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Foodstuffs - Guidelines for the calibration and quantitative determination of pesticide residues and organic contaminants using chromatographic methods

Produits alimentaires - Lignes directrices pour l'étalonnage et le dosage des résidus de pesticides et contaminants organiques par des méthodes chromatographiques

Lebensmittel - Leitfaden für die Kalibrierung und die Auswertung von Analysenergebnissen bei der Anwendung chromatographischer Methoden für die quantitative Bestimmung von Pflanzenschutzmittelrückständen und organischen Kontaminanten

This Technical Specification (CEN/TS) was approved by CEN on 11 May 2017 for provisional application.

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European foreword

This document (CEN/TS 17061:2017) has been prepared by Technical Committee CEN/TC 275 “Food analysis - Horizontal methods”, the secretariat of which is held by DIN.

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.

Annex A (informative) contains a list of abbreviations.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1 Scope

This Technical Specification describes the execution of calibration and quantitative evaluation of chromatographic procedures for the determination of pesticides and organic contaminants in residue analysis. In addition, the essential requirements for calibration are outlined.

The calibration of analytical procedures and the evaluation of analytical results need to be conducted according to uniform principles in order to allow for a comparison of analytical results (even from different analytical procedures). They constitute the basis of any method validation and of the quality assurance within laboratories [1], [2], [3].

This Technical Specification does not consider issues of identification/qualification and extraction efficiency.

2 Principle

This document describes the approach for the calibration of chromatographic procedures. The following types of calibration are discussed in more detail:

— external calibration with linear calibration function;

— external calibration with quadratic calibration function;

— calibration with internal standard and linear calibration function;

— calibration with internal standard and quadratic calibration function;

— calibration with standards labelled with stable isotopes (isotopic dilution analysis);

— standard addition to final extract;

— standard addition to sample.

For this purpose, the calibration function and the selection criteria are illustrated on the basis of examples. The calculation formulae refer to the final extract ready for analysis (“test solution”).

The description is rounded off by essential items of quality assurance, e.g. the qualification of chromatographic systems or the quality control chart.

3 General

Calibration of a system is understood as the determination of a functional relationship between a measurable quantity and a concentration to be determined. The chosen type of calibration depends on the various analytical problems/tasks. It is performed in connection with the respective series of measurements.

Basic calibration is regarded as the determination of the functional relationship when an analyte is to be determined for the first time by means of a particular measurement system.

Depending on the problem and on the type of reference solution used, it is distinguished between:

— *calibration with external standard*;

— *calibration with internal standard*;

— *calibration with standard addition*;

— *calibration of the entire procedure*.

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