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**Rastlinska olja - Določevanje nasičenih ogljikovodikov mineralnih olj (MOSH) in aromatskih ogljikovodikov mineralnih olj (MOAH) s spletno povezano tekočinsko kromatografijo visoke ločljivosti - plinsko kromatografijo - plamensko ionizacijsko detekcijo (HPLC-GC-FID) - Metoda za nizko mejo določljivosti (ISO 20122:2024)**

Vegetable oils - Determination of mineral oil saturated hydrocarbons (MOSH) and mineral oil aromatic hydrocarbons (MOAH) with online-coupled high performance liquid chromatography-gas chromatography-flame ionization detection (HPLC-GC-FID) analysis - Method for low limit of quantification (ISO 20122:2024)

Pflanzliche Öle - Bestimmung von gesättigten Mineralölkohlenwasserstoffen (MOSH) und aromatischen Kohlenwasserstoffen (MOAH) mit online gekoppelter HPLC-GC-FID-Analyse - Verfahren für die niedrige Bestimmungsgrenze (ISO 20122:2024)

Huiles végétales - Dosage des hydrocarbures saturés d'huile minérale (MOSH) et des hydrocarbures aromatiques d'huile minérale (MOAH) par analyse par chromatographie en phase liquide haute performance et chromatographie en phase gazeuse couplées à un détecteur à ionisation de flamme (CLHP-CG-FID) en ligne - Méthode pour une faible limite de quantification (ISO 20122:2024)

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Vegetable oils - Determination of mineral oil saturated hydrocarbons (MOSH) and mineral oil aromatic hydrocarbons (MOAH) with online-coupled high performance liquid chromatography-gas chromatography-flame ionization detection (HPLC-GC-FID) analysis - Method for low limit of quantification (ISO 20122:2024)

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## European foreword

This document (EN ISO 20122:2024) has been prepared by Technical Committee ISO/TC 34 "Food products" in collaboration with Technical Committee CEN/TC 307 "Oilseeds, vegetable and animal fats and oils and their by-products - Methods of sampling and analysis" the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by October 2024, and conflicting national standards shall be withdrawn at the latest by October 2024.

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**International  
Standard**

**ISO 20122**

**Vegetable oils — Determination of mineral oil saturated hydrocarbons (MOSH) and mineral oil aromatic hydrocarbons (MOAH) with online-coupled high performance liquid chromatography-gas chromatography-flame ionization detection (HPLC-GC-FID) analysis — Method for low limit of quantification**

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**ISO 20122:2024(en)****Foreword**

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This document was prepared by Technical Committee ISO/TC 34 *Food products*, Subcommittee SC 11, *Animal and vegetable fats and oils*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 307, *Oilseeds, vegetable and animal fats and oils and their by-products — Methods of sampling and analysis*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

**ISO 20122:2024(en)****Introduction**

In order to achieve a low limit of quantification (LOQ), the method contains additional and partially modified processing steps, specifications for the uniform processing of defined product groups and additional requirements for system suitability compared to EN 16995:2017.

The method has been tested in an interlaboratory study via the analysis of both naturally contaminated and spiked vegetable oil samples, ranging from 1 mg/kg to 75 mg/kg for MOSH, and from 1 mg/kg to 7 mg/kg for MOAH.

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# Vegetable oils — Determination of mineral oil saturated hydrocarbons (MOSH) and mineral oil aromatic hydrocarbons (MOAH) with online-coupled high performance liquid chromatography-gas chromatography-flame ionization detection (HPLC-GC-FID) analysis — Method for low limit of quantification

## 1 Scope

This document specifies a procedure for the determination of saturated and aromatic hydrocarbons (from C10 to C50) in vegetable fats and oils using the online-coupled high performance liquid chromatography-gas chromatography-flame ionization detection (HPLC-GC-FID).<sup>[4][5][6]</sup> This document does not apply to other matrices.

The method is applicable for the analysis of mineral oil saturated hydrocarbons (MOSH) and/or mineral oil aromatic hydrocarbons (MOAH).

According to the results of the interlaboratory studies, the method has been proven suitable for MOSH mass concentrations above 3 mg/kg and MOAH mass concentrations above 2 mg/kg.

In case of suspected interferences, the fossil origin of the MOSH and MOAH fraction can be verified by examination by GC×GC-MS.

An alternative method for the epoxidation of the MOAH fraction (performic acid epoxidation) is proposed in [Annex C](#). This alternative method provides comparable results to the ethanolic epoxidation of the MOAH fraction described in [8.6](#). This alternative method for epoxidation has proven to be efficient for samples with a high amount of interferences in the MOAH fraction (e.g. tropical oils).<sup>[14]</sup>

## 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.

ISO 661, *Animal and vegetable fats and oils — Preparation of test sample*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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/>

## ISO 20122:2024(en)

### 3.1

#### mineral oil saturated hydrocarbons

##### MOSH

paraffinic (open-chain, usually branched) and naphthenic (cyclic, alkylated) hydrocarbons in the boiling range of *n*-alkanes with a chain length of 10 to 50 carbon atoms, which are obtained from mineral oil by this method by means of online-coupled high performance liquid chromatography-gas chromatography-flame ionization detection (HPLC-GC-FID)

### 3.2

#### mineral oil aromatic hydrocarbons

##### MOAH

aromatic mainly alkylated hydrocarbons from mineral oil in the boiling range of *n*-alkanes with a chain length of 10 to 50 carbon atoms, determined by means of online-coupled high performance liquid chromatography-gas chromatography-flame ionization detection (HPLC-GC-FID)

### 3.3

#### unresolved complex mixture

##### UCM

complex mixture of saturated or aromatic hydrocarbons not resolved by gas chromatography such as branched paraffins, alkylated naphthenes and alkylated aromatics, that produces a hump when analysed by gas chromatography-flame ionization detection (GC-FID)

### 3.4

#### polyolefin oligomeric saturated hydrocarbons

##### POSH

synthetic hydrocarbons from oligomers of polyolefins, such as polyethylene, polypropylene and polybutylenes

Note 1 to entry: Food contact uses comprise plastic bags, containers or films, heat sealable layers and other lamination as well as adhesives and plasticizers.

Note 2 to entry: POSH can be distinguished from mineral oil saturated hydrocarbons (MOSH) by their chromatographic pattern, but it is difficult to differentiate and chromatographically separate them from the MOSH if both are present.<sup>[5]</sup>

### 3.5

#### resin oligomeric saturated hydrocarbons

##### ROSH

synthetic saturated hydrocarbons (oligomers from monoterpenes, cyclopentadienes and other C5- or C9-monomeres) that are ingredients of hot-melt adhesives and can migrate into the sample mostly via gas phase transfer or via direct contact

### 3.6

#### resin oligomeric aromatic hydrocarbons

##### ROAH

synthetic aromatic hydrocarbons that are ingredients of hot-melt adhesives and can migrate into the sample mostly via gas phase transfer or by direct contact

### 3.7

#### poly-alpha-olefins

##### PAO

synthetic iso-paraffins with short and long side chains, used as lubricants or in adhesives and hotmelts

Note 1 to entry: When analysed by gas chromatography-flame ionization detection (GC-FID), they are recognized by series of rather narrow humps of unresolved branched hydrocarbons with regular distance between them.<sup>[5]</sup>

## 4 Principle

The sample is saponified and from the unsaponifiable residue, purified fractions are obtained following additional steps. These fractions are separated on a silica gel column of the HPLC-GC-FID system into MOSH