

SLOVENSKI STANDARD

SIST EN 12014-1:1999

01-maj-1999

Živila - Določevanje vsebnosti nitratov in/ali nitritov - 1. del: Splošna navodila

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

Lebensmittel - Bestimmung des Nitrat- und/oder Nitritgehaltes - Teil 1: Allgemeines

Produits alimentaires - Détermination de la teneur en nitrates et/ou en nitrites - Partie 1: Considérations générales

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ICS:

67.050

Splošne preskusne in
analizne metode za živilske
proizvode

General methods of tests and
analysis for food products

SIST EN 12014-1:1999

en

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EUROPEAN STANDARD

EN 12014-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 1997

ICS 67.040

Descriptors: food products, chemical analysis, determination of content, nitrates, nitrites

English version

**Foodstuffs - Determination of nitrate and/or nitrite
content - Part 1: General considerations**

Produits alimentaires - Détermination de la
teneur en nitrates et/ou en nitrites - Partie
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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

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

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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 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.

0 Introduction

Due to existing and possible future legislation for nitrate and/or nitrite content of foodstuffs, and especially to avoid trade barriers, there is a need for European Standards for the determination of nitrate and/or nitrite in the following foodstuffs:

- vegetables and vegetable products,
- meat products,
- food for babies and infants,
- milk and milk products.

It was decided to not consider any method involving the use of open sources of spongy cadmium on the grounds of its potential threat to the environment. As a result, the only methods available for inclusion in this standard were vertical methods for the particular substrates of interest.

1 Scope

This European Standard provides a summary of each scope and principle and describes general considerations for the applicability of the following Parts of EN 12014 .

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 12014-2 Foodstuffs - Determination of nitrate and/or nitrite content - Part 2: HPLC/IC method for the determination of nitrate content of vegetables and vegetable products
- prEN 12014-3 Foodstuffs - Determination of nitrate and/or nitrite content - Part 3: Spectrometric determination of nitrate and nitrite content of meat products after enzymatic reduction of nitrate to nitrite
- prEN 12014-4 Foodstuffs - Determination of nitrate and/or nitrite content - Part 4: IC method for the determination of nitrate and nitrite content of meat products
- EN 12014-5 Foodstuffs - Determination of nitrate and/or nitrite content - Part 5: Enzymatic determination of nitrate content of vegetable-containing food for babies and infants
- prEN 12014-7 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.

3 Principles and scopes of the other Parts of EN 12014

3.1 EN 12014-2 "Foodstuffs - Determination of nitrate and/or nitrite content - Part 2: HPLC/IC method for the determination of nitrate content of vegetables and vegetable products"

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 high performance liquid chromatography (HPLC) with ultraviolet (UV) detection or ion-exchange high performance liquid chromatography (IC) with conductivity detection.

This method is applicable to the analysis of vegetables and vegetable products and has been validated for nitrate contents in the range of 50 mg/kg to 3000 mg/kg.

This method has been successfully tested in an interlaboratory test on spinach, beetroot juice, a spinach product and a carrot product for babies and infants.

3.2 prEN 12014-3 "Foodstuffs - Determination of nitrate and/or nitrite content - Part 3: Spectrometric determination of nitrate and nitrite content of meat products after enzymatic reduction of nitrate to nitrite"

Conversion of nitrate in an aqueous extract of the analytical sample into nitrite by nitrate reductase. Treatment of nitrite with sulfanilamide and N-(1-naphthyl)ethylenediammonium dichloride to produce a red compound. Spectrometric measurement of the colour intensity of this red compound at a wavelength of 540 nm.

This method is applicable to the analysis of meat products and has been validated for total nitrate and nitrite contents in the range of 20 mg/kg to 150 mg/kg, measured as KNO_3 .

This method has been successfully tested in an interlaboratory test on sausage.

3.3 prEN 12014-4 "Foodstuffs - Determination of nitrate and/or nitrite content - Part 4: IC method for the determination of nitrate and nitrite content of meat products"

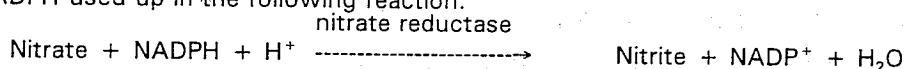
The extraction of nitrate and nitrite is carried out with hot water. Any interfering substance is removed by clarification with acetonitrile and subsequent filtration. The determination is carried out by ion-exchange high performance liquid chromatography (IC) and ultraviolet (UV) detection at a wavelength of 205 nm.

This method is applicable to the determination of meat products and has been validated for nitrate contents of 50 mg/kg to 300 mg/kg and a nitrite content of 40 mg/kg.

This method has been successfully tested in an interlaboratory test on corned beef.

3.4 EN 12014-5 "Foodstuffs - Determination of nitrate and/or nitrite content - Part 5: Enzymatic determination of nitrate content of vegetable-containing food for babies and infants"

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



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

This method is applicable for the analysis of vegetable-containing food for babies and infants and having a nitrate content of 50 mg/kg to 200 mg/kg.

The method has been successfully tested in an interlaboratory test on a spinach product and carrot juice.

3.5 "Foodstuffs - Determination of nitrate and/or nitrite content - Part 5: Determination of nitrate and nitrite content of milk and milk products" (in preparation)

This method is not yet specified.

3.6 prEN 12014-7 "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"

Test portions are extracted with water and, after filtration, cleaned-up by dialysis in the continuous flow system. Extracted nitrates are on-line reduced to nitrite by metallic cadmium followed by reaction of nitrite with sulfanilamide and N-1-naphthylethylenediamine resulting in the formation of a reddishpurple azo dye. This dye is measured spectrometrically at a wavelength of 530 nm.

The method is applicable for the analysis of vegetables and vegetable products having nitrate contents of 900 mg/kg to 5200 mg/kg.

The method has been successfully tested in an interlaboratory test on beetroot, lettuce, endive and spinach.

4 Test report

All test reports shall contain at least the following:

- a) all information necessary for the identification of the sample;
- b) a reference to this European Standard or to the method used;
- c) the results and the units in which the results have been expressed;
- d) date and type of sampling procedure (if known);
- e) date of receipt;
- f) date of test;
- g) if the repeatability has been verified;
- h) any particular points observed in the course of the test;
- i) any operations not specified in the method or regarded as optional which might have affected the results.