INTERNATIONAL STANDARD

ISO 770

Second edition
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Crude or rectified oils of Eucalyptus globulus (*Eucalyptus globulus* Labill.)

*Huile essentielle, crue ou rectifiée, d'Eucalyptus globulus (*Eucalyptus globulus *Labill.)*

Reference number
ISO 770:2002(E)

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 770 was prepared by Technical Committee ISO/TC 54, *Essential oils*.

This second edition cancels and replaces the first edition (ISO 770:1980) and ISO 4732:1983, *Rectified oil of* Eucalyptus globulus *Labillardière, Portugal*, which have been combined and technically revised.

Annexes A and B of this International Standard are for information only.

Crude or rectified oils of Eucalyptus globulus (*Eucalyptus globulus* Labill.)

1 Scope

This International Standard specifies certain characteristics of the raw and rectified oils of Eucalyptus globulus (*Eucalyptus globulus* Labill.), in order to facilitate assessment of its quality.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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 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 Term and definition

For the purposes of this International Standard, the following term and definition apply.

3.1
oil of Eucalyptus globulus
essential oil obtained by steam distillation of recently collected leaves and twigs of *Eucalyptus globulus* Labill., of the Myrtaceae family

NOTE 1 The trade products denominated “70 % to 75 %” and “80 % to 85 %” are the oils rectified by distillation in order to obtain 1,8-cineole contents higher than 70 % and 80 %, respectively.

NOTE 2 For information on the CAS number, see ISO/TR 21092.

4 Requirements

4.1 Appearance

Liquid.

4.2 Colour

Raw oils	Rectified oils	
	70 % to 75 %	80 % to 85 %
Yellow to pale yellow	Colourless	

4.3 Odour

Raw oils	Rectified oils	
	70 % to 75 %	80 % to 85 %
Aromatic with a characteristic odour of cineole	Fresh, aromatic and characteristic of cineole	

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

Raw oils		Rectified oils			
		70 % to 75 %		80 % to 85 %	
min.	max.	min.	max.	min.	max.
0,905	0,925	0,904	0,920	0,906	0,920

4.5 Refractive index at 20 °C

Raw oils		Rectified oils			
		70 % to 75 %		80 % to 85 %	
min.	max.	min.	max.	min.	max.
1,457	1,475	1,460	1,468	1,458	1,465

4.6 Optical rotation at 20 °C

Raw oils		Rectified oils			
		70 % to 75 %		80 % to 85 %	
min.	max.	min.	max.	min.	max.
+ 2°	+ 8°	0°	+ 10°	+ 2°	+ 10°

4.7 Miscibility in ethanol, 70 % (volume fraction), at 20 °C

Raw oils	Rectified oils	
	70 % to 75 %	80 % to 85 %
It shall not be necessary to use more than		
7	10	5
volumes of ethanol 70 % (volume fraction) to obtain a clear solution with 1 volume of essential oil		

4.8 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, by the normalization method 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	Raw oil		Rectified oils			
			70 % to 75 %		80 % to 85 %	
	min. %	max. %	min. %	max. %	min. %	max. %
α-Pinene	10	22	1	10	1	10
α-Phellandrene	0,1	1	0,1	1,5	0,1	1
Limonene	1	8	2	15	4	15
1,8-Cineole	60	—	70	—	80	—
p-Cimene	1	2	1	6	1	4
trans-Pinocarveol	1	6	traces	5	traces	3
Aromadendrene	0,5	10	traces	2	traces	1
Globulol	0,5	1,5	—	traces	—	traces
NOTE The chromatographic profile is normative, contrary to typical chromatogram given for information in annex A.						

4.9 Flashpoint

Information on the flashpoint is given in annex B.

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, 70 % (volume fraction), at 20 °C

See ISO 875.

6.5 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 rectified essential oil of Eucalyptus globulus (*Eucalyptus globulus* Labill.) 80 %

Peak identification	
1	α-Pinene
2	β-Pinene
3	Myrcene
4	α-Phellandrene
5	*p*-Cymene
6	Limonene + 1,8-cineole
7	γ-Terpinene
8	*trans*-Pinocarveol
9	Aromadendrene
10	Globulol

Operating conditions

Column: capillary; length 60 m; internal diameter 0,25 mm
Stationary phase: poly(dimethyl siloxane) (SPB-1®)
Film thickness: 0,25 µm
Oven temperature: isothermal at 80 °C for 15 min, then temperature programming from 80 °C to 260 °C at a rate of 4 °C/min
Injector temperature: 250 °C
Detector temperature: 270 °C
Detector: flame ionization type
Carrier gas: nitrogen
Volume injected: 0,06 µl
Carrier gas flow rate: 1 ml/min
Split ratio: 1/80

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

Peak identification		Operating conditions
1	α-Pinene	Column: capillary; length 20 m; internal diameter 100 µm
2	β-Pinene	Stationary phase: poly(ethylene glycol) 20 000 (Carbowax 20 M®)
3	Myrcene	Film thickness: 0,2 µm
4	α-Phellandrene	Oven temperature: isothermal at 50 °C for 1 min, then temperature programming from 50 °C to 200 °C at a rate of 10 °C/min
5	Limonene	Injector temperature: 250 °C
6	1,8-Cineole	Detector temperature: 250 °C
7	γ-Terpinene	Detector: flame ionization type
8	*p*-Cymene	Carrier gas: hydrogen
9	Pinocarvone	Volume injected: 0,2 µl
10	Aromadendrene	Carrier gas flow rate: 0,3 ml/min
11	*trans*-Pinocarveol	Split ratio: 1/650
12	α-Terpineol + terpenyl acetate	Pressure programming: 220,68 kPa for 20 min, then 34,48 kPa/min up to 310,34 kPa, then 310,34 kPa for 20 min (1 kPa = 0,145 psi)

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 a 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 essential 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 Eucalyptus globulus

The mean value for the raw oil is + 44 °C.

NOTE 1 Obtained with “Setaflash” equipment.

The mean value for the rectified oil is + 51 °C.

NOTE 2 Obtained with “Luchaire” equipment.

Bibliography

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

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

1) To be published.

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