

Measurement Of Calcium In Soil

LAQUAtwin is a series of pocket ION meters. Using Ion Selective Electrode (ISE) technology, they are available for measuring Conductivity, Calcium, Nitrate, Potassium, Sodium, Salt concentration and pH measurement. Using just a tiny amount of sample, the LAQUAtwin proprietary flat sensors can quickly and accurately measure the values of the chemical parameters in the field.



Introduction

All plants need calcium rich soil to grow. The calcium is used by the plant in developing the plant cell walls and membranes. Furthermore, it is a non-leaching mineral (it will stay in the soil) and will improve water penetrability and reduce soil salinity. It is thus helpful to determine the amount of calcium contained in soil. Generally, Atomic Absorption Instruments (AA) or Inductivity Coupled Plasma-Optical Emission Spectrometry Instruments (ICP-OES) are used to measure the amount of calcium ions present in soil. An easier method involves extracting the calcium ion from sample soils with 1 mol/L ammonium acetate (CH₃COONH₄), and then by using the handy and affordable LAQUAtwin calcium ion meter B-751. The LAQUAtwin Ca²⁺ meter is used as a quick check to determine the Calcium content of soil.

Method

1. Dry the soil for about a week, and sift it using a 2mm diameter net sieve.
2. Place 1g of test soil in 100mL glass beaker and add the 20 mL of 1mol/L CH₃COONH₄ to the beakers.
3. Shake the beakers (amplitude 40m/min, speed 250 rpm) for 1 hour to extract Ca²⁺ from the soil using a laboratory shaker (Recipro Shaker SR-IIW made by Taiyo Kagaku Kogyo Company of Japan).
4. Filter the liquid through JIS No.6 filter paper.
5. Calibrate LAQUAtwin B-751 with 150mg/L and 2000mg/L Ca²⁺ standard solutions which contain the same

concentration of CH₃COONH₄ as in the filtered samples. (Do not use the standard solutions packed with the instrument)

6. A small sample of the filtered solution is placed on the sensor of the LAQUAtwin Ca²⁺ and measured. To repeat sampling, wash with tap water and pat dry with a paper tissue.

Results and Benefits

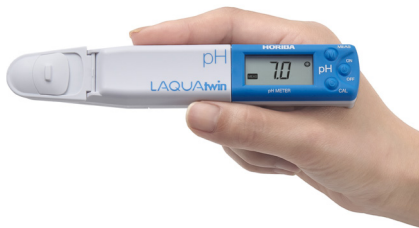
The use of accurate Calcium ion testing in controlling the calcium content of soil ensures that the plants which are grown in the soil are given the necessary minerals and can easily absorb water. The table below shows that the results given by the LAQUAtwin Ca²⁺ pocket meter are comparable to those from Inductivity Coupled Plasma-Optical Emission Spectrometry Instruments (ICP-OES).

Soil types	Measured Ca ²⁺ concentration (mg/L)		CaO converted values (mg/100g of air-dried soil)	
	ICP-OES	LAQUAtwin B-751	ICP-OES	LAQUAtwin B-751
For bell pepper	130	140	360	390
For tomato	110	120	310	340
For spinach	82	88	230	240
For lettuce	88	97	240	270
For kale	59	68	160	190

The LAQUAtwin Ca²⁺ pocket meter is small and compact; convenient to carry around in your pocket for quick on-site testing. Its easy-to-use interface is simple for anyone to use the LAQUAtwin Ca²⁺ pocket meter.

LAQUAtwin

Unique Features



LAQUAtwin: the only meters with flat sensor technology.

HORIBA's highly-sensitive, flat sensor technology opens up new possibilities for sampling and sample types. Only a small amount of sample is required, so you can easily sample in situ without the need for beakers or other labware. Sensors are easily replaced as required.

Calibrate and measure at the touch of a button—the smiley face will tell you when the result can be read.

Hassle-free automatic calibration with a few drops of standard solution reassures you of your measurement accuracy. Two-point calibration is also possible.*1

*1 Except for B-711



LAQUAtwin is fully waterproof and dustproof.

The meter and sensor are fully waterproof*3 and dustproof, so you can take it anywhere.

*3 IP67 rated. Will withstand immersion for 30 minutes at 1 m. Not suitable for underwater use.

Carry case comes as standard for handy portability.

The compact carry case contains everything you need for your measurements, including the standard solution and sampling sheets.



1 X 6

One meter, six methods.

Only LAQUAtwin allows you to be this flexible!

Choose the best method according to your sample, your situation, and your needs.



01 Immersion

When you're in the lab, you can test the sample in a beaker. Ensure the sensor guard sliding cap is open.



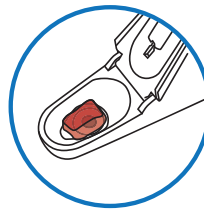
02 Scoop

Use as a scoop to test water eg from a river. A vertical scoop for an aquarium is also available with a unique sensor guard.



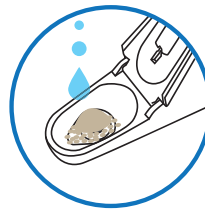
03 Drops

Place a drop of the sample onto the sensor with a pipette. LAQUAtwin meters can measure sample volume as low as 0.1mL



04 Solid Samples

Foods containing some moisture can be tested by placing a small piece directly onto the sensor.



05 Powders

LAQUAtwin meters can also test dry powders. Simply place the powder sample onto the sensor and drop on your defined volume of pure water.



06 Paper and textiles

To test sheets of paper and textiles, cut up the sample into small pieces and place directly onto the sensor. Drop on your defined volume of pure water.

pH



Accurate pH measurements in a few seconds, from a single drop.

Water pH varies in different environments, and a slight change can often have a major effect.

Whether you need to keep the pH of an aquarium within tight limits, are checking for the acidity of rain water or for the quality of meat and fish products, LAQUAtwin compact pH meters are ideal for you. No matter where and when you need to test.

COND



Determine water conductivity with as little as 0.12 mL of sample.

The conductivity of rain water is a trusted guide to determining atmospheric purity. In agriculture, measuring the conductivity of soil allows farmers and agronomists to determine optimum fertilizer usage and check the 'health' of soil after salt water damage. The LAQUAtwin meter makes conductivity testing simple, anywhere.

Na+



Only compact meter for a quick and reliable measurement of sodium ion at the scene using ion selective membrane.

K+



Only compact meter for a quick and reliable measurement of potassium ion at the scene using ion selective membrane.

NO3-



Only compact meter for a quick and reliable measurement of nitrate ion at the scene. Special application packages for crop (B-741) and soil (B-742) are also available.

Ca2+



Only compact meter for a quick and reliable measurement of ionized calcium at the scene using ion selective membrane.



<http://www.horiba.com/laquatwin>

IMS

HORIBA Group is operating Integrated Management System (IMS)
ISO9001 JOA-0298 / ISO14001 JOA-E-90039 / ISO13485
JOA-MD0010 / OHSAS18001 JOA-OH0068

