

Measuring Moisture Content in Butter

Description:

AN #: 07_016_11_001
Subcategory: Butter

Market: Food & Dairy
Product: HI904

Butter is a common dairy product that is used in many recipes because of the rich, creamy feel and flavor. It is used in everything from baking to sautéing and, therefore, is available in a variety of butterfat compositions. Butter is made by churning milk or cream to separate the buttermilk from the butterfat. Butterfat is the main ingredient in butter; typically, commercially produced butter is composed of ~80% butterfat, ~15% water, and ~5% buttermilk solids. In the United States moisture content is regulated by the U.S. Department of Agriculture (USDA). The butterfat and moisture content of the butter will affect the texture and flavor of the final product. For example, in a study done, pie crusts were baked using two types of butter: one with high butterfat content and one with slightly lower butterfat content. In the final products, the butterfat content effected how crispy and buttery flavored the pie crust was.



Clarified butters, such as butter oil and ghee, are more refined products of butter that are used in cooking instead of other oils to give a buttery flavor. Butter is clarified by separating the butterfat and oils from the water and buttermilk solids, resulting in a final product that is almost pure butterfat. This gives clarified butters a longer and more stable shelf life, as well as higher smoke point than traditional butter that makes them more suitable for some cooking applications such as sautéing. If the clarifying process isn't done correctly, excess moisture will cause clarified butters to go rancid more quickly and have a lower smoke point. It is important for butter and clarified butter manufacturers to measure the amount of moisture in their product to make sure that they meet USDA guidelines to provide the best product available to their customer

Application:

Recently, a butter manufacturing company was looking to measure the amount of moisture in their butter oil for quality assurance purposes. Using the **HI904** Karl Fischer Coulometric Titrator, the customer was able to accurately and efficiently measure the moisture of their clarified butter. The recommended range for the HI904 is 1 ppm (0.0001%) to 5% water, which bracketed the customer's expected water concentration of 0.4%. An Applications Engineer analyzed the customer's sample to determine a sufficient sample preparation and a choice of sample size and reagents. It was found a long chained alcohol cosolvent was required to adequately dissolve the sample due to the fats and oils content, and as long as the cosolvent was utilized in the titration cell, the customer could directly enter the

butter oil without performing an external dissolution. The Applications Engineer set up a customized user method that utilized a pretitration stir time to ensure sample dissolution and expressed results in % water, the customer's preferred results units. This method was loaded onto the customer's titrator via the titrator's USB port before shipping so it was ready to run upon arrival. A generator electrode without a diaphragm was recommended to avoid potential clogging of a diaphragm due to viscosity of the sample. The customer appreciated the simplicity of the method and intuitive interface of the titrator itself.

