

Measurement Of Calcium In Drinking Water

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

It is helpful to determine the amount of calcium contained in water, since this will enable one to ascertain whether the water is hard, or if the water (if drinking water) has minerals. This can be determined using atomic absorption spectroscopy (AA) or inductively coupled plasma atomic emission spectroscopy (ICP). However, a much simpler way is by ionizing acid-bound calcium using acidizing pretreatment. The LAQUAtwin Ca²⁺ can be used to measure the total amount of calcium.

The LAQUAtwin Ca²⁺ meter is used as check to determine the Calcium content of water products before selling to consumers. This is an easy, quick method used to check the amount of calcium present in water.

Method

Pretreatment procedure

1. Place 5 mL of sample solution in a 100 ml beaker.
2. Add 10 to 40 μ L of 5M hydrochloric acid to the sample solution and confirm that it has a pH of around 2. Return the sample solution to the beaker.
3. Add 15 to 20 mL of tris-hydroxy-aminomethane buffer solution with a pH of 6.95 to the solution created in step 2 (thereby diluting it by a factor of 4 to 5) and confirm its pH has changed to around 6 using LAQUAtwin pH.

A small sample of this 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 quality and calcium content of water products ensures that consumers are accurately able to gauge their calcium intake. It also enables one to determine whether or not scaling will occur with boiling of their water.

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

¹For each type of sample, the following table shows the labeled value, together with the values measured by various methods. Figure 1 shows the correlation between LAQUAtwin Ca²⁺ data and that from ion chromatography for pretreated and non pretreated samples. Figure 2 shows the correlation between LAQUAtwin Ca²⁺ data and that from other methods for a pretreated sample. Calcium rich mineral water contains calcium sulfate and calcium carbonate, and these were ionized by pretreatment. The data for total Ca amount obtained by LAQUAtwin Ca²⁺ shows better correlation with other methods when the sample has been pretreated.

Fig. 1 Correlation of Calcium concentration between LAQUAtwinCa²⁺ and IC method

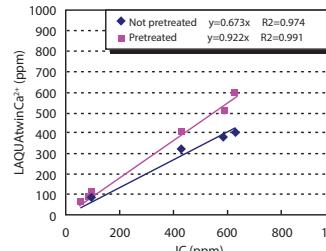
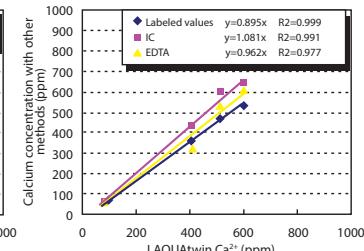


Fig. 1 Correlation of Calcium concentration between LAQUAtwinCa²⁺ and other methods

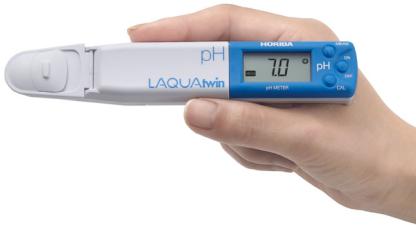


¹Internal study by HORIBA labs, 2013

Pocket ION Meter

LAQUAtwin

Unique Features



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: 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.



LAQUAtwin is fully waterproof and dustproof.

The meter and sensor are fully waterproof³ 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 breaker. Ensure the sensor guard sliding cap is open.



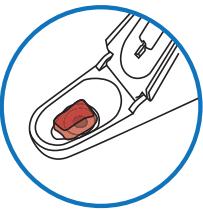
02 Scoop

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.

Lineup



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.

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.

Na+



IMS

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

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



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

