

Application Note AN-R-029

Oxidation stability of cosmetic and pharmaceutical raw materials

Fast and extensive determination without sample preparation

Raw materials used for manufacturing pharmaceutical and cosmetic products tend to oxidize. The demands on the quality of these goods are growing worldwide. Customers and producers want the highest quality in terms of manufacturing, processing, and of course origin. Therefore, producers need to know which raw materials meet these requirements. Furthermore, organic products play an increasingly important role.
Using the Rancimat method, the oxidation stability of cosmetic and pharmaceutical raw materials can be determined quickly and reliably. The sample is analyzed without any preparation, and the induction time can be related directly to the oxidation stability of the sample.
This Application Note demonstrates the feasibility of the Rancimat method. Using the 892 Professional Rancimat, reproducible and accurate determination of the oxidation stability of different raw materials used for the production of cosmetic oils is possible.

SAMPLE AND SAMPLE PREPARATION

All natural oils were measured directly with the Rancimat. In this application note, only a small selection is shown. On request, the determination database can be obtained.

EXPERIMENTAL

For analysis, an appropriate amount of the raw material 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 between 100–180 °C. 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. The secondary oxidation products lead 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.

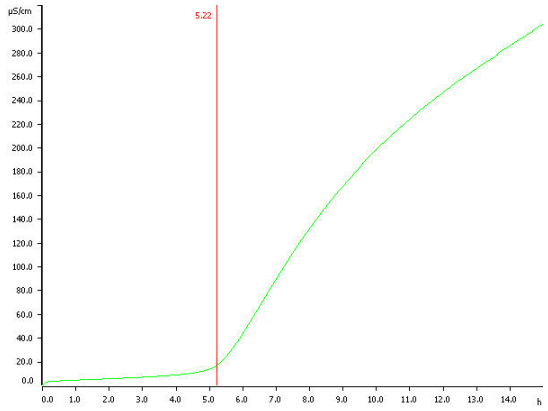


Figure 1. Determination of the oxidation stability of refined mango butter. Induction time is determined at 5.22 h.

Table 1. Results of the oxidation stability of a selection of different raw materials with the 892 Professional Rancimat. Four-fold determinations were carried out for each oil type.

Analyte (n = 4)	Mean value (h)	SD(abs) (h)	SD(rel) (%)
Almond oil, cold-pressed, org. and demeter	2.64	0.06	2.2
Argan oil, deodorized, org.	5.56	0.10	1.7
Cashew oil, CO_2 extraction, org.	6.55	0.18	2.8
Coconut oil, org.	76.05	0.79	1.0
Mango butter, refined	11.15	0.22	1.9

RESULTS

Here, you will find only a small selection of cosmetic oils that were tested. For the complete list of tested oils (> 50) please ask your local Metrohm sales representative. Overall, the demonstrated method delivers acceptable values for all samples with SD(rel) ≤ 10%.

CONCLUSION

Most natural oils for the cosmetics industry can be measured directly with the Rancimat for their oxidation stability. In order to guarantee a constant high quality of the finished product, high quality of the raw product is essential. With the Rancimat you can determine this parameter easily and simultaneously on eight different positions.

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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.