
**Essential oil of caraway (*Carum
carvi* L.)**

Huile essentielle de carvi (Carum carvi L.)

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 54, *Essential oils*.

This second edition cancels and replaces the first edition (ISO 8896:1987), which has been technically revised.

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Essential oil of caraway (*Carum carvi* L.)

1 Scope

This International Standard specifies certain characteristics of the essential oil of caraway (*Carum carvi* L.), in order to facilitate assessment of its quality.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TS 210, *Essential oils — General rules for packaging, conditioning and storage*

ISO/TS 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 1242, *Essential oils — Determination of acid value*

ISO 11024 (all parts), *Essential oils — General guidance on chromatographic profiles*

3 Terms and definitions

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

3.1

essential oil of Caraway

essential oil obtained by steam distillation from the dried, ripe fruit of caraway (*Carum carvi* L.) of the Apiaceae family

Note 1 to entry: For information on the CAS number, see ISO/TR 21092.

4 Requirements

4.1 Appearance

Clear mobile liquid.

4.2 Colour

Colourless to pale yellow.

4.3 Odour

Fresh, herbaceous and spicy.

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

Minimum: 0,900

Maximum: 0,920

4.5 Refractive index at 20 °C

Minimum: 1,484

Maximum: 1,490

4.6 Optical rotation at 20 °C

Between +67° and +80°.

4.7 Acid value

Maximum: 1,0

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

It shall not be necessary to use more than 3 volumes of ethanol 80 % (volume fraction) to obtain a clear solution with 1 volume of essential oil.

Sometimes opalescence can arise on continuing the addition of ethanol.

4.9 Chromatographic profile

Carry out the analysis of the essential oil by gas chromatography. Identify in the chromatogram obtained, the representative and characteristic components shown in [Table 1](#). 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.

Table 1 — Chromatographic profile

| Component | Min. % | Max. % |
|--|---------------------|-----------|
| Myrcene | 0,2 | 0,7 |
| Limonene | 33,0 | 45,0 |
| <i>cis</i> -Dihydrocarvone | 0,1 | 1,5 |
| <i>trans</i> -Carveol | traces ^a | 0,5 |
| <i>cis</i> -Carveol | 0,2 | 0,5 |
| Carvone | 50,0 | 63,0 |
| ^a traces: <0,01 %. NOTE The chromatographic profile is normative, contrary to typical chromatograms given for information in Annex A . | | |

5 Flashpoint

Information on the flashpoint is given in [Annex B](#).

6 Sampling

Sampling shall be performed in accordance with 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.

7 Test methods

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

Determine the relative density in accordance with ISO 279.

7.2 Refractive index at 20 °C

Determine the refractive index in accordance with ISO 280.

7.3 Optical rotation at 20 °C

Determine the optical rotation in accordance with ISO 592.

7.4 Acid value

Determine the acid value in accordance with ISO 1242.

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

Determine the miscibility in ethanol in accordance with ISO 875.

7.6 Chromatographic profile

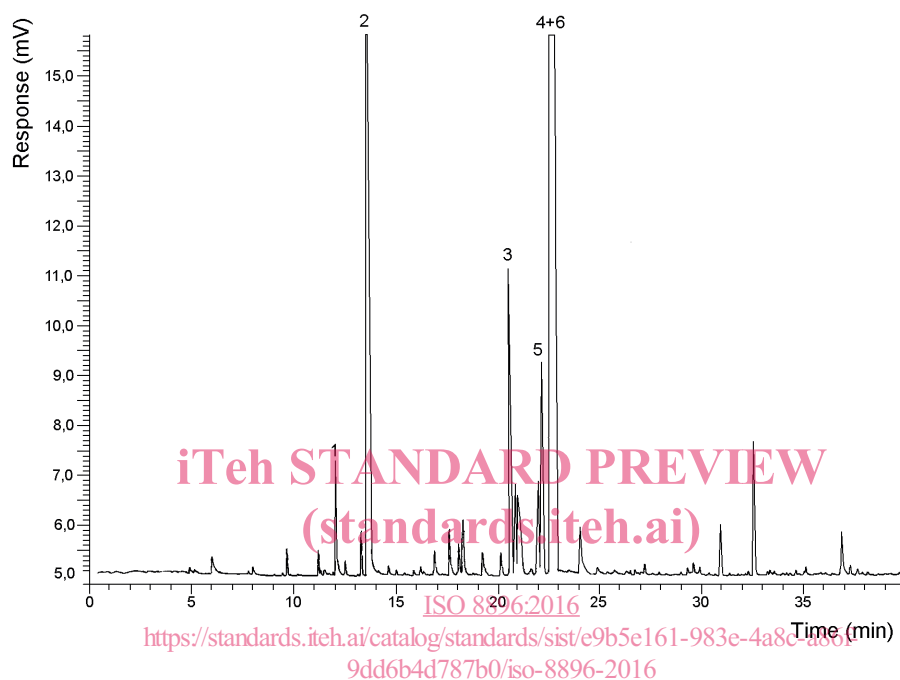
Determine the chromatographic profile in accordance with ISO 11024 (all parts).

8 Packaging, labelling, marking and storage

These items shall be in accordance with ISO/TS 210 and ISO/TS 211.

Annex A (informative)

Typical chromatograms of the analysis by gas chromatography of the essential oil of caraway (*Carum carvi* L.)



Peak identification

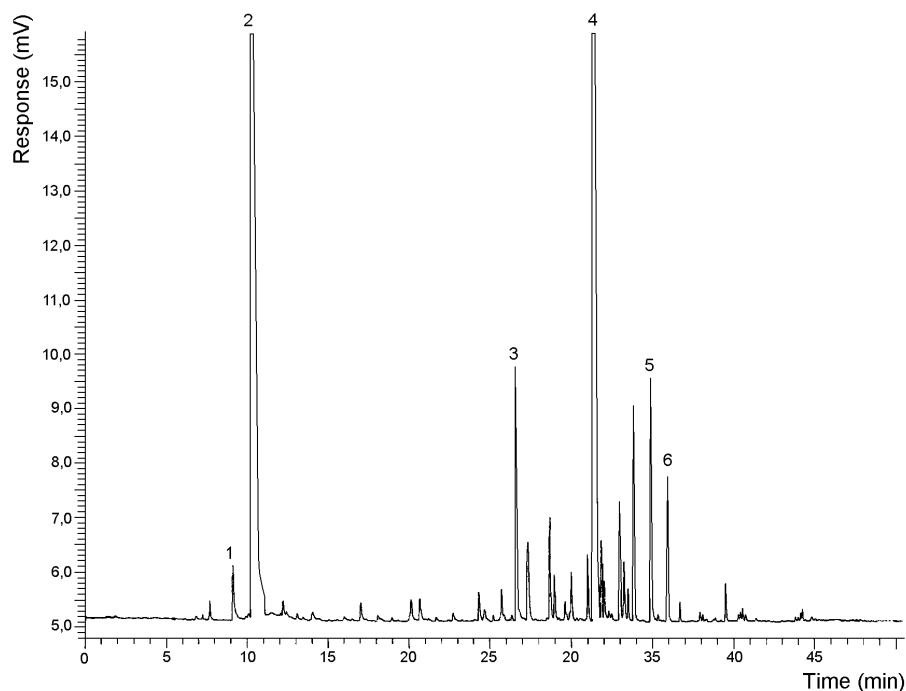
- 1 Myrcene
- 2 Limonene
- 3 *cis*-Dihydrocarvone
- 4 Carvone
- 5 *trans*-Carveol
- 6 *cis*-Carveol

Operating conditions

Column: fused capillary silica, 30 m length, 0,25 mm internal diameter
 Stationary phase: SPB™ –1 (SE-30)^a
 Film thickness: 0,25 µm
 Oven temperature: programming temperature from 50 °C to 180 °C at a rate of 3 °C/min
 and 180 °C to 220 °C at a rate of 10 °C/min
 Injector temperature: 260 °C
 Detector temperature: 280 °C
 Detector: flame ionization type
 Carrier gas: helium
 Volume injected: 1 µl
 Carrier gas flow rate: 1 ml/min
 Split ratio: 1/50

^a SPB™ –1 (SE-30) is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.

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

**Peak identification**

- 1 Myrcene
- 2 Limonene
- 3 *cis*-Dihydrocarvone
- 4 Carvone
- 5 *trans*-Carveol
- 6 *cis*-Carveol

Operating conditions

Column: fused capillary silica, 30 m length, 0,25 mm internal diameter

Stationary phase: Supelco WaxTM-10^a

Film thickness: 0,25 µm

Oven temperature: programming temperature from 50 °C to 180 °C at a rate of 3 °C/min and 180 °C to 220 °C at a rate of 10 °C/min

Injector temperature: 260 °C

Detector temperature: 280 °C

Detector: flame ionization type

Carrier gas: helium

Volume injected: 1 µl

Carrier gas flow rate: 1 ml/min

Split ratio: 1/50

^a Supelco WaxTM-10 is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.

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