Peroxide value in edible oils

Fully automated determination according to the current EN ISO, AOAC, Ph. Eur, and USP standards

Summary

The peroxide number or peroxide value is an important sum parameter for assessing the quality of edible fats and oils. It provides quantitative information about the presence of peroxides or hydroperoxides, which are formed when unsaturated fatty acids in fats and oils react with oxygen. Peroxide and hydroperoxides can lead to a rancid taste in oils, thus the peroxide number provides information about the freshness of the sample.

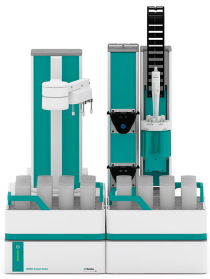
This Application Note describes the titrimetric determination of the peroxide value in canola and olive oil according to EN ISO 27107, EN ISO 3960, AOAC 965.33, Ph.Eur. 2.5.5, as well as USP<401>. Using the DIS-Cover technique all sample preparation steps can be fully automated, freeing up valuable time of the operator and thus increasing the productivity in the lab.

Find more information in the video:

Configuration

2.1001.0310 - OMNIS Professional Titrator without stirrer

Innovative, modular potentiometric OMNIS Titrator for endpoint titration and equivalence point titration (monotonic/dynamic). Thanks to 3S Liquid Adapter technology, handling chemicals is safer than ever before. The titrator can be freely configured with measuring modules and cylinder units and can have a stirrer added as needed. Including "Professional" function license for parallel titration with additional titration or dosing modules. Control via PC or local network; Connection option for up to four additional titration or dosing modules for additional applications or auxiliary solutions; Can be supplemented with magnetic stirrer and/or rod stirrer; Various cylinder sizes available: 5, 10, 20 or 50 mL; Liquid Adapter with 3S technology: Safe handling of chemicals, automatic transfer of the original reagent data from the manufacturerMeasuring modes and software options:; Endpoint titration: "Basic" function license; Endpoint and equivalence point titration (monotonic/dynamic): "Advanced" function license; Endpoint and equivalence point titration (monotonic/dynamic) with parallel titration: "Professional" function license;



2.1010.1010 - OMNIS Sample Robot S Pick&Place

OMNIS Sample Robot S with a "Peristaltic" (2-channel) pump module and a Pick&Place module in addition to extensive accessories for the direct transition to fully automatic titration. The system provides space in two sample racks for 32 sample beakers of 120 mL each. This modular system is supplied completely installed and can thus be put into operation in a very short time.The system can also be extended upon request to include two additional peristaltic pumps and another Pick&Place module, thus doubling the throughput. If additional workstations are required, then this Sample Robot is already able to be expanded to become an L-sized OMNIS Sample Robot, thus enabling samples from seven racks to be processed in parallel on up to four Pick&Place modules and quadrupling the sample throughput.

6.00401.300 - dPt Titrode

Digital, combined platinum ring electrode for OMNIS with a pH glass membrane as reference electrode.This maintenance-free electrode is suitable for redox titrations when the pH value remains constant, e. g.: Iodometry; Chromatometry; Cerimetry; Permanganometry; This electrode is stored in distilled water.dTrodes can be used on OMNIS Titrators.

Sample and sample preparation

The method is demonstrated for two different edible oils: canola oil (rapeseed oil) and olive oil. For both samples, no sample preparation is necessary.

Experimental

Figure 1. Sample Robot with Dis-Cover functionality, Dosing module and OMNIS Advanced Titrator equipped with dPt Titrode for the determination of peroxide value.

This analysis is carried out on an automated system consisting of an OMNIS Advanced Titrator and an OMNIS Sample Robot S with Dis-Cover equipped with a dPt Titrode (**Figure 1**).

To a reasonable amount of sample, solvent mixture and auxiliary solution are automatically added and the solution is stirred for 1 minute to complete the reaction. Deionized water is added and the sample is titrated with standardized titrant until after the equivalence point is reached.

Results

The analysis demonstrates acceptable results with SD(rel) < 2% and well defined titration curves. The results and an example titration curve are displayed in **Table 1** and **Figure 2**, respectively.

Table 1. Mean peroxide value for canola oil and olive oil determined with an automated OMNIS system (n = 5).

	Canola oil	Olive oil
Peroxide value in mq O_2/kg	1.9	6.4
SD(rel) in %	1.05	0.86

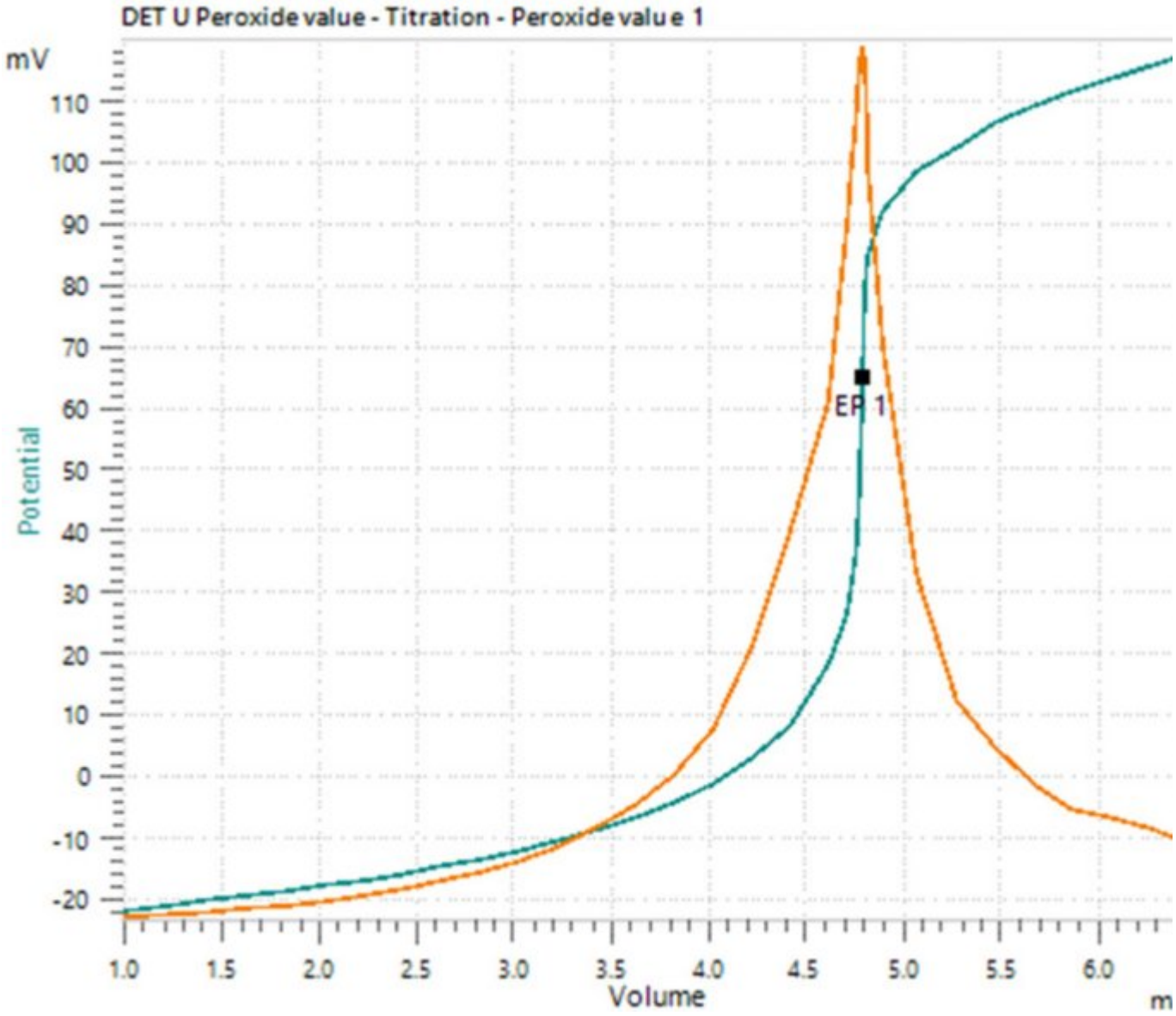


Figure 2. Example titration determination in olive oil.

Conclusion

Titration is a precise and reliable method to determine the peroxide value in various edible oils according to various international standards.

Using an OMNIS Sample Robot with Dis-Cover functionality allows a fully automated determination of up to four samples simultaneously, freeing up valuable time of the operator and thus increasing the productivity in the lab. The OMNIS system offers the opportunity to

customize the system according to your needs and expand it for other required titration applications on edible oils, such as the acid value or iodine value.

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