Application Note AN-R-031

Oxidation stability of sausages with PEG

Reliable and accurate determination of the oxidation stability of sausages with the polyethylene glycol method

The antioxidant content in foods is of great interest, especially for meat products such as sausages. In addition to fat, sausages also contain a lot of water. They have a complex matrix including salts and various natural or added antioxidants and stabilizers.

The Metrohm Rancimat method answers the question of how to measure antioxidants in sausages. Using this method with polyethylene glycol (PEG) as carrier material, the antioxidant measurement in sausages can be determined quickly and reliably. The sample is analyzed without any preparation needed. The induction time can be related directly to the antioxidant capacity—and therefore to the possible shelf life of the sample.

This Application Note describes the determination of the oxidation stability of different sausages with the recommended method from Metrohm using an 892 Professional Rancimat.

SAMPLE AND SAMPLE PREPARATION

This application is demonstrated on cervelat and bratwurst sausages.
The sausage samples are measured directly with the Rancimat.
No sample preparation is required.

EXPERIMENTAL

First, an appropriate amount of chopped sausage and PEG are weighed into the reaction vessel, and then the analysis is started.
With the Rancimat method, the sample is exposed to an airflow at a constant temperature of 100–180 °C (Figure 1). Highly volatile secondary oxidation products are transferred into the measuring vessel along with the airflow where they are absorbed in the measuring solution.

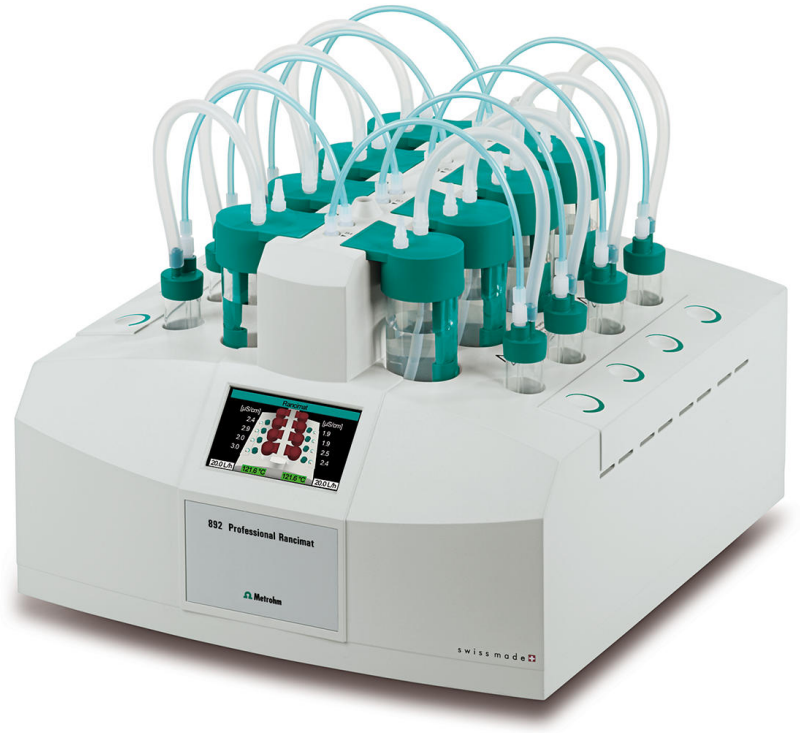

Figure 1. 892 Professional Rancimat equipped with measuring and reaction vessels for the determination of oxidation stability.

The conductivity of the measuring solution is continuously registered. The formation of secondary oxidation products leads to an increase in the conductivity. The time until occurrence of this marked conductivity increase is referred to as the «induction time», which is a good indicator for the oxidation stability (Figure 2).

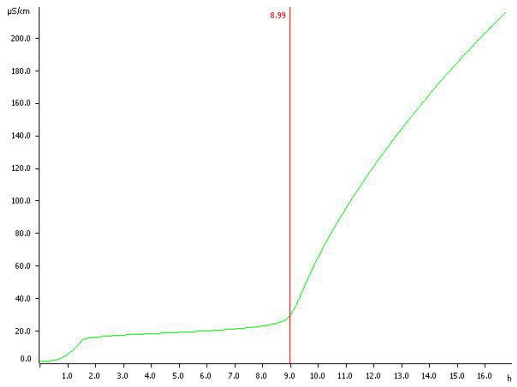

Figure 2. Determination of the oxidation stability of a cervelat sausage. Induction time is determined at 8.99 h.

Table 1. Results of the oxidation stability of sausages with the 892 Professional Rancimat at 100 °C.

Sample (n=4)	Mean value (h)	SD(abs) in h	SD(rel) in %
Cervelat	8.75	0.75	8.6
Bratwurst	2.29	0.17	7.3

Table 2. Results of the oxidation stability of sausages with the 892 Professional Rancimat at 120 °C.

Sample (n=4)	Mean value (h)	SD(abs) in h	SD(rel) in %
Cervelat	1.44	0.06	3.8
Bratwurst	1.99	0.16	8.0

CONCLUSION

Most sausages can be measured directly with the Rancimat for their oxidation stability. This determination helps to guarantee a consistent high quality of the finished product.

Thanks to the PEG method, conclusions can be drawn about both the antioxidants and the stabilizers in the processed end product. Since there is no sample preparation, the direct influence of the entire matrix of the sample is seen, and not just individual components.

With the Rancimat, this quality parameter can easily and simultaneously be determined for eight different samples at a time, increasing quality control laboratory throughput.

CONTACT

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CONFIGURATION

892 Professional Rancimat

The 892 Professional Rancimat is an analysis system for the simple and safe determination of the oxidation stability of natural fats and oils with the well-established Rancimat method. With eight measuring positions in two heating blocks. The built-in display shows the status of the instrument and each individual measuring position. Start buttons for every measuring position enable the measurement start on the instrument. Cleaning effort can be reduced to a minimum through the use of practical disposable reaction vessels and dishwasher-safe accessories. This saves time and costs and significantly improves accuracy and reproducibility.

All accessories necessary for carrying out determinations are included in the scope of delivery. The StabNet software is required for instrument control, data recording and evaluation and for data storage.