INTERNATIONAL STANDARD

ISO 1342

Third edition
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Essential oil of rosemary (*Rosmarinus officinalis* L.)

Huile essentielle de romarin (Rosmarinus officinalis L.)

Reference number
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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 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 1342 was prepared by Technical Committee ISO/TC 54, *Essential oils*.

This third edition cancels and replaces the second edition (ISO 1342:2000), which has been technically revised.

Essential oil of rosemary (*Rosmarinus officinalis* L.)

1 Scope

This International Standard specifies certain characteristics of the essential oil of rosemary (*Rosmarinus officinalis* 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 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 rosemary
essential oil obtained by steam distillation of the twigs and blossoming tips of *Rosmarinus officinalis* L. of the *Lamiaceae* family

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

4 Requirements

4.1 Appearance

Clear mobile liquid.

4.2 Colour

Colourless to pale yellow or greenish yellow.

4.3 Odour

Aromatic, balsamic, cineole-like, more or less camphoraceous.

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

Tunisian and Moroccan type	Spanish type
Minimum: 0,907	Minimum: 0,892
Maximum: 0,920	Maximum: 0,910

4.5 Refractive index at 20 °C

Tunisian and Moroccan type	Spanish type
Minimum: 1,464	Minimum: 1,464
Maximum: 1,470	Maximum: 1,472

4.6 Optical rotation at 20 °C

Tunisian and Moroccan type	Spanish type
Between −2° and +5°	Between −6° and +8°

4.7 Miscibility in ethanol at 20 °C

4.7.1 Tunisian and Moroccan type

It shall not be necessary to use more than 2 volumes of 80 % volume fraction ethanol to obtain a clear solution with 1 volume of essential oil.

4.7.2 Spanish type

It shall not be necessary to use more than 3 volumes of 90 % volume fraction ethanol to obtain a clear solution with 1 volume of essential oil.

4.8 Acid value

Tunisian and Moroccan type	Spanish type
Maximum: 1,0	Maximum: 2,0

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	Tunisian and Moroccan type		Spanish type	
	min. %	max. %	min. %	max. %
α-Pinene	9,0	14,0	18,0	26,0
Camphene	2,5	6,0	7,0	13,0
β-Pinene	4,0	9,0	2,0	5,0
Myrcene	1,0	2,0	2,5	4,5
Limonene	1,5	4,0	2,5	5,5
1,8-Cineole	38,0	55,0	16,0	23,0
p-Cymene	0,5	2,5	1,0	2,0
Camphor	5,0	15,0	12,5	22,0
Linalool	0,3	2,0	0,5	2,5
Bornyl acetate	0,1	1,6	0,5	2,5
α-Terpineol	1,0	2,5	1,0	4,0
Borneol	1,0	5,0	1,0	4,5
Verbenone	n.d.[a]	0,4	0,7	2,5
NOTE The chromatographic profile is normative, contrary to typical chromatograms given for information in Annex A.				
[a] Not detectable.				

4.10 Flashpoint

Information on the flashpoint is given in Annex B.

5 Sampling

Sampling shall be performed in accordance with 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}

Determine the relative density in accordance with ISO 279.

6.2 Refractive index at 20 °C

Determine the refractive index in accordance with ISO 280.

6.3 Optical rotation at 20 °C

Determine the optical rotation in accordance with ISO 592.

6.4 Miscibility in ethanol at 20 °C

Determine the miscibility in accordance with ISO 875.

6.5 Acid value

Determine the acid value in accordance with ISO 1242.

6.6 Chromatographic profile

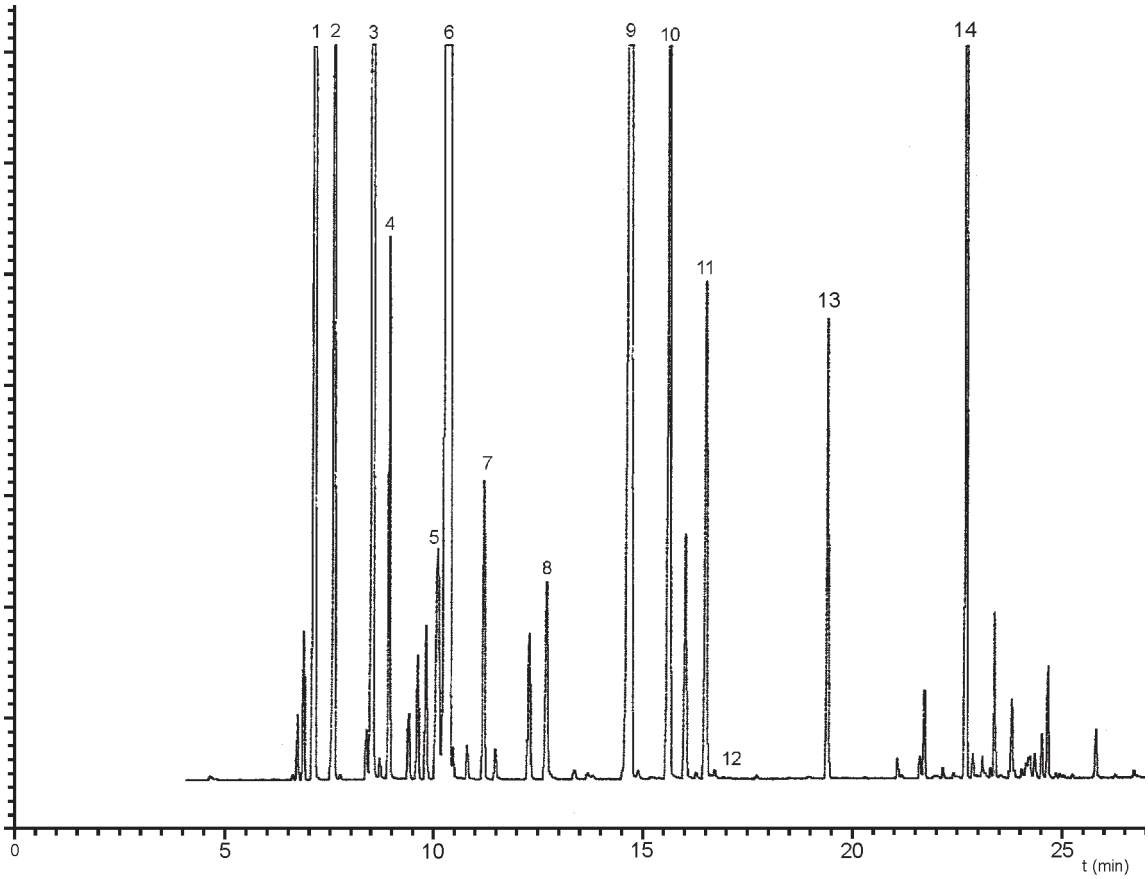
Determine the chromatographic profile in accordance with ISO 11024.

7 Packaging, labelling, marking and storage

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

Annex A
(informative)

Typical chromatograms of the analysis by gas chromatography of the essential oil of rosemary (*Rosmarinus officinalis* L.)

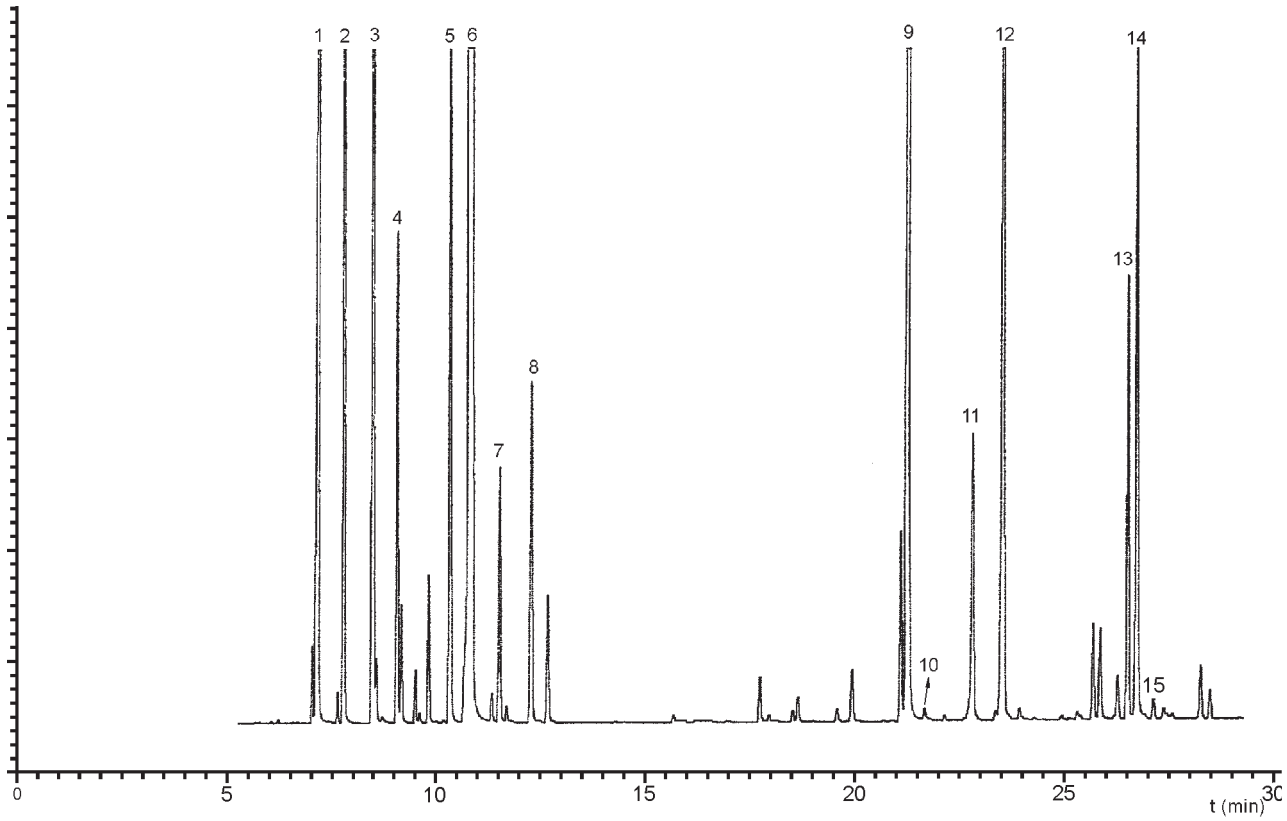


Peak identification		Operating conditions
1	α-Pinene	Column: capillary, fused silica; length 20 m; internal diameter 0,1 mm
2	Camphene	Stationary phase: poly(dimethylsiloxane) (HP-1[a])
3	β-Pinene	Film thickness: 0,40 µm
4	Myrcene	Oven temperature: 50 °C for 1 min, then programmed temperature from 50 °C to 220 °C at a rate of 10 °C/min, then isothermal at 220 °C for 13 min
5	*p*-Cymene	
6	Limonene + 1,8-cineole	Injector temperature: 250 °C
7	γ-Terpinene	Detector temperature: 250 °C
8	Linalool	Detector: flame ionization type
9	Camphor	Carrier gas: hydrogen
10	Borneol	Volume injected: 0,2 µl
11	α-Terpineol	Carrier gas flow rate: 0,3 ml/min
12	Verbenone	Split ratio: 1/350
13	Bornyl acetate	Pressure programming: starting at 220,7 kPa for 20 min, then 34,5 kPa/min up to 310,3 kPa, then 310,3 kPa for 20 min
14	β-Caryophyllene	

t time

[a] HP-1 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.

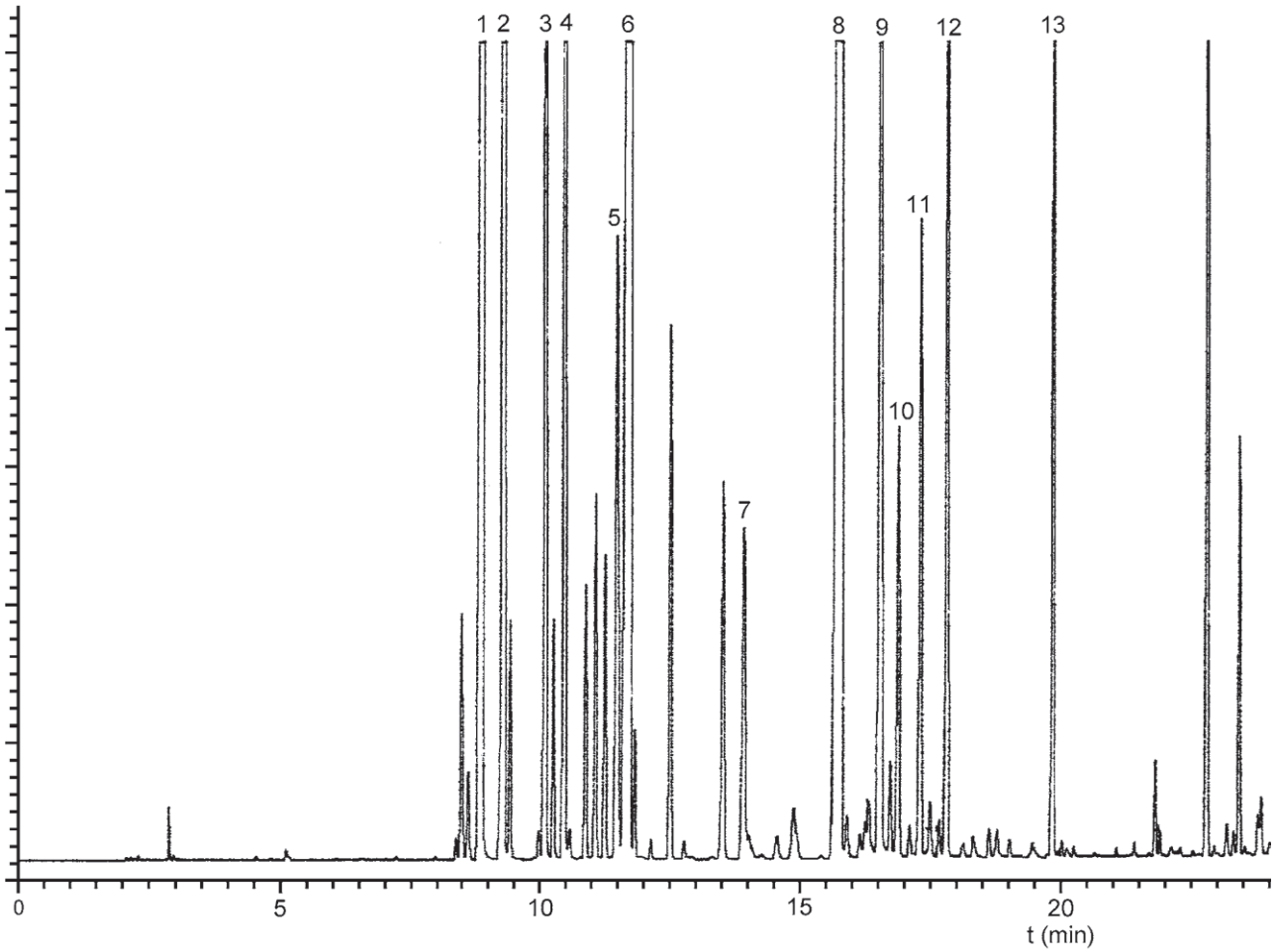
Figure A.1 — Typical chromatogram taken on an apolar column for Tunisian and Moroccan type



Peak identification		Operating conditions
1	α-Pinene	Column: capillary, fused silica; length 20 m; internal diameter 0,1 mm
2	Camphene	Stationary phase: poly(ethylene glycol) 20 000
3	β-Pinene	Film thickness: 0,20 µm
4	Myrcene	Oven temperature: 50 °C for 1 min, then programmed temperature from 50 °C to 200 °C at a rate of 10 °C/min
5	Limonene	
6	1,8-Cineole	Injector temperature: 250 °C
7	γ-Terpinene	Detector temperature: 250 °C
8	*p*-Cymene	Detector: flame ionization type
9	Camphor	Carrier gas: hydrogen
10	Linalool	Volume injected: 0,2 µl
11	Bornyl acetate	Carrier gas flow rate: 0,3 ml/min
12	β-Caryophyllene	Split ratio: 1/350
13	α-Terpineol	
14	Borneol	Pressure programming: starting at 220,7 kPa for 20 min, then 34,5 kPa/min up to 310,3 kPa, then 310,3 kPa for 20 min
15	Verbenone	

t time

Figure A.2 — Typical chromatogram taken on a polar column for Tunisian and Moroccan type

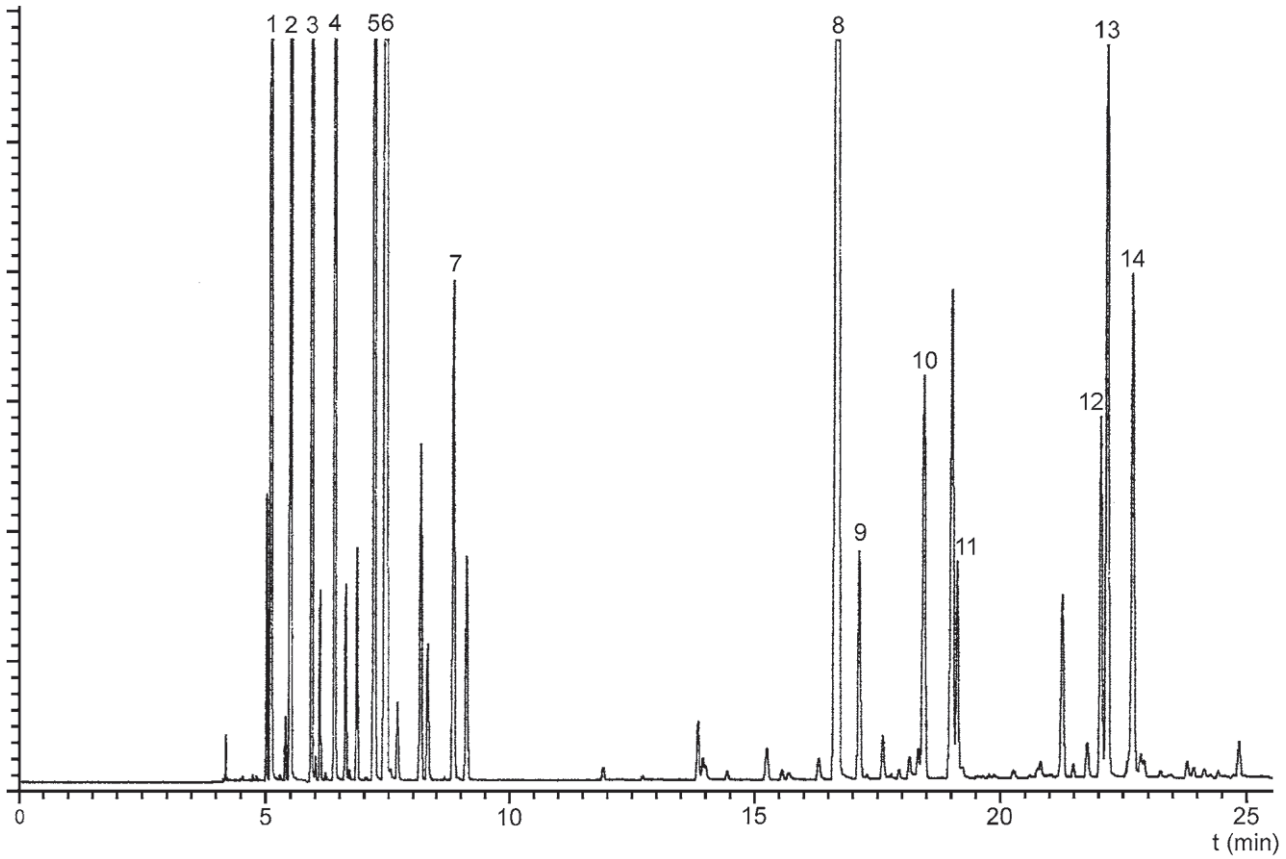


Peak identification		Operating conditions
1	α-Pinene	Column: capillary, fused silica; length 30 m; internal diameter 0,25 mm
2	Camphene	Stationary phase: 5 % diphenyl-95 % dimethylpolysiloxane (DB-5[a])
3	β-Pinene	Film thickness: 0,25 µm
4	Myrcene	Oven temperature: programmed temperature from 55 °C to 100 °C at a rate of 5,5 °C/min, then programmed temperature from 100 °C to 200 °C at a rate of 8 °C/min
5	*p*-Cymene	
6	Limonene + 1,8-cineole	Injector temperature: 250 °C
7	Linalool	Detector temperature: 250 °C
8	Camphor	Detector: flame ionization type
9	Borneol	Carrier gas: nitrogen
10	Terpinen-4-ol	Volume injected: 0,1 µl
11	α-Terpineol	Carrier gas flow rate: 1 ml/min
12	Verbenone	Split ratio: 1/100
13	Bornyl acetate	

t time

[a] DB-5 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.3 — Typical chromatogram taken on an apolar column for Spanish type



Peak identification		Operating conditions
1	α-Pinene	Column: capillary, fused silica; length 60 m; internal diameter 0,25 mm
2	Camphene	Stationary phase: poly(ethylene glycol) (DB-FFAP[a])
3	β-Pinene	Film thickness: 0,25 µm
4	Myrcene	Oven temperature: programmed temperature from 95 °C to 190 °C at a rate of 4 °C/min
5	Limonene	Injector temperature: 250 °C
6	1,8-cineole	Detector temperature: 250 °C
7	*p*-Cymene	Detector: flame ionization type
8	Camphor	Carrier gas: nitrogen
9	Linalool	Volume injected: 0,1 µl
10	Bornyl acetate	Carrier gas flow rate: 1 ml/min
11	Terpinen-4-ol	Split ratio: 1/100
12	α-Terpineol	
13	Borneol	
14	Verbenone	

t time

[a] DB-FFAP 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.4 — Typical chromatogram taken on a polar column for Spanish type

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[1]) 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 in 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 annexed to each International Standard, for information, in order to meet the requirements of the interested parties.

The equipment with which this value was obtained has to be specified.

For further information, see ISO/TR 11018.[1]

B.2 Flashpoint of the essential oil of rosemary, Tunisian and Moroccan, and Spanish types

The mean value is +43 °C.

NOTE Obtained with Setaflash[1)] equipment.

1) Equipment 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.

Bibliography

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

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

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