copper*	Nitric/hydrochloric digestion (based on US EPA 200.2) followed by ICP-OES. (Total recoverable nutrients reported on a dry weight basis) The levels from this method are referred to as 'Totals' in quotation marks, as they will be a slight under-estimation of the true Totals for some elements.	4 mg/kg	1
'Total' Boron*	Nitric/hydrochloric digestion (based on US EPA 200.2) followed by ICP-OES. (Total recoverable nutrients reported on a dry weight basis) The levels from this method are referred to as 'Totals' in quotation marks, as they will be a slight under-estimation of the true Totals for some elements.	6 mg/kg	1

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 17-Apr-2023 and 20-Apr-2023. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.

Andrew Whitmore BSc (Tech)
Client Services Manager