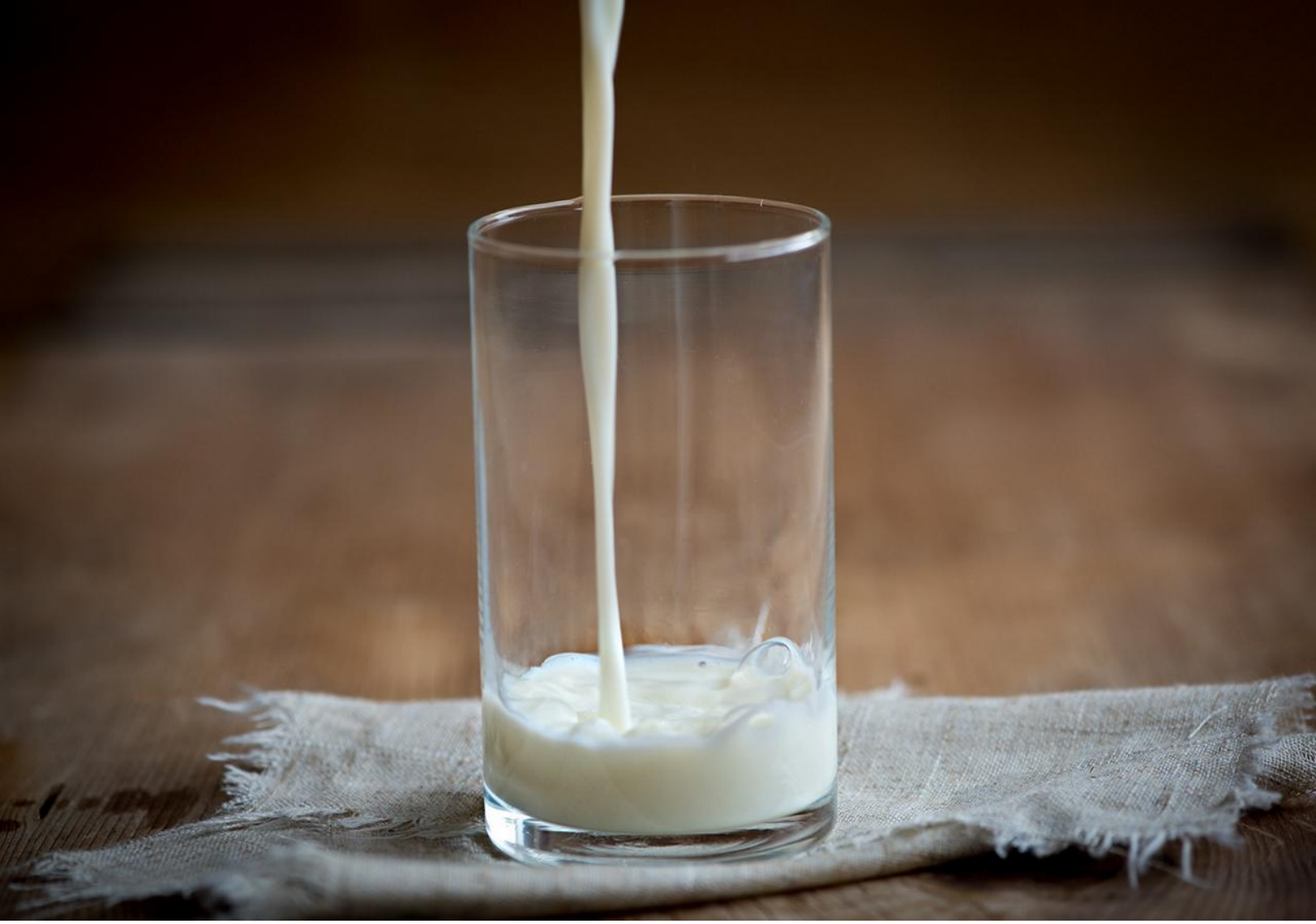

Application Note AN-T-133

Chloride in milk and milk powder

Fully automated determination according to ISO, IDF, and AOAC standards

To maintain product quality, the sodium chloride content in dairy products must be monitored and not exceed the limits defined by the respective public health authorities. The chloride content in food correlates with the salt content, its determination is therefore described in various norms and standards. However, preparation of such samples is time consuming, as it includes a chloride extraction with warm water. Whole milk powders in particular are difficult to handle as an inhomogeneous dispersion of fat in the titration suspension occurs.

In order to reduce the workload, increase sample throughput, and eliminate the matrix challenges posed by high fat products, this Application Note presents a fully automatic potentiometric titration of chloride with silver nitrate in milk and milk powder based on ISO 21422, IDF 242, AOAC 2015.07, AOAC 2015.08, and AOAC 2016.03.

SAMPLE AND SAMPLE PREPARATION

The method is demonstrated for different milk and milk powders: toddler and whole milk powder, milk, salted dairy beverage (e.g., ayran, doogh), and protein shake. All samples are well-mixed before use.

EXPERIMENTAL

This analysis is performed on an automated system consisting of an OMNIS Advanced Titrator and an OMNIS Sample Robot S equipped with a dProfitrode and a dAg-Titrode.

Warm water is added to a reasonable amount of sample. For samples with high fat content, some isopropanol is additionally added. The pH is adjusted with nitric acid to below pH 1.5. The sample is titrated with standardized silver nitrate until after the equivalence point. For automated rinsing of electrodes and burets, isopropanol is used.

Figure 1. OMNIS Sample Robot S, OMNIS Dosing Module and OMNIS Advanced Titrator equipped with dProfitrode and dAg-Titrode for the determination of chloride content.

RESULTS

The analysis demonstrates acceptable results and well-defined titration curves. The results are displayed in Table 1.

Table 1. Mean chloride content of various milk and milk powder products determined with an automated OMNIS system (n = 6).

	Chloride content in mg/100 g sample	SD(rel) in %
Whole milk powder	832.9	0.2
Toddler formula powder milk based	293.7	0.3
Salted dairy beverage	411.8	0.2
Protein shake	88.4	2.7
Organic milk	99.3	0.5

CONCLUSION

Titration is a precise and reliable method to determine the chloride content in dairy products according to various international standards.
Utilization of an OMNIS Sample Robot allows a fully automated determination of up to four samples in parallel, freeing up valuable time of the operator and thus increasing the productivity in the lab. The OMNIS system offers the opportunity to customize the system according to your needs, and expand it for other required titration applications on dairy products, such as the Ca / Mg content or acidity.

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