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Indian Standard

CHEESE AND PROCESSED CHEESE PRODUCTS — DETERMINATION OF CHLORIDE CONTENT — POTENTIOMETRIC TITRATION METHOD

(Second Revision)

ICS 67.100.30
NATIONAL FOREWORD

This Indian Standard (Second Revision) which is identical with ISO 5943:2004 'Cheese and processed cheese products—Determination of chloride content — Potentiometric titration method' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendations of the Dairy Products and Equipment Sectional Committee and approval of the Food and Agriculture Division Council.

This standard was first published in 1986 as a dual number and revised in 1996 to align with the revised ISO Standard under dual numbering. The second revision of this standard is being brought out to align it with the latest edition of the ISO Standard.

The text of the ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain terminology and conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2:1960 'Rules for rounding off numerical values (revised)'.

Dairy Products and Equipment Sectional Committee, FAD 19
Indian Standard

CHEESE AND PROCESSED CHEESE PRODUCTS — DETERMINATION OF CHLORIDE CONTENT — POTENTIOMETRIC TITRATION METHOD

( Second Revision )

1 Scope

This International Standard specifies a potentiometric titration method for the determination of the chloride content of cheese and processed cheese products.

The method is applicable to all cheeses and processed cheese products containing more than 0.2 % (mass fraction) of chloride ion.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1 chloride content of cheese and processed cheese products
mass fraction of substances determined by the procedure specified in this International Standard

NOTE It is expressed as a mass fraction, in percent, of chloride ion or sodium chloride or any other chloride.

3 Principle

A test portion is suspended in water. The suspension is acidified with nitric acid then the chloride ions are titrated potentiometrically with a silver nitrate standard solution.

4 Reagents

Use only reagents of recognized analytical grade, unless otherwise specified, and distilled or demineralized water or water of at least equivalent purity.

4.1 Silver nitrate standard solution, \( c(\text{AgNO}_3) = 0.08 \text{ mol/l} \) to \( 0.12 \text{ mol/l} \).

Dissolve 13.6 g to 20.4 g of silver nitrate in water which is practically free from carbon dioxide and dilute to 1000 ml. Standardize the solution against sodium chloride (NaCl), which has previously been dried at 300 °C, expressing the concentration of the silver nitrate standard solution to four decimal places.

Store the solution away from direct sunlight.

4.2 Nitric acid, \( c(\text{HNO}_3) = 4 \text{ mol/l} \).
5 Apparatus

5.1 Device for grinding or grating cheese, capable of being cleaned easily.

5.2 Analytical balance, capable of weighing to the nearest 1 mg, with a readability of 0,1 mg.

5.3 Blender.

5.4 Potentiometer, provided with a measuring electrode suitable for the determination of chloride (e.g. a silver electrode) and a reference electrode [e.g. a mercury(II) sulfate electrode].

5.5 Vessel, suitable for blending and titrating.

5.6 Graduated cylinders, of capacity 10 ml and 50 ml.

5.7 Burette, graduated in divisions of 0,1 ml, of capacity 50 ml, or an automatic plunger burette, readable to the nearest 0,01 ml. The burette, or automatic plunger burette, should preferably be made of brown glass.

5.8 Stirrer.

6 Sampling

A representative sample should have been sent to the laboratory. It should not have been damaged or changed during transport or storage.

Sampling is not part of the method specified in this International Standard. A recommended sampling method is given in ISO 7071.

7 Preparation of test sample

Prior to analysis, remove the rind or smear or mouldy surface layer of the cheese, in such a way as to provide a sample representative of the cheese as it is usually consumed. Grind or grate the sample by means of an appropriate device (5.1). Mix the ground or grated mass quickly, and if possible grind or grate a second time and again mix thoroughly. If the sample cannot be ground or grated, mix it thoroughly by intensive stirring and kneading.

Transfer the test sample to an airtight container to await analysis, which should be carried out as soon as possible after grinding. If delay is unavoidable, take all precautions to ensure proper preservation of the sample and to prevent condensation of moisture on the inside surface of the container. The storage temperature should be 10 °C to 12 °C.

Clean the device after grinding or grating each sample.

8 Procedure

8.1 Test portion

Weigh, to the nearest 0,001 g, 2 g to 5 g of the test sample (Clause 7) into the vessel (5.5).

8.2 Determination

8.2.1 Add 30 ml of water at about 55 °C. Suspend the test portion using the blender (5.3). Rinse the blender with approximately 10 ml of water, collecting the rinsings in the vessel.
8.2.2 Add 2 ml to 3 ml of the nitric acid (4.2). Put the measuring electrode and the reference electrode into the suspension.

Titrate the contents of the vessel with the silver nitrate standard solution (4.1) using the burette (5.7), stirring continuously, until the endpoint has nearly been reached. Then titrate cautiously until reaching the endpoint, which corresponds to the maximum potential difference observed between two successive equal additions (of about 0.05 ml) of the silver nitrate standard solution.

8.3 Blank test

Carry out a blank test using the reagents but omitting the test portion.

9 Calculation and expression of results

9.1 Calculation

Calculate the chloride content, \( w_{Cl} \), as a mass fraction in percent, by means of the equation:

\[
\frac{(V_1 - V_0) \times c \times f}{m} \times 100 \%
\]

where

- \( V_0 \) is the volume, in millilitres, of the silver nitrate standard solution used in the blank test;
- \( V_1 \) is the volume, in millilitres, of the silver nitrate standard solution used in the determination;
- \( c \) is the actual concentration, expressed in moles per litre, of the silver nitrate standard solution;
- \( m \) is the mass, in grams, of the test portion;
- \( f \) is the factor for expressing the result as a percentage of any chloride; the numerical values are, for example:
  - \( f = 3.55 \) for expression as \% Cl\(^-\)
  - \( f = 5.84 \) for expression as \% NaCl
  - \( f = 7.46 \) for expression as \% KCl

9.2 Expression of results

Report the result to the second decimal place.

10 Precision

10.1 Interlaboratory test

The values for repeatability and reproducibility were derived from the results of an interlaboratory test (see [4]) carried out in accordance with ISO 5725:1986\(^1\).

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1) ISO 5725:1986, *Precision of test methods — Determination of repeatability and reproducibility for a standard test method by inter-laboratory tests* (now withdrawn), was used to calculate the precision data.
10.2 Repeatability

The absolute difference between two independent single test results, obtained using the same method on identical test material in the same laboratory by the same operator using the same equipment within a short interval of time, will in not more than 5 % of cases be greater than 0,02 g of Cl⁻ ion (for the equivalent quantity of any chloride) per 100 g of product.

10.3 Reproducibility

The absolute difference between two single test results, obtained using the same method on identical test material in different laboratories with different operators using different equipment, will in not more than 5 % of cases be greater than 0,06 g of Cl⁻ ion (or the equivalent quantity of any chloride) per 100 g of product.

11 Test report

The test report shall specify:

a) all information necessary for the complete identification of the sample;

b) the sampling method used, if known;

c) the test method used, with reference to this International Standard;

d) all operating details not specified in this International Standard, or regarded as optional, together with details of any incidents which may have influenced the test results;

e) the test results obtained, mentioning clearly the way in which they are expressed.
Bibliography


2) Equivalent to IDF 50.
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Amendments Issued Since Publication

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