BS EN 16802:2016

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Foodstuffs — Determination of elements and their chemical species — Determination of inorganic arsenic in foodstuffs of marine and plant origin by anion-exchange HPLC-ICP-MS

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National foreword

This British Standard is the UK implementation of EN 16802:2016.

The UK participation in its preparation was entrusted to Technical Committee AW/275, Food analysis - Horizontal methods.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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English Version

Foodstuffs - Determination of elements and their chemical species - Determination of inorganic arsenic in foodstuffs of marine and plant origin by anion-exchange HPLC-ICP-MS

Produits alimentaires - Détermination des éléments et de leurs espèces chimiques - Détermination de la teneur en arsenic inorganique dans les produits alimentaires d'origines marine et végétale, par CLHP avec échange d'anions et spectrométrie de masse à plasma induit par haute fréquence (ICP-SM)

Lebensmittel - Bestimmung von Elementen und ihren Verbindungen - Bestimmung von anorganischem Arsen in Lebensmitteln marinen Ursprungs und pflanzlichen Lebensmitteln mit Anionenaustausch-HPLC-ICP-MS

This European Standard was approved by CEN on 8 February 2016.

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European foreword

This document (EN 16802:2016) has been prepared by Technical Committee CEN/TC 275 “Food analysis - Horizontal methods”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2016, and conflicting national standards shall be withdrawn at the latest by September 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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1 Scope

This European Standard describes a procedure for the determination of inorganic arsenic in foodstuffs of marine and plant origin by anion-exchange HPLC-ICP-MS following waterbath extraction.

This method has been validated in an interlaboratory test on white rice, wholemeal rice, leek, blue mussels, fish muscle and seaweed with an inorganic arsenic mass fraction in the range 0,073 mg/kg to 10,3 mg/kg [1].

2 Normative references

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

EN 13804, *Foodstuffs — Determination of elements and their chemical species — General considerations and specific requirements*

EN ISO 3696, *Water for analytical laboratory use — Specification and test methods (ISO 3696)*

3 Principle

This standard describes a method for the determination of inorganic arsenic. Inorganic arsenic consists of arsenite, As(III) and arsenate, As(V). A representative test portion of the sample is treated with a diluted nitric acid and hydrogen peroxide solution in a heated waterbath. Hereby the arsenic species are extracted into solution and As(III) is oxidized to As(V). The inorganic arsenic is selectively separated from other arsenic compounds using anion exchange HPLC (High Performance Liquid Chromatography) coupled online to the element-specific detector ICP-MS (Inductively Coupled Plasma Mass Spectrometry) for the determination of the mass fraction of inorganic arsenic. External calibration with solvent matrix-matched standards is used for quantification of the amount of inorganic arsenic.

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

4 Reagents

4.1 General

The concentration of the arsenic species in the reagents and water used shall be low enough to not affect the results of the determination. When using a method of high sensitivity like ICP-MS, the control of the blank levels of water, acid and other reagents is very important. Generally ultra-pure water complying with ISO 3696 grade 1 (i.e. electrical conductivity below 0,1 µS/cm at 25 °C) and acid of high purity, e.g. cleaned by sub-boiling distillation, are recommended. Reagents should be of minimum p.a. quality where possible. Special facilities can be used in order to avoid contamination during the steps of preparation and measurement (e.g. uses of laminar flow benches or comparable clean room facilities).

4.2 Nitric acid concentrated, mass fraction $w(HNO_3)$, ≥ 65 %, mass concentration of approximately $\rho(HNO_3)$ = 1,4 g/ml.

Use only nitric acid available with high purity or perform a clean-up by a sub-boiling distillation in order to avoid potential contamination.

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