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NSAI Standards

Irish Standard
I.S. EN 16857:2017

Foodstuffs - Determination of benzene in soft drinks, other beverages and vegetable-based infant foods by headspace gas chromatography mass spectrometry (HS-GC-MS)

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National Foreword

I.S. EN 16857:2017 is the adopted Irish version of the European Document EN 16857:2017, Foodstuffs - Determination of benzene in soft drinks, other beverages and vegetable-based infant foods by headspace gas chromatography mass spectrometry (HS-GC-MS)

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16857

May 2017

ICS 67.160.20; 67.230

English Version

Foodstuffs - Determination of benzene in soft drinks, other beverages and vegetable-based infant foods by headspace gas chromatography mass spectrometry (HS-GC-MS)

Produits alimentaires - Détermination de la teneur en benzène dans les boissons non alcoolisées, les autres boissons et les aliments pour nourrissons à base de légumes par chromatographie en phase gazeuse avec espace de tête couplée à la spectrométrie de masse (HS CG-SM)

Lebensmittel - Bestimmung von Benzol in Erfrischungsgetränken, anderen Getränken und in Babynahrung auf Gemüsebasis mit Headspace-Gaschromatographie/Massenspektrometrie (HS-GC-MS)

This European Standard was approved by CEN on 20 February 2017.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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European foreword

This document (EN 16857:2017) 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 November 2017, and conflicting national standards shall be withdrawn at the latest by November 2017.

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

This document has been prepared under a mandate given to CEN by the European Commission and the Europan Free Trade Association.

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 take appropriate measures for ensuring the safety and health of the personnel prior to application of the standard and to fulfil statutory requirements for this purpose. Benzene has been classified by IARC as carcinogenic to humans (see [1]).

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1 Scope

This European Standard specifies a method for the determination of benzene in soft drinks, other beverages and vegetable-based infant foods, by headspace gas chromatography mass spectrometry (HS-GC-MS). The method has been validated in an interlaboratory study via the analysis of spiked samples of carbonated soft drink, still fruit-based drink, carbonated fruit-based drink, vegetable and fruit juice containing carrot, infant food vegetable based and infant food containing meat, ranging from 1,9 µg/kg to 18,6 µg/kg. However, linearity of the instrument response was proven for the concentration range from 0,5 µg/kg to 20 µg/kg. The limit of quantification (LOQ) depends on the instrument but can generally be expected to be in the range from 0,5 µg/kg to 1,0 µg/kg.

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 ISO 3696:1995, *Water for analytical laboratory use - Specification and test methods (ISO 3696:1987)*

3 Principle

The sample is homogenized, a test portion is heated in a closed system with isotopically-labelled benzene added as internal standard. A portion of the headspace is injected into a GC-MS system for identification and quantification. The injection is performed with a split-splitless injection port. The chromatographic separation is obtained on a mid-polarity capillary GC column. The benzene is ionized at 70 eV, recorded in selected ion monitoring (SIM) mode, and quantified by comparison with the stable isotope labelled analogue.

4 Reagents

Use only reagents of recognized analytical grade and water complying with grade 1 of EN ISO 3696:1995, unless otherwise specified. Prepare standard solutions preferably gravimetrically. Use an analytical balance (5.1) for the preparation of both native and stable isotope labelled benzene standard solutions.

4.1 Benzene, C_6H_6, purity is ≥ 99,0 % (CAS 71-43-2).

While not necessary, it is recommended to store at 4 °C to 6 °C to prevent evaporation. Bring to room temperature before use.

4.2 Benzene-d_6, purity is ≥ 99, 6 atom % D (CAS 1076-43-3).

While not necessary, it is recommended to store at 4 °C to 6 °C to prevent evaporation. Bring to room temperature before use.

4.3 Helium purified compressed gas, purity equivalent to 99,995 % or better.

4.4 Methanol, suitable for headspace GC analysis (CAS 67-56-1).

4.5 Preparation of stock and standard solutions

4.5.1 General

Prepare all standard solutions preferably gravimetrically. Record the tare masses of all recipients and the masses after each preparation step and use for calculation of the mass concentrations of standard solutions.

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