

Application Note AN-H-076

油脂碘值的测定

Fast and reliable analysis of oil products by thermometric titration

The iodine value is a benchmark for the quality control of fats and oils. It is a measure of the total number of double bonds (or degree of unsaturation) present in these oils. The double bonds react with an excess of Wijs solution. Iodine is formed in this chemical reaction, and its concentration is determined with sodium thiosulfate in a thermometric back-titration. The iodine number is expressed as the number of grams of iodine per 100 grams of sample.
Thermometric titration (TET) is a reliable method for the analysis of the iodine value. During thermometric titration, the enthalpy change of the reaction is monitored rather than the potential. The titration endpoint is revealed by an inflection in the temperature curve. The titrant is added at a constant rate, meaning TET is very fast in comparison to potentiometry.

SAMPLE AND SAMPLE PREPARATION

This application is demonstrated on two standardized solutions: cyclohexene and castor oil with a known iodine value.

Usually, sample preparation is not required for the iodine value titration method.

EXPERIMENTAL

The determinations are carried out on an OMNIS Professional Titrator equipped with a dThermoprobe (**Figure 1**). To avoid manually handling chemicals, solutions can be automatically added using OMNIS Dosing Modules.
Before the iodine value method is started, the titer and the method blank are determined.



Figure 1. OMNIS Professional Titrator equipped with a dThermoprobe and a rod stirrer.

For the iodine value determination, an appropriate amount of sample is weighed into the titration vessel. Then, cyclohexene, $Mg(OAc)_2$, glacial acetic acid, Wijs solution, and KI are added. While stirring, the solution is titrated until after the first exothermic endpoint with standardized sodium thiosulfate (**Figure 2**).

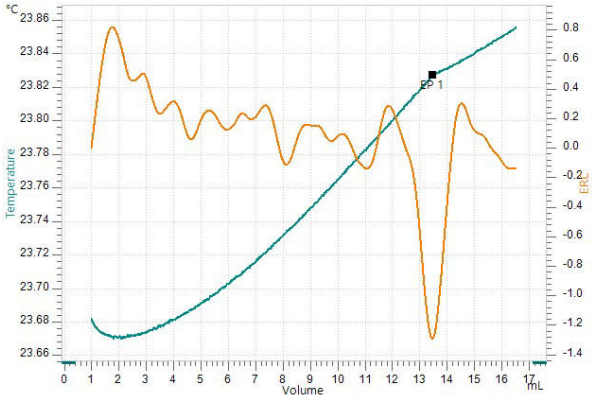


Figure 2. Titration curve of the thermometric determination of cyclohexene.

RESULTS

This method offers repeatable results for the iodine value (IV) as displayed in **Table 1**.

Table 1. Results for the thermometric iodine value determination with an OMNIS system.

IV (n = 3)	Mean in g I_2 / 100 g sample	RSD in %
Cyclohexene	290.63	0.62
Castor oil	81.83	0.17

CONCLUSION

Thermometric titration is a very fast method to determine the IV of oil products using a back-titration. No sensor maintenance is required, making TET a robust alternative to potentiometric titration methods.

CONTACT

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CONFIGURATION



OMNIS Titrator

创新型、模块式电位分析 OMNIS Titrator 滴定仪,适于独立运行或作为 OMNIS 滴定系统的核心元件运行。由于采用 3S 试剂瓶适配器技术,处理化学品很安全。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。由于采用不同的软件功能许可证,因此可以有不同的测量模式和功能。

- 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四个滴定模块或加液模块
- 螺旋搅拌器的连接方式
- 可提供不同大小的计量管:5、10、20 或 50 mL
- 采用 3S 技术的试剂瓶适配器:安全处理化学品,自动传输生产商的原始试剂数据

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),包括平行滴定:“Professional” 功能许可证

OMNIS

A WHOLE NEW LEVEL OF PERFORMANCE

“温度等当点滴定仪”功能许可证,用于 OMNIS Titrator

包含功能模式

- 温度等当点滴定 (TET)
- MEAS U / T / pH
- 灵快量化液体处理
- 仅使用一个 OMNIS Tritator 的内部滴定管进行滴定



dThermoprobe

高灵敏性数字温度探针,用于使用 OMNIS 进行热滴定。

Thermoprobe 温度电极具有较短的响应时间和较高的分辨率,能够精确检测温度变化。

该传感器可以用于不含 HF 的水溶液和非水溶液,例如,测定:

- 酸值 (TAN) 根据 ASTM D8045
- 基数 (TBN)
- 游离脂肪酸
- Ca/Mg 测定
- 磷酸盐



OMNIS 10 mL

智能 10 mL 计量管单元,用于一台 OMNIS Titrator、滴定模块或加液模块。该计量管单元特别推荐用于以下溶液:

- 水性碱溶液
- 滴定剂 5
- 硝酸银溶液
- 非水性碱溶液
- 高锰酸盐溶液
- EDTA 溶液

包含加液软管和防扩散滴管头。