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.

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SAMPLE AND SAMPLE PREPARATION

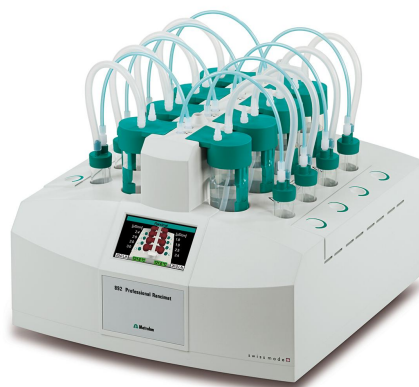The sunflower oil sample is measured directly with the Rancimat without any preparation steps.

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.

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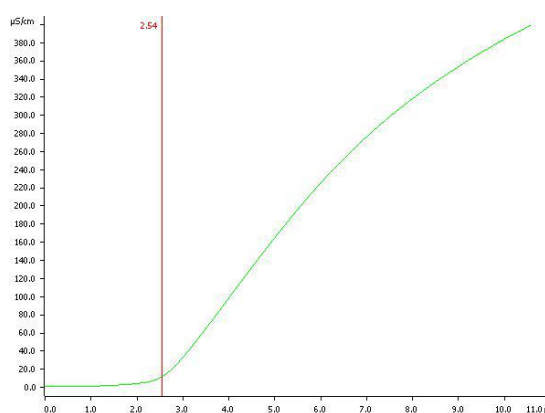
Figure 2. Determination of the oxidation stability of sample 4. Induction time is determined to be 2.54 h.

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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).

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CONFIGURATION

892 Professional Rancimat

892 Professional Rancimat 是用于通已使用多年的 Rancimat 方法来定天然油脂的化定性的分析系,即便又安全。2 个加中共有 8 个量位置。内置示屏可示状和每个量位置。每个量位置都有按,可在器上量。采用用的一次性反管和可使用洗碗机清洗的附件可将清洗工作降至最低。即可省和用,并且也可著提高。

行定所需的所有附件均已包括在准配置内。需要使用 StabNet 件来行器控制、数据和估以及数据保存。

Rancimat PVC Thermomat
用于精温度整的套件

743/763
率量池,用于743和763定性定 池常数 $c = 1$ cm^{-1}

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