AN-T-109

Iodine value in canola and olive oil

Achieve faster results with the modified standard method

Summary

The iodine number is an important sum parameter for assessing the quality of edible oils and fats. It provides quantitative information about the presence of unsaturated fats and oils. The higher the amount of unsaturated fatty acids in the sample, the more iodine reacts with these double bonds, resulting in a higher iodine value. For common oils, such as sunflower or olive oil, the iodine value is well known. Hence, it can be used as a test parameter for counterfeit detection in the fight against food fraud.

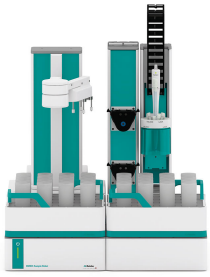
For the classical titrimetric determination, the samples have to be placed in the dark for up to two hours after the addition of the reaction solution (Wijs solution). In this Application Note, we describe a modified analysis based on EN ISO 3961, ASTM D5554, AOAC 920.159, AOAC 993.20, AOCS Cd 1d-92, USP<401> Method II, and Ph.Eur. 2.5.4 Method B. Due to the modification, the reaction time reduces significantly, from 2 hours to 5 minutes. This modified analysis thus allows for much higher 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 analysis is demonstrated on canola (rapeseed) oil and olive oil. No sample preparation is required.

Experimental

Figure 1. Example of an OMNIS system consisting of an OMNIS Sample Robot S with two working stations, an OMNIS Professional Titrator, and a corresponding amount of OMNIS Dosing Modules to add all necessary solutions.

The analysis is carried out automatically on an OMNIS system consisting of an OMNIS Sample Robot S and an OMNIS Titrator. The maintenance-free dPt Titrode is used for indication of the equivalence point.

An appropriate amount of sample is weighed into the titration beaker, then the beaker is covered with a lid and placed on the sample rack. Before the titration, glacial acetic acid, Wijs solution (ICl), and magnesium acetate solution are added and the solution is stirred for 5 minutes. Afterwards, potassium iodide solution is added and the solution is titrated with standardized sodium thiosulfate until after the equivalence point.

Results

Sharp titration curves are obtained where the equivalence point is reliably determined by the OMNIS software.

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

	Canola oil	Olive oil
Iodine value in g I_2/g	109.3	80.9
SD(rel) in %	0.1	0.1

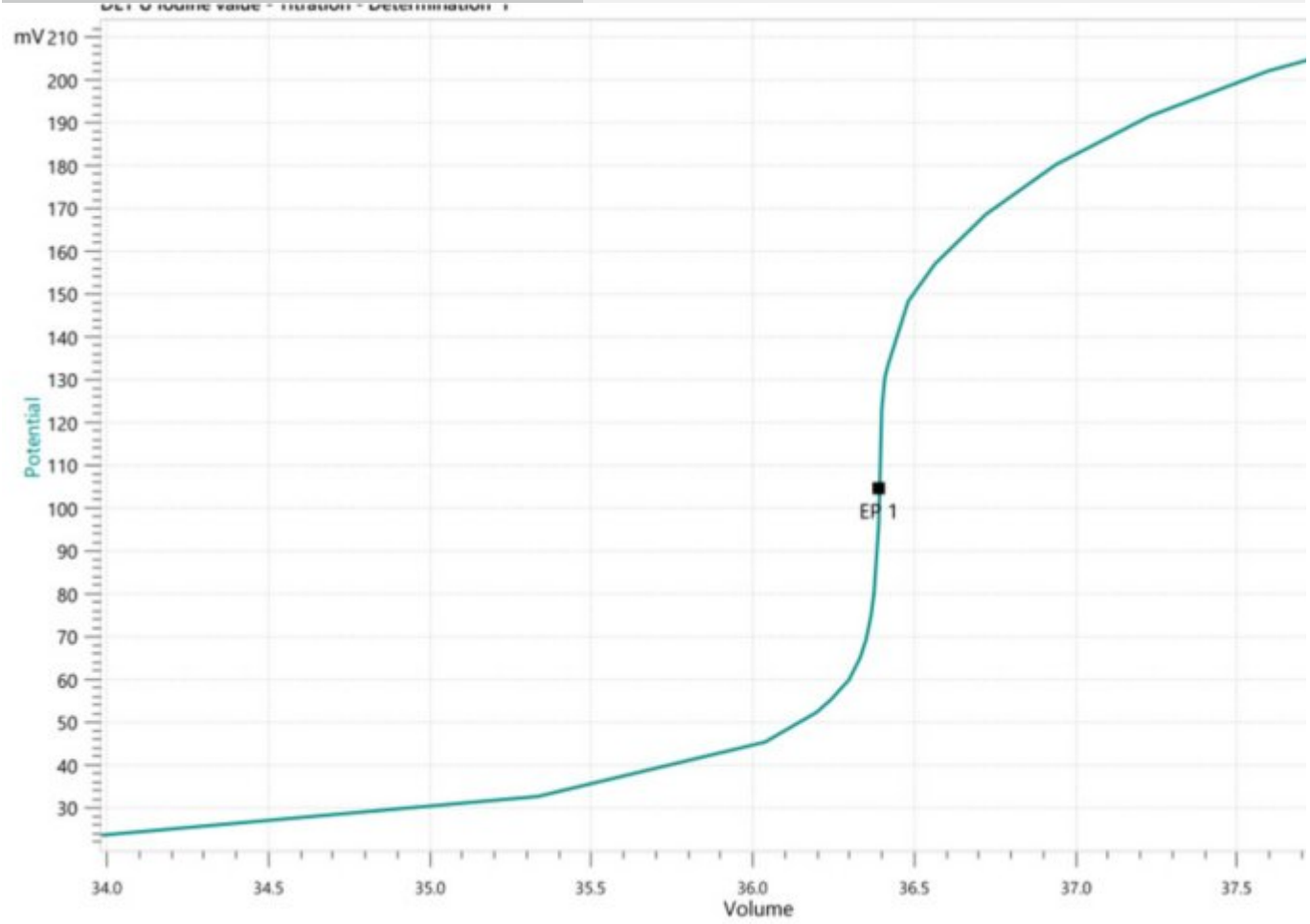


Figure 2. Titration curve of the determination of the iodine value in olive oil with the described OMNIS System.

Conclusion

The standards EN ISO 3961, ASTM D5554, AOAC 920.159, AOAC 993.20, AOCS Cd 1d-92, USP<401> Method II, and Ph.Eur. 2.5.4 Method B describe a procedure which needs a reaction time of 2 hours. Here, we show a reliable way to determine the iodine value in oils and fats within just a few minutes. This significantly enhances sample throughput and reduces the cost per analysis. With an OMNIS system, the analyses can even be carried out in parallel so that laboratory throughput can be enhanced even further.

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