



Monitoring TA Throughout Cheese Production

Description

Dairy products are an important contribution to the human diet. Dairy provides high-quality protein and are good sources of vitamins such as A, D, and B-12, and minerals such as calcium, magnesium, potassium, zinc, and phosphorus. In the United States, the way people are consuming dairy products is changing. Since the 1970's, milk consumption per capita in the United States has been steadily decreasing, while consumption of other dairy products, such as cheese, yogurt, and sour cream, is increasing. This shift in consumption has prompted an increase in the production of specialty dairy products.

No matter what the final product will be, the starting quality of the milk and cream being used has significant impacts on the quality of the final product. Fresh milk should have a pH of 6.7-6.5 and a titratable acidity of 0.10-0.25% lactic acid. Values outside of this range can indicate potential cow illness or microbial spoilage from contamination or improper storage. The presence of undesirable bacteria will convert the sugars in milk to lactic acid as spoilage occurs; however, the pH of milk is buffered due to naturally present salts such as citrates, phosphates, and lactates. This means a significant amount of acid development can occur before a change in pH is observed. Therefore, both pH and acidity must be measured to properly assess microbial spoilage.

Application

A specialty cheese and yogurt manufacturer contacted Hanna Instruments for a way to measure the pH and acidity of their initial milk quality and final products. Since the customer was purchasing raw, unpasteurized milk for their cheeses, the initial milk quality was especially important. They were performing manual titrations for acidity using

phenolphthalein as a color indicator, but were unhappy with the repeatability and consistency of their results. They were looking to move from a manual titration with a color indicator to a pH endpoint of 8.3. Because pH 8.3 is the point that phenolphthalein changes from colorless to pale pink, a titration to pH 8.3 would still comply with their standard method while removing the subjectivity of a color indicator endpoint.

Hanna Instruments offered the **HI84529** Mini Titrator for Measuring Titratable Acidity in Dairy Products. The HI84529 is a single-parameter automatic titrator and pH meter at the same price point as a bench top pH meter. The HI84529 titrates to a user-selectable fixed pH endpoint from pH 8.0-8.7. The HI84529 has two measurement ranges for optimal accuracy: the low range measures from 0.01-0.20 % lactic acid with an accuracy of ± 0.01 , and the high range from 0.1-2.0% lactic acid with an accuracy of ± 0.1 . The customer appreciated that the HI84529 features a piston-driven dosing pump capable of accurate dynamic dosing, providing better endpoint resolution than their manual burette.

The HI84529 includes application specific electrodes for pH and TA measurement, the **FC260B** half-cell glass body pH electrode and **HI5315** reference half-cell. The FC260B utilizes a low-temperature glass formulation for faster response and better stability at the temperatures dairy products are stored. The HI5315 reference junction features an open, flushable reference junction that will not get clogged by the fats and proteins present in dairy. The customer appreciated the ability to calibrate the unit at up to three points, using the four predefined buffers pH 4.01, pH 7.01, pH 8.30, and pH 10.01. The calibration points allowed them to bracket their expected values for their fresh milk, post-fermentation cheese and yogurt, and their TA titration endpoint.

This easy-to-use meter is ideal for routine measurements. The "Tutorial Mode" feature walks the user through each measurement step, ensuring the sample preparation and the measurement are taken correctly every time. Hanna's exclusive CAL Check™ feature alerted the customer of any potential problems during calibration, such as a dirty electrode or contaminated buffer, and provided an overall probe condition readout after calibration. This allowed them to easily determine if the electrode was in good working condition and properly calibrated. The ability to measure a sample size by volume or by weight made it easy for the customer to switch between their liquid samples (milk) and solid and semi-solid samples (cheese and yogurt). Finally, the customer was pleased with the increased traceability of their testing provided by the data logging ability of the HI84529 for both pH and TA results. Overall, the HI84529 was the ideal solution for their pH and TA testing needs.

