



## Certificate of Analysis

<b>Client:</b> Chris Kura	<b>Lab No:</b> 3209xyz	shvpv1
<b>Address:</b> 123 Kaupapa Street Tokomaru Palmerston North 4474	<b>Date Received:</b> 21-Mar-2023	
	<b>Date Reported:</b> 24-Mar-2023	
	<b>Quote No:</b>	
	<b>Order No:</b>	
	<b>Client Reference:</b>	
	<b>Submitted By:</b> Chris Kura	

**Sample Name:** 01

**Lab Number:** 3209xyz.1

**Sample Type:** SOIL Vegetable (150mm) (S60)

Analysis	Level Found	Medium Range*	Low	Medium	High
pH	pH Units	5.1	5.8 - 6.5		
Olsen Phosphorus	mg/L	10	50 - 100		
Potassium	me/100g	0.26	0.70 - 1.40		
Calcium	me/100g	5.3	6.0 - 12.0		
Magnesium	me/100g	1.13	1.00 - 3.00		
Sodium	me/100g	0.19	0.00 - 0.50		
CEC	me/100g	15	12 - 25		
Total Base Saturation	%	46	60 - 85		
Volume Weight	g/mL	0.86	0.60 - 1.00		
Sulphate Sulphur	mg/kg	14	20 - 50		
Extractable Organic Sulphur*	mg/kg	6	12 - 20		
Potentially Available Nitrogen (15cm Depth)*	kg/ha	183	100 - 150		
Anaerobically Mineralisable N*	µg/g	143			
Organic Matter*	%	7.5	7.0 - 17.0		
Total Carbon*	%	4.4			
Total Nitrogen*	%	0.35	0.30 - 0.60		
C/N Ratio*		12.6			
Anaerobically Mineralisable N/Total N Ratio*	%	4.1			
Soil Sample Depth*†	mm	0-150			
Base Saturation %		K 1.7 Ca 35 Mg 7.5 Na 1.3			
MAF Units		K 5 Ca 6 Mg 22 Na 8			

The above nutrient graph compares the levels found with reference interpretation levels. NOTE: It is important that the correct sample type be assigned, and that the recommended sampling procedure has been followed. R J Hill Laboratories Limited does not accept any responsibility for the resulting use of this information. IANZ Accreditation does not apply to comments and interpretations, i.e. the 'Range Levels' and subsequent graphs.



This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked \* or any comments and interpretations, which are not accredited.



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### Soil Analysis Results

<b>Sample Name:</b>	01					
<b>Lab Number:</b>	3209xyz.1					
<b>Sample Type:</b>	SOIL Vegetable (150mm)					
<b>Sample Type Code:</b>	S60					
pH	pH Units	5.1	-	-	-	-
Olsen Phosphorus	mg/L	10	-	-	-	-
Potassium	me/100g	0.26	-	-	-	-
Potassium	%BS	1.7	-	-	-	-
Potassium	MAF units	5	-	-	-	-
Calcium	me/100g	5.3	-	-	-	-
Calcium	%BS	35	-	-	-	-
Calcium	MAF units	6	-	-	-	-
Magnesium	me/100g	1.13	-	-	-	-
Magnesium	%BS	7.5	-	-	-	-
Magnesium	MAF units	22	-	-	-	-
Sodium	me/100g	0.19	-	-	-	-
Sodium	%BS	1.3	-	-	-	-
Sodium	MAF units	8	-	-	-	-
CEC	me/100g	15	-	-	-	-
Total Base Saturation	%	46	-	-	-	-
Volume Weight	g/mL	0.86	-	-	-	-
Sulphate Sulphur	mg/kg	14	-	-	-	-
Extractable Organic Sulphur*	mg/kg	6	-	-	-	-
Potentially Available Nitrogen (15cm Depth)*	kg/ha	183	-	-	-	-
Anaerobically Mineralisable N*	µg/g	143	-	-	-	-
Organic Matter*	%	7.5	-	-	-	-
Total Carbon*	%	4.4	-	-	-	-
Total Nitrogen*	%	0.35	-	-	-	-
C/N Ratio*		12.6	-	-	-	-
Anaerobically Mineralisable N/Total% N Ratio*		4.1	-	-	-	-
Soil Sample Depth**	mm	0-150	-	-	-	-



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### Analyst's Comments

† Customer supplied data. Please note: Hill Laboratories cannot be held responsible for the validity of this customer supplied data, or any subsequent calculations that rely on this information.

#### Sample 1 Comment:

The medium or optimum range guidelines shown in the histogram report relate to sampling protocols as per Hill Laboratories' crop guides and are based on reference values where these are published. Results for samples collected to different depths than those described in the crop guide should be interpreted with caution. For pastoral soils, the medium ranges are specific for a 75mm sample depth, but if a 150mm sampling depth is used the nutrient levels measured may appear low against these ranges, as nutrients are typically more concentrated in the top of the soil profile. These soil profile differences are altered upon cultivation or contouring. Further explanation of the derivation of the medium and optimum ranges is available on request.

#### Sample 1 Comment:

The Potentially Available Nitrogen (kg/ha) test above assumes the sample is taken to a 15 cm depth. If the depth is 7.5 cm, then the result reported above should be divided by two.

To calculate Potentially Available Nitrogen (as kgN/ha) for other sample depths use the reported Anaerobic Mineralisable Nitrogen (AMN) result in the following equation:

$$AN \text{ (kg/ha)} = AMN \text{ (}\mu\text{g/g)} \times VW \text{ (g/ml)} \times \text{sample depth (cm)} \times 0.1$$

Note that the AN and AMN results reported include the readily available Mineral N (NH<sub>4</sub>-N and NO<sub>3</sub>-N) fraction, which is typically quite low.

## 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: Soil			
Test	Method Description	Default Detection Limit	Sample No
Sample Registration*	Samples were registered according to instructions received.	-	1
Soil Prep (Dry & Grind)*	Air dried at 35 - 40°C overnight (residual moisture typically 4%) and crushed to pass through a 2mm screen.	-	1
pH	1:2 (v/v) soil:water slurry followed by potentiometric determination of pH. In-house.	0.1 pH Units	1
Olsen Phosphorus	Olsen extraction followed by Molybdenum Blue colorimetry. In-house method.	1 mg/L	1
Sulphate Sulphur	0.02M Potassium phosphate extraction followed by Ion Chromatography. In-house.	1 mg/kg	1
Potassium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	1 MAF units	1
Calcium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	1 MAF units	1
Magnesium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	1 MAF units	1
Sodium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	2 MAF units	1
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	1



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### Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Potentially Available Nitrogen*	Determined by NIR, calibration based on Available N by Anaerobic incubation followed by extraction using 2M KCl followed by Berthelot colorimetry. (Calculation based on 15cm depth sample). Note that any Mineral N present is included in the AN/AMN result reported.	10 kg/ha	1
Anaerobically Mineralisable N*	As for Potentially Available Nitrogen but reported as µg/g.	5 µg/g	1
Organic Matter*	Organic Matter is 1.72 x Total Carbon.	0.2 %	1
Total Carbon*	Determined by NIR, calibration based on Total Carbon by Dumas combustion.	0.1 %	1
Total Nitrogen*	Determined by NIR, calibration based on Total N by Dumas combustion.	0.04 %	1
Potassium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.01 me/100g	1
Calcium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.5 me/100g	1
Magnesium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.04 me/100g	1
Sodium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.05 me/100g	1
Potassium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.1 %BS	1
Calcium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	1 %BS	1
Magnesium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.2 %BS	1
Sodium	1M Neutral ammonium acetate extraction followed by ICP-OES. In-house.	0.1 %BS	1
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	1
Total Base Saturation	Calculated from Extractable Cations and Cation Exchange Capacity.	5 %	1
Volume Weight	The weight/volume ratio of dried, ground soil. In-house.	0.01 g/mL	1

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

Testing was completed between 22-Mar-2023 and 24-Mar-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.

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Wendy Homewood  
Operations Support - Agriculture