

Measurement Of Sodium In Athletes' Sweat

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 useful to determine the amount of sodium present in sweat as replacing sodium (Na+) lost from sweating plays an important role in preventing fluid and electrolyte imbalances. By finding the amount of sodium lost, one may estimate the amount of electrolyte that should be replaced.

Sweat can usually be tested for sodium content by a ion chromatography techniques in analytical laboratories. But most athletes do not have ready access to such facilities. The Horiba ion tester can be used instead of the traditional ion chromatography in order to determine the amount of sodium in sweat

The LAQUAtwin Na+ meter is used as simple test to determine the Sodium ion content of sweat in order to replace the electrolytes after intense activity. This is an easy, quick method used to check the amount of sodium present in sweat.

Method

When the subject has begun to sweat, the target sites must be cleaned with deionized water and dried. Then, sterile patches can be applied directly onto the right anterior mid-thigh, right posterior mid forearm, left posterior mid forearm, upper chest, right scapula, left scapula, and forehead. The subjects should then continue with their strenuous activity and the patches removed just before they are saturated with sweat.

Sweat is then extracted from the patches. A small sample of the sweat solution extracted is placed on the sensor of the LAQUAtwin Na+ and measured. To repeat sampling, wash the sensor with tap water and pat dry with a paper tissue.

Results and Benefits

By using accurate Sodium ion testing for sweat in athletes, we can determine the electrolyte imbalance and thus athletes can better address this by optimising their electrolyte intake during activity.

Though ion chromatography is the gold laboratory standard, the results derived by Horiba's ion analysis alternate method are not only simpler to acquire, but also accurate.

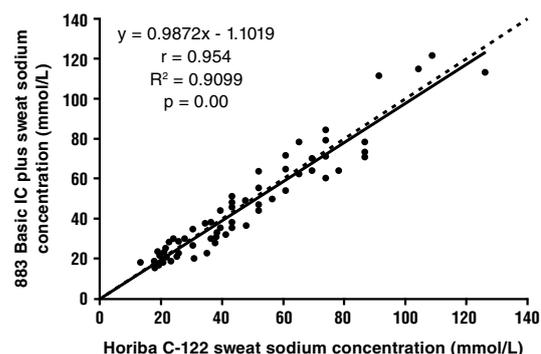
According to a study by Gatorade Sports Science Institute, 'On the basis of typical error of the measurement results, sweat [Na+] and [K+] obtained with HORIBA falls within ±15.4 mEq/L and ±0.68 mEq/L, respectively 95% of the time'.

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

Reference:

Lindsay B. Baker, Corey T. Ungaro, Kelly A. Barnes, Ryan P. Nuccio, Adam J. Reimel, and John R. Stofan "Validity and reliability of a field technique for sweat Na+ and K+ analysis during exercise in a hot-humid environment" *Physiological Reports* Vol. 2 Issue 5 (2014)

Eric D. B. Goulet, Tommy Dion, and Étienne Myette-Côté "Validity and reliability of the Horiba C-1 compact sodium analyzer in sweat sample of athletes" *European Journal of Applied Physiology* (2012)



Inter-analyzer correlation plot for the Horiba C-122 versus 883 Basic IC plus analyzer. The dashed line represents the line of identity

Pocket ION 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.



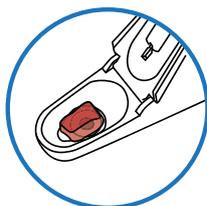
02 Scoop

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.

Lineup

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

