

Determination of Chloride/ Sodium Chloride in Food Samples

SI Analytics
a xylem brand

Titration Application
M102-01

Introduction

The application describes potentiometric determination of chloride/sodium chloride ("salt") in food samples such as salt, spice mixtures, cheese, meat or tomato sauce.

Required Equipment

Apparatus

- TL 5000/TL 7000/TL 7750
- 20 mL exchangeable unit (WA 20). WA 10 or WA 50 would also be suitable.
- TM 235 stirrer

Electrode, Cable and Electrolyte

- AgCl 62 (item # 285102100) **or** AgCl 62 RG (item # 285102100) are suitable electrodes.
Note: AgCl 62 features liquid electrolyte, while AgCl 62 RG features gel and cannot be refilled.
- L 1 A plug cable combination (item # 285122456).
- 2 mol/L KNO₃ electrolyte (item # 285138349) *if AgCl 62 is used.*

Solutions

- Solvent:** Distilled water
- Titration agent:** Commercially prepared silver nitrate solution (AgNO₃) 0.1 mol/L
- Standard:** NaCl titrimetric standard and HNO₃ 1 mol/L

Procedure

Preparation of the silver nitrate solution

It is recommended the 0.1 mol/L silver nitrate solution (AgNO₃) be a commercially prepared solution.

Connect electrode

Connect the electrode to the TitroLine® 5000, TitroLine® 7000, or TitroLine® 7750. If using the AgCl 62 electrode, open the refilling hole during measurement or calibration.

Standard titration

Weigh 70 to 90 mg of the NaCl standard and place in a 150 mL beaker. Add approximately 80 mL distilled water and 1 mL HNO₃ 1 mol/L. Place the electrode and burette tip in the sample and start the method. The titration should stop at the equivalence point.

$$(W \cdot F2) / ((EQ1 - B) \cdot M \cdot F1)$$

W = weight of the NaCl standard in grams

F1 = 1

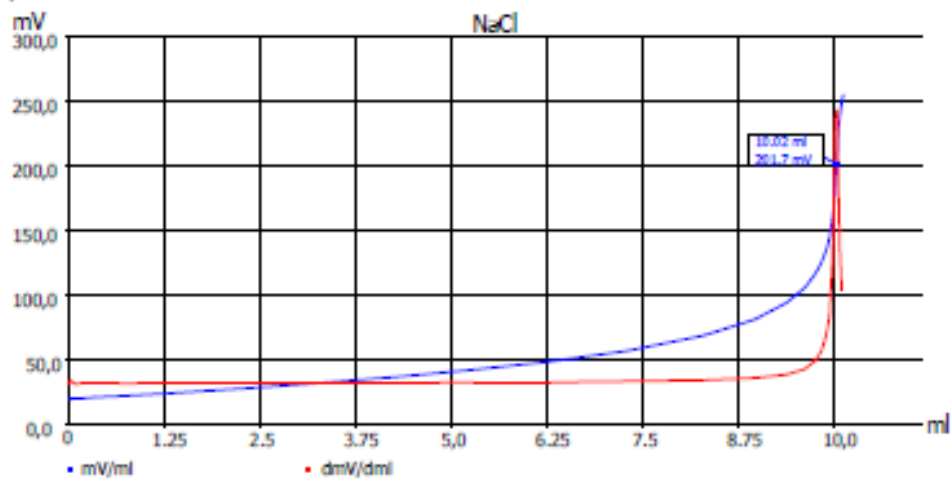
F2 = 1000; for the conversion from milligrams to grams

B = 0; blank value

The result is the calculated as mol/L and can be automatically transferred to the exchangeable unit WA 20.

GLP documentation

Titration graph



Method data

Method name:	Titre AgNO3	Titration duration:	3 m 4 s
End date:	11.01.13	End time:	18:27:02

Titration data

Start mV:	19.7 mV	Weight:	0.58660 g
		End mV:	255.4 mV
EQ:	10.024 ml / 201.7 mV	Titre:	0.1001 mol/l

Calculation formula

Titre:	$(W \cdot F2) / ((EQ1 - B) \cdot M \cdot F1) \rightarrow WA$	Mol (M):	58.44000
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Sample titration

Chemical Equation: $\text{Ag}^+ + \text{Cl}^- \rightarrow \text{AgCl} \downarrow$

Calculation: $(\text{EQ1}-\text{B}) \cdot \text{T} \cdot \text{M} \cdot \text{F1} / (\text{W} \cdot \text{F2})$

EQ1 = mL consumption at the equivalence point

B = 0; blank value

T = exact concentration of the titrant in mol/L (c * factor)

M = molecular/equivalent weight of NaCl or Cl

F1 = 0.1; conversion factor for % (*100/1000)

W = weight of the sample in grams

F2 = 1

Weigh 0.05 to 10 grams of sample according to the table below and add to a 150 mL glass beaker. Dilute the sample with distilled or deionized water up to 80 to 100 mL and add 1 mL of HNO_3 1 mol/L (or similar). Place the electrode and burette tip in the sample, adjust the stirring speed and press the "START" key. Enter sample weight and sample ID, if prompted to do so. Then push OK or ENTER to execute the titration. The titration stops at the equivalence point. The result can be read from the display, printed if a printer is connected, and exported to a USB stick.

Table 1: Sample amount using 0.1 mol/L silver nitrate solution (AgNO_3):

Salt content	Sample weight
< 0.1 %	> 10 g
0.1 - 1 %	1 - 10 g
1 - 10 %	0.1 - 2 g
10 - 50 %	0.05 - 0.1 g
50 - 100 %	0.05 g

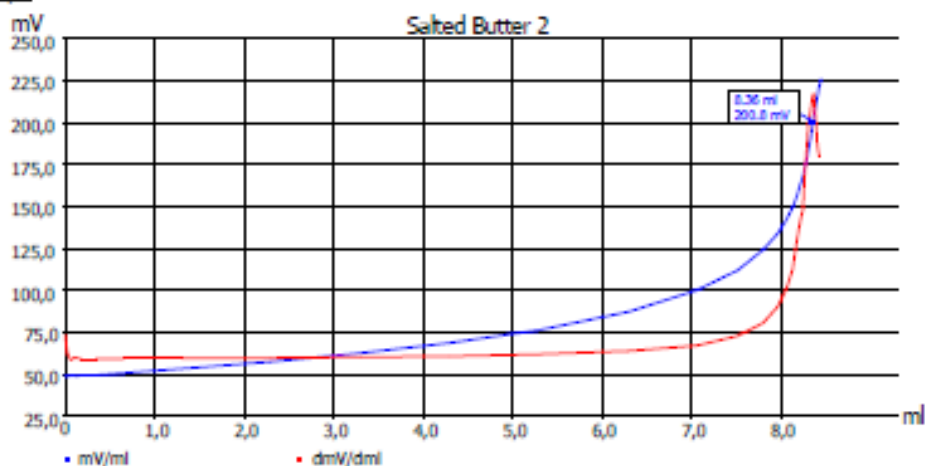
Cheese samples, butter or other solid food products:

Weigh the sample in a 150 to 250 mL glass beaker and add 100 mL hot water (55 °C). For butter, boiling water is recommended. It is also recommended to use a homogenizer for better extraction of NaCl from the sample. Add 1 mL HNO_3 . The warm/hot sample can be titrated directly.

Result example:

GLP documentation

Titration graph



Method data

Method name:	Salt in %	Titration duration:	2 m 10 s
End date:	07.03.13	End time:	16:46:19

Titration data

Sample ID:	Salted Butter 2	Weight:	2.93600 g
Start mV:	49.7 mV	End mV:	225.9 mV

EQ:	8.361 ml / 200.8 mV	Salt:	1.66 %
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Calculation formula

Salt:	$(EQ1-B)^*T^*M^*F1/(W^*F2)$	Mol (M):	58.44300
Blank value (B):	0.0000 ml	Titre (T):	0.10000000 (a)
Factor 1 (F1):	0.1000	Weight (W):	2.93600 g (m)
Factor 2 (F2):	1.0000	Statistics:	Off

Method Information

Method data overall view

Method name:	Salt in %	Created at:	03/07/13 16:30:12
Method type:	Automatic titration	Last modification:	03/07/13 16:40:54
Measured value:	mV		
Titration mode:	Dynamic	Documentation:	GLP
Dynamic:	Steep		
Measuring speed / drift:	User-defined:	minimum holding time:	03 s
		maximum holding time:	15 s
		Measuring time:	03 s
		Drift:	10 mV/min
Initial waiting time:	0 s		
Titration direction:	Increase		
Pretitration:	Off		
End value:	Off		
EQ:	On		
Slope value:	User-defined	Value:	200

Dosing parameter

Dosing speed:	100.00 %	Filling speed:	30 s
Maximum dosing volume:	50.00 ml		

Unit values

Unit size:	20ml
Unit ID:	1296649042
Reagent:	AgNO3 0.1 mol/L
Batch ID:	Any Comment
Concentration [mol/l]:	0.10000
Determined at:	01/18/13 23:13:00
Expire date:	12/31/12
Opened/compounded:	08/19/11
Test according ISO 8655:	01/01/00
Last modification:	02/15/13 9:54:17

Contact Information

Please contact our titration experts if you have any application or product questions. Thanks!

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