Application Note AN-T-109

菜籽油和橄榄油中的碘值

Achieve faster results with the modified standard method

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:

SAMPLE AND SAMPLE PREPARATION

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

EXPERIMENTAL

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.

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.

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

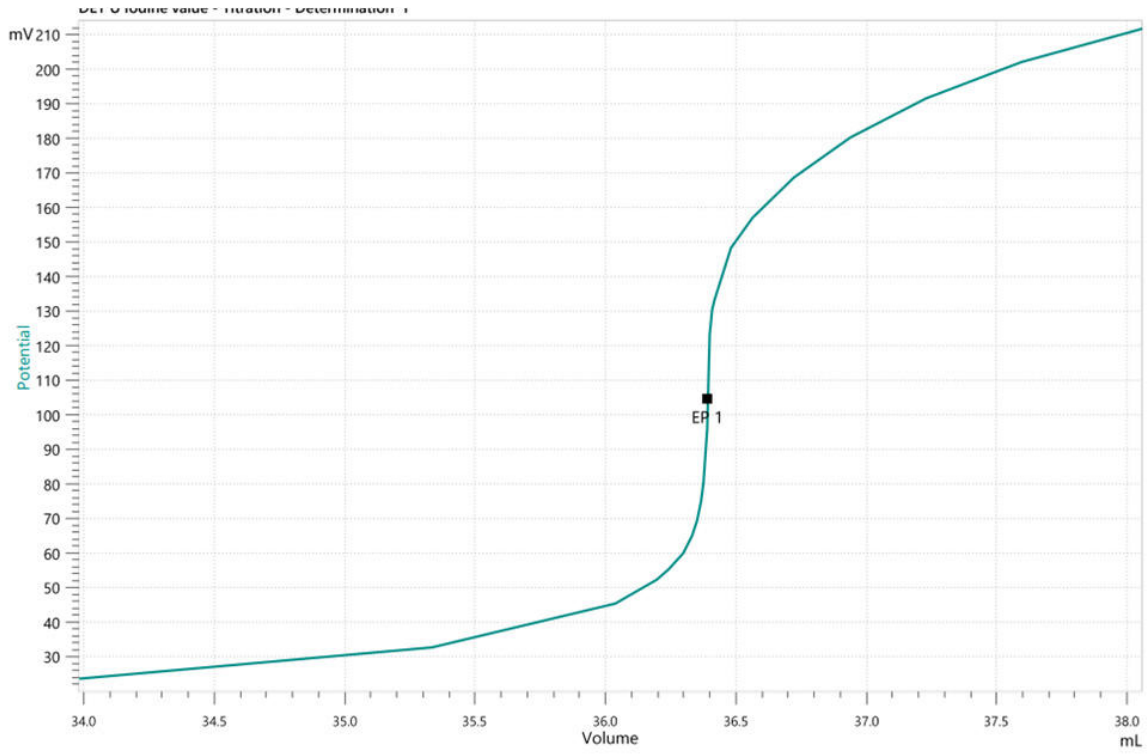


Figure 2. Titration curve of the determination of the iodine value in olive oil with the described OMNIS System.

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.

CONTACT

瑞士万通中国
北京市海淀区上地东路1号
院1号楼7层702
100085 北京
marketing@metrohm.com.cn

CONFIGURATION

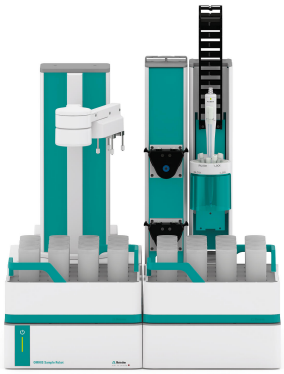
OMNIS Professional Titrator

创新型、模块式电位分析 OMNIS Titrator,用于进行终点和等当点滴定(单一/动态)。由于采用 3S OMNIS Liquid Adapter 技术,处理化学品从未像现在一样安全。可以使用测量模块和计量管单元自由配置滴定仪,并在需要时扩展一台搅拌器。包括用于使用其他滴定或加液模块平行滴定的“Professional”功能许可证。

- 通过计算机或本地网络控制
- 可以为其他应用或辅助溶液另外连接最多四个滴定模块或加液模块
- 可以扩展磁力搅拌器和/或棒式搅拌器
- 可提供不同大小的计量管:5、10、20 或 50 mL
- 采用 3S 技术的 OMNIS Liquid Adapter:安全处理化学品,自动传输生产厂家的原始试剂数据

测量模式和软件选项:

- 终点设定滴定:“Basic” 功能许可证
- 终点和等当点滴定(单一/动态):“Advanced” 功能许可证
- 终点和等当点滴定(单一/动态),包括 5 路平行滴定:“Professional” 功能许可证



OMNIS Sample Robot S Pick and Place

OMNIS Sample Robot S 具有一个“蠕动”泵模块(2 通道)和一个 Pick&Place 模块以及大量附件,可直接进入全自动滴定。此系统具有两个样品盘位置,可用于 32 个 120 mL 的样品盘。此模块化系统供货时已完全安装完毕,因此可在极短时间内投入运行。

该系统也可根据需要扩展配备另外两台蠕动泵以及多加一个 Pick&Place 模块,由此使通量翻倍。如果需要更多工作台,则可将此 Sample Robot 扩展为 L 规格款型的 OMNIS Sample Robot,由此可使七个样品盘的样品在多达四个 Pick&Place 模块上并行处理,将样品通量扩大四倍。

dPt Titrode

带 pH 玻璃膜的 OMNIS 用数字组合式铂环形电极,用作参比电极。

该免维护电极适用于 pH 值恒定的氧化还原滴定,例如:

- 碘量法
- 重铬酸钾法
- 铈量法
- 高锰酸盐滴定法

该电极存放在蒸馏水中。

dTrodes 可在 OMNIS Titratoren 上使用。