Measuring Sodium Content in Chili Sauce with LAQUAtwin Na-11 Pocket Meter

Chili sauces may contain high amount of sodium from dissolved salts. To measure the sodium content in chili sauce, simply dilute a weighed sample with distilled or deionized water and then place some drops onto the sensor of LAQUAtwin Na-11 pocket meter. The meter measures the sodium content accurately and displays the result in either parts per million (ppm) or mg/L in just a few seconds.

Introduction

Salt, chemically known as sodium chloride (NaCl), is a commonly used seasoning ingredient that serves as flavour enhancer and preservative in packaged or processed foods. It aids in balancing sweetness and suppressing bitterness. It also keeps the growth of pathogenic organisms at bay. Most bacteria, fungi, and other potentially pathogenic organisms cannot survive in a highly salty environment. Such environment is hypertonic, which will dehydrate any living cell causing it to die or temporarily inactivated.

Chili sauce is a popular condiment that adds spice and flavour to food. It may be hot, sweet, or a combination thereof, and may have a thicker texture and viscosity compared to that of hot sauces. The ingredients of chili sauces vary, but typically include cooked chili peppers, vinegar, sugar, salt and sometimes red tomato.

Chili sauces may contain varying amounts of salt. Salt is soluble in water. It contains 40% sodium (Na), which is a mineral required by the body in small amount for maintaining blood pressure and fluid balance as well as transmitting nerve impulses. Besides salt, sodium is also found in monosodium glutamate (MSG), baking soda, and baking powder. Too much sodium can increase blood pressure and damage kidneys.

The LAQUAtwin Na-11 pocket meter offers fast, simple, and easy way of measuring sodium content in packaged or processed foods such as chili sauces. This waterproof pocket meter measures the sodium concentration in micro volume sample ~ 0.3ml when directly placed onto the sensor or 0.05ml with sampling sheet. The replaceable sensor is designed with small sample well, which is embedded with flat sodium ion selective sensor. The reading on the backlit LCD can be expressed as mg/L or parts per million (ppm).

Method

Meter Set-up and Calibration

Calibrate the meter according to manufacturer's instructions using 150ppm and 2000ppm sodium standards that come with the kit.

Sample Preparation and Measurement

1. Weigh a portion of the chili sauce and add distilled or deionized water.

   Example: 2 to 10 grams of chili sauce diluted to 100 ml or grams with DI water in a volumetric flask.

2. Mix the diluted sample thoroughly.
3. Using a dropper, place some drops of diluted sample onto the sensor.
4. Record the stable reading.

Chili sauce should be diluted with distilled or deionized water to liberate the salt. The reading of the diluted sample should fall within the calibrated measurement range of the meter. To obtain accurate results, a uniform temperature should be maintained for the standards and samples.

After measurement, clean the sensor with detergent and warm water. If there are still sample residues or stains after cleaning, place some drops of household bleach (≤5% sodium hypochlorite) onto the sensor and leave it for 5 to 30 minutes. Rinse the sensor with clean water and blot dry with soft tissue. For more information on maintenance, refer to Technical Tip 2: LAQUAtwin Ion Sensor Maintenance Procedures.

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Results and Benefits

For packaged or processed foods, sodium is listed as milligrams (mg) per serving as well as per 100g on the nutrition information panel of the label, rather than salt. Table 1 shows the measurement results of chili sauce with LAQUAtwin Na-11 pocket meter.

Table 1: Measurement Results of Chili Sauce with LAQUAtwin Na-11 Pocket Meter

A	Sodium (mg / 100g) on Bottle Label	4520
B	Chili Sauce Weight (g)	2.3185
C	Volume (ml) or weight (g) After Dilution	100
D	LAQUAtwin Na-11 Pocket Meter Reading (ppm)	1000
E	Calculated Na (mg / 100g)	4313
F	Calculated NaCl Salt (g / 100g)	10.96
G	Recovery (%)	95

To calculate the amount of salt from sodium reading obtained with LAQUAtwin Na-11 pocket meter, use the equations in Table 2. Refer to the values in Table 1 to follow the sample calculations.

Table 2: Sodium and Sodium Chloride Conversions

Meter Reading	1000ppm Na =1000 mg Na / L or Kg dil. chili sauce
Na (mg / 100g)	Meter reading (D) x Dilution Factor (C/B) x 100
	$\frac{1000\text{ mg Na}}{\text{L (Kg)}} \times \frac{0.1\text{L (Kg)}}{2.3185\text{g}} \times 100\text{g}$
NaCl Salt (g / 100g)	Na per 100g (E) x $\frac{\text{NaCl molar mass}}{\text{Na molar mass}} \times \frac{1}{1000}$
	$4313\text{mg Na} \times \frac{58.44\text{ NaCl}}{22.99\text{ Na}} \times \frac{\text{g}}{1000\text{mg}}$
Recovery (%)	$\frac{\text{Calculated Sodium mg / 100g (E)}}{\text{Listed Sodium mg / 100g on Label (A)}} \times 100$
	$\frac{4313}{4520} \times 100$

According to the National Health Group Pharmacy in Singapore, adults should limit the amount of salt to one teaspoon per day, which is about 5g of salt or 2g of sodium. To ensure that you are not taking more than that amount, always check the amount of sodium per serving on the nutrition information panel of your chili sauce and other packaged or processed food. If that information is not available, simply perform a quick sodium test with LAQUAtwin Na-11 pocket meter.

References and Suggested Readings

1. Chili Sauce. Wikipedia. https://en.wikipedia.org/wiki/Chili_sauce
2. National Healthcare Group Pharmacy. All About Salt. https://www.pharmacy.nhg.com.sg/All_About_Salt/

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