SRI LANKA STANDARD 185 : 2012

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SPECIFICATION FOR
OIL OF CEYLON CINNAMON BARK
(First Revision)

SRI LANKA STANDARDS INSTITUTION

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SLS 185 : 2012

Gr.6

SRI LANKA STANDARDS INSTITUTION,
No. 17, Victoria Place,
Elvitigala Mawatha,
Colombo – 08,
Sri Lanka.

Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This standard does not purport to include all the necessary provisions of a contract.

Sri Lanka Standard
SPECIFICATION FOR OIL OF CEYLON CINNAMON BARK
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FOREWORD

This standard was approved by the Sectoral Committee on Agricultural and Food Products and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2012-01-27.

Ceylon cinnamon bark oil of commerce is derived from steam distillation of bark of the true cinnamon, *Cinnamomum zeylanicum* Blume, cultivated in Sri Lanka. The main constituents of oil of Ceylon cinnamon bark are cinnamic aldehyde and eugenol. The oil of Ceylon cinnamon bark is used to some extent in perfumery and extensively in flavouring.

This standard was first published in 1972. From the point of view of International trade, it is most essential that standardization should be effected at the International level in addition to the National level. Therefore, the Committee responsible for the preparation of this standard felt that it should be revised in view of the present trade practices and also to suit the product currently being manufactured and exported. Basic changes have been made in presentation aspects.

In this revision, gas chromatographic method for determination of chemical composition of the oil which is progressively used in the country, has been included for guidance only under Annex **A**.

Information on the flashpoint is given in Annex **B**.

This standard is subject to the restrictions imposed under the Sri Lanka Food Act No. 26 of 1980, Department of Export Agriculture Development Act No. 46 of 1992 and the regulations framed thereunder, wherever applicable.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the results of a test or an analysis shall be rounded off in accordance with **SLS 102**. The number of significant places to be retained in the rounded off value shall be the same as that of the specified value in this standard.

1 SCOPE

This standard specifies the requirements and methods of sampling and testing for oil of Ceylon cinnamon bark obtained from *Cinnamomum zeylanicum* Blume.

2 REFERENCES

SLS	81	Ceylon cinnamon
SLS	102	Rules for rounding off numerical values
SLS	210	Methods for the preparation of test samples for essential oils
SLS	211	Methods for labeling and marking of containers for essential oils
SLS	212	Methods for packing of essential oils

SLS 213 Methods for sampling of essential oils
SLS 572 Methods for analysis for essential oils
Part 1 : Determination of relative density
Part 2 : Determination of refractive index
Part 3 : Determination of optical rotation
Part 4 : Evaluation of miscibility in ethanol
Part 5 : Determination of content of phenols
Part 8 : General guidance on chromatographic profiles

3 DEFINITION

For the purpose of this standard, the following definition shall apply:

3.1 oil of Ceylon cinnamon bark : Essential oil obtained by steam distillation of the bark material (quills, quillings, featherings and chips) derived from the species of the true cinnamon *Cinnamomum zeylanicum* Blume of the Lauraceae family (see **SLS 81**), growing in Sri Lanka.

4 GRADES

Ceylon cinnamon bark oil shall be of four grades as classified according to **5.2**.

4.1 Superior grade
4.2 Special grade
4.3 Average grade
4.4 Ordinary grade

5 REQUIREMENTS

5.1 Physical properties

5.1.1 *Appearance, Colour and odour*

The oil shall be clear mobile liquid, free from sediment and suspended matter. The oil shall be of pale yellow in colour and shall have characteristic spice-like odour reminiscent of cinnamic aldehyde.

5.1.2 *Solubility in ethanol*

One volume of the oil shall be soluble in 2 volumes of 70 percent (v/v) ethanol at 28 ^{o}C, when tested by the method described in **SLS 572 : Part 4**.

5.1.3 *Relative density*

The relative density of the oil at 28 ^{o}C shall be not less than 1.0100 and not more than 1.0300, when tested as prescribed in **SLS 572 : Part 1.**

5.1.4 *Refractive index*

The refractive index of the oil at 28 ^{o}C shall be not less than 1.5550 and not more than 1.5800, when tested as prescribed in **SLS 572 : Part 2**.

5.1.5 *Optical rotation*

The optical rotation of the oil at 28 ^{o}C shall be not less than -2.5^{o} and not more than $+ 2^{o}$, when tested as prescribed in **SLS 572 : Part 3.**

5.2 Chemical constituents

Main chemical constituents of cinnamon bark oil shall comply with the requirements prescribed in Table **1,** when tested in accordance with the methods prescribed in Column 7 of the Table.

TABLE 1 – Chemical constituents

SI. No. (1)	Characteristic (2)	Requirement				Method of test (7)
		Superior grade (3)	Special grade (4)	Average grade (5)	Ordinary grade (6)	
i)	Cinnamic aldehyde content, per cent by mass	Above 60	55-60	45-54	30-44	Appendix A
ii)	Phenol content (as eugenol) per cent by mass, (max.)	6	15	25	40	SLS 572: Part 5

5.3 Chromatographic analysis

Analysis of the cinnamon bark oil shall be carried out by gas chromatographic method described in **Part 8** of **SLS 572**. In the chromatogram obtained, the representative and characteristic components given in Table **2** shall be identified. The proportions of these major components shall be as given in Table **2**. This constitutes the chromatographic analysis of the essential oil.

TABLE 2 – Chromatographic analysis

SI. No. (1)	Component (2)	Minimum % (3)	Maximum % (4)
i)	trans-Cinnamic aldehyde	30	75
ii)	Eugenol	0.5	40
iii)	Linalol	0.1	6.0
iv)	trans -2- Methoxy Cinnamaldehyde	0.1	1.0
v)	Benzyl benzoate	-	2.0
vi)	Coumarin	-	0.5
vii)	Safrole	-	0.5
viii)	β Caryophyllene	2	7.0
ix)	Cinnamyl acetate	2.0	6.0
x)	1: 8 Cineole	1.0	3.0

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

5 PACKAGING AND STORAGE

5.1 The packaging shall be in accordance with **SLS 212**.

5.2 The product shall be protected from direct light and stored in a cool and dry place.

5.3 The product shall be supplied in air-tight and preferably amber-coloured glass or epoxy coated metal containers, permitting a minimum of air space, or as agreed to between the purchaser and the supplier.

6 MARKING AND/OR LABELLING

6.1 The container shall be marked or labelled legibly and indelibly with the following information:

a) Name of the product including botanical name of the plant;
b) The name or trade name and the address of the manufacturer or distributor;
c) The gross mass, tare and net mass;
d) Month and Year of manufacture;
e) Batch number;
f) Cautionary notice, if any; and
g) Any other information requested by the buyer.

6.2 The marking and labelling shall also be in accordance with **SLS 211**.

7 SAMPLING

Unless otherwise agreed to between the purchaser and the supplier, the procedure given in **SLS 213** shall be followed for sampling. The sample shall be prepared in accordance with the **SLS 210**.

8 METHOD OF TESTS

Tests for determination of all the requirements shall be conducted on the composite sample. Tests shall be carried out as prescribed in **Part 1,2,3,4,5** and **8** of **SLS 572** and Appendix **A**.

9 CRITERIA FOR CONFORMITY

The lot shall be declared as conforming to the standard, if the composite sample satisfies all the requirements specified in the standard.

APPENDIX A
DETERMINATION OF CINNAMIC ALDEHYDE CONTENT

A-1 Reagents

All reagents shall conform to recognized analytical reagent quality.

A-1.1 *Ethyl alcohol*, 60 per cent, v/v, free from aldehydes and ketones

A-1.2 *Benzene*

A-1.3 *Methyl orange indicator*, 0.2 per cent, solution of pure methyl orange in ethanol.

A-1.4 *N/2 Potassium hydroxide*, 60 per cent v/v ethanol.

This should be standardized against N/2 Hydrochloric acid, using methyl orange solution as indicator and running the alkali into the acid until the full yellow colour is obtained.

A-1.5 *Hydroxylamine hydrochloric reagent*, 60 per cent v/v ethanol.

Dissolve 3.475 g of hydroxylamine hydrochloride in 95 ml of 60 per cent ethyl alcohol; add 0.5 ml of the methyl orange indicator; adjust to the full yellow colour of the indicator with the N/2 alcoholic potassium hydroxide and make up to 100 ml with the 60 per cent alcohol.

The full yellow colour of the indicator may be defined as that colour which is not changed by the further addition of alkali. Confirm the correct adjustment to the reagent in the following manner;

Place 10 ml in each of two tubes and to one tube add 1 drop of N alcoholic potassium hydroxide: no change in colour should be observed. To the other add 1 drop of N hydrochloric acid: a slight change in colour towards orange should be produced.

A-2 Procedure

Weigh, to the nearest milligram, 1 g of the cinnamon bark oil into a glass stoppered cylinder (approximately 150 mm long, 25 mm in diameter), add 5 ml benzene and 15 ml of N/2 hydroxylamine hydrochloric reagent.)

Shake vigorously and titrate immediately with N/2 alcoholic potassium hydroxide until the red colour changes to yellow.

Continue the shaking and titrating until the full yellow colour of the indicator is permanent in the lower layer after shaking vigorously for two minutes and then allowing to stand for the liquids to separate. The reaction is slow towards the end, but should be complete in about 15 minutes.

Make a second determination, using the first titrate liquid plus a slight excess of alcoholic potassium hydroxide (0.5 ml) as a colour standard for the end point and calculate the result from the second determination.

A-3 Calculation

Cinnamic aldehyde content, per cent by mass = $\frac{6.661 \times V}{m}$

where,

V is the volume, in milliliters, of N/2 alcoholic Potassium hydroxide used; and

m is the mass, in grams, of oil taken.

ANNEX A
(Informative)

Typical chromatogram of the analysis by chromatography of the essential oil of Ceylon cinnamon bark, (*Cinnamomum zeylanicum* Blume)

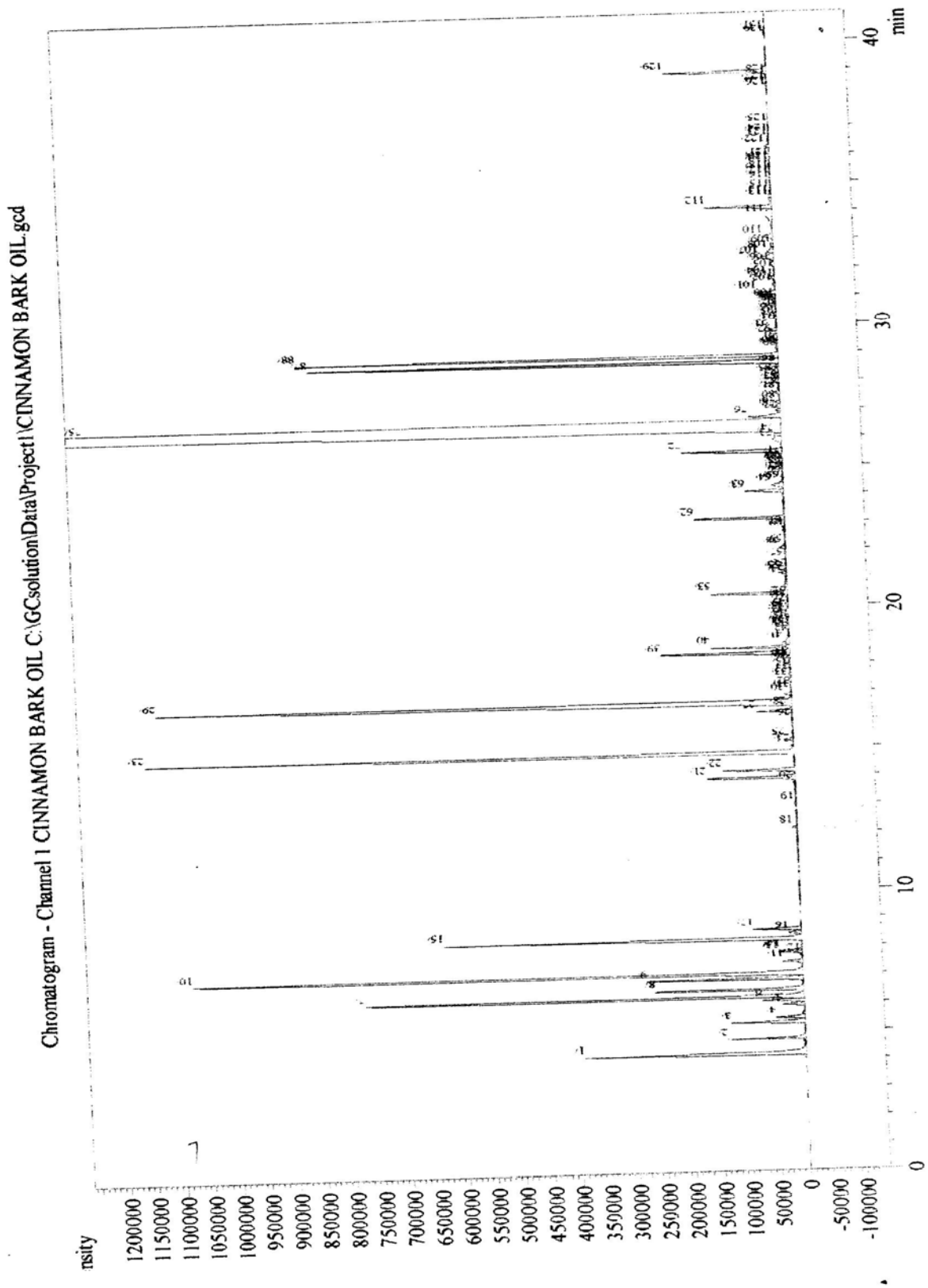
Gas Chromatographic Analysis of Cinnamon Bark oil

Gas chromatographic conditions : Detector - Flame ionization detector type (FID)

Column	:	Capillary, fused silica, 30 m. long and 0.25 mm internal diameter
Thickness of film	:	0.25µm
Stationary phase	:	DB-1 & DB Wax , Rtx wax boded phase fused silica
Oven temperature	:	temperature programming from 75^0C to 100^0C at rate of 5^0C /minand from 100^0C to 220^0C at rate of 6^0C
Injector temperature	:	230 ^{0}C
Detector temperature	:	240 ^{0}C
Programme rate	:	5^0C
Carrier gas	:	Helium
Split ratio	:	1:30
Carrier gas Flow rate	:	1ml/min

Peak identification - Major compounds

	Peak No.	Rt time	Compound	Percent
1.	23	14.5	Linalol	3.2
2.	29	16.6	β- Caryo[phyllene	4.7
3.	75	26.6	tr- Cinnamaldehyde	70.3
4.	87	28.7	Cinnamyl acetate	2.3
5.	88	28.9	Eugenol	2.2
6.	112	34.1	tr-2 meth. Cinnamaldehyde	0.4
7.	129	38.9	Benzyl benzoate	0.8


Chromatogram - Channel 1 CINNAMON BARK OIL C:\GCsolution\Data\Project1\CINNAMON BARK OIL.gcd
nsity
1200000
1150000
1100000
1050000
1000000
950000
900000
850000
800000
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700000
650000
600000
550000
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450000
400000
350000
300000
250000
200000
150000
100000
50000
0
-50000
-100000
0
10
20
30
40
min

SHIMADZU

DATA F

Peak Table - Channel 1

Peak#	Ret.Time	Area	Area%	Height	Height%	Unit	Mark	Cmpd Name
1	4.185	1570729	1.2008	389264	2.2190		SV	
2	4.708	525989	0.4021	135246	0.7710		SV	
3	5.286	483491	0.3696	129779	0.7398		V	
4	5.446	210518	0.1609	49448	0.2819		SV	
5	5.917	147009	0.1124	37987	0.2165		V	
6	6.079	278224	0.2127	73408	0.4185		V	
7	6.206	2752925	2.1045	772065	4.4011		V	
8	6.461	932766	0.7131	260684	1.4860		V	
9	6.825	1005720	0.7688	274837	1.5667		V	
10	7.040	3656741	2.7955	1075484	6.1308		V	
11	7.444	139996	0.1070	34197	0.1949		V	
12	7.756	127826	0.0977	41978	0.2393		V	
13	7.808	168638	0.1289	38454	0.2192		V	
14	8.268	2083705	1.5929	629598	3.5890		V	
15	8.578	487533	0.3727	84618	0.4824		SV	
16	13.936	658867	0.5037	155493	0.8864		V	
17	14.206	434953	0.3325	126469	0.7209		SV	
18	14.845	4166775	3.1854	1138687	6.4911		SV	
19	16.263	217846	0.1665	62201	0.3546		T	
20	16.623	6104000	4.6663	1119294	6.3805		V	
21	18.317	1003888	0.7674	226924	1.2936		V	
22	18.543	478804	0.3660	139831	0.7971		V	
23	20.451	706771	0.5403	134612	0.7674		SV	
24	23.127	627637	0.4798	159421	0.9088		SV	
25	24.095	273458	0.2091	67804	0.3865		V	
26	24.307	116456	0.0890	19460	0.1109		V	
27	25.499	736727	0.5632	176259	1.0048		V	
28	25.916	142322	0.1088	14824	0.0845		V	
29	26.579	92061385	70.3780	7844434	44.7171		V	
30	26.738	241706	0.1848	57479	0.3277		V	
31	28.673	3022338	2.3105	827556	4.7175		V	
32	28.907	2833370	2.1660	852094	4.8573		V	
33	31.125	143782	0.1099	33159	0.1890		V	
34	32.349	209861	0.1604	27380	0.1561		V	
35	33.086	145839	0.1115	18343	0.1046		V	
36	33.826	318513	0.2435	14222	0.0811		V	
37	34.135	504427	0.3856	117345	0.6689		V	
38	38.912	1088284	0.8320	182030	1.0377		SV	
Total		130809812	100.0000	17542371	100.0000			

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, user 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 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 – Essential oils – General guidance on the determination of flashpoint.

B-2 Flashpoint of the oil of cinnamon bark

The mean value is +93 ^{o}C.

NOTE **:** *Obtained with "closed-cup" method.*

SRI LANKA STANDARDS INSTITUTION

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