



SLOVENSKI STANDARD

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Hrana za dojenčke in prehranska dopolnila za odrasle - Določevanje celotnega joda - Masna spektrometrija z induktivno sklopljeno plazmo (ICP-MS) (ISO 20647:2015)

Infant formula and adult nutritionals -Determination of total iodine - Inductively coupled plasma mass spectrometry (ICP-MS) (ISO 20647:2015)

Säuglingsanfangsnahrung und Nahrungsergänzungsmittel für Erwachsene - Bestimmung des Gesamtjods - Massenspektrometrie mit induktiv gekoppeltem Plasma (ICP-MS) (ISO 20647:2015)

Formules infantiles et produits nutritionnels pour adultes - Détermination de la teneur en iode total - Spectrométrie de masse avec plasma à couplage inductif (ICP-SM) (ISO 20647:2015)

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67.050

Splošne preskusne in
analizne metode za živilske
proizvode

General methods of tests and
analysis for food products

oSIST prEN ISO 20647:2020

en

INTERNATIONAL STANDARD

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**IDF
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Infant formula and adult nutritionals — Determination of total iodine — Inductively coupled plasma mass spectrometry (ICP-MS)

*Formules infantiles et produits nutritionnels pour adultes —
Détermination de la teneur en iode total — Spectrométrie de masse
avec plasma à couplage inductif (ICP-SM)*

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ISO 20647:2015(E)
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Forewords

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products* and the International Dairy Federation (IDF), in collaboration with AOAC INTERNATIONAL. It is being published jointly by ISO and IDF and separately by AOAC INTERNATIONAL. The method described in this International Standard is equivalent to the AOAC Official Method 2012.15: *Total iodine in infant formula and adult/pediatric nutritional formula – inductively coupled plasma-mass spectrometry*.

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IDF (the International Dairy Federation) is a non-profit private sector organization representing the interests of various stakeholders in dairying at the global level. IDF members are organized in National Committees, which are national associations composed of representatives of dairy-related national interest groups including dairy farmers, dairy processing industry, dairy suppliers, academics and governments/food control authorities.

ISO and IDF collaborate closely on all matters of standardization relating to methods of analysis and sampling for milk and milk products. Since 2001, ISO and IDF jointly publish their International Standards using the logos and reference numbers of both organizations.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. IDF shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute and endorsement.

ISO 20647 | IDF 234 was prepared by the IDF Standing Committee on Analytical Methods for Composition and the ISO Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*, in collaboration with AOAC INTERNATIONAL. It is being published jointly by ISO and IDF, and separately by AOAC INTERNATIONAL. The method described in this International Standard is equivalent to the AOAC Official Method 2012.15: *Total iodine in infant formula and adult/pediatric nutritional formula – inductively coupled plasma-mass spectrometry*.

All work was carried out by the ISO-IDF Project Group C37 of the Standing Committee on *Analytical Methods for Composition* under the aegis of its project leader, Mr Erik Konings (CH).

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Infant formula and adult nutritionals — Determination of total iodine — Inductively coupled plasma mass spectrometry (ICP-MS)

WARNING — The use of this International Standard can involve hazardous materials, operations and equipment. This International Standard does not purport to address all the safety problems associated with its use. It is the responsibility of the user of this International Standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

1 Scope

This International Standard specifies a method for the quantitative determination of total iodine in infant formula and adult nutritional formula.^[1] The method is applicable to the measurement of total iodine in infant formula and adult nutritional formula from 0,5 µg/100g to 1 500 µg/100g reconstituted final product and for ready-to-feed products from 2,5 µg/100 g to 1 000 µg/100 g using ICP-MS.

Using various infant formula and adult nutritional products, the method was subjected to an interlaboratory study. Levels obtained ranged from 3,47 µg/100 g to 124 µg/100 g. For all precision data related to the interlaboratory study, see [Table A.1](#) located in [Annex A](#).

2 Principle

Digestion occurs using a potassium hydroxide (KOH) solution in an oven or open-vessel microwave system. Iodine is stabilized with ammonium hydroxide and sodium thiosulfate after digestion. The solution is brought to volume followed by filtration. The filtrate is analysed directly or after dilution by inductively coupled plasma mass spectrometry (ICP-MS).^[2]

3 Reagents and materials

During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and distilled or demineralized water or water of equivalent purity. Equivalent chemicals and reagents may be used.

3.1 KOH pellets, certified ACS grade, e.g. Fisher Scientific, Fairlawn, NJ¹⁾.

NOTE KOH may contribute background levels of iodine.

3.2 Ammonium hydroxide (NH₄OH), 28 % to 30 % (m/m), certified ACS PLUS, Fisher Scientific¹⁾.

3.3 Sodium thiosulfate (Na₂S₂O₃), purity ≥ 99,99 %, metal basis, Fisher Scientific¹⁾.

3.4 Surfactant, e.g. Triton®X-100, Sigma, St. Louis, MO¹⁾.

3.5 Concentrated nitric acid (HNO₃), Optima, high purity, Fisher Scientific¹⁾.

3.6 Perchloric acid (HClO₄), 70 % (m/m).

¹⁾ This is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by either ISO or IDF of the product named. Equivalent products may be used if they can be shown to lead to the same results.

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3.7 Purified water, 18 M Ω /cm.

3.8 Reference standards

3.8.1 Iodide standard solution in water, mass concentration $\rho = 1\,000\ \mu\text{g/ml}$, SPEX CertiPrep¹⁾.

3.8.2 Iodide standard solution in 1 % triethylamine (TEA), $\rho = 1\,000\ \mu\text{g/ml}$, Inorganic Ventures¹⁾.

3.8.3 Standard Reference Material (SRM), National Institute of Standards and Technology (NIST) SRM 1849a, Infant/Adult Nutritional Formula.

Either stock iodide reference solutions may be used for intermediate and working standard solutions preparation. The remaining source may be used as a continuing calibration verification (CCV) standard. Equivalent reference standards may be substituted. 'Iodide' may be referred to as 'iodine' throughout this International Standard.

3.9 Internal standards

3.9.1 Praseodymium (Pr) standard solution in 5 % HNO₃, $\rho = 10\ \mu\text{g/ml}$, Inorganic Ventures¹⁾.

Individual values of iodine are reported for each test sample using praseodymium as the internal standard. Equivalent stock internal standard solutions may be substituted.

3.10 Preparation of reagent solutions

3.10.1 General

Prepare all reagent solutions as recommended by either mass per volume or volume per volume. Adjusting for purity and/or concentration is not required.

3.10.2 KOH solution, $\rho = 50\ \text{g/l}$

Dissolve 25 g of KOH pellets in an appropriate amount of purified water, then dilute to 500 ml with purified water. This solution may be added using a re-pipet volumetric bottle top dispenser. Store this solution at room temperature. Reagent expires 6 months after preparation date.

3.10.3 Stabilizer concentrate

Dissolve 5 g of Na₂S₂O₃ in an appropriate amount of purified water, add 50 ml of NH₄OH, then dilute to 500 ml with purified water. The resulting concentration is 10 % NH₄OH and 1 % Na₂S₂O₃ in purified water. Store this solution at room temperature. Reagent expires 6 months after preparation date.

3.10.4 Wash solution (rinse)

Dissolve 2 g of surfactant (3.4) in an appropriate amount of purified water, add 20 ml of NH₄OH, then dilute to 2 000 ml with purified water. The resulting concentration is 1 % NH₄OH and 0,1 % surfactant in purified water. This solution may be added using a re-pipet volumetric bottle top dispenser. Store this solution at room temperature. Reagent expires 6 months after preparation date.

3.10.5 Diluent

Dissolve 10 g of KOH pellets and 0,4 g Na₂S₂O₃ in an appropriate amount of purified water, add 4 ml NH₄OH, then dilute to 2 000 ml with purified water. Store this solution at room temperature. Reagent expires 6 months after preparation date.