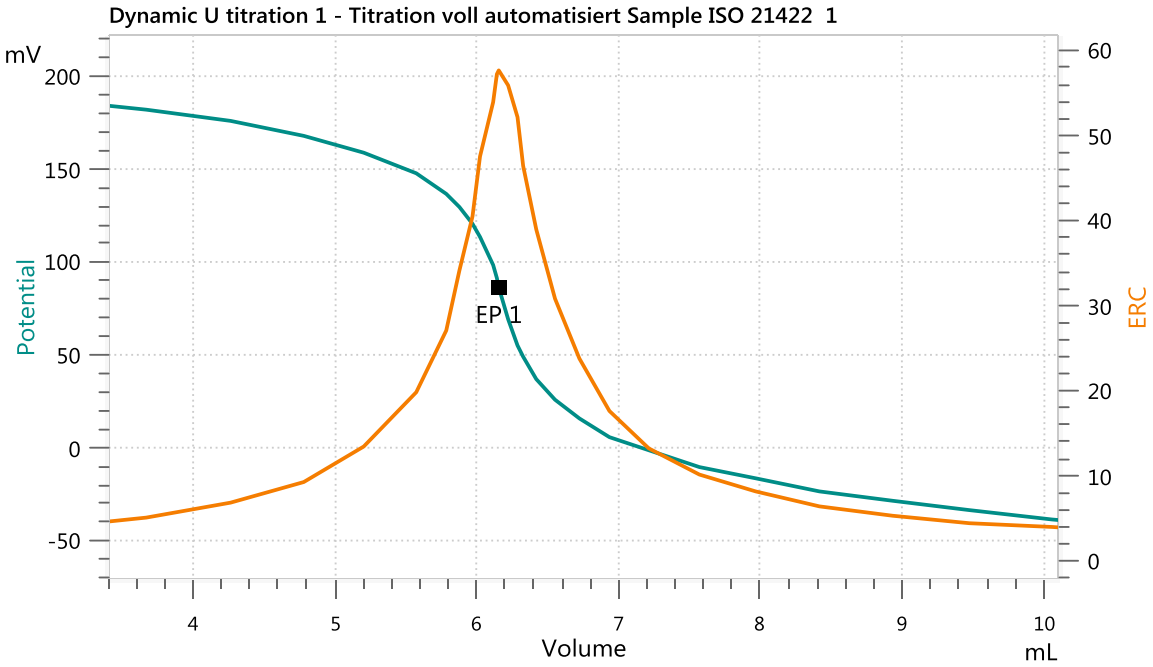
Titration Application Note T–134

Chloride in salted butter

Automated standard method reduces saves time and helps increase throughput



The salt content in food is a critical parameter, given that the WHO recommends a maximum daily intake of 5 g for an adult. In butter with a salt content exceeding 0.1%, it can be determined by a precipitation titration of chloride with silver nitrate. However, during manual titration the operator cannot leave the system unattended because he has to exchange the sample beakers manually which is time consuming and prone to errors.

This Application Note describes the automated determination of chloride in salted butter in accordance with ISO 15648, ISO 21422, IDF 179 and IDF 242. If automated according to the norms and standards, salt determination can be performed completely unattended with superior reproducibility of results increasing efficiency in the laboratory.

Metrohm

Method description

Sample

Herbal butter

Sample preparation

The sample is heated to not more than 30°C so that it can be well homogenized by thorough mixing.

Configuration

OMNIS Sample Robot S Pick&Place	2.1010.1010
OMNIS Advanced Titrator without stirrer	2.1001.0210
OMNIS Dosing module, 2x	2.1003.0010
OMNIS Cylinder unit 50 mL	6.03001.250
OMNIS Cylinder unit 20 mL, 2x	6.03001.220
Digital measuring module, 2x	6.02100.010
OMNIS Stand-Alone license	6.06003.010
OMNIS instruments license	6.06002.010
Heating plate with magnetic stirrer	n.a.
dAg-Titrode	6.00404.300
dProfitrode, bridge electrolyte $c(KNO_3)$ = 1 mol/L	6.00204.300

Solutions

Titrant	$c(AgNO_3)$ = 0.1 mol/L This solution should be bought from a supplier. The solution has to be protected from daylight and can be stored for up to two months.
Nitric acid	$c(HNO_3)$ = 4 mol/L 200 mL nitric acid is carefully added to 600 mL deionized water.
Wash solution	ϕ(Isopropanol) = 70 % v/v

Analysis

2 to 4 g butter is weighed into a titration vessel. 100 mL boiling deion. H_2O is added and stirred for 1 min while boiling. The hot suspension is cooled below 55 °C, 5 mL $c(HNO_3)$ = 4 mol/L is added automatically, stirred for 5 s and the pH is measured. If it is above 1.5, an additional 5 mL $c(HNO_3)$ = 4 mol/L is added. The suspension is then titrated with $c(AgNO_3)$ = 0.1 mol/L until after the equivalence point.

The buret tip and electrode are rinsed with the wash solution, in addition to dip rinsing with water, after each titration to remove organic residues.

A blank determination is performed the same way, omitting the sample and using a MET U titration with a volume increment of 0.005 mL and an EP criterion of 30 mV.

Parameters

Mode	DET U
Pause	0 s
Signal drift	50.0 mV/min
Min. waiting time	0 s
Max. waiting time	26 s
Min. Volume increment	10 µL
Meas. point distance	4
Stirring rate	10
Stop volume	15 mL
Stop EP	Off
EP criterion	5
EP recognition	greatest

Results

	Chloride content in mg / 100 g sample (n = 6)
Mean	892.7
s(rel)	0.5 %