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NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

GB/T 24893-2025

Replacing GB/T 24893-2010

Animal and vegetable fats and oils - Determination of polycyclic aromatic hydrocarbons

动植物油脂 多环芳烃的测定

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document replaces GB/T 24893-2010 "Determination of Polycyclic Aromatic Hydrocarbons in Animal and Vegetable Oils". Compared with GB/T 24893-2010, except for...

Aside from structural adjustments and editorial changes, the main technical changes are as follows.

---The file range has been changed (see Chapter 1, Chapter 1 of the 2010 edition);

---Some reagent and material requirements have been changed (see 5.1, 5.13, and 5.13 in the 2010 version);

---Some instrument and equipment requirements have been revised (see 6.9, 6.12, and 6.9 and 6.12 in the 2010 edition);

---The general requirements for the determination of polycyclic aromatic hydrocarbons (PAHs) in oils and fats have been changed (see 9.1, 2010 edition of 9.1);

---The equilibration time of the extract at room temperature during the purification operation of the Florisil-bonded solid-phase extraction column has been modified (see 9.6.1, 10.4.1).

(Versions 9.4.1 and 10.4.1 from the 2010 edition).

This document is modified to adopt ISO 15753:2016 "Determination of polycyclic aromatic hydrocarbons in animal and vegetable oils".

This document has undergone the following structural adjustments compared to ISO 15753:2016.

---9.6.4 corresponds to 9.6.4 and 9.6.5 of ISO 15753:2016;

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---10.4.4 corresponds to 10.4.4 and 10.4.5 of ISO 15753:2016;

---Appendix A corresponds to Appendix B of ISO 15753:2016;

---Appendix B corresponds to Appendix A of ISO 15753:2016.

The technical differences between this document and ISO 15753:2016, and the reasons therefor, are as follows.

---The reagent and material requirements were changed; the purity of methanol was changed from ultrapure to chromatographic grade; and the polycyclic aromatic hydrocarbon standard solution was taken out and leveled.

The equilibrium time has been changed from more than 1 hour to more than 0.5 hours (see 5.1, 5.13), increasing operability;

---The instrument requirements have been changed, altering the capacity of the conical centrifuge tubes from 11 mL to 15 mL, and the syringe has been replaced with a pipette (see...).

Versions 6.9 and 6.12 have improved operability;

---The sampling requirements have been changed, from "samples received by the laboratory should preferably be representative" to "sampling should be representative" (see Chapter 7), emphasizing the importance of sample representativeness.

The importance of quality;

---ISO 661 (see Chapter 8) has been replaced with the normatively referenced GB/T 15687, increasing operability;

---The general requirements (see 9.1) have been revised, reducing redundant daily scheduling procedures and improving work efficiency;

---The equilibration time of the extract at room temperature before purification in the Florisil-bonded solid-phase extraction column was changed, from...

The requirement of 1 hour or more has been changed to 0.5 hours or more (see 9.6.1 and 10.4.1), which increases operability.

The following editorial changes have been made to this document.

---Some reagent footnotes have been deleted;

---Footnotes for some instruments have been removed;

---Some instrument references have been removed;

---Corrected the units of toluene density (d) in the explanations of letter symbols in formulas (1) and (2), and the meanings of letter symbols in formula (3).

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Explain the unit of concentration (cir) of the polycyclic aromatic hydrocarbon standard working solution in the explanation;

---The informative reference ISO 5555 has been replaced by GB/T 5524.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the National Food and Strategic Reserves Administration.

This document is under the jurisdiction of the National Technical Committee on Standardization of Grain and Oil (SAC/TC270).

1 Scope

This document describes a method for determining 15 polycyclic aromatic hydrocarbons (PAHs) in animal and vegetable oils using high-performance liquid chromatography (HPLC), and defines the determination criteria for PAHs.

The paper outlines the principles, reagents, instruments, and equipment for the determination method, as well as general pretreatment methods for animal and vegetable oils, and methods for coconut oil and oils containing short-chain fatty acids.

Pretreatment methods, determination procedures, result expression, and precision of petroleum oils.

This document applies to the determination of polycyclic aromatic hydrocarbons in general animal and vegetable oils, as well as coconut oil and vegetable oils containing short-chain fatty acids.

This document is not applicable to the quantitative analysis of highly volatile components such as naphthalene, acenaphthene, and fluorene.

This document is not applicable to the determination of polycyclic aromatic hydrocarbons in palm oil and olive pomace oil due to matrix interference.

Note: The results in Appendix A indicate that this assay method is not applicable to olive pomace oil.

This document does not apply to the determination of polycyclic aromatic hydrocarbons in milk and dairy products (or fats derived from milk and dairy products).

The limits of detection (LODs) for fluoranthene and benzo[g,h,i]perylene were 0.3 μg/kg, and the LOD for indo[1,2,3-c,d]pyrene was 1.0 μg/kg.

The limits of detection for the remaining polycyclic aromatic hydrocarbons were all 0.2 μg/kg.

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2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

GB/T 15687 Preparation of animal and vegetable oil samples (GB/T 15687-2008, ISO 661:2003, IDT)

3 Terms and Definitions

The following terms and definitions apply to this document.

Compounds containing two or more fused aromatic hydrocarbon rings shall have their content determined according to the conditions specified in this document.

Example.

Light polycyclic aromatic hydrocarbons include. naphthalene (CAS No.. 91-20-3), acenaphthene (CAS No.. 83-32-9), acenaphthene (CAS No.. 208-96-8), fluorene (CAS No.. 86-73-7), anthracene.

(CAS No.. 120-12-7), phenanthrene (CAS No.. 85-01-8), fluoranthene (CAS No.. 206-44-0), cypermethrin (CAS No.. 218-01-9), benzo[a]anthracene (CAS No.. 56-55-

3), Pyrene (CAS No.. 129-00-0).

Heavy polycyclic aromatic hydrocarbons include. benzo[a]pyrene (CAS No.. 50-32-8), benzo[b]fluoranthene (CAS No.. 205-99-2), benzo[k]fluoranthene (CAS No.. 207-08-

9), Benzo[g,h,i]perylene (CAS No.. 191-24-2), Dibenzo[a,h]anthracene (CAS No.. 53-70-3), Indo[1,2,3-c,d]pyrene (CAS No.. 193-39-5).

Note 1: Content is expressed in milligrams per kilogram (mg/kg).

Note 2: Polycyclic aromatic hydrocarbons are generally divided into light polycyclic aromatic hydrocarbons containing 2 to 4 aromatic rings and heavy polycyclic aromatic hydrocarbons containing 5 or more aromatic rings.

4 Principles

The polycyclic aromatic hydrocarbons in the sample were extracted with an acetonitrile-acetone mixture, followed by sequential extraction with a C18 reversed-phase extraction column and a Florisil-bonded stationary phase.

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