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Quote Number: 85273
Client Name: CLIENT - as per Request Form
Primary Contact: David Holmes
Charge To: CHARGE - as per Request Form
Quote Ref: 2023 Berry season
Extra Quote Ref: BerryCo

Date: 05-May-2017
Expires: 31-Aug-2023
From: Andrew Whitmore
Email: andrew.whitmore@hill-labs.co.nz
Priority: Normal

Sample Type	Details	Qty	Quote Price	Line Total
	Quote for 2023 season			
	Potting Mix testing			
MEDIA General	Basic Media; Sample Registration; Media Trace Elements; Media & Compost Prep (Dry & Grind); C/N Ratio (BM, TE, CN) Note: See the Summary of Methods table for details of tests included in the above.	1	\$172.90	\$172.90
	Soil testing			
SOIL Blueberry	Sample Registration; Soil Prep (Dry & Grind); Extractable Soil Sulphur Profile; Basic Soil; Organic Soil Profile; Mehlich 3 Profile; EC (in 1:5 Extract); Soluble Salts (Field) (S, BS, OrgSP, m3, ECF) Note: See the Summary of Methods table for details of tests included in the above.	1	\$167.20	\$167.20
	Runoff nutrient solution testing			
NFT General, Solution	Sample Registration; Ammonium-N; Basic Nutrient (NH4, BN) Note: See the Summary of Methods table for details of tests included in the above.	1	\$79.80	\$79.80
	Leaf testing			
LEAF Blueberry	Sample Registration; Plant Prep (Dry & Grind); Plant Basic (BP) Note: See the Summary of Methods table for details of tests included in the above.	1	\$87.40	\$87.40
	Water Testing			
Surface Water for Irrigation	Irrigation Water profile; Total Digestion; Filtration, Unpreserved (IrrgWater) Note: See the Summary of Methods table for details of tests included in the above.	1	\$140.00	\$140.00
Surface Water	Bicarbonate; Total Alkalinity; pH (HCO3)	1	\$22.89	\$22.89

Default Report Recipients

This quote has specified that the following report and delivery methods will be sent:

Ag Std Hist + Vert Grid PDF:

- Other: BerryCo NZ Limited via Email to david@berryco.co

Ag Std Histogram PDF:

- Client: CLIENT - as per Request Form via Email
- Primary Contact: David Holmes via Email to david@berryco.co

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Notes

Quoted prices are in New Zealand Dollars (NZD) and do not include GST.

This quote is subject to our usual terms and conditions, a copy of which is available on request.

Individual dates of testing are not routinely included in the Certificate of Analysis. Please inform the laboratory if you would like this information reported.

Clients will be invoiced directly unless otherwise stipulated on the analysis request form. The discount may not apply if invoiced to another entity.

Hill Laboratories is an IANZ Accredited Laboratory. We are Accredited for a very wide range of tests on waters, effluents, soils, sediments, plants and biota. Copies of our Accreditation are available on request.

NOTE: The estimated turnaround time for the types and number of samples and analyses specified on this quote is by 4:30 pm, 7 working days following the day of receipt of the samples at the laboratory. This turnaround time is based on the samples being received at the appropriate laboratory location.

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods that will be 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 will be performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Surface Water for Irrigation		
Test	Method Description	Default Detection Limit
Individual Tests		
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) 23 rd ed. 2017.	-
Irrigation Water profile		
Total anions for anion/cation balance check	Calculation: sum of anions as mEq/L calculated from Alkalinity (bicarbonate), Chloride and Sulphate. Nitrate-N, Nitrite-N. Fluoride, Dissolved Reactive Phosphorus and Cyanide also included in calculation if available. APHA 1030 E 23 rd ed. 2017.	0.07 meq/L
Total cations for anion/cation balance check	Sum of cations as mEq/L calculated from Sodium, Potassium, Calcium and Magnesium. Iron, Manganese, Aluminium, Zinc, Copper, Lithium, Total Ammoniacal-N and pH (H ⁺) also included in calculation if available. APHA 1030 E 23 rd ed. 2017.	0.05 meq/L
pH	pH meter. APHA 4500-H ⁺ B 23 rd ed. 2017. Note: It is not possible to achieve the APHA Maximum Storage Recommendation for this test (15 min) when samples are analysed upon receipt at the laboratory, and not in the field. Samples and Standards are analysed at an equivalent laboratory temperature (typically 18 to 22 °C). Temperature compensation is used.	0.1 pH Units
pH _c *	Calculation from Sodium, Calcium, Magnesium, pH and Alkalinity. Valid where; Sum of (Ca + Mg + Na) in the range 0.5 - 76 me/L Sum of (Ca + Mg) in the range 0.05 - 19.80 me/L Sum of (CO ₃ + HCO ₃) in the range 0.05 - 19.80 me/L Outside these ranges please treat the results for pH _c and adjusted SAR as indicative only.	0.1 pH Units
Total Alkalinity	Titration to pH 4.5 (M-alkalinity), autotitrator. APHA 2320 B (modified for Alkalinity <20) 23 rd ed. 2017.	1.0 g/m ³ as CaCO ₃
Hydroxide Alkalinity	Calculation: from pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO ₂ D 23 rd ed. 2017.	1.0 g/m ³ as CaCO ₃
Carbonate	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO ₂ D 23 rd ed. 2017.	1.0 g/m ³ at 25°C
Bicarbonate	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO ₂ D 23 rd ed. 2017.	1.0 g/m ³ at 25°C

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Sample Type: Surface Water for Irrigation		
Test	Method Description	Default Detection Limit
Free Carbon Dioxide	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO ₂ D 23 rd ed. 2017.	1.0 g/m ³ at 25°C
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 23 rd ed. 2017.	0.1 mS/m
Approx Total Dissolved Salts	Calculation: from Electrical Conductivity.	2 g/m ³
Total Boron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.0053 g/m ³
Total Calcium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.053 g/m ³
Total Copper	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8	0.00053 g/m ³
Total Iron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.021 g/m ³
Total Magnesium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.021 g/m ³
Total Manganese	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8	0.00053 g/m ³
Total Phosphorus	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.021 g/m ³
Total Potassium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.053 g/m ³
Total Sodium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.021 g/m ³
Sodium Absorption Ratio (Total)*	Calculation; from sodium, calcium and magnesium, as follows; $(Na / 23) / [(Ca / 20 + Mg / 12.15)/2]^{0.5}$ where the concentrations for these ions (Na, Ca and Mg) are expressed as g/m ³ .	0.2 (mmol/L) ^{0.5}
Adjusted Sodium Absorption Ratio*	Calculation; from sodium, calcium, magnesium carbonate and bicarbonate. Food and Agriculture Organization of the United Nations, Bulletin 31	0.2
Total Zinc	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8	0.0011 g/m ³
Chloride	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 23 rd ed. 2017.	0.5 g/m ³
Nitrate-N	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 23 rd ed. 2017.	0.05 g/m ³
Nitrate	Calculation from Nitrate-N.	0.005 g/m ³
Sulphate	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 23 rd ed. 2017.	0.5 g/m ³

Sample Type: MEDIA General		
Test	Method Description	Default Detection Limit
Individual Tests		
Sample Registration*	Samples were registered according to instructions received.	-
Media & Compost Prep (Dry & Grind)*	Oven dried at 105°C for 24 hours and ground to pass through a 2.0mm screen.	-
Basic Media		
pH	1:1.5 (v/v) Water extraction followed by potentiometric pH determination. In-house.	0.1 pH Units
Electrical Conductivity (EC)	1:1.5 (v/v) Water extraction followed by potentiometric conductivity determination (25°C). In-house.	0.1 mS/cm
Nitrate-N	1:1.5 (v/v) Water extraction followed by Salicylate colorimetry. In-house.	1 mg/L
Ammonium-N	1:1.5 (v/v) Water extraction followed by Berthelot colorimetry. In-house.	1 mg/L
Phosphorus	1:1.5 (v/v) Water extraction followed by ICP-OES. In-house.	1 mg/L
Sulphur	1:1.5 (v/v) Water extraction followed by ICP-OES. In-house.	1 mg/L
Potassium	1:1.5 (v/v) Water extraction followed by ICP-OES. In-house.	1 mg/L
Calcium	1:1.5 (v/v) Water extraction followed by ICP-OES. In-house.	1 mg/L
Magnesium	1:1.5 (v/v) Water extraction followed by ICP-OES. In-house.	1 mg/L
Sodium	1:1.5 (v/v) Water extraction followed by ICP-OES. In-house.	1 mg/L
Media Trace Elements		
Iron	2 mM DTPA extraction (Australian Standard 3743-1989) followed by ICP-OES. In-house.	0.2 mg/L

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Sample Type: MEDIA General		
Test	Method Description	Default Detection Limit
Manganese	2 mM DTPA extraction (Australian Standard 3743-1989) followed by ICP-OES. In-house.	0.1 mg/L
Zinc	2 mM DTPA extraction (Australian Standard 3743-1989) followed by ICP-OES. In-house.	0.05 mg/L
Copper	2 mM DTPA extraction (Australian Standard 3743-1989) followed by ICP-OES. In-house.	0.05 mg/L
Boron	2 mM DTPA extraction (Australian Standard 3743-1989) followed by ICP-OES. In-house.	0.05 mg/L

Sample Type: NFT General, Solution		
Test	Method Description	Default Detection Limit
Individual Tests		
Ammonium-N	Berthelot colorimetry. In-house.	1 mg/L
Basic Nutrient		
pH	Potentiometric pH determination. In-house.	0.1 pH Units
Electrical Conductivity	Potentiometric conductivity determination (25°C). In-house.	1 CF
Nitrate-N	IC. In-house.	1 mg/L
Phosphorus	ICP-OES. In-house.	1 mg/L
Potassium	ICP-OES. In-house.	6 mg/L
Sulphur	ICP-OES. In-house.	1 mg/L
Calcium	ICP-OES. In-house.	1 mg/L
Magnesium	ICP-OES. In-house.	1 mg/L
Sodium	ICP-OES. In-house.	1 mg/L
Chloride	IC. In-house.	1 mg/L
Iron	ICP-OES. In-house.	0.2 mg/L
Manganese	ICP-OES. In-house.	0.05 mg/L
Zinc	ICP-OES. In-house.	0.05 mg/L
Copper	ICP-OES. In-house.	0.03 mg/L
Boron	ICP-OES. In-house.	0.05 mg/L
Sum of Cations*		1 me/L
Sum of Anions*		1 me/L

Sample Type: LEAF Blueberry		
Test	Method Description	Default Detection Limit
Individual Tests		
Plant Prep (Dry & Grind)*	Oven dried at 62°C overnight and ground to pass through a 1.0mm screen. By convention for plant analysis, analytical results are reported from this sample fraction and are not corrected for residual moisture (typically 5%), unless units denoted as %DM.	-
Plant Basic		
Nitrogen	Estimated by NIR, calibration based on Total Nitrogen (N) by Dumas combustion. To correct result to fully dry-basis, multiply by 1.05 (assuming 5% residual moisture).	0.2 %
Phosphorus	Nitric Acid/Hydrogen Peroxide digestion followed by ICP-OES. To correct result to fully dry-basis, multiply by 1.05 (assuming 5% residual moisture). In-house.	0.02 %
Potassium	Nitric Acid/Hydrogen Peroxide digestion followed by ICP-OES. To correct result to fully dry-basis, multiply by 1.05 (assuming 5% residual moisture). In-house.	0.1 %
Sulphur	Nitric Acid/Hydrogen Peroxide digestion followed by ICP-OES. To correct result to fully dry-basis, multiply by 1.05 (assuming 5% residual moisture). In-house.	0.02 %
Calcium	Nitric Acid/Hydrogen Peroxide digestion followed by ICP-OES. To correct result to fully dry-basis, multiply by 1.05 (assuming 5% residual moisture). In-house.	0.02 %

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Sample Type: LEAF Blueberry		
Test	Method Description	Default Detection Limit
Magnesium	Nitric Acid/Hydrogen Peroxide digestion followed by ICP-OES. To correct result to fully dry-basis, multiply by 1.05 (assuming 5% residual moisture). In-house.	0.02 %
Sodium	Nitric Acid/Hydrogen Peroxide digestion followed by ICP-OES. To correct result to fully dry-basis, multiply by 1.05 (assuming 5% residual moisture). In-house.	0.002 %
Iron	Nitric Acid/Hydrogen Peroxide digestion followed by ICP-OES. To correct result to fully dry-basis, multiply by 1.05 (assuming 5% residual moisture). In-house.	5 mg/kg
Manganese	Nitric Acid/Hydrogen Peroxide digestion followed by ICP-OES. To correct result to fully dry-basis, multiply by 1.05 (assuming 5% residual moisture). In-house.	3 mg/kg
Zinc	Nitric Acid/Hydrogen Peroxide digestion followed by ICP-OES. To correct result to fully dry-basis, multiply by 1.05 (assuming 5% residual moisture). In-house.	2 mg/kg
Copper	Nitric Acid/Hydrogen Peroxide digestion followed by ICP-OES. To correct result to fully dry-basis, multiply by 1.05 (assuming 5% residual moisture). In-house.	1 mg/kg
Boron	Nitric Acid/Hydrogen Peroxide digestion followed by ICP-OES. To correct result to fully dry-basis, multiply by 1.05 (assuming 5% residual moisture). In-house.	1 mg/kg

Sample Type: SOIL Blueberry		
Test	Method Description	Default Detection Limit
Individual Tests		
Soil Prep (Dry & Grind)*	Air dried at 35 - 40°C overnight (residual moisture typically 4%) and crushed to pass through a 2mm screen.	-
Soluble Salts (Field)	1:5 soil:water extraction followed by potentiometric determination of conductivity (25°C). Calculated by EC (mS/cm) x 0.35. In-house.	0.05 %
EC (in 1:5 Extract)	Electrical Conductivity measured in 1:5 Soil:Water extract (25°C).	0.01 mS/cm
Basic Soil		
pH	1:2 (v/v) soil:water slurry followed by potentiometric determination of pH. In-house.	0.1 pH Units
Olsen Phosphorus	Olsen extraction followed by Molybdenum Blue colorimetry. In-house method.	1 mg/L
Potassium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	1 MAF units
Calcium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	1 MAF units
Magnesium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	1 MAF units
Sodium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	2 MAF units
Potassium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.01 me/100g
Calcium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.5 me/100g
Magnesium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.04 me/100g
Sodium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.05 me/100g
Potassium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.1 %BS
Calcium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	1 %BS
Magnesium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.2 %BS
Sodium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.1 %BS
CEC	Summation of extractable cations (K, Ca, Mg, Na) and extractable acidity. May be overestimated if soil contains high levels of soluble salts or carbonates. In-house.	2 me/100g
Total Base Saturation	Calculated from Extractable Cations and Cation Exchange Capacity.	5 %
Extractable Soil Sulphur Profile		
Sulphate Sulphur	0.02M Potassium phosphate extraction followed by Ion Chromatography. In-house.	1 mg/kg

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Sample Type: SOIL Blueberry		
Test	Method Description	Default Detection Limit
Extractable Organic Sulphur*	Determined by NIR, calibration based on; 0.02M Potassium phosphate extraction. Total extractable S determined by ICP-OES from which the Sulphate-S is subtracted.	2 mg/kg
Volume Weight	The weight/volume ratio of dried, ground soil. In-house.	0.01 g/mL
Organic Soil Profile		
Potentially Available Nitrogen (15cm Depth)*	Determined either by NIRS or by conventional wet chemistry method of 7-day Anaerobic incubation followed by extraction using 2M KCl followed by Berthelot colorimetry. (Calculation for kgN/ha based on 15cm depth sample). Note that any Mineral N present is included in the AN/AMN result reported.	10 kg/ha
Anaerobically Mineralisable N/Total N Ratio*		0.5 %
Organic Matter*	Organic Matter is 1.72 x Total Carbon.	0.2 %
C/N Ratio*		0.5



This Laboratory is accredited by International Accreditation New Zealand (IANZ).

The tests quoted herein will be performed in accordance with the terms of accreditation, with the exception of tests marked *, which are not accredited.

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