

**Toiduained. Nitraadi- ja/või
nitritisisalduse määramine. Osa 2:
Taimedes ja taimsetes toodetes
nitraadisisalduse määramine
kõrgefektiivse vedelikkromatograafiaga
võiioonivahetuskromatograafiaga**

Foodstuffs - Determination of nitrate and/or nitrite
content - Part 2:HPLC/IC method for the
determination of nitrate content of vegetables and
vegetable products

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 12014-2:2000 sisaldab Euroopa standardi EN 12014-2:1997 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 19.07.2000 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 12014-2:2000 consists of the English text of the European standard EN 12014-2:1997.</p> <p>This document is endorsed on 19.07.2000 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala: See Euroopa standard määrab kindlaks kõrgefektiivse vedelikkromatograafia või ionivahetuskromatograafia meetodi nitraadisalduse määramiseks taimedes ja taimsetes toodetes. Meetodit kasutatakse nitraadisalduse määramiseks piirides 50 mg/kg kuni 3000 mg/kg.</p>	<p>Scope:</p>
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ICS 67.080.20

Võtmesõnad: keemiline analüüs, kõrgefektiivne vedelikkromatograafia, nitraadid, sisalduse määramine, taimed, toiduainetooted

ICS 67.080.20

Descriptors: Foodstuffs, food for babies and infants, nitrate content, testing.

English version

**Foodstuffs – Determination of nitrate and/or
nitrite content**

**Part 2: HPLC/IC method for the determination of nitrate content
of vegetables and vegetable products**

Produits alimentaires – Détermination de
la teneur en nitrates et/ou en nitrites –
Partie 2: Détermination par CLHP/CI de la
teneur en nitrates des légumes et produits
à base de légumes

Lebensmittel – Bestimmung des Nitrat-
und/oder Nitritgehaltes – Teil 2: HPLC/IC-
Verfahren für die Bestimmung des Nitrat-
gehaltes in Gemüse und Gemüse-
erzeugnissen

This European Standard was approved by CEN on 1997-02-28.

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

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Foreword

This European Standard has been prepared by CEN/TC 275 "Food analysis - Horizontal methods" the secretariat of which is held by DIN.

This series "Foodstuffs - Determination of nitrate and/or nitrite content" consist of the following parts:

- Part 1: General
- Part 2: HPLC/IC method for the determination of nitrate content of vegetables and vegetable products
- Part 3: Spectrometric determination of nitrate and nitrite content of meat products after enzymatic reduction of nitrate to nitrite;
- Part 4: IC method for the determination of nitrate and nitrite content of meat products;
- Part 5: Enzymatic determination of nitrate content of vegetable-containing food for babies and infants;
- Part 7: Continuous flow method for the determination of nitrate content of vegetables and vegetable products after cadmium reduction,

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 October 1997 and conflicting national standards shall be withdrawn at the latest by October 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies a high performance liquid chromatography (HPLC)/ion-exchange high performance liquid chromatography (IC) method for the determination of nitrate contents of vegetables and vegetable products. This method is applicable to nitrate contents in the range of 50 mg/kg to 3000 mg/kg.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 12014-1 Foodstuffs - Determination of nitrate and/or nitrite content - Part 1: General

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

3 Principle

Extraction of nitrate from the food with hot water and removal of interfering substances by clarification with Carrez reagents or by purification with solid phase extraction columns. Determination by reversed phase HPLC with ultraviolet (UV) detection or IC with conductivity detection [1].

4 Reagents

During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and water of at least grade 1 as defined in EN ISO 3696. When preparing solutions, the purities of the reagents available shall be taken into account.

4.1 Methanol, for HPLC

4.2 Acetonitrile, for HPLC

4.3 Sulfuric acid, $c(\text{H}_2\text{SO}_4) = 0,0125 \text{ mol/l}^1$

Carefully pipette 20 ml of sulfuric acid of 96 % [$\rho(\text{H}_2\text{SO}_4) = 1,84 \text{ g/ml}^2$] into a 1 000 ml volumetric flask containing 800 ml of water, mix, dilute to the mark with water and mix again. Transfer, e.g. by means of a graduated cylinder 33 ml of this dilution into a further 1 000 ml volumetric flask containing 500 ml of water. Dilute to the mark with water and mix.

4.4 Carrez solution No 1

Dissolve 150 g of potassium hexacyanoferrate(II) ($\text{K}_4[\text{Fe}(\text{CN})_6] \cdot 3 \text{ H}_2\text{O}$) in water, mix well and dilute to 1 000 ml with water. Store in a brown bottle and replace it every week.

4.5 Carrez solution No 2

Dissolve 220 g of zinc acetate ($\text{Zn}(\text{CH}_3\text{COO})_2 \cdot 2 \text{ H}_2\text{O}$) in water, add 30 ml of glacial acetic acid, mix and dilute to 1 000 ml with water.

¹⁾ c is the substance concentration

²⁾ ρ is the mass concentration