Toiduained. Nitraadi- ja/või nitritisisalduse määramine. Osa 5: Ensümaatiline nitraadisisalduse määramine köögivilja sisaldavas imiku- ja väikelastetoidus

Foodstuffs - Determination of nitrate and/or nitrite content - Part 5: Enzymatic determination of nitrate content of vegetable-containing food for babies and infants

EESTI STANDARDIKESKUS

EESTI STANDARDI EESSÕNA NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 12014-5:2000 sisaldab Euroopa standardi EN 12014-5:1997 ingliskeelset teksti. Käesolev dokument on jõustatud 19.07.2000 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 12014-5:2000 consists of the English text of the European standard EN 12014-5:1997. This document is endorsed on 19.07.2000 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: See Euroopa standard esitab ensümaatilise meetodi köögivilja sisaldava imiku- ja väikelastetoidu analüüsiks. Meetodit saab rakendada nitraadisisalduse puhul, mis jääb vahemikku 50 mg/kg kuni 200 mg/kg.	**Scope:**

ICS 67.230

Võtmesõnad: ensümaatilised meetodid, keemiline analüüs, köögiviljad, nitraadid, nitritid, sisalduse määramine, toiduained, väikelastetoidud

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

English version

Foodstuffs – Determination of nitrate and/or nitrite content

Part 5: Enzymatic determination of nitrate content of vegetable-containing food for babies and infants

Produits alimentaires – Détermination de la teneur en nitrates et/ou en nitrites – Partie 5: Détermination enzymatique de la teneur en nitrates des aliments à base de légumes pour bébés et petits enfants

Lebensmittel – Bestimmung des Nitrat- und/oder Nitritgehaltes – Teil 5: Enzymatische Bestimmung des Nitratgehaltes in gemüsehaltiger Säuglings- und Kleinkindernahrung

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

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 Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Contents

Foreword

This European Standard has been prepared by CEN/TC 275 "Food analysis - Horizontal methods" the secretariat of which is held in 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 an enzymatic method for the determination of vegetable-containing food for babies and infants [1], [2]. This method is applicable to nitrate contents in the range of 50 mg/kg to 200 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 considerations

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

3 Principle

Enzymatic determination in an aqueous sample extract by measuring the amount of NADPH used up in the following reaction:

$$\text{Nitrate} + \text{NADPH} + \text{H}^+ \xrightarrow{\text{nitrate reductase}} \text{Nitrite} + \text{NADP}^+ + \text{H}_2\text{O}$$

where the amount of NADPH used up is equivalent to the quantity of nitrate [3].

4 Reagents

During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and water of at least grade 3 as defined in EN ISO 3696. When preparing solutions, the purities of the reagents available shall be taken into account.

4.1 Carrez solution No 1

Dissolve 150 g of potassium hexacyanoferrate(II), $K_4[Fe(CN)_6] \cdot 3\ H_2O$ in water and dilute to 1 000 ml. Store the solution in a brown bottle and replace it every two months.

4.2 Carrez solution No 2

Dissolve 300 g of zinc sulfate, $ZnSO_4 \cdot 7\ H_2O$ in water and dilute to 1 000 ml.

4.3 Sodium hydroxide solution, c (NaOH) = 2 mol/l [1])

4.4 Imidazole buffer solution, pH = 7,3 [2])

Dissolve 0,68 g of imidazole ($C_3H_4N_2$) in 80 ml of water, adjust the pH to 7,3 with 2 mol/l hydrochloric acid solution and dilute to 100 ml with water. The solution will be stable for at least 1 year at 4 °C.

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[1]) c is the substance concentration

[2]) These reagents are included in commercially available test kits. If these test kits are used, follow the manufacturer's instructions.