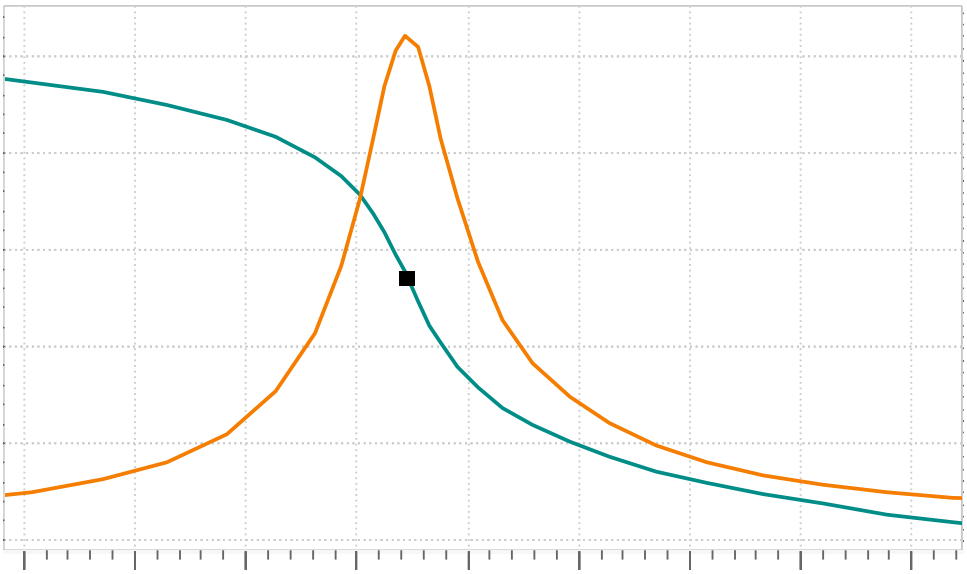
Titration Application Note T–135

Chloride in cheese

Automation reduces sample preparation and increases throughput



The WHO recommends a maximum daily intake of 5 g salt for an adult. The chloride content in food correlates with the salt content, its determination is therefore described by various standards. In cheese and cheese products with a chloride content higher than 0.2%, chloride is usually determined by a precipitation titration with silver nitrate. However, time-consuming sample preparation is required, as the cheese has to be homogenized and the chloride extracted with hot water.

This Application Note describes the fully automatic determination of chloride in cheese according to EN ISO 5943, ISO 21422, IDF 242 and IDF 88 including sample preparation with a Polytron homogenizer. This increases productivity due to a higher sample throughput and lower work load for the operator.

Metrohm

Method description

Sample

Grinded cheese

Sample preparation

If not already grinded cheese is used, dry rims of the selected cheese are removed, before cutting the cheese into small pieces, which are then manually well mixed.

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 modules, 2x	6.02100.010
OMNIS Stand-alone license	6.06003.010
OMNIS instruments license	6.06002.010
Heating plate with magnetic stirrer	n.a.
Polytron PT 1300 D	2.136.0100
OMNIS titration head with Polytron for 120 mL beaker	6.09914.005
Dispersing aggregate for Polytron, 157 mm	6.9012.010
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 5 g cheese is weighed into a titration vessel. 130 mL hot (55 °C), deion. H_2O is added and the cheese is then homogenized in the titration vessel using the Polytron. The suspension time depends on the type of cheese. 5 mL c(HNO_3) = 4 mol/L is added, 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 aggregate of the Polytron, buret tip, and electrode are rinsed with the wash solution, in addition to dip rinsing with water, after each titration to remove organic residue.

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	852.8
s(rel)	0.4%