INTERNATIONAL STANDARD

ISO 3063

Second edition
2004-11-15

Oil of ylang-ylang [*Cananga odorata* (Lam.) Hook. f. et Thomson forma *genuina*]

*Huile essentielle d'ylang-ylang [*Cananga odorata *(Lam.) Hook. f. et Thomson forma* genuina*]*

Reference number
ISO 3063:2004(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 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 3063 was prepared by Technical Committee ISO/TC 54, *Essential oils*.

This second edition cancels and replaces the first edition (ISO 3063:1983), which has been technically revised.

Oil of ylang-ylang [*Cananga odorata* (Lam.) Hook. f. et Thomson forma *genuina*]

1 Scope

This International Standard specifies certain characteristics of the oil of ylang-ylang [*Cananga odorata* (Lam.) Hook. f. et Thomson forma *genuina*] from Madagascar, Mayotte and Comores, 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 709, *Essential oils — Determination of ester value*

ISO 1242, *Essential oils — Determination of acid 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 ylang-ylang
essential oil obtained by steam distillation of the fresh flowers of *Cananga odorata* (Lam.) Hook. f. et Thomson forma *genuina*, of the Annonaceae family, growing mainly in Madagascar, Mayotte and Comores

NOTE 1 This volatile product is not generally collected as a whole oil, but in five successive fractions during the course of distillation. These five fractions, known respectively as “Extra super”, “Extra”, “First”, “Second” and “Third”, are the oils usually found in the trade.

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

4 Requirements

4.1 Appearance

Liquid.

4.2 Colour

Pale yellow to dark yellow.

4.3 Odour

Characteristic, floral and recalling jasmine.

4.4 Physical and chemical requirements

See Table 1.

4.5 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 2 shall be identified. The proportions

of these components, indicated by the integrator, shall be as shown in Table 2. This constitutes the chromatographic profile of the essential oil.

4.6 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 Acid value

See ISO 1242.

6.5 Ester value

See ISO 709.

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.

Table 1 — Physical and chemical requirements

Characteristics	Fractions								
	Extra super	Extra		First		Second		Third	
	Comores and Mayotte	Comores and Mayotte	Mada-gascar	Comores and Mayotte	Mada-gascar	Comores and Mayotte	Mada-gascar	Comores and Mayotte	Mada-gascar
Relative density at 20 °C d_{20}^{20}									
Min.	0,970	0,955	0,950	0,938	0,933	0,925	0,922	0,906	0,906
Max.	0,990	0,976	0,965	0,960	0,949	0,945	0,942	0,925	0,925
Refractive index at 20 °C									
Min.	1,497	1,498	1,493	1,501	1,495	1,502	1,496	1,503	1,502
Max.	1,505	1,506	1,509	1,509	1,510	1,511	1,511	1,513	1,513
Optical rotation at 20 °C									
Min.	− 33°	− 40°	− 42°	− 46°	− 46°	− 60°	− 58°	− 72°	− 70°
Max.	− 12,5°	− 20°	− 20°	− 25°	− 24°	− 35°	− 30°	− 45°	− 45°
Acid value	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Ester value									
Min.	160	140	125	100	90	75	65	45	40
Max.	200	185	160	160	125	115	95	75	70

Table 2 — Chromatographic profile

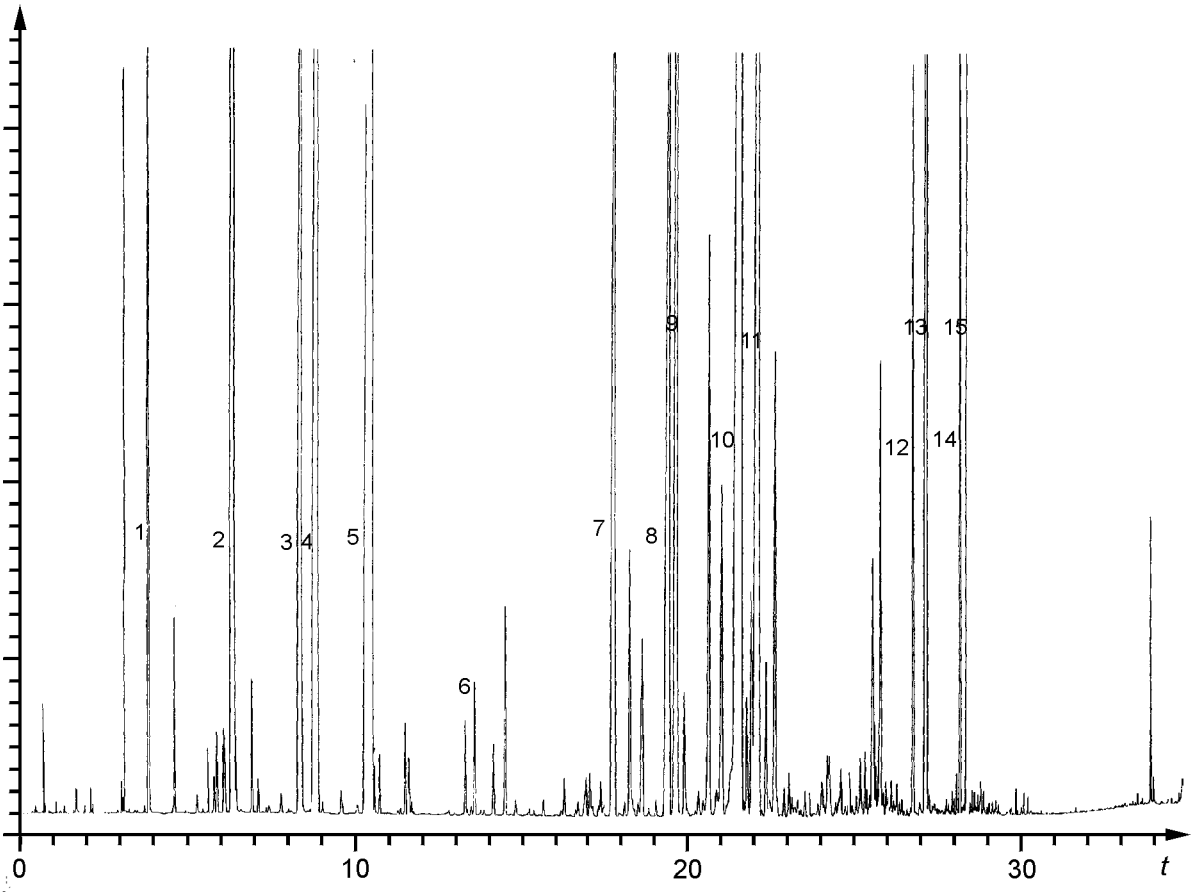
Component	Fractions								
	Extra super	Extra		First		Second		Third	
	Comores and Mayotte	Comores and Mayotte	Mada-gascar	Comores and Mayotte	Mada-gascar	Comores and Mayotte	Mada-gascar	Comores and Mayotte	Mada-gascar
Prenyl acetate									
Min.	1,5	1,0	0,6	0,3	0,2	0,2	0,1	0,1	traces
Max.	3,2	2,3	2,2	1,8	1,0	0,9	0,5	0,2	0,2
***p*-Cresyl methyl ether**									
Min.	7,0	5,0	7,0	3,0	5,0	2,0	1,0	0,1	0,1
Max.	13,0	13,0	16,0	8,5	10,0	5,0	4,6	1,0	1,4
Methyl benzoate									
Min.	4,5	4,0	4,5	1,5	3,0	1,0	1,0	0,1	0,1
Max.	8,0	6,5	9,0	5,5	5,0	3,5	3,0	0,8	0,9
Linalool									
Min.	8,0	7,0	15,0	3,0	12,0	2,0	4,0	0,1	0,6
Max.	13,0	12,0	24,0	10,0	19,0	6,0	9,5	2,0	4,0
Benzyl acetate									
Min.	14,0	11,0	5,5	6,0	2,8	4,0	0,5	0,5	0,1
Max.	20,0	17,5	14,0	14,0	10,0	8,8	5,0	3,0	2,2
Geraniol									
Min.	0,1	0,1	1,3	0,1	1,6	0,1	0,7	traces	0,2
Max.	0,7	0,5	3,0	0,3	2,6	0,3	2,4	0,1	0,8
Geranyl acetate									
Min.	2,0	2,5	7,0	2,0	8,0	1,7	5,6	0,4	1,0
Max.	6,0	6,0	14,0	5,0	15,0	6,0	12,0	3,0	6,6
***E*-Cinnamyl acetate**									
Min.	4,0	3,0	0,5	2,2	0,5	2,0	0,4	0,5	0,1
Max.	6,0	6,5	3,0	5,0	2,0	4,8	2,2	2,5	2,0
β-Caryophyllene									
Min.	2,0	2,5	2,5	4,0	5,5	4,8	10,0	5,0	12,0
Max.	6,0	8,0	8,5	10,0	12,0	14,0	17,0	15,0	19,0
D-Germacrene									
Min.	9,0	14,0	5,0	10,0	9,5	16,0	13,0	20,0	15,0
Max.	15,0	20,0	15,0	24,0	18,0	28,0	28,0	35,0	34,0
(*E*,*E*)-α-Farnesene									
Min.	2,0	6,5	1,0	7,0	3,0	14,0	5,0	12,0	9,0
Max.	6,0	15,0	5,0	18,0	8,0	21,0	11,5	29,0	25,0

Table 2 (*continued*)

Component	Fractions								
	Extra super	Extra		First		Second		Third	
	Comores and Mayotte	Comores and Mayotte	Mada-gascar	Comores and Mayotte	Mada-gascar	Comores and Mayotte	Mada-gascar	Comores and Mayotte	Mada-gascar
(*E*,*E*)-Farnesol									
Min.	0,8	0,8	0,5	0,8	0,1	0,8	1,2	0,8	1,2
Max.	1,5	1,6	3,0	2,0	2,5	3,0	3,5	3,0	4,0
Benzyl benzoate									
Min.	3,0	4,0	3,5	4,2	4,5	4,5	6,0	4,0	4,8
Max.	6,0	6,0	8,0	9,2	8,0	7,8	10,0	8,0	8,5
(*E*,*E*)- Farnesyl acetate									
Min.	1,0	1,0	0,5	1,0	1,0	1,0	1,2	1,5	1,7
Max.	3,0	3,0	3,0	4,0	2,0	3,5	3,5	5,0	5,0
Benzyl salicylate									
Min.	1,5	2,0	1,2	2,0	1,6	2,0	1,8	2,5	2,0
Max.	3,5	3,8	4,0	4,0	4,0	4,0	4,0	4,8	5,0

Annex A
(informative)

Typical chromatograms of the analysis by gas chromatography of oil of ylang-ylang [*Cananga odorata* (Lam.) Hook. f. et Thomson forma *genuina*]



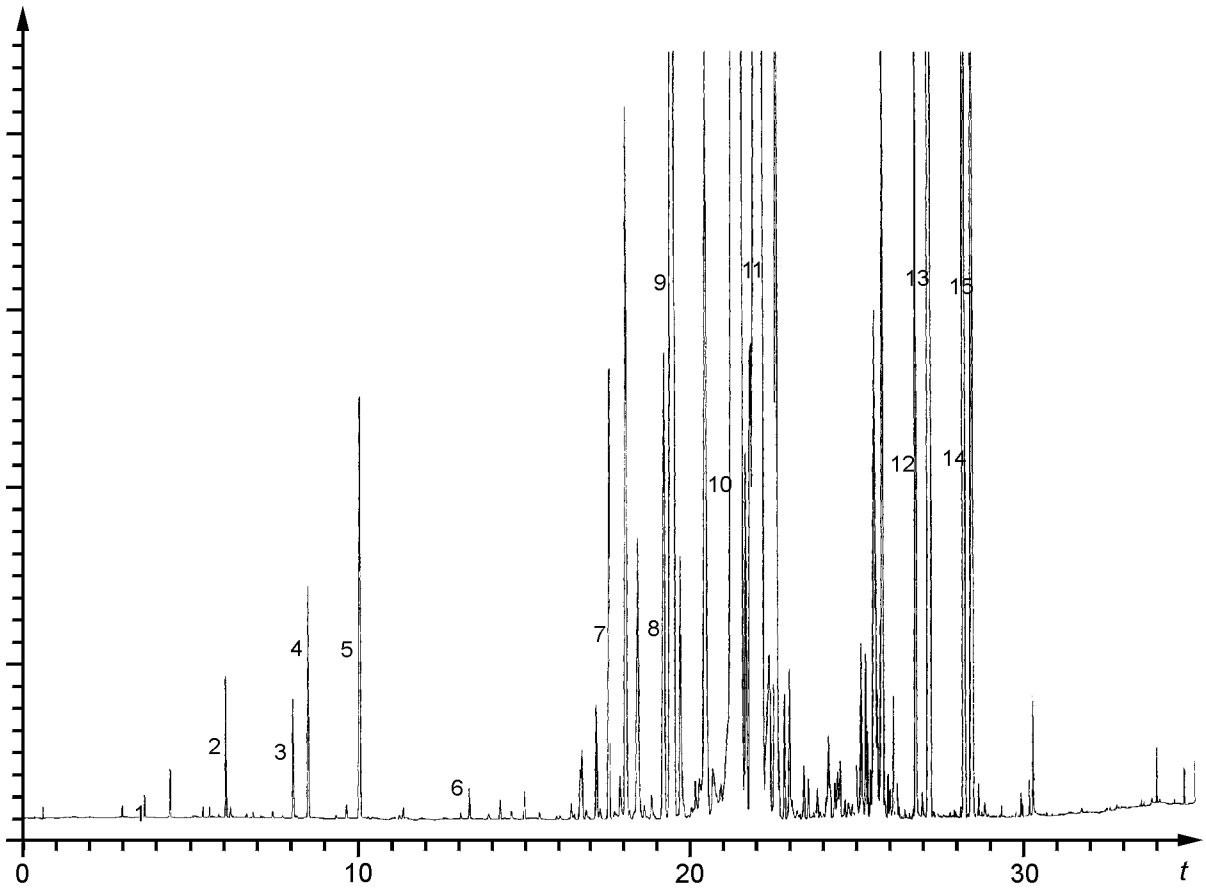
Peak identification

1	Prenyl acetate	9	β-Caryophyllene
2	*p*-Cresyl methyl ether	10	D-Germacrene
3	Methyl benzoate	11	(*E*,*E*)-α-Farnesene
4	Linalool	12	(*E*,*E*)-Farnesol
5	Benzyl acetate	13	Benzyl benzoate
6	Geraniol	14	(*E*,*E*)-Farnesyl acetate
7	Geranyl acetate	15	Benzyl salicylate
8	*E*-Cinnamyl acetate		

Operating conditions

Column: silica capillary, length 20 m, internal diameter 0,1 mm
Stationary phase: methyl siloxane
Film thickness: 0,40 µm
Oven temperature: isothermal at 80 °C for 2 min, then temperature programming from 80 °C to 170 °C at a rate of 4 °C/min, and from 170 °C to 305 °C at a rate of 15 °C/min, and isothermal at 305 °C for 2 min
Injector temperature: 260 °C
Detector temperature: 300 °C
Detector: flame ionization type
Carrier gas: hydrogen
Volume injected: 0,2 µl
Carrier gas flow rate: 0,6 ml/min
Split ratio: 1/120

Figure A.1 — Typical chromatogram of oil of ylang-ylang Extra Comores taken on an apolar column



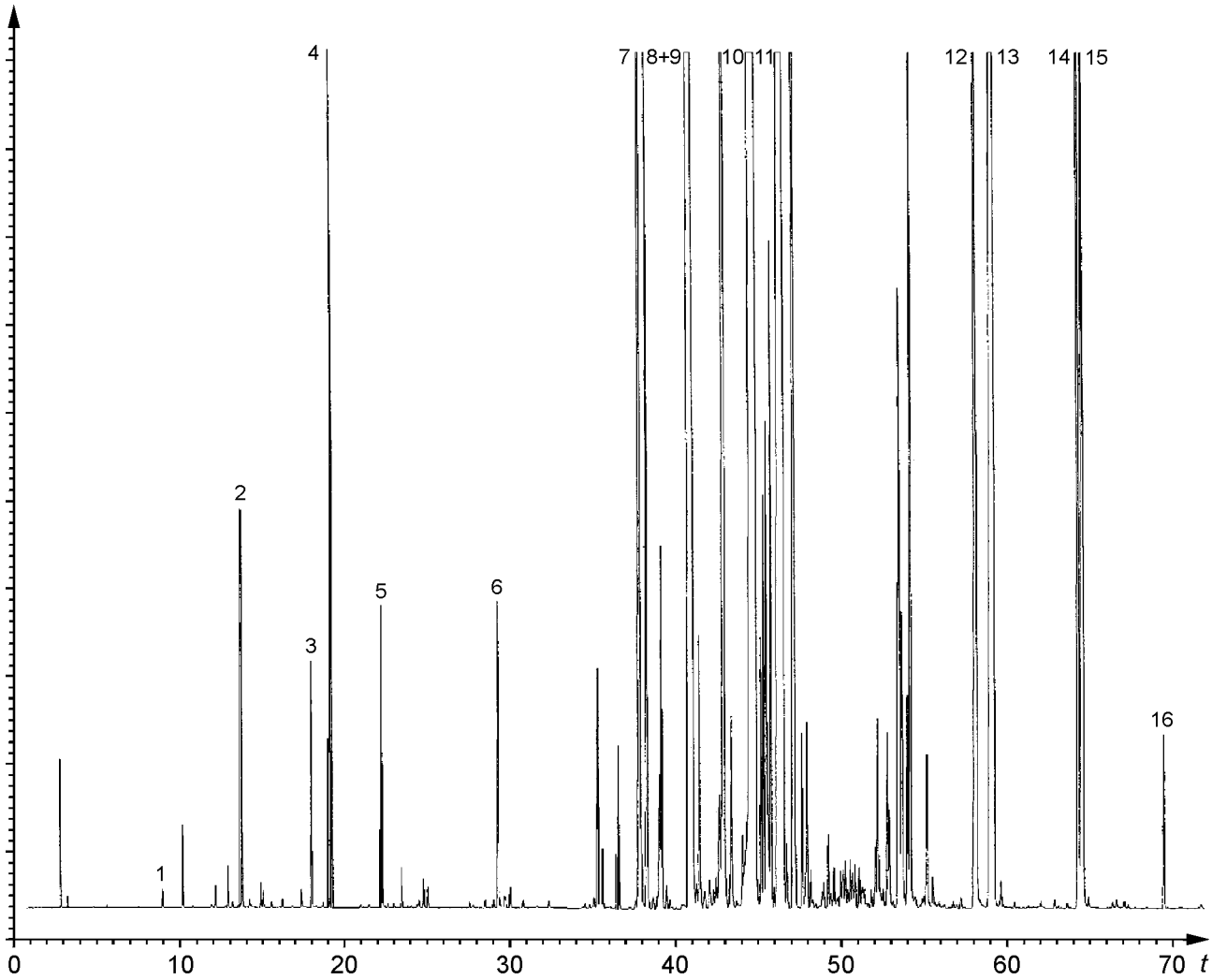
Peak identification

1	Prenyl acetate	9	β-Caryophyllene
2	*p*-Cresyl methyl ether	10	D-Germacrene
3	Methyl benzoate	11	(*E*,*E*)-α-Farnesene
4	Linalool	12	(*E*,*E*)-Farnesol
5	Benzyl acetate	13	Benzyl benzoate
6	Geraniol	14	(*E*,*E*)-Farnesyl acetate
7	Geranyl acetate	15	Benzyl salicylate
8	*E*-Cinnamyl acetate		

Operating conditions

Column: silica capillary, length 20 m, internal diameter 0,1 mm
Stationary phase: methyl siloxane
Film thickness: 0,40 µm
Oven temperature: isothermal at 80 °C for 2 min, then temperature programming from 80 °C to 170 °C at a rate of 4 °C/min, and from 170 °C to 305 °C at a rate of 15 °C/min, and isothermal at 305 °C for 2 min
Injector temperature: 260 °C
Detector temperature: 300 °C
Detector: flame ionization type
Carrier gas: hydrogen
Volume injected: 0,2 µl
Carrier gas flow rate: 0,6 ml/min
Split ratio: 1/120

Figure A.2 — Typical chromatogram of oil of ylang-ylang "Third" Comores taken on an apolar column



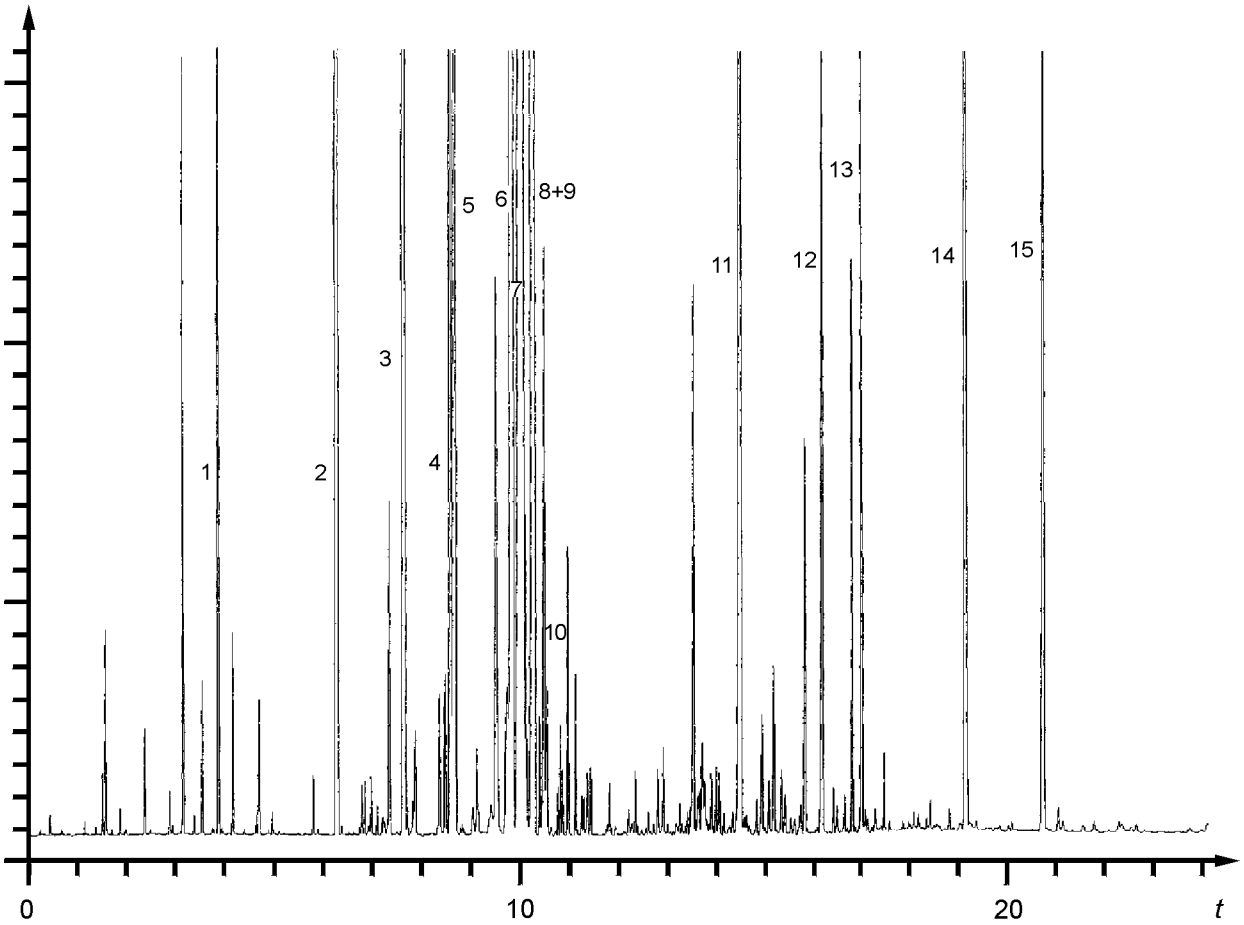
Peak identification

1	Prenyl acetate	9	β-Caryophyllene
2	*p*-Cresyl methyl ether	10	D-Germacrene
3	Methyl benzoate	11	(*E*,*E*)-α-Farnesene
4	Linalool	12	(*E*,*E*)-Farnesol
5	Benzyl acetate	13	Benzyl benzoate
6	Geraniol	14	(*E*,*E*)-Farnesyl acetate
7	Geranyl acetate	15	Benzyl salicylate
8	*E*-Cinnamyl acetate	16	Geranyl benzoate

Operating conditions

Column: capillary, length 50 m, internal diameter 0,2 mm
Stationary phase: poly (dimethyl siloxane)
Film thickness: 0,25 µm
Oven temperature: programme of temperature from 65 °C to 230 °C at a rate of 2 °C/min
Injector temperature: 230 °C
Detector temperature: 250 °C
Detector: flame ionization type
Carrier gas: hydrogen
Volume injected: 0,2 µl
Carrier gas flow rate: 1,1 ml/min
Split ratio: 1/100

Figure A.3 — Typical chromatogram of oil of ylang-ylang "Third" Madagascar taken on an apolar column



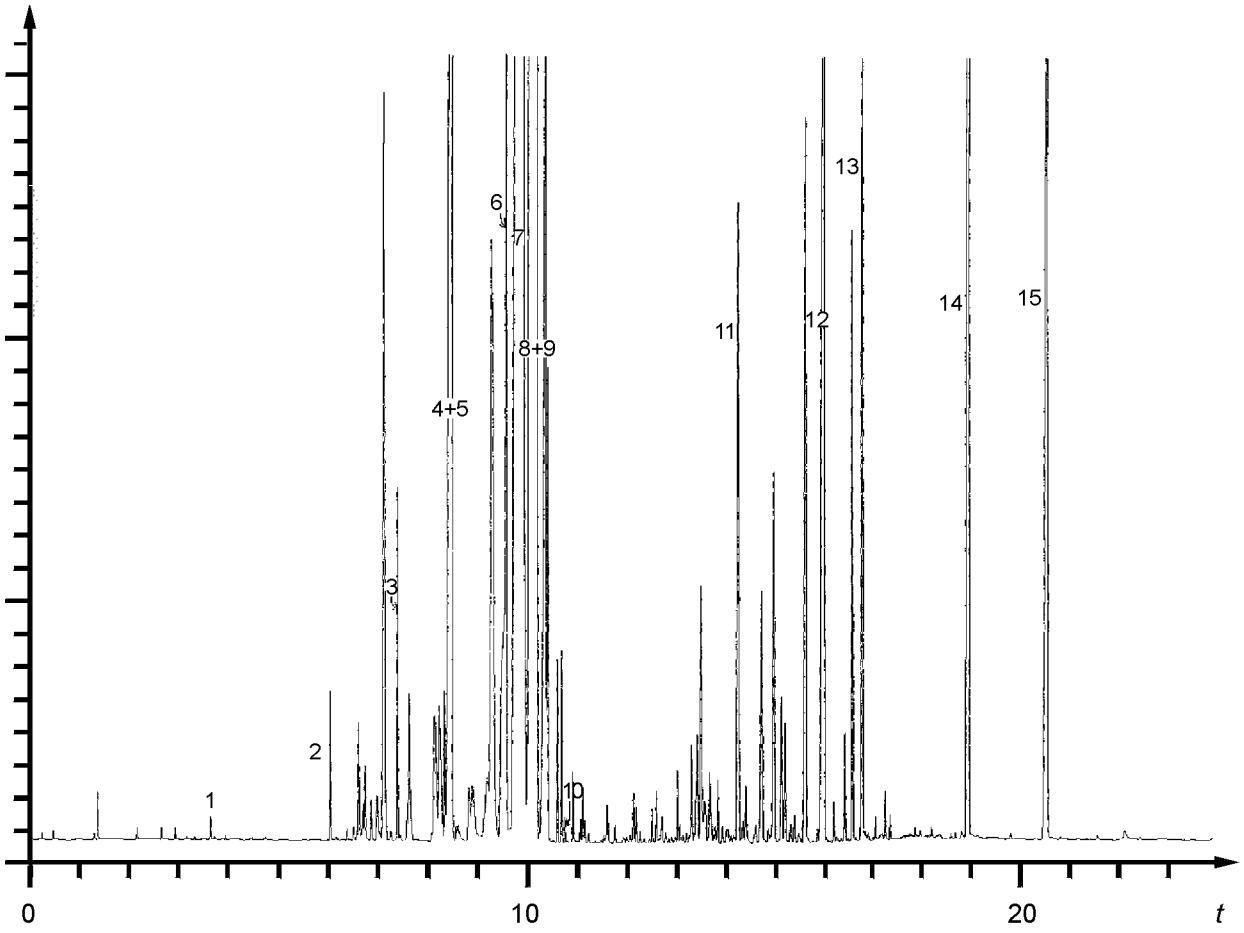
Peak identification

1 Prenyl acetate
2 *p*-Cresyl methyl ether
3 Linalool
4 Methyl benzoate
5 β-Caryophyllene
6 Benzyl acetate
7 D-Germacrene
8 Geranyl acetate
9 (*E*,*E*)-α-Farnesene
10 Geraniol
11 *E*-Cinnamyl acetate
12 (*E*,*E*)-Farnesyl acetate
13 (*E*,*E*)-Farnesol
14 Benzyl benzoate
15 Benzyl salicylate

Operating conditions

Column: silica, capillary, length 20 m, internal diameter 0,1 mm
Stationary phase: bonded polyethylene glycol
Film thickness: 0,20 µm
Oven temperature: isothermal at 65 °C for 1 min, then temperature programming from 65 °C to 190 °C at a rate of 10 °C/min, and isothermal 190 °C for 2 min, and from 190 °C to 240 °C, at a rate of 20 °C/min, and isothermal 240 °C for 6 min
Injector temperature: 250 °C
Detector temperature: 280 °C
Detector: flame ionization type
Carrier gas: hydrogen
Volume injected: 0,2 µl
Carrier gas flow rate: 0,4 ml/min
Split ratio: 1/150

Figure A.4 — Typical chromatogram of oil of ylang-ylang Extra Comores taken on a polar column



Peak identification

1	Prenyl acetate	9	(*E*,*E*)-α-Farnesene
2	*p*-Cresyl methyl ether	10	Geraniol
3	Linalool	11	*E*-Cinnamyl acetate
4	Methyl benzoate	12	(*E*,*E*)-Farnesyl acetate
5	β-Caryophyllene	13	(*E*,*E*)-Farnesol
6	Benzyl acetate	14	Benzyl benzoate
7	D-Germacrene	15	Benzyl salicylate
8	Geranyl acetate		

Operating conditions

Column: silica, capillary, length 20 m, internal diameter 0,1 mm
Stationary phase: bonded polyethylene glycol
Film thickness: 0,20 µm
Oven temperature: isothermal at 65 °C for 1 min, then temperature programming from 65 °C to 190 °C at a rate of 10 °C/min, and isothermal 190 °C for 2 min, and from 190 °C to 240 °C, at a rate of 20 °C/min, and isothermal 240 °C for 6 min
Injector temperature: 250 °C
Detector temperature: 280 °C
Detector: flame ionization type
Carrier gas: hydrogen
Volume injected: 0,2 µl
Carrier gas flow rate: 0,4 ml/min
Split ratio: 1/150

Figure A.5 — Typical chromatogram of oil of ylang-ylang "Third" Comores 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 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 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 ylang-ylang

B.2.1 The mean value is

— 78 °C for the Extra super fraction,

— 81 °C for the Extra fraction,

— 89 °C for the First fraction,

— 95 °C for the Second fraction, and

— 101 °C for the Third fraction.

NOTE Values obtained with “Luchaire” equipment.

B.2.2 The mean value is

— 78 °C for the Extra super fraction,

— 81 °C for the Extra fraction,

— 87 °C for the First fraction,

— 93 °C for the Second fraction, and

— 101 °C for the Third fraction.

NOTE Values obtained with “Pensky-Martens” equipment.

Bibliography

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

[2] ISO/TR 21092:2004, *Essential oils — Characterization*

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Price based on 12 pages