



Application Note AN-I-032

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

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

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.

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

The determinations are carried out with a 914 pH/DO/Conductometer equipped with an O₂-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.



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.

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 O₂-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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