INTERNATIONAL STANDARD

ISO 21093

First edition
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Oil of dwarf pine (*Pinus mugo* Turra)

*Huile essentielle de pin de montagne (*Pinus mugo *Turra)*

Reference number
ISO 21093:2003(E)

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Foreword

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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 21093 was prepared by Technical Committee ISO/TC 54, *Essential oils*.

Oil of dwarf pine (*Pinus mugo* Turra)

1 Scope

This International Standard specifies certain characteristics of the oil of dwarf pine oil (*Pinus mugo* Turra), 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 ºC — 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 3960, *Animal and vegetable fats and oils — Determination of peroxide value*

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

ISO 11024-2, *Essential oils — General guidance on 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 dwarf pine
essential oil obtained by steam distillation of the branches, fresh or partially dried, of *Pinus mugo* Turra, mainly growing in the Alps

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

4 Requirements

4.1 Appearance

Clear, transparent, mobile liquid.

4.2 Colour

Colourless

4.3 Odour

Characteristic, slightly fatty, reminiscent of turpentine.

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

Minimum: 0,858

Maximum: 0,868

4.5 Refractive index at 20 °C

Minimum: 1,474 0

Maximum: 1,478 0

4.6 Optical rotation at 20 °C

Between –7° and –15°.

4.7 Miscibility in ethanol, 90 % (volume fraction), at 20 °C

It shall not be necessary to use more than 10 volumes of ethanol, 90 % (volume fraction), to obtain a clear solution with 1 volume of essential oil.

4.8 Acid value

Maximum: 1,0

4.9 Peroxide value

Maximum: 20 mmol/kg

4.10 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.

Table 1 — Chromatographic profile

Component	Minimum %	Maximum %
α-Pinene	10	30
β-Pinene	3	14
δ-3-Carene	5	25
p-Cymene	traces	2,5
Limonene	8	14
Terpinolene	1	8
Bornyl acetate	1	5
β-Caryophyllene	0,5	5
Myrcene	3	11
β-Phellandrene	8	17

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

4.11 Flashpoint

Information on the flashpoint is given in Annex B.

5 Sampling

See ISO 212.

Minimum volume of test sample: 50 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, 90 % (volume fraction), at 20 °C

See ISO 875.

6.5 Acid value

See ISO 1242.

6.6 Peroxide value

See ISO 3960.

6.7 Chromatographic profile

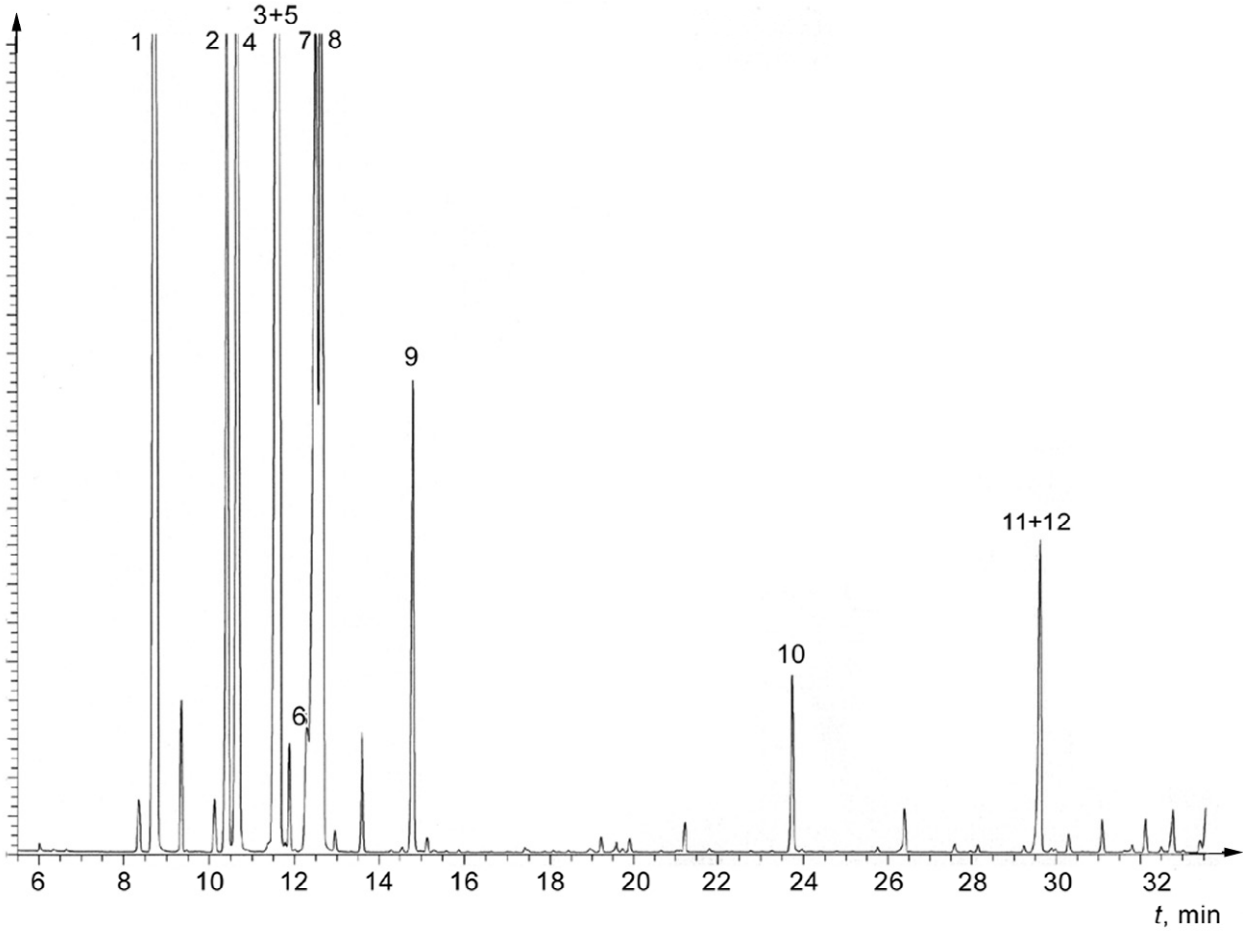
See ISO 11024-1 and ISO 11024-2.

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 dwarf pine (*Pinus mugo* Turra)



Peak identification		Operating conditions
1	α-Pinene	Column: capillary; length 25 m; internal diameter 0,22 mm
2	β-Pinene	Stationary phase: poly(dimethyl siloxane)
3	δ-3-Carene	Film thickness: 1,0 µm
4	Myrcene	Oven temperature: isothermal at 50 °C for 10 min, then temperature programming from 50 °C to 250 °C at a rate of 2 °C/min
5	α-Phellandrene	
6	*p*-Cymene	Injector temperature: 250 °C
7	Limonene	Detector temperature: 270 °C
8	β-Phellandrene	Detector: flame ionization type
9	Terpinolene	Carrier gas: nitrogen
10	Bornyl acetate	Volume injected: 0,2 µl
11	β-Caryophyllene	Carrier gas flow rate: 0,3 µl/min
12	α-Cedrene	

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

Peak identification		Operating conditions
1	α-Pinene	Column: capillary; length 25 m; internal diameter 0,22 mm
2	β-Pinene	Stationary phase: poly(ethylene glycol) [Carbowax (BP20)®]
3	δ-3-Carene	Film thickness: 0,25 µm
4	Myrcene	Oven temperature: isothermal at 50 °C for 10 min, then temperature programming from 50 °C to 250 °C at a rate of 2 °C/min
5	α-Phellandrene	Injector temperature: 250 °C
6	Limonene	Detector temperature: 270 °C
7	β-Phellandrene	Detector: flame ionization type
8	*p*-Cymene	Carrier gas: nitrogen
9	Terpinolene	Volume injected: 0,2 µl
10	α-Cedrene	Carrier gas flow rate: 0,3 µl/min
11	Bornyl acetate	
12	β-Caryophyllene	

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

Annex B
(informative)

Flashpoint

B.1 General information

For safety reasons, transport companies, insurance companies, and people in charge of safety services require information on the flashpoints of essential oils, which in most cases are flammable products.

A comparative study on the relevant methods of analysis (see ISO/TR 11018) concluded that it was difficult to recommend a single apparatus for standardization purposes, given that:

— there is wide variation in the chemical composition of essential oils;

— the volume of the sample needed for certain requirements would be too costly for high-priced essentials oils;

— as there are several different types of equipment which can be used for the determination, users cannot be expected to use one specified type only.

Consequently, it was decided to give a mean value for the flashpoint in an informative annex to each International Standard, for information, in order to meet the requirements of the interested parties.

The equipment with which this value was obtained should be specified.

For further information see ISO/TR 11018.

B.2 Flashpoint of oil of dwarf pine oil

The mean value is +42 °C.

NOTE Obtained with “Grabner Instruments Miniflash-FLPL” equipment.

Bibliography

[1] ISO/TR 11018:1997, *Essential oils — General guidance on the determination of flashpoint*

[2] ISO/TR 21092:—[1)], *Essential oils — Characterization*

1) To be published.

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