

Measuring Salt Concentration in a Brine Solution

Description:

Traditionally, salt was added to food as a form of preservation. Since the invention of refrigeration, salt is more commonly used to enhance flavor but its ability to reduce microbial growth, improve texture, and increase shelf life are still utilized. In some food preparations, such as cold smoked salmon, the curing process remains essential for preservation and shelf life of the fish. In the case of cold smoked salmon, the salmon is cured by soaking in a brine solution (a mixture of salt, pepper, and spices) for up to 3 days, before being cold smoked. Cold smoking is a process of smoking the fish over low heat for an extended period of time, and results in a more delicate texture and milder flavors than hot smoking. The salmon is cold smoked in a smoke house at temperatures ranging from 70- 90°F (21-32°C), and this process can take anywhere from 4 hours to 3 weeks. The heat in the smoking process is so low that the salmon never truly cooks, which is why proper curing of the salmon is so important.



Application:

A customer approached Hanna Instruments because they wanted to measure the salt concentration of their brine solution for curing salmon. The salt concentration of a brine solution is often reported in salometer degrees or °SAL, which is a scale based on how saturated a solution is with salt. A simple conversion from %NaCl to °SAL made the **HI96821** a perfect fit for measuring the brine solution. Since a fully saturated brine solution contains 26.4% present salt, the value obtained in %NaCl can be divided by 0.264 to express the results in °SAL. A solution of 60°SAL was needed. Based on the conversion the equivalent reading for the HI96821 is 15.8% (g/mL). A brine solution was made and tested to ensure all of the salt dissolved, and then checked periodically to ensure the concentration of the brine hadn't changed over time.

The HI96821 has a dual level LCD making it easy to view both the result and the temperature. Since it uses the refractive index to determine the sodium chloride concentration, the analysis is simple and fast, requiring only 100 µL of sample and taking only 1.5 seconds per test. The

fast analysis and small sample size made taking many measurements easy for the customer. The HI96821 has automatic temperature compensation (ATC), which is an algorithm based on the changes in density of NaCl with temperature. The HI96821 is easy to calibrate by placing a small sample of deionized water on the stainless steel sample well, which is easy to clean. The customer appreciated the durability since they had to replace salometers in the past due to glass breakage. The customer also appreciated the IP65 water resistance rating of the meter, making it easy to clean in fresh water.

