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Milk and milk products — Determination of zinc content — Flame atomic absorption spectrometric method

Lait et produits laitiers — Détermination de la teneur en zinc — Méthode par spectrométrie d'absorption atomique avec flamme

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Foreword

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ISO 11813|IDF 156 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*, and the International Dairy Federation (IDF). It is being published jointly by ISO and IDF.

This second edition of ISO 11813|IDF 156 cancels and replaces the first edition (ISO 11813:1998), of which it constitutes a minor revision.

Foreword

IDF (the International Dairy Federation) is a non-profit organization representing the dairy sector worldwide. IDF membership comprises National Committees in every member country as well as regional dairy associations having signed a formal agreement on cooperation with IDF. All members of IDF have the right to be represented on the IDF Standing Committees carrying out the technical work. IDF collaborates with ISO in the development of standard methods of analysis and sampling for milk and milk products.

The main task of Standing Committees is to prepare International Standards. Draft International Standards adopted by the Standing Committees are circulated to the National Committees for endorsement prior to publication as an International Standard. Publication as an International Standard requires approval by at least 50% of IDF National Committees casting a vote.

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ISO 11813 | IDF 156 was prepared by the International Dairy Federation (IDF) and Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*. It is being published jointly by IDF and ISO.

All work was carried out by the former Joint ISO-IDF Action Team on *Minor compounds*, now part of the Standing Committee on *Analytical methods for composition*.

This edition of ISO 11813 | IDF 156 cancels and replaces IDF 156:1992, of which it constitutes a minor revision.

Milk and milk products — Determination of zinc content — Flame atomic absorption spectrometric method

1 Scope

This International Standard specifies a flame atomic absorption spectrometric method for the determination of the zinc content of milk and milk products. The method has been validated for zinc contents of between 25 mg/kg and 70 mg/kg (dry mass) in milk and milk products.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6732|IDF 103, *Milk and milk products — Determination of iron content — Spectrometric method (Reference method)*

3 Terms and definitions

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

3.1
zinc content in milk and milk products
mass fraction of substances determined by the procedure specified in this International Standard

NOTE The zinc content is expressed in milligrams per kilogram of product.

4 Principle

The sample is dry ashed in a programmable ashing furnace. The ash is dissolved in concentrated hydrochloric acid and, after adding strontium chloride solution, diluted with water. The zinc content of the resulting solution is measured by flame atomic absorption spectrometry at a wavelength of 213,9 nm with deuterium or Zeeman background correction.

5 Reagents

Use only reagents of recognized analytical grade which, with the exception of the standard zinc solutions (5.5), shall be free from zinc.

Unless otherwise indicated, the use of Aristar, Suprapur or Ultrex reagents[1] or products of equivalent reagent grade purity is strongly recommended.

5.1 Water, complying with grade 2 as defined in ISO 3696[3].

5.2 Hydrochloric acid (HCl), concentrated (ρ_{20} = 1,17 g/ml to 1,18 g/ml).

5.3 Strontium chloride solution.

Dissolve 38,0 g of strontium chloride hexahydrate ($SrCl_2 \cdot 6H_2O$) in water (5.1) and make up to 250 ml with water.

NOTE Strontium chloride hexahydrate from BDH (Spectrosol)[1] or equivalent is suitable.

5.4 Nitric acid (HNO_3), concentrated (ρ_{20} = 1,42 g/ml).

5.5 Zinc standard solutions.

5.5.1 Stock solution, containing 1 000 mg of zinc per litre of 0,3 mol/l nitric acid (equivalent to 18,9 g/l of nitric acid).

NOTE Baker Instra-analyzed Atomic Spectral Solution[1] 1.6946 is suitable.

5.5.2 Working solution, containing 100 mg of zinc per litre. Add 1 ml of nitric acid (5.4) to 10 ml of the stock solution (5.5.1) and make up to 100 ml with water (5.1).

5.6 Zero-standard solution.

In a 500 ml one-mark volumetric flask, dilute 2,5 ml of hydrochloric acid (5.2) and 12,5 ml of strontium chloride solution (5.3) with water (5.1) to the 500 ml mark. Mix well.

6 Apparatus

IMPORTANT — Store clean glassware in nitric acid, 10 % mass fraction. Rinse it three times before use with distilled water and then three times with double-distilled water.

Usual laboratory equipment and in particular the following.

6.1 Quartz crucibles, with quartz lids, capacity 50 ml.

6.2 One-mark volumetric flasks, capacities 100 ml and 250 ml, ISO 1042[2] class A.

6.3 Manual piston pipettes, capacities 0,2 ml, 1,0 ml, and 5,0 ml, ISO 8655-2[6].

6.4 Drying oven, capable of being maintained at 102 °C ± 5 °C.

6.5 Programmable ashing furnace, or equivalent, capable of maintaining a minimum attainable temperature of 550 °C with a heating rate programmable at 50 °C/h.

NOTE If a programmable ashing furnace is not available, manual adjustment of temperature of an isothermal furnace is possible in steps of 50 °C every hour.

1) Aristar, Suprapur, Ultrex and Spectrosol reagents and Baker Instra-analyzed Atomic Spectral Solution are examples of suitable products available commercially. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO or IDF of these products.

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