Application Note AN-T-110

Peroxide value in edible oils

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

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. Both peroxides and hydroperoxides can lead to a rancid taste in oils, thus the peroxide value provides information about the freshness of the sample.

This Application Note describes the peroxide value titration method in canola oil (rapeseed oil) 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 in OMNIS, all sample preparation steps can be fully automated, freeing up valuable time and thus increasing sample throughput and laboratory productivity.

SAMPLE AND SAMPLE PREPARATION

The analysis is demonstrated on canola oil (rapeseed oil) and olive oil. No sample preparation is required.

EXPERIMENTAL

This peroxide value 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, both a solvent mixture (containing acetic acid) and auxiliary solution (saturated potassium iodide solution) are automatically added. Afterward, the resulting solution is stirred for one minute to complete the reaction. Deionized water is added and the sample is titrated with standardized sodium thiosulfate until after the equivalence point is reached.

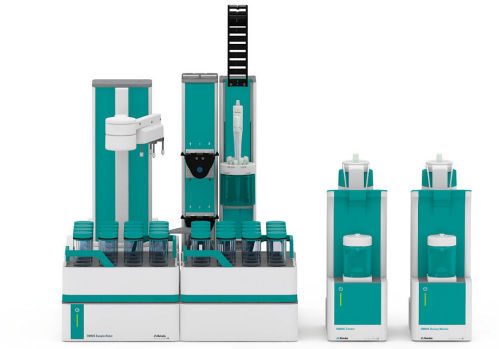

Figure 1. Sample Robot S with Dis-Cover functionality, Dosing module, and OMNIS Advanced Titrator equipped with dPt Titrode for the determination of peroxide value in edible oils.

RESULTS

This method offers very accurate results for peroxide value with SD(rel) < 2% and well defined titration curves as displayed in Table 1 and Figure 2.

Table 1. Results for the peroxide value for canola (rapeseed) oil and olive oil.

Sample (n = 5)	Mean peroxide value in meq O_2/kg	SD(rel) in %
Canola oil	1.9	1.1
Olive oil	6.4	0.9

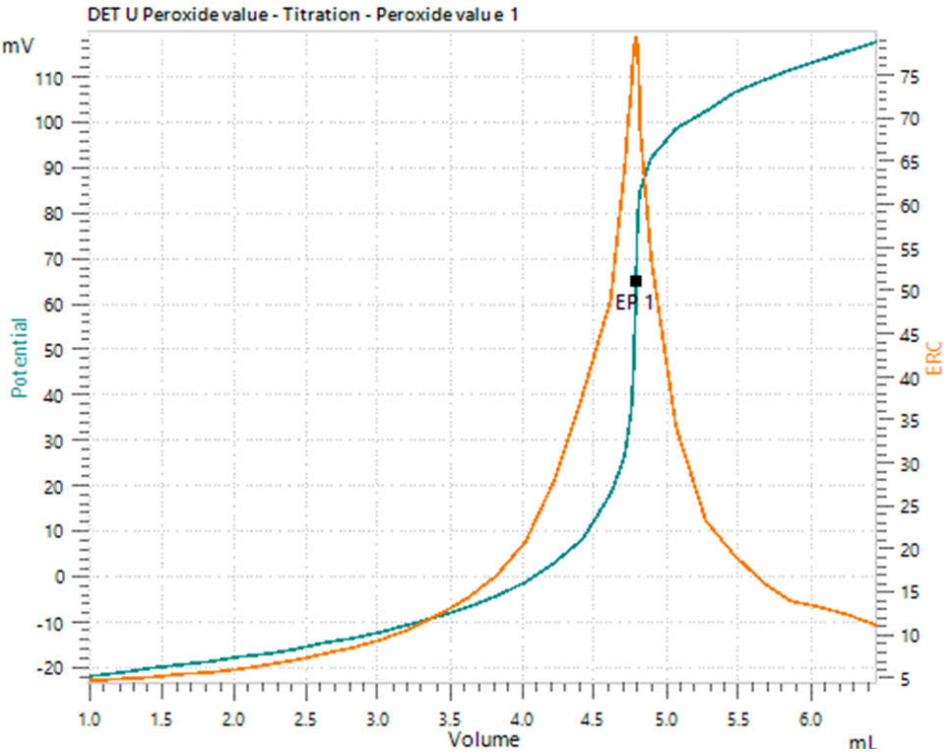

Figure 2. Example titration curve of the peroxide value determination in olive oil with the described OMNIS system.

CONCLUSION

The determination of peroxide value by titration is a precise, reliable, and official method usable for various edible oils and fats according to several international standards like, e.g., the AOAC 965.33 peroxide value. Using an OMNIS Sample Robot with Dis-Cover functionality allows the 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 user needs and expand it for other required titration applications on edible oils, such as the acid value or iodine value.

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