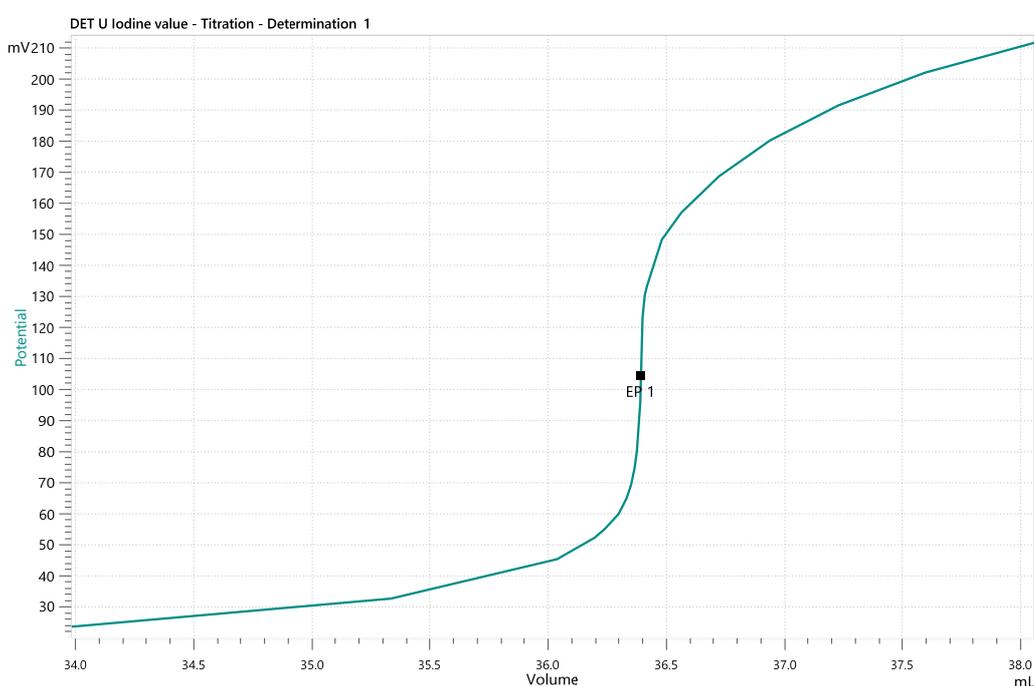


Titration Application Note T-109

Iodine value in rapeseed oil and olive oil

Modified standard method reduces reaction time for faster results



The iodine number is an important sum parameter for assessing the quality of edible fats and oils. 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 the double bonds, resulting in a higher iodine value. For native 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 2 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. For this modified analysis, magnesium acetate is added as catalyst, reducing the reaction time from up to 2 h to 5 min. This modified analysis thus allows a much higher productivity in the lab.

Method description

Sample

Rapeseed oil

Olive oil

Sample preparation

No sample preparation is required.

Configuration

Main module Pick&Place S	2.1010.0010
Pick&Place module with stirrer	2.1014.0110
Dummy panel for module plate	6.02600.000
Peristaltic (2-channel) pump module	2.1016.0010
Gripper fingers 43 - 65 mm	6.02601.010
Lid tray for OMNIS Sample Robot S	6.02007.010
Dis-Cover lid for OMNIS 250 mL sample beaker, 9 pieces, 2x	6.02710.050
Titration head 6xNS14 / 3xNS9 (P&P)	6.01403.000
OMNIS sample rack 9 x 250 mL, 2x	6.02041.010
Sample beakers, amber glass, 250 mL, 10 pieces, 2x	6.01400.003
Rod Stirrer "Sample Robot"	2.1006.0010
Stirring propeller 30 mm ETFE	6.01900.010
OMNIS Professional Titrator without stirrer	2.1001.0310
OMNIS Dosing Module without stirrer, 4x	2.1003.0010
OMNIS 50 mL cylinder unit, 3x	6.03001.250
OMNIS 20 mL cylinder unit	6.03001.220
OMNIS 10 mL cylinder unit	6.03001.210
Digital measuring module	6.02100.010
Electrode cable plug-in head Q / plug P, 1.5 m	6.02104.310
Cable MDL PL/SO 2 m, 2x	6.02102.030
Cable MDL PL/SO 1 m, 3x	6.02102.020
OMNIS Stand-alone license	6.06003.010
OMNIS instrument license, 1x	6.06002.010
dPt Titrode	6.00401.300

Solutions

Titration	$c(\text{Na}_2\text{S}_2\text{O}_3) = 0.1 \text{ mol/L}$, if possible this solution should be bought from a supplier.
Potassium iodide solution	$\beta(\text{KI}) = 100 \text{ g/L}$, 50 g potassium iodide is given into a 500 mL volumetric flask and filled up to the mark with deionized water. The solution is stored into an amber glass flask.
Magnesium acetate solution	$w(\text{Mg}(\text{CH}_3\text{COO})_2) = 3\%$, 22 g magnesium acetate tetrahydrate is given into a 500 mL volumetric flask and filled up to the mark with glacial acetic acid.
Wijs-solution	$c(\text{I}_2) = 0.1 \text{ mol/L}$, if possible this solution should be bought from a supplier.

Analysis

Blank

The blank is determined the same way as the sample, without adding sample.

Sample

An appropriate amount of sample is weight into the titration beaker, the beaker is cover with a lid and placed on the sample rack. Before the titration, 20 to 25 mL glacial acetic acid, 25 mL $c(\text{I}_2) = 0.1 \text{ mol/L}$ and 10 mL $w(\text{Mg}(\text{CH}_3\text{COO})_2) = 3\%$ are added And the solution is stirred for 5 minutes. Afterwards, 15 mL $\beta(\text{KI}) = 100 \text{ g/L}$ is added and the solution is titrated with $c(\text{Na}_2\text{S}_2\text{O}_3) = 0.1 \text{ mol/L}$ until after the equivalence point.

Method description

Parameters

Mode	DET U
Pause	30 s
Stirring rate	8
Signal drift	20 mV/min
Min. waiting time	0 s
Max. waiting time	38 s
Meas. point distance	4
Min. increment	10 µL
Stop EP	1
Volume after EP	2.0 mL
EP criterion	5
EP recognition	Greatest

Results

Sample (n = 5)	Iodine value in g iodine/100 g sample	s(rel) / %
Rapeseed oil	109.3	0.1
Olive oil	80.9	0.1