SRI LANKA STANDARD 384 : 2012
ISO 2918 : 1975

METHODS OF TEST FOR
MEAT AND MEAT PRODUCTS
DETERMINATION OF NITRITE CONTENT
(First Revision)

SRI LANKA STANDARDS INSTITUTION

Sri Lanka Standard
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SLS 384 : 2012
ISO 2918 : 1975

Gr.B

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Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This standard does not purport to include all the necessary provisions of a contract.

Sri Lanka Standard
METHODS OF TEST FOR MEAT AND MEAT PRODUCTS
DETERMINATION OF NITRITE CONTENT
(First Revision)

NATIONAL FOREWORD

This Sri Lanka standard was approved by the Sectoral Committee on Agricultural and Food Products and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2012-01-27.

This standard was first published in 1976, which has been derived from the International Organization for Standardization on the subject of testing meat and meat products. This revision has been undertaken to update the standard to be in line with the available ISO standard for meat and meat products.

This standard is identical with ISO 2918 : 1975, Meat and meat products – Determination of nitrite content – Reference method, published by the International Organization for Standardization (ISO).

Terminology and Conventions:

The text of the International Standard has been accepted as suitable for publication, without deviation, as a Sri Lanka Standard. However, certain terminology and conventions are not identical with those used in Sri Lanka Standards. Attention is therefore drawn to the following:

a) Wherever the words “International Standard” appear referring to this standard should be interpreted as “Sri Lanka Standard”.

b) The comma has been used throughout as a decimal marker. In Sri Lanka Standards it is the current practice to use the full point on the base line as the decimal marker.

c) Wherever page numbers are quoted, they are ISO page numbers.

CROSS REFERENCE

International Standard	Corresponding Sri Lanka Standard
ISO 3100, Meat and meat products - Sampling	No corresponding standards

INTERNATIONAL STANDARD 2918

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION·МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ·ORGANISATION INTERNATIONALE DE NORMALISATION

Meat and meat products — Determination of nitrite content (Reference method)

Viandes et produits à base de viande — Détermination de la teneur en nitrites (Méthode de référence)

First edition — 1975-09-01

UDC 637.5 : 546.17 **Ref. No. ISO 2918-1975 (E)**

Descriptors : meat, meat products, chemical analysis, determination of content, nitrites.

Price based on 3 pages

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2918 was drawn up by Technical Committee ISO/TC 34, *Agricultural food products,* and circulated to the Member Bodies in April 1974.

It has been approved by the Member Bodies of the following countries :

Australia	France	Romania
Austria	Germany	South Africa, Rep. of
Belgium	Hungary	Spain
Bulgaria	India	Turkey
Chile	Israel	United Kingdom
Czechoslovakia	Netherlands	Yugoslavia
Denmark	New Zealand	
Egypt, Arab Rep. of	Poland	

The Member Body of the following country expressed disapproval of the document on technical grounds :

Canada

Printed in Switzerland

INTERNATIONAL STANDARD ISO 2918-1975 (E)

Meat and meat products — Determination of nitrite content (Reference method)

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a reference method for the determination of the nitrite content of meat and meat products.

2 REFERENCE

ISO 3100, *Meat and meat products — Sampling.*

3 DEFINITION

nitrite content of meat and meat products : The nitrite content determined according to the procedure described in this International Standard and expressed as milligrams of sodium nitrite per kilogram (parts per million).

4 PRINCIPLE

Extraction of a test portion with hot water, precipitation of the proteins and filtration. In the presence of nitrite, development of a red colour by the addition of sulphanilamide and *N*-1-naphthylethylenediamine dihydrochloride to the filtrate and photometric measurement at a wavelength of 538 nm.

5 REAGENTS

All reagents shall be of analytical quality. The water used shall be distilled water or water of at least equivalent purity.

5.1 Solutions for precipitation of proteins

5.1.1 Reagent I

Dissolve 106 g of potassium ferrocyanide trihydrate [$K_4Fe(CN)_6 \cdot 3H_2O$] in water and dilute to 1 000 ml.

5.1.2 Reagent II

Dissolve 220 g of zinc acetate dihydrate [$Zn(CH_3COO)_2 \cdot 2H_2O$] and 30 ml of glacial acetic acid in water and dilute to 1 000 ml.

5.1.3 **Borax** solution, saturated

Dissolve 50 g of disodium tetraborate decahydrate ($Na_2B_4O_7 \cdot 10H_2O$) in 1 000 ml of tepid water and cool to room temperature.

5.2 **Sodium nitrite** standard solutions

Dissolve 1,000 g of sodium nitrite ($NaNO_2$) in water and dilute to 100 ml in a one-mark volumetric flask. Pipette 5 ml of the solution into a 1 000 ml one-mark volumetric flask. Dilute to the mark.

Prepare a series of standard solutions by pipetting 5 ml, 10 ml and 20 ml of this solution into 100 ml one-mark volumetric flasks and diluting to the mark with water. These standard solutions contain respectively 2,5 μg, 5,0 μg and 10,0 μg of sodium nitrite per millilitre.

The standard solutions and the dilute (0,05 g/l) sodium nitrite solution from which they are prepared shall be made up on the day of use.

5.3 Solutions necessary for colour development

5.3.1 Solution I

Dissolve, by heating on a water bath, 2 g of sulphanilamide ($NH_2C_6H_4SO_2NH_2$) in 800 ml of water. Cool, filter, if necessary, and add 100 ml of concentrated hydrochloric acid solution (ρ_{20} 1,19 g/ml), while stirring. Dilute to 1 000 ml with water.

5.3.2 Solution II

Dissolve 0,25 g of *N*-1-naphthylethylenediamine dihydrochloride ($C_{10}H_7NHCH_2CH_2NH_2 \cdot 2HCl$) in water. Dilute to 250 ml with water.

Store the solution in a well-stoppered brown bottle. It shall be kept in a refrigerator, for not longer than one week.

5.3.3 Solution III

Dilute 445 ml of concentrated hydrochloric acid solution (ρ_{20} 1,19 g/ml) to 1 000 ml with water.

6 APPARATUS

Usual laboratory equipment and the following items :

6.1 Mechanical meat mincer, laboratory size, fitted with a perforated plate with holes not greater than 4 mm in diameter.

6.2 Analytical balance.

6.3 One-mark volumetric flasks of 100 ml, 200 ml and 1 000 ml, complying with ISO/R 1042, Class B.

6.4 One-mark pipettes of 10 ml and, if necessary, with another capacity according to the aliquot of filtrate (8.4.1), complying with ISO/R 648, Class A.

6.5 Boiling water bath.

6.6 Photoelectric colorimeter or **spectrophotometer** with cells of 1 cm optical path length.

6.7 Fluted filter paper, diameter about 15 cm, free of nitrite.

6.8 Conical flask, 300 ml.

7 SAMPLE

7.1 Proceed from a representative sample of at least 200 g. See ISO 3100.

7.2 Prepare the test sample (8.1) immediately or, if this cannot be done, store the sample at a temperature of 0 to 5 °C, for not longer than 4 days.

8 PROCEDURE

8.1 Preparation of test sample

Make the sample homogeneous by passing it at least twice through the meat mincer (6.1) and mixing. Keep it in a completely filled, air-tight, closed container under refrigeration.

Analyse the test sample as soon as possible, but always within 24 h.

NOTE – In the case of uncooked products, analyse immediately after homogenization.

8.2 Test portion

Weigh, to the nearest 0,001 g, about 10 g of the test sample.

8.3 Deproteination

8.3.1 Transfer the test portion quantitatively into the conical flask (6.8) and add successively 5 ml of saturated borax solution (5.1.3) and 100 ml of water at a temperature not below 70 °C.

8.3.2 Heat the flask for 15 min on the boiling water bath (6.5) and shake repeatedly.

8.3.3 Allow the flask and its contents to cool to room temperature and add successively 2 ml of reagent I (5.1.1) and 2 ml of reagent II (5.1.2). Mix thoroughly after each addition.

8.3.4 Transfer the contents to a 200 ml one-mark volumetric flask (6.3). Dilute to the mark with water and mix. Allow the flask to stand for 30 min at room temperature.

8.3.5 Carefully decant the supernatant liquid and filter it through the fluted filter paper (6.7) so as to obtain a clear solution.

8.4 Colour measurement

8.4.1 Pipette an aliquot portion of the filtrate (V ml), but not more than 25 ml, into a 100 ml one-mark volumetric flask (6.3) and add water to obtain a volume of about 60 ml.

8.4.2 Add 10 ml of solution I (5.3.1), followed by 6 ml of solution III (5.3.3), mix and leave the solution for 5 min at room temperature, in the dark.

8.4.3 Add 2 ml of solution II (5.3.2), mix and leave the solution for 3 to 10 min at room temperature in the dark. Dilute to the mark with water.

8.4.4 Measure the absorbance of the solution in a 1 cm cell using a photoelectric colorimeter or a spectrophotometer (6.6), at a wavelength of about 538 nm.

NOTE – If the absorbance of the coloured solution obtained from the test portion exceeds that obtained for the standard solution with the highest concentration, repeat the operations described in 8.4, reducing the quantity of filtrate pipetted in 8.4.1.

8.5 Number of determinations

Carry out two independent determinations, beginning with different test portions taken from the same test sample.

8.6 Calibration curve

8.6.1 Pipette respectively into four 100 ml one-mark volumetric flasks (6.3) 10 ml of water and 10 ml of each of the three sodium nitrite standard solutions (5.2), containing 2,5 μg, 5,0 μg and 10,0 μg of nitrite per millilitre.

8.6.2 To each flask add water to obtain a volume of about 60 ml and proceed as described in 8.4.2 to 8.4.4.

8.6.3 Draw the calibration curve by plotting the measured absorbances against the concentrations, in micrograms per millilitre, of the standard solutions.

9 EXPRESSION OF RESULTS

9.1 Method of calculation and formula

Calculate the nitrite content of the sample, expressed as milligrams of sodium nitrite per kilogram, using the formula :

$$NaNO_2 = c \times \frac{2\,000}{m \times V}$$

where

m is the mass, in grams, of the test portion;

V is the volume, in millilitres, of the aliquot portion of the filtrate (see 8.4.1) taken for the photometric determination;

c is the concentration of sodium nitrite, in micrograms per millilitre, read from the calibration curve, that corresponds with the absorbance of the solution prepared from the test portion (see 8.4.4).

Take as the result the arithmetic mean of the two determinations, provided that the requirement for repeatability (see 9.2) is satisfied. Express the result to the nearest 1 mg per kilogram of product.

9.2 Repeatability

The difference between the results of two determinations carried out simultaneously or in rapid succession, by the same analyst, shall not be greater than 10 % of the mean value.

10 TEST REPORT

The test report shall show the method used and the result obtained; it shall also mention all operating conditions not specified in this International Standard, or regarded as optional, as well as any circumstances that may have influenced the result.

The report shall include all details necessary for complete identification of the sample.

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SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Technology & Research.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and Administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in return are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of Standardization as are of special interest to Sri Lanka.

Printed at the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08

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Further particulars of the terms and conditions of the permit may be obtained from the Sri *Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.*

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