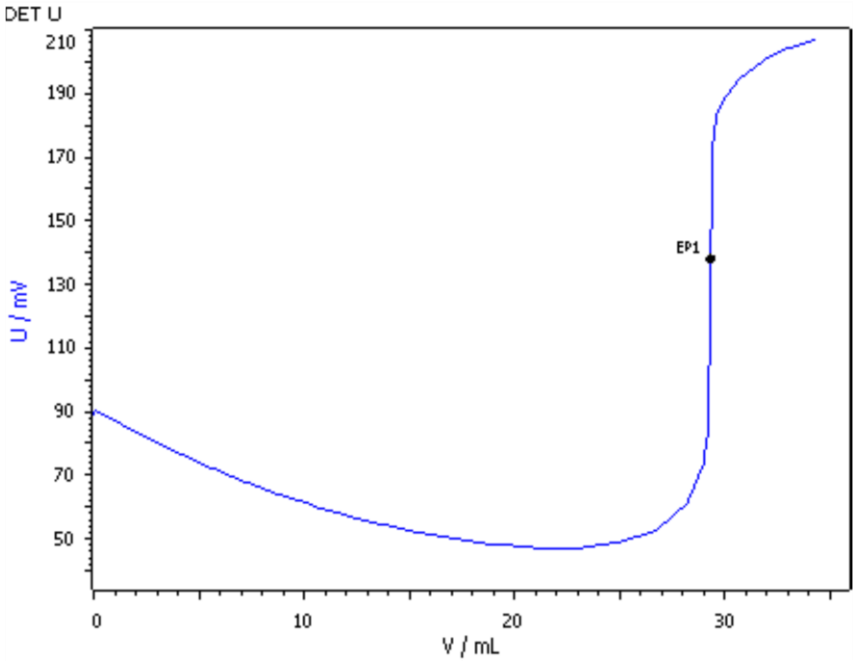
Titration Application Note T-109

Automated determination of the iodine value



This Application Note describes the automated determination of the iodine value using the DIS-Cover technique and magnesium acetate as catalyst. The addition of the catalyst reduces the reaction time from 1–2 h to 5 min.

Metrohm

Method description

Sample

10-undecenoic acid (standard)

Sunflower oil

Olive oil

Sample preparation

No sample preparation is required

Configuration

815 Robotic USB Sample Processor XL (2T/0P)	2.815.0130
2 × 786 Swing Head	2.786.0040
905 Titrando	2.905.0010
7 × 800 Dosino	2.800.0010
2 × Dosing Unit 20 mL	6.3032.220
5 × Dosing Unit 50 mL	6.3032.250
802 Stirrer	2.802.0020
772 Pump Unit - aspirate	2.772.0120
823 Membrane Pump Unit «rinse»	2.823.0030
Titration head 6 x SGJ 14, 3 x SGJ 9 openings	6.1458.010
Robotic DIS-Cover	6.1462.080
Robotic arm with holder for titration head, right swinging	6.1462.070
Sample rack 28 x 250 mL	6.2041.820
Lid for 250 mL sample beaker	6.2037.060
Sample beaker 250 mL (brown glass)	6.1432.323
iPt Titrode	6.0471.300

Solutions

Potassium iodide solution	β(KI) = 100 g/L 50 g potassium iodide is weighed into a 500 mL volumetric flask and filled up with dist. water.
Magnesium acetate solution	w($Mg(CH_3COO)_2$) = 3% 15 g magnesium acetate is weighed into a 500 mL volumetric flask and filled up with dist. Water
Reaction solution	c(ICl) = 0.1 mol/L in glacial acetic acid If possible this solution should be bought from a supplier.
Solvent	Glacial acetic acid
Titrant	c($Na_2S_2O_3$) = 0.1 mol/L If possible this solution should be bought from a supplier.

Analysis

An appropriate sample amount is weighed into a 250 mL brown glass beaker and placed onto the sample rack. 20 to 25 mL glacial acetic acid, 25 mL c(ICl) = 0.1 mol/L and 10 mL w($Mg(CH_3COO)_2$) = 3% are then added. Afterwards, the beaker is closed with the lid and left standing for five minutes. 15 mL β(KI) = 100 g/L is added to the solution and the originated iodine is titrated with c($Na_2S_2O_3$) = 0.1 mol/L until the first equivalence point.

A blank determination was performed the same way before sample analysis.

Parameters

Mode	DET U
Signal drift	20 mV/min
Max. waiting time	38 s
Meas. point. density	4
Min. increment	10 µL
Max. increment	Off
EP criterion	5
EP recognition	all

Results

Sample	Mean iodine value / (g I_2 / 100 g)	s(rel) / %	Recovery / %
10-undecenoic acid (n = 10)	135.223	0.25	98
Sunflower oil (n = 6)	126.853	0.67	
Olive oil (n = 6)	82.674	0.53	