INTERNATIONAL STANDARD

ISO 9301

First edition
2003-11-15

Oil of cumin seed (*Cuminum cyminum* L.)

*Huile essentielle de cumin (*Cuminum cyminum *L.)*

Reference number
ISO 9301:2003(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 9301 was prepared by Technical Committee ISO/TC 54, *Essential oils*.

Oil of cumin seed (*Cuminum cyminum* L.)

1 Scope

This International Standard specifies certain characteristics of the oil of cumin seed (*Cuminum cyminum* L.), in order to facilitate assessment of its quality.

2 Normative references

The following referenced documents are indispensable for the application 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/TR 210, *Essential oils — General rules for packaging, conditioning and storage*

ISO/TR 211, *Essential oils — General rules for labelling and marking of containers*

ISO 212, *Essential oils — Sampling*

ISO 279, *Essential oils — Determination of relative density at 20 °C — Reference method*

ISO 280, *Essential oils — Determination of refractive index*

ISO 592, *Essential oils — Determination of optical rotation*

ISO 875, *Essential oils — Evaluation of miscibility in ethanol*

ISO 1271, *Essential oils — Determination of carbonyl value — Free hydroxylamine method*

ISO 11024-1, *Essential oils — General guidance on preparation of chromatographic profiles — Part 1: Preparation of chromatographic profiles for presentation in standards*

ISO 11024-2, *Essential oils — General guidance on preparation of chromatographic profiles — Part 2: Utilization of chromatographic profiles of samples of essential oils*

3 Terms and definitions

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

3.1
oil of cumin seed
essential oil obtained by steam distillation of the seeds of *Cuminum cyminum* L., of the Apiaceae family

NOTE For information on the CAS number, see ISO/TR 21092.

4 Requirements

4.1 Appearance

Clear mobile liquid.

4.2 Colour

Dark brown to dark amber.

4.3 Odour

Intense and somewhat fatty and herbaceous.

4.4 Relative density at 20 °C, d_{20}^{20}

Minimum: 0,900 0

Maximum: 0,940 0

4.5 Refractive index at 20 °C

Minimum: 1,490 0

Maximum: 1,515 0

4.6 Optical rotation at 20 °C

Between +1° and +9°.

4.7 Miscibility in ethanol, 80 % (volume fraction), at 20 °C

It shall not be necessary to use more than 8 volumes of ethanol, 80 % (volume fraction), to obtain a clear solution with 1 volume of essential oil.

4.8 Carbonyl value

Shall contain from 45 % to 58 % of carbonyl compounds, expressed as cuminic aldehyde.

4.9 Chromatographic profile

Analysis of the essential oil shall be carried out by gas chromatography. In the chromatogram obtained, the representative and characteristic components shown in Table 1 shall be identified. The proportions of these components, indicated by the integrator, shall be as shown in Table 1. This constitutes the chromatographic profile of the essential oil.

4.10 Flashpoint

Information on the flashpoint is given in Annex B.

Table 1 — Chromatographic profile

Component	Minimum %	Maximum %
α-Pinene	0,3	2,0
β-Pinene	7,0	20,0
α-Phellandrene	traces	2,5
Myrcene	0,1	1,5
α-Terpinene	0,1	0,3
Limonene	0,2	0,5
β-Phellandrene	0,2	0,5
γ-Terpinene	14,0	32,0
p-Cymene	3,0	17,0
p-Menth-3-en-7-al	0,3	5,0
Cuminic aldehyde	15,0	46,0
p-Mentha-1,3-dien-7-al	2,8	22,0
p-Mentha-1,4-dien-7-al	1,5	16,0

NOTE The chromatographic profile is normative, contrary to typical chromatograms given for information in Annex A.

5 Sampling

See ISO 212.

Minimum volume of test sample: 25 ml.

NOTE This volume allows each of the tests specified in this International Standard to be carried out at least once.

6 Test methods

6.1 Relative density at 20 °C, d_{20}^{20}

See ISO 279.

6.2 Refractive index at 20 °C

See ISO 280.

6.3 Optical rotation at 20 °C

See ISO 592.

6.4 Miscibility in ethanol, 80 % (volume fraction), at 20 °C

See ISO 875.

6.5 Carbonyl value

See ISO 1271.

Test sample: 1 g.

Saponification time: 30 min.

Molecular mass: 148,20.

6.6 Chromatographic profile

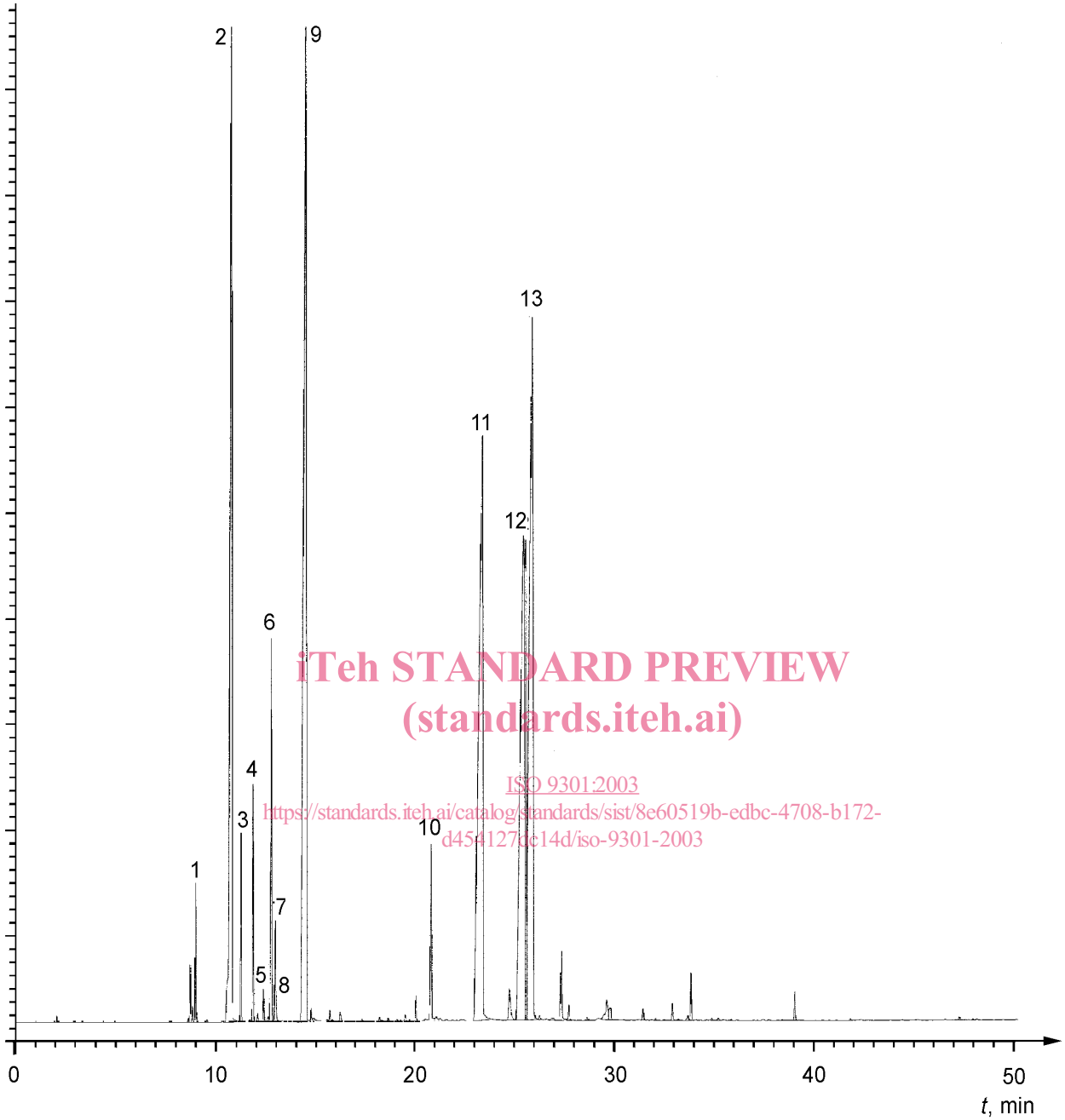
See ISO 11024-1 and ISO 11024-2.

7 Packaging, labelling, marking and storage

See ISO/TR 210 and ISO/TR 211.

Annex A
(informative)

Typical chromatograms of the analysis by gas chromatography of the essential oil of cumin (*Cuminum cyminum* L.)



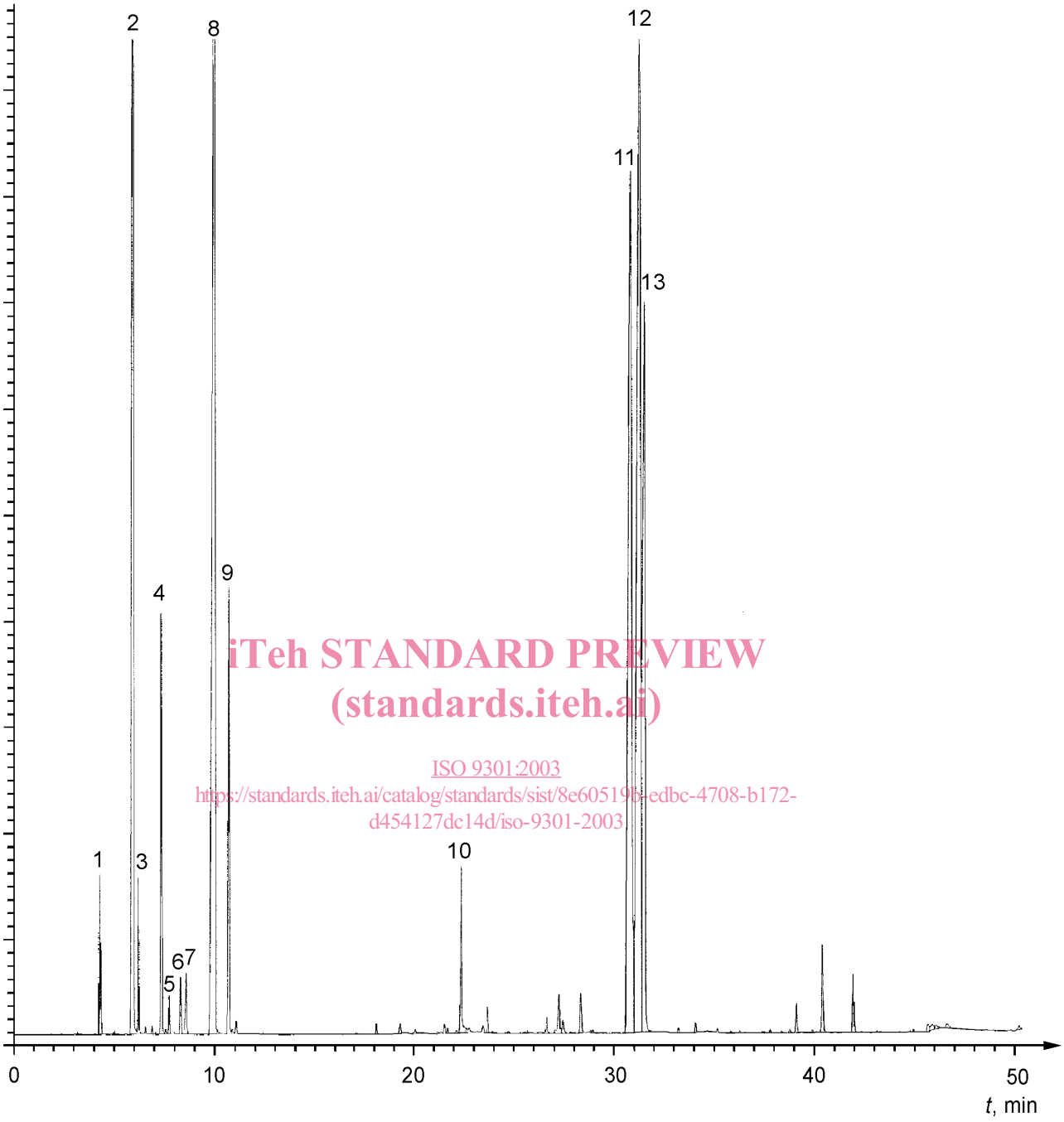
Peak identification

1 α-Pinene
2 β-Pinene
3 Myrcene
4 α-Phellandrene
5 α-Terpinene
6 *p*-Cymene
7 β-Phellandrene
8 Limonene
9 γ-Terpinene
10 *p*-Menth-3-en-7-al
11 Cuminic aldehyde
12 *p*-Mentha-1,3-en-7-al
13 *p*-Mentha-1,4-en-7-al

Operating conditions

Column: silica capillary; length 30 m; internal diameter 0,2 mm
Stationary phase: poly(dimethyl siloxane) (SP5®)
Film thickness: 0,20 µm
Oven temperature: temperature programming from 50 °C to 220 °C at a rate of 3 °C/min
Injector temperature: 275 °C
Detector temperature: 285 °C
Detector: flame ionization type
Carrier gas: helium
Volume injected: 0,1 µl
Carrier gas flow rate: 20 ml/min
Split ratio: 1/60

Figure A.1 — Typical chromatogram taken on an apolar column



Peak identification

1 α-Pinene
2 β-Pinene
3 Sabinene
4 Myrcene + α-phellandrene
5 α-Terpinene
6 Limonene
7 β-Phellandrene
8 γ-Terpinene
9 *p*-Cymene
10 *p*-Menth-3-en-7-al
11 Cuminic aldehyde
12 *p*-Mentha-1,4-dien-7-al
13 *p*-Mentha-1,3-dien-7-al

Operating conditions

Column: silica capillary; length 30 m; internal diameter 0,2 mm
Stationary phase: poly(ethylene glycol) (Supelcowax-10®)
Film thickness: 0,20 µm
Oven temperature: temperature programming from 50 °C to 220 °C at a rate of 3 °C/min
Injector temperature: 275 °C
Detector temperature: 285 °C
Detector: flame ionization type
Carrier gas: helium
Volume injected: 0,1 µl
Carrier gas flow rate: 20 ml/min
Split ratio: 1/60

Figure A.2 — Typical chromatogram taken on a polar column