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Infant formula and adult nutritionals — Determination of chromium, selenium and molybdenum — Inductively coupled plasma mass spectrometry (ICP-MS)

Formules infantiles et produits nutritionnels pour adultes — Détermination de la teneur en chrome, sélénium et molybdène — Spectrométrie de masse avec plasma à couplage inductif (ICP-SM)

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Forewords

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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 2011.19: *Chromium, selenium, and molybdenum in infant formula and adult nutritional products, 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.

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Infant formula and adult nutritionals — Determination of chromium, selenium and molybdenum — 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 chromium, selenium and molybdenum in infant formula and adult nutritional formula.[1] The method has been validated in an interlaboratory study on seven different matrices.

2 Principle

A test portion is heated with nitric acid in a closed vessel microwave digestion system at 200 °C. The digested test solution, or an appropriate dilution, is presented to the inductively coupled plasma-mass spectrometer (ICP-MS) instrument standardized with acid matched standard calibrant solutions. An ionization buffer (potassium) is used to minimize easily ionizable element (EIE) effects, methanol is added to normalize the carbon content, and germanium and tellurium are used as internal standards. It is permissible to combine the analysis of Cr/Mo/Se with simultaneous determination of any or all of these elements: Na, K, P, Mg, Ca, Fe, Zn, Cu, Mn. An ionization buffer would not be added if the calibration standards already contained Na, K, Mg, and/or Ca.

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 Purified water, 18 MΩ/cm.

3.2 Concentrated nitric acid (HNO_3), 65 % to 70 %, trace metal grade.

3.3 Hydrogen peroxide (H_2O_2), 30 % ACS reagent grade.

3.4 Methanol, purity ≥ 99,99 %, analytical reagent grade for matrix matching.

3.5 Potassium solution, mass concentration ρ = 10 000 mg/l in nitric acid for matrix matching.

The potassium solution may be replaced by multi-element standards that contain K, if major minerals are determined simultaneously.

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