AN #: 07_029_11_001
Market: Food & Dairy
Subcategory: Condiments
Product: HI902, HI921, FC210B

Acidity of Mayonnaise

Description

Sauces and dressings are often used as cooking mediums, tenderizers, and enhancers. Food scientists use a variety of these products to enhance flavor. Among sauces, mayonnaise is extremely popular both in homes and in the restaurants. While the exact origin of mayonnaise is unknown, one belief is that it was invented by accident; in 1756, a French chef was preparing a sauce made of cream and eggs. The chef realized he did not have cream and used oil instead. Popularity spread across Europe and eventually to the U.S., when a German immigrant named Richard Hellmann opened a delicatessen in New York City. Many of his salads were prepared with his wife's mayonnaise recipe, and customers requested to purchase the product.

Mayonnaise is comprised of a mixture of vinegar, oil, eggs or egg yolk, spices, and water. The ingredients are often shipped in and stored in different holding tanks until ready to be mixed. The vinegar and egg are first mixed together, and then gradually the oil is added. The eggs contain lecithin, an emulsifier, which keeps the oil and water from separating while the ingredients are mixing. The final product is tested and then packaged for consumer use.

In mayonnaise production, many parameters are measured in the raw materials as well as the final product. In the final product, pH and acidity are measured to ensure shelf stability. For mayonnaise, the desired pH in the finished product is between 3.60 and 4.00 and desired total acidity is from 0.29% and 0.50% acetic acid. If the finished product is outside of these ranges, the risk of microbial growth greatly increases.

Application

A mayonnaise producer contacted Hanna Instruments about measuring pH and total acidity in their final product. For the acidity measurement they wanted to follow AOAC method 935.57 using 0.1M NaOH as the titrant and reporting acidity as acetic acid, the major acid present in vinegar. The customer also wanted to perform multiple analyses in a timely manner. The **HI902** Potentiometric Titrator and **HI921** Autosampler were suggested for their quality control needs.

Hanna Instruments also recommended the **FC210B** Foodcare pH Electrode for Creams for their testing. The open junction design ensured fast response time, was not subject to reference junction clogging, and was capable of pH measurements in viscous samples like mayonnaise without having to dilute the sample with water. The customer appreciated the ability to take a direct pH measurement without having to prepare a 1:1 slurry, which was time consuming. It was also important to the customer that when they calibrated their electrode, the GLP data could be viewed to ensure a valid calibration. With the HI902, pH calibration may be performed on up to five calibration points, and GLP information could be included in their direct measurement and titration reports for tracking and traceability.

For their analyses, two titrator and autosampler sequences were developed: a sequence for pH measurement, and a sequence for TA. For the pH method, the customer prepared the sample by filling sample beakers halfway with sample and adding a small amount of DI water. Once the sequence was initiated, the electrode was lowered in the beaker. A customer-defined preanalysis stir time ensured the sample was homogenous before measurement. After this stir time, the meter automatically recorded the pH measurement once the reading stabilized. A pH measurement report was generated for each sample in the tray.

For TA, the customer was preparing a dilution as outlined in the AOAC method. Samples were titrated with NaOH and results were reported as acetic acid. The customer appreciated the ability of the system to accommodate up to 15 samples and 3 rinse beakers in their 18-beaker tray for both their pH and TA sequences. The combination of the HI902C Titrator, HI921 Autosampler, and FC210B FoodCare Electrode provided the customer a comprehensive, accurate, and simple solution to their mayonnaise testing needs.