



Application Note AN-T-112

Acid value and free fatty acids in edible oils

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

The acid value and the free fatty acid content are important parameters used for the characterization and the quality assessment of edible fats and oils. Furthermore, the content of free fatty acids is used for purity testing and allows in certain cases conclusions about the pretreatment or occurring decomposition reactions. The higher the acid value and free fatty acid content, the lower the quality of the oil. The acid value additionally increases with the age of an oil as triglycerides decompose into

fatty acids and glycerol as an effect of time. This Application Note describes the titrimetric determination of the acid value and the free fatty acid content in different edible oils. The method is based on the standards EN ISO 660, USP<401>, and Ph. Eur. 2.5.1. 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:

SAMPLE AND SAMPLE PREPARATION

The method is demonstrated for different edible oils: canola (rapeseed) oil, palm oil, sunflower oil,

and olive oil. For all samples, no sample preparation is necessary.

EXPERIMENTAL

This analysis is performed on an automated system consisting of an OMNIS Advanced Titrator and an OMNIS Sample Robot S with Discover equipped with a dSolvotrode.

To a reasonable amount of sample, a solvent mixture consisting of ethanol and diethyl ether is automatically added, and the solution is stirred for one minute to dissolve the sample. Afterwards, the sample is titrated with standardized ethanolic KOH until after the equivalence point.

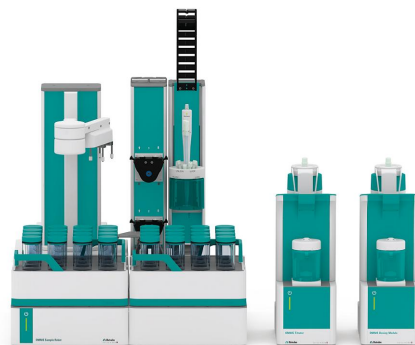


Figure 1. Fully automated OMNIS system for the determination of acid value in edible oils.

RESULTS

The analysis demonstrates acceptable results and well-defined titration curves. The SD(rel) is a bit high with max. 5.3%, however, this

corresponds to a SD(abs) of approx. 8.5 μg KOH/g sunflower oil or 4.4 μg KOH/g canola oil, respectively. The results are displayed in **Table 1**.

Table 1. Mean acid value and free fatty acids expressed as oleic acid (canola oil, olive oil, sunflower oil) or palmitic acid (palm oil) for edible oils determined with an automated OMNIS system (n = 5).

	Acid value in mg KOH/g	Free fatty acids in %	SD(rel) %
Canola oil	0.11	0.05	4.0
Olive oil	0.41	0.21	2.0-
Palm oil	11.6	5.3	0.2
Sunflower oil	0.16	0.08	5.3

CONCLUSION

Titration is a precise and reliable method to determine the acid value and free fatty acids 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 in parallel,

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 peroxide value or iodine value.

Internal reference: AW TI CH1-1278-062019

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CONFIGURATION



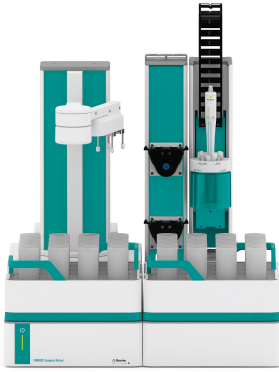
OMNIS Professional Titrator

新型、模式位分析 OMNIS Titrator 滴定,用于行点和等当点滴定(一/)。由于采用 3S 瓶配器技,理化学品从未像在一安全。可以使用量模和量管元自由配置滴定,并在需要展一台拌器。包括用于使用其他滴定或加液模平行滴定的“Professional”功能可。

- 通计算机或本地网控制
- 可以其他用或助溶液外接最多四个滴定模或加液模
- 可以展磁力拌器和/或螺旋拌器
- 可提供不同大小的量管:5、10、20 或 50 mL
- 采用 3S 技的瓶配器:安全理化学品,自生商的原始数据

量模式和件:

- 点定滴定:“Basic” 功能可
- 点和等当点滴定(一/):“Advanced” 功能可
- 点和等当点滴定(一/),包括平行滴定:“Professional” 功能可



OMNIS Sample Robot S Pick and Place

OMNIS Sample Robot S 具有一个“蠕”模(2 通道)和一个 Pick&Place 模以及大量附件,可直接入全自滴定。此系具有个品位置,可用于 32 个 120 mL 的品。此模化系供已完全安装完,因此可在短内投入行。

系也可根据需要展配外台蠕以及多加一个 Pick&Place 模,由此使通量翻倍。如果需要更多工作台,可将此 Sample Robot 展 L 格款型的 OMNIS Sample Robot,由此可使七个品的品在多四个 Pick&Place 模上并行理,将品通量大四倍。



dSolvotrode

用于所有非水性酸/滴定的 OMNIS 数字合式 pH。玻璃膜性差的溶液行了化,并且由于活的磨口隔膜,也用于非常的品。

此可与非水参比解(化或四乙基化)一起使用。

存在相的参比解中。

dTrodes 可在 OMNIS Titratoren 上使用。