Foodstuffs - Determination of calcium, copper, iron, magnesium, manganese, phosphorus, potassium, sodium, sulfur and zinc by ICP-OES

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NATIONAL FOREWORD

See Eesti standard EVS-EN 16943:2017 sisaldab Euroopa standardi EN 16943:2017 ingliskeelset teksti.	This Estonian standard EVS-EN 16943:2017 consists of the English text of the European standard EN 16943:2017.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 10.05.2017.	Date of Availability of the European standard is 10.05.2017.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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English Version

Foodstuffs - Determination of calcium, copper, iron, magnesium, manganese, phosphorus, potassium, sodium, sulfur and zinc by ICP-OES

Produits alimentaires - Dosage du calcium, du cuivre, du fer, du magnésium, du manganèse, du phosphore, du potassium, du sodium, du soufre et du zinc par ICP-OES

Lebensmittel - Bestimmung von Calcium, Kupfer, Eisen, Magnesium, Mangan, Phosphor, Kalium, Natrium, Schwefel und Zink mit ICP OES

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

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 16943:2017) 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of an identical text or by endorsement, at the latest by November 2017, and conflicting national standards shall be withdrawn at the latest by November 2017.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.

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1 Scope

This European Standard describes a method for the determination of calcium, copper, iron, magnesium, manganese, phosphorus, potassium, sodium, sulfur and zinc in different foodstuffs using optical emission spectrometry with inductively coupled plasma (ICP-OES) after pressure digestion.

This method has been validated in an interlaboratory study according to ISO 5725 [1] on infant formula soya based, cheese, chicken meat, wheat flour, apple juice, lobster and milk (see elements ranges Table 1 and validation data in Annex B).

HorRat values greater than 2 have been observed for certain analyte/matrix combinations during the validation study.

Table 1 — Validated element ranges

Element	**Range** mg/kg
Calcium	70 to 7178
Copper	0,60 to 16,40
Iron	0,88 to 77
Magnesium	45 to 1 174
Manganese	0,44 to 5,12
Phosphorus	72 to 9 708
Potassium	605 to 14 312
Sodium	11 to 2 220
Sulfur	26 to 8 542
Zinc	0,16 to 43,5

At European or International level, vertical standards for the determination of specific minerals can exist, e.g. for milk and milk products or for animal and vegetable fats and oils [2].

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 13804, *Foodstuffs - Determination of elements and their chemical species - General considerations and specific requirements*

EN 13805, *Foodstuffs - Determination of trace elements - Pressure digestion*

3 Principle

After digestion of the sample with the pressure digestion process described in EN 13805, calcium, copper, iron, magnesium, manganese, phosphorus, potassium, sodium, sulfur and zinc are determined quantitatively with the ICP-OES [2]. The digestion solution is nebulized, the aerosol is directed into an inductively coupled argon plasma, where the elements are atomized and excited for radiation. The emission radiation is resolved spectrally and its intensity determined at element-specific wavelengths with a detector system. Ionization interference can be minimized using an ionization buffer.