Introduction

The application describes the potentiometric determination of chloride/sodium chloride ("salt") in food samples such as salt, spice mixtures, cheese, meat, dressings, or tomato sauce. This method excludes sample preparation of solid food samples that may need additional dissolving or emulsifying to accurately measure the concentration of chloride/sodium chloride ("salt") in the sample.
**Apparatus**

<table>
<thead>
<tr>
<th>TL 5000 / TL 7000 / TL 7750 / 7800</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM 235 stirrer</td>
</tr>
</tbody>
</table>

20 mL exchangeable unit (WA 20). WA 50 would also be suitable.

**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**

**Titration agent:** Commercially prepared silver nitrate solution (AgNO₃) 0.1 mol/L

**Solvent:** Distilled water

**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, TitroLine® 7750, or TitroLine® 7800. 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.

\[(W \times F2) / ((EQ1-B) \times M \times F1)\]

- **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 calculated as mol/L and can be automatically transferred to the exchangeable unit WA 20.
Sample titration

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

\[ (\text{EQ1} - \text{B}) \times \text{TM} \times \text{F1} / (\text{W} \times \text{F2}) \]

**Table 1: Sample amount using 0.1 mol/L silver nitrate solution (AgNO}_3\)**

<table>
<thead>
<tr>
<th>Salt content</th>
<th>Sample weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.1 %</td>
<td>&gt; 10 g</td>
</tr>
<tr>
<td>0.1 - 1 %</td>
<td>1 - 10 g</td>
</tr>
<tr>
<td>1 - 10 %</td>
<td>0.1 - 2 g</td>
</tr>
<tr>
<td>10 - 50 %</td>
<td>0.05 - 0.1 g</td>
</tr>
<tr>
<td>50 - 100 %</td>
<td>0.05 g</td>
</tr>
</tbody>
</table>

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

Method data
- Method name: Salt in %
- End date: 07.03.13

Titration data
- Sample ID: Salted Butter 2
- Start mV: 49.7 mV
- EQ: 8.361 mL / 200.8 mV

Calculation formula
- Salt: \((\text{EQ1-B}) \times T \times F1 / (W \times F2)\)
- Blank value (B): 0.0000 mL
- Factor 1 (F1): 0.1000
- Factor 2 (F2): 1.0000
- Titration duration: 2 m 10 s
- End time: 16:46:19
- Weight: 2.93600 g
- End mV: 225.9 mV
- Salt: 1.66%
- Mol (M): 58.44300
- Titre (T): 0.10000000 (a)
- Weight (W): 2.93600 g (m)
- Statistics: Off
## Method Information

### Method data overall view

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method name</td>
<td>Salt in %</td>
</tr>
<tr>
<td>Method type</td>
<td>Automatic titration</td>
</tr>
<tr>
<td>Measured value</td>
<td>mV</td>
</tr>
<tr>
<td>Titration mode</td>
<td>Dynamic</td>
</tr>
<tr>
<td>Dynamic</td>
<td>Steep</td>
</tr>
<tr>
<td>Measuring speed / drift</td>
<td>User-defined</td>
</tr>
<tr>
<td>Created at</td>
<td>03/07/13 16:30:12</td>
</tr>
<tr>
<td>Last modification</td>
<td>03/07/13 16:40:54</td>
</tr>
<tr>
<td>Minimum holding time</td>
<td>03 s</td>
</tr>
<tr>
<td>Maximum holding time</td>
<td>15 s</td>
</tr>
<tr>
<td>Measuring time</td>
<td>03 s</td>
</tr>
<tr>
<td>Drift</td>
<td>10 mV/min</td>
</tr>
<tr>
<td>Initial waiting time</td>
<td>0 s</td>
</tr>
<tr>
<td>Titration direction</td>
<td>Increase</td>
</tr>
<tr>
<td>Pretitration</td>
<td>Off</td>
</tr>
<tr>
<td>End Value</td>
<td>Off</td>
</tr>
<tr>
<td>EQ</td>
<td>On</td>
</tr>
<tr>
<td>Slope value</td>
<td>User-defined Value 200</td>
</tr>
<tr>
<td>Measuring speed / drift</td>
<td>User-defined</td>
</tr>
<tr>
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</tr>
<tr>
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<td>0 s</td>
</tr>
<tr>
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<td>Initial waiting time</td>
<td>0 s</td>
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<td>Titration direction</td>
<td>Increase</td>
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<td>03 s</td>
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<tr>
<td>Drift</td>
<td>10 mV/min</td>
</tr>
</tbody>
</table>

### Dosing parameter

<table>
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<th>Parameter</th>
<th>Value</th>
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<tr>
<td>Dosing speed</td>
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<tr>
<td>Maximum dosing</td>
<td>50.00 mL</td>
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<tr>
<td>Volume</td>
<td></td>
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<tr>
<td>Filling speed</td>
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### Unit values

<table>
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<th>Value</th>
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<tr>
<td>Unit size</td>
<td>20 mL</td>
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<tr>
<td>Unit ID</td>
<td>1296649042</td>
</tr>
<tr>
<td>Reagent</td>
<td>AgNO3 0.1 mol/L</td>
</tr>
<tr>
<td>Batch ID</td>
<td>Any Comment</td>
</tr>
<tr>
<td>Concentration [mol/L]</td>
<td>0.10000</td>
</tr>
<tr>
<td>Determined at</td>
<td>01/18/13 23:13:00</td>
</tr>
<tr>
<td>Expire date</td>
<td>12/31/12</td>
</tr>
<tr>
<td>Opened/compounded</td>
<td>08/19/11</td>
</tr>
<tr>
<td>Test according ISO 8655:</td>
<td>01/01/00</td>
</tr>
<tr>
<td>Last Modification</td>
<td>02/15/13 9:54:17</td>
</tr>
<tr>
<td>Filling speed</td>
<td>30 s</td>
</tr>
</tbody>
</table>