# Toiduained. Nitraadi- ja/või nitritisisalduse määramine. Osa 7: Nitraadisisalduse määramine taimedes ja taimsetes toodetes pideva voolamise meetodil pärast kaadmiumi taandamist

Foodstuffs - Determination of nitrate and/or nitrite content - Part 7: Continous Flow method for the determination of nitrate content of vegetables and vegetable products after Cadmium reduction

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

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| Käesolev Eesti standard EVS-EN 12014-7:2000 sisaldab Euroopa standardi EN 12014-7:1998 ingliskeelset teksti.<br><br>Käesolev dokument on jõustatud 19.07.2000 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.<br><br>Standard on kättesaadav Eesti standardiorganisatsioonist. | This Estonian standard EVS-EN 12014-7:2000 consists of the English text of the European standard EN 12014-7:1998.<br><br>This document is endorsed on 19.07.2000 with the notification being published in the official publication of the Estonian national standardisation organisation.<br><br>The standard is available from Estonian standardisation organisation. |

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| **Käsitlusala:**<br>See standard määrab kindlaks pideva voolamise meetodi nitraadisisalduse määramiseks taimedes ja taimsetes toodetes, mille nitraadisisaldus on vahemikus 900 - 5200 mg/kg (väljendatuna nitraatioonina). | **Scope:** |

**ICS** 67.080.20

**Võtmesõnad:** analüüsimeetodid, keemiline analüüs, nitraadid, nitritid, sisalduse määramine, taimed, toiduainetooted

# EUROPEAN STANDARD
# NORME EUROPÉENNE
# EUROPÄISCHE NORM

EN 12014-7

June 1998

ICS 67.080.20

Descriptors: Foodstuffs, nitrate content, vegetables, testing.



**English version**

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

### Part 7: 'Continuous flow' method for the determination of nitrate content of vegetables and vegetable products after cadmium reduction

Produits alimentaires – Détermination de la teneur en nitrates et/ou en nitrites – Partie 7: Détermination de la teneur en nitrates par flux continu dans les légumes et les produits à base de légumes, après réduction au cadmium

Lebensmittel – Bestimmung des Nitrat- und/oder Nitritgehaltes – Teil 7: Kontinuierliches Durchflußverfahren zur Bestimmung des Nitratgehaltes in Gemüse und Gemüseerzeugnissen nach Cadmiumreduktion

This European Standard was approved by CEN on 1998-05-13.

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**



Ref. No. EN 12014-7 : 1998 E

**Content**





**Foreword**

This European Standard 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 December 1998, and conflicting national standards shall be withdrawn at the latest by December 1998.

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

Part 1: General considerations;

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: Ion-exchange chromatographic (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.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, 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 continuous flow method (CF-method) for the determination of nitrate content of vegetables and vegetable products having a nitrate content of 900 mg/kg to 5200 mg/kg (calculated as nitrate ion).

NOTE: Experiences have shown that the method may also applied for vegetables and vegetable products having a nitrate content of greater than 50 mg/kg (calculated as nitrate ion).

## 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

Test portions are extracted with water and filtered. The filtrate is transferred to the dializer of the continuous flow (CF) system [1]. An aliquot portion of the nitrate ions diffuses in the dializing unit with a hydrophilic membrane into a slightly alkaline buffer solution in which the nitrates are reduced to nitrite by metallic cadmium. The nitrite ions react with sulfanilamide and N-1-naphthylethylenediamine to give a reddish-purple azo dye.

The absorbance of this dye is determined spectrometrically at a wavelength between 520 nm and 540 nm, preferably at its maximum.

NOTE: The CF method is an automated version of the manual procedure for nitrate determinations in leafy vegetables as prescribed by the Official Dutch Food Act [2]. With the automated method the cadmium reductor may be used for a longer period of time without any appreciable loss of its reducing capacity. Also ready-made cadmium columns from commercial suppliers are available, minimizing the main objection of working with this toxic element.

## 4 Reagents

All reagents and materials used shall be of recognized analytical grade and water shall be of at least grade 1 according to EN ISO 3696. Consult safety data sheets or labels for additional information on toxicity, flammability and explosivity of chemicals used. When preparing solutions, the purities of the reagents available shall be taken into account.

**4.1 Cadmium column**, activated, ready-to-use, as commercially available.

**CAUTION: Cadmium is extremely toxic for humans and the environment; take effective precautions before handling and disposing this compound.**

Cadmium columns may also be prepared in the laboratory according to the description given in the annex A

**4.2 Hydrochloric acid**, concentrated, $\rho_{20}$ (HCl) = 1,18 g/l

**4.3 Hydrochloric acid** *c* (HCl) = 4 mol/l [1])

Dilute 320 ml of hydrochloric acid (4.2) to 1 l with water.

**4.4 Hydrochloric acid** *c* (HCl) = 0,1 mol/l

**4.5 Ammonia**, $w(NH_3)$ = 25 %[2])

**4.6 Ammonia**, $w(NH_3)$ = 5 %

**4.7 Ammonium chloride**, $NH_4Cl$

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[1]) *c* is the substance concentration
[2]) *w* is the mass fraction