# Oxidation stability comparison of AOCS Cd 12b-92 and EN ISO 6886

## No difference found between Metrohm method and norms

The two most commonly used norms for determining the oxidation stability of animal fats and vegetable oils are AOCS Cd 12b-92 and EN ISO 6886. The standard method recommended by Metrohm for this is based on EN ISO 6886.

This Application Note describes the determination and comparison of the oxidation stability of sunflower oil according to AOCS Cd 12b-92, EN ISO 6886, and the recommended method from Metrohm with an 892 Professional Rancimat.

Despite different parameters of the norms and the Metrohm method, it is shown that there is no significant difference found between the results of these experiments.

## SAMPLE AND SAMPLE PREPARATION

The sunflower oil sample is measured directly with the Rancimat without any preparation steps.

Ω Metrohm

## EXPERIMENTAL

For analysis, an appropriate amount of the raw sunflower oil is weighed into the reaction vessel and 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 with the airflow where they are absorbed in the measuring solution. Here, the conductivity is continuously registered.
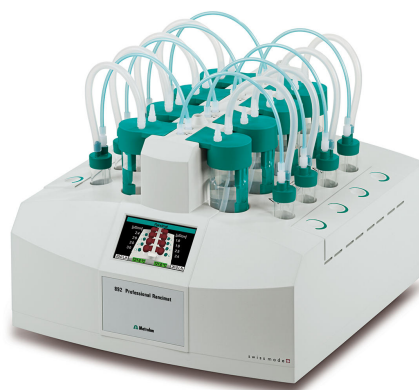


**Figure 1.** 892 Professional Rancimat equipped with measuring and reaction vessels for the determination of oxidation stability.

## EXPERIMENTAL

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).
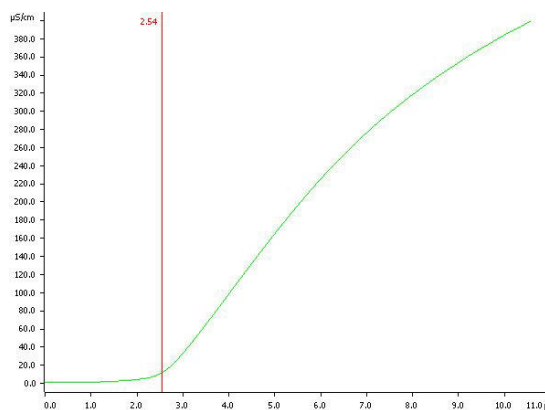


**Figure 2.** Determination of the oxidation stability of sample 4. Induction time is determined to be 2.54 h.

Ω Metrohm

**Table 1.** Overview of the different measuring parameters for the samples. Sample 1 is prepared with 60 mL measuring solution, and samples 2–6 are made with 50 mL measuring solution.

| Sample | According to | Sample size (g) | Gas flow (L/h) |
|---|---|---|---|
| 1 | Metrohm | 3.00 ± 0.01 | 20.0 |
| 2 | EN ISO 6886 | 3.00 ± 0.01 | 10.0 |
| 3 | AOCS Cd 12b-92 | 2.50 ± 0.01 | 9.0 |
| 4 | AOCS Cd 12b-92 | 5.00 ± 0.01 | 9.0 |
| 5 | AOCS Cd 12b-92 | 2.50 ± 0.01 | 20.0 |
| 6 | AOCS Cd 12b-92 | 5.00 ± 0.01 | 20.0 |

**Table 2.** Results of the oxidation stability of sunflower oil with the 892 Professional Rancimat. Determinations were carried out in four-fold for each parameter set mentioned in the norms.

| Sample (n = 4) | Mean value (h) | SD(abs) in h | SD(rel) in % |
|---|---|---|---|
| Sample 1 | 2.57 | 0.05 | 1.8 |
| Sample 2 | 2.51 | 0.06 | 2.4 |
| Sample 3 | 2.53 | 0.08 | 3.4 |
| Sample 4 | 2.51 | 0.04 | 1.5 |
| Sample 5 | 2.75 | 0.06 | 2.1 |
| Sample 6 | 2.56 | 0.04 | 1.5 |

## CONCLUSION

A mean value of 2.57 h induction time is found over all samples (n = 24), with SD(abs) = 0.06 h and SD(rel) = 2.1%. These values meet both the repeatability and the reproducibility requirements listed in AOCS Cd 12b-92 and EN ISO 6886.

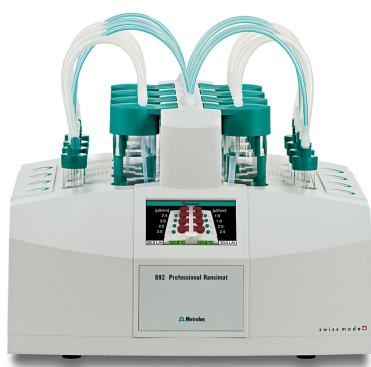Furthermore, all demonstrated methods delivered acceptable values for all samples with SD(rel) ≤10% (Table 2).

Internal reference: AW ST CH-0177-082022

Ω Metrohm

## CONTACT

## 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.



### Equipment for determination of temperature correction with Rancimats and PVC Thermomats.

Set for exact temperature adjustment

Ω Metrohm

## Measuring vessel cover for stability measuring instruments

With built-in conductometric measuring cell.

Ω Metrohm