Dissolved oxygen, conductivity, and pH value in liquid dairy products

Fast and reliable single determination with the 914 pH/DO/Conductometer

Summary

In the food industry, it is essential to determine and monitor certain quality parameters to guarantee consistency. This is especially important for liquid dairy products, which are subject to a strict cold chain. Both the dissolved oxygen (DO) and the pH value have proven to be reliable quality criteria.

Oxygen shortens the shelf life and influences the product quality (e.g., nutritional value, color, and flavor). The DO content depends on the salinity in the sample, which is automatically calculated and corrected by the 914 pH/DO/Conductometer during the parallel conductivity measurement.

Acidity is another important characteristic to measure in liquid dairy products. It can be checked easily using the pH value.

With the 914 pH/DO/Conductometer, all important quality criteria can be monitored with one device. Fast, safe, and reliable analysis for the food industry.

Configuration

2.914.0230 - 914 pH/DO/Conductometer, laboratory version

Portable two-channel pH/DO/conductivity measuring instrument with intelligent measuring input for measuring dissolved oxygen/pH /mV and analog measuring input for conductivity/TDS/salinity and temperature. You will be optimally equipped for measurements in the field and in the laboratory with this battery-operated measuring instrument with a stand plate.Digital measuring input for the O2 Lumitrode or the intelligent pH electrodes; Analog conductivity measuring input for the 4-conductor conductivity measuring cells; Laboratory pH/DO and conductivity measuring instrument with built-in battery pack; Parallel measurement of pH value and conductivity; Parallel measurement of oxygen and conductivity; Robust, water-tight, and dust-tight housing (IP67) for tough outdoor and laboratory use; LCD color display with background illumination making results easy to read; USB interface for simple data export to PC or printer; Large internal memory (10,000 data sets); Pin-protected User mode and Expert mode, prevents unwanted parameter changes; GLP-compliant printout and data export with User ID and timestamp;

6.1116.000 - O2 Lumitrode

The optical sensor for measuring dissolved oxygen (DO) can be used with a 913 pH/DO meter or with a 914 pH/DO conductometer. The measuring principle of the sensor is based on luminescence quenching. The space-saving and maintenance-free sensor is suitable for DO measurement, for example in: Water quality control; Wastewater industry; Beverage production; Fish farming; This sensor is supplied with a calibration vessel, and 3 x 30 mL oxygen standard, 0%. Where necessary, it is easy to replace the measurement cap (O2 cap) which contains the oxygen-intensive luminophore.

6.0917.080 - Conductivity measuring cell c = 0.5 cm-1 with Pt1000 (fixed cable)

4-wire conductivity measuring cell with cell constant c = 0.5 cm-1 (guide value), with integrated Pt1000 temperature sensor and fixed cable for connecting to 912/914 Meters.Thanks to the robust/break-proof plastic shaft made of PEEK, this sensor is mechanically very resistant. The sensor is suitable for measurements of medium conductivities (15 µS/cm to 250 mS/cm), e.g., in:drinking water; surface water; wastewater;

6.0278.300 - iUnitrode with Pt1000

Intelligent, combined pH electrode with integrated memory chip for storing sensor data and Pt1000 temperature sensor. This electrode is particularly suitable:for pH measurements and titrations in difficult, viscous, or alkaline samples; at elevated temperatures; for long-term measurements; The fixed ground-joint diaphragm is insensitive to contamination.Reference electrolyte: c(KCl) = 3 mol/L, storage in storage solution.Alternatively: reference electrolyte for measurements at T>80°C: Idrolyte, storage in Idrolyte.iTrodes can be connected to Titrando, Ti-Touch or 913/914 meters.

Sample and sample preparation

This application is demonstrated on raw milk (untreated and fresh), UHT skimmed milk with 0.1% fat, UHT milk with 1.5% fat, pasteurized milk with 3.5% fat, UHT coffee cream with 15% fat, UHT full-fat cream with 35% fat, and whey drink.

No sample preparation is required.

Experimental

Figure 1. 914 pH/DO/Conductometer equipped with an O2-Lumitrode, conductivity measuring cell, and iUnitrode (missing in the picture) for the determination of DO, K (conductivity), and pH in liquid dairy products.

The determinations are carried out with a 914 pH/DO/Conductometer equipped with an O_2-Lumitrode, conductivity measuring cell, and an iUnitrode. All sensors are pre-calibrated with appropriate standards.

An appropriate amount of sample is poured carefully (to omit entrainment of oxygen) into the sample beaker equipped with a magnetic stir bar.

The sensors are placed directly into the sample. The measurement is started and the corresponding parameters are measured until a stable value is reached. Afterwards, the sensors are removed and cleaned with deionized water.

Results

Table 1. Summarized results for DO, conductivity (K), and pH value in several liquid dairy products.

Sample (n = 6)	DO in mg/L	K in mS/cm	pH value
Raw milk	5.81	4.978	6.65
UHT milk	5.86	5.024	6.74
Skimmed milk	0.87	5.119	6.76
Past. milk	10.65	4.868	6.76
Coffee cream	7.74	4.856	6.94
Full-fat cream	0.47	2.530	6.86
Whey drink	8.87	6.406	4.24

Conclusion

The 914 DO/pH/Conductometer is a fast, precise, and reliable all-in-one solution to determine the dissolved oxygen, conductivity, and pH value in liquid dairy products.

Accurate measurement of all listed parameters takes a few minutes. Thanks to the well-known Metrohm quality, the O_2-Lumitrode is completely maintenance-free while the Conductivity measuring cell and the iUnitrode are easy to use and robust for daily laboratory work.

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