



BSI Standards Publication

Foodstuffs — Determination of trace elements

Part 3: Determination of total mercury in foodstuffs with atomic absorption directly from the foodstuff (elemental mercury analysis)

National foreword

This British Standard is the UK implementation of EN 13806-3:2025. Together with BS EN 13806-1:2025 and BS EN 13806-2:2025, it supersedes BS EN 13806:2002, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee AW/275, Food analysis - Horizontal methods.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Amendments/corrigenda issued since publication

Date	Text affected
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English Version

**Foodstuffs - Determination of trace elements - Part 3:
Determination of total mercury in foodstuffs with atomic
absorption directly from the foodstuff (elemental mercury
analysis)**

Produits alimentaires - Dosage des éléments-traces -
Partie 3 : Dosage du mercure total dans les produits
alimentaires par absorption atomique directe (analyse
du mercure élémentaire)

Lebensmittel - Bestimmung von Elementspuren - Teil
3: Bestimmung des Gesamtquecksilbers in
Lebensmitteln durch Atomabsorption direkt aus dem
Lebensmittel (Elementare Quecksilberanalyse)

This European Standard was approved by CEN on 17 February 2025.

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European foreword

This document (EN 13806-3:2025) 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of an identical text or by endorsement, at the latest by September 2025, and conflicting national standards shall be withdrawn at the latest by September 2025.

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.

This document supersedes EN 13806:2002.

The main changes compared to the previous edition are listed below:

- the document has been split up into three separate parts: EN 13806-1 covering the AAS-cold-vapour technique, EN 13806-2 the AFS-cold-vapour technique and EN 13806-3 the solid sample AAS technique;
- full technical revision to bring the technical realization up to date with the latest technology;
- Stabilization of the digest solution;
- Update of statistical data by new interlaboratory study.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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Introduction

This document has been developed in parallel with EN 13806-1 [2] and EN 13806-2 [3]. All three methods were validated in parallel in interlaboratory studies with the same scope. They are statistically compatible in performances. This allows the users of these documents to employ the most appropriate/available method depending on the purpose of their studies. The statistical parameters of these standards are presented in the respective documents.

1 Scope

This document specifies a method for the determination of total mercury (Hg) in foodstuffs using direct atomic absorption spectrometry after thermal decomposition in an oxygen or air flow and concentration by amalgam formation. The method is applicable for solid and liquid samples.

This method was tested in a interlaboratory study carried out on seven different materials with a mercury concentration in the range from 0,005 mg/kg to 5,20 mg/kg and successfully validated in this range.

The following foodstuffs were analysed:

- Saithe (dried);
- Celery (dried);
- Wheat noodle powder;
- Wild mushrooms (dried);
- Pig liver (dried);
- Cacao powder;
- Tuna fish (dried).

The lower limit of the method's applicability varies depending on the food matrix and the water content of the foodstuff. It is a laboratory-specific value and is defined by the laboratory when calculating the limit of quantification (see 9.2).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. 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*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Principle

The samples to be analysed are weighed directly - without pressure digestion - into suitable sample containers and are thermally decomposed in the analyser system in an oxygen atmosphere at approx. 700 °C. The resulting reaction gases are catalytically cleaned together with the mercury vapour, and the

mercury is concentrated on a consecutive amalgamator. Subsequently, the mercury is released as atomic vapour by fast heating up of the amalgamator, transferred into a system of measurement cuvettes and quantified by absorption at 253,7 nm.

By the simultaneous use of measurement cuvettes of different lengths, a dynamic measurement range over several orders of magnitude can be achieved.

The total content of mercury is understood as the content measured using this document. It is indicated in mg/kg.

WARNING — The use of this method can involve the application of dangerous substances, actions or equipment. Nevertheless, the method description cannot mention all dangers possibly involved in its application. Each operator of the method is responsible for taking the appropriate safety precautions and to respect the corresponding regulations.

5 Reagents

5.1 General

Unless otherwise specified, “solutions” are understood to be aqueous solutions.

The content of mercury in the chemicals and water shall be low enough not to affect the results.

5.2 Hydrochloric acid, $\omega = 30\%$ to 37% , density = approx. 1,15 g/ml.

5.3 Nitric acid, $\omega = 65\%$ to 69% , density = approx. 1,4 g/ml.

5.4 Diluted nitric acid

Nitric acid (5.3) + water, $V_1 + V_2$, approx. 1 + 9.

5.5 Stabilization

The standard, calibration and zero-point solutions are stabilized with hydrochloric acid (5.2). It is recommended to adjust the hydrochloric acid concentration to approx. $\omega = 1\%$ in the solutions.

Alternatively, other stabilizing reagents may be used (for details see the instructions of the instrument manufacturer or [2]).

5.6 Mercury stock solution, e.g. $\rho = 1\,000\text{ mg/l}$.

The stock solution is commercially available. It is recommended to use certified stock solutions.

5.7 Mercury standard solution

The standard solution is prepared from the stock solution (5.6) by means of dilution (e.g. see Table 1).

For this purpose, fill approx. 5 ml of water into a 20 ml volumetric flask, add the necessary amount of stabilizing acid (e.g. 0,6 ml hydrochloric acid (5.2)) and mix. After the mixture has cooled down to room temperature, add the stock solution (5.6) and fill up to the mark with water.

The standard solution is stable for at least one month.