SRI LANKA STANDARD 192: 2019
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SPECIFICATION FOR LEMONGRASS OIL
(*First Revision*)

SRI LANKA STANDARDS INSTITUTION

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SLS 192: 2019

Gr. 6

SRI LANKA STANDARDS INSTITUTION
No 17, Victoria Place
Elvitigala Mawatha
Colombo 08

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 LEMONGRASS OIL
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FOREWORD

This Sri Lanka Standard was approved by the Sectoral Committee on Food Products and authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2019-03-07.

The lemongrass oil is widely used for its intense lemon like odour and as a raw material for the manufacture of ionones and other aromatic products. This Standard was first published in 1973. In this first revision, chemical requirements have been revised to safeguard the consumers and also to meet the market requirements.

This Standard is subject to the restrictions imposed under the Sri Lanka Food Act No. 26 of 1980 and the regulations framed thereunder.

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

In the revision of this Standard, valuable assistance derived from the relevant publications of the International Organization for Standardization and the Bureau of Indian Standards is gratefully acknowledged.

1 SCOPE

This Standard prescribes requirements and methods of sampling and test for lemongrass oil (*Cymbopogon flexuosus* and *Cymbopogon citratus*) obtained from the leaves by steam distillation.

2 REFERENCES

SLS 102 Rules for rounding off numerical values
SLS 143 Code of practice for general principles of food hygiene
SLS 210 Method for the preparation of test sample for essential oils
SLS 211 Method for labelling 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 of test for essential oils
Part 1: Determination of relative density at 20 °C reference method
Part 2: Determination of refractive index
Part 3: Determination of optical rotation
Part 4: Evaluation of miscibility in ethanol

Part 6: Analysis by gas chromatography on capillary columns – General method
Part 8: General guidance on chromatographic profiles
Part 10: Analysis by gas chromatography on packed columns – General method

3 REQUIREMENTS

3.1 Hygienic requirements

The product shall be manufactured, processed, packaged, stored and distributed in accordance with the hygienic conditions prescribed in **SLS 143**.

3.2 General requirements

The product shall be a clear, mobile liquid, free from sediments, suspended matter, water and adulterants.

3.3 Colour

The product shall be of pale yellow to yellow colour. It shall be free from added colours.

3.4 Odour

The product shall have its characteristic odour of citral. It shall be free from foreign odour including rancidity and mustiness.

3.5 Other requirements

The product shall comply with the requirements specified in Table **1** when tested in accordance with the relevant methods given in Column **4** of the table.

TABLE 1 – Requirements for lemongrass oil

Sl No (1)	**Characteristic** (2)	**Requirement** (3)	**Method of test** (4)
i)	Relative density at 20 °C	0.8720 to 0.9050	**SLS 572: Part 1**
ii)	Refractive index at 20 °C	1.4820 to 1.4980	**SLS 572: Part 2**
iii)	Optical rotation at 20 °C	-4° to +1°	**SLS 572: Part 3**
iv)	Citral content* per cent by mass, min	75	**SLS 572: Part 6** or **SLS 572: Part 10**

***** *Total citral content = citral a (geranial) + citral b (neral)*

3.6 Solubility/ miscibility

The solubility of the oil at 30 ^{o}C, determined by the method described in **Part 4** of **SLS 572** in 70% (V/V) Ethanol shall be one volume in three volumes of Ethanol. The solubility diminishes on storage.

NOTE
This is applicable only to the oil extracted from Cymbopogon flexuosus.

3.7 Chromatographic profile

Analysis of the lemongrass oil shall be carried out by gas chromatographic method described in **Part 8** and **6** or **10** 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 lemongrass oil.

TABLE 2 – Chromatographic profile

Sl No	**Component**	**Percentage**	
		C. flexuosus	***C. citratus***
(1)	(2)	(3)	(4)
i)	Limonene	0.5 to 5.7	ND to 0.10
ii)	6-Methyl-5-heptene-2-one	0.1 to 2.0	0.26 to 0.53
iii)	Caryophyllene	0.2 to 3.5	0.13 to 1.14
iv)	Geranial (citral a)	35.0 to 47.0	43.84 to 56.28
v)	Neral (citral b)	25.0 to 35.0	31.21 to 35.61
vi)	Geranyl acetate	0.5 to 6.0	0.27 to 0.44
vii)	Geraniol	1.2 to 8.0	0.44 to 3.69

NOTES
1. *The chromatographic analysis is normative, contrary to typical chromatograms given for information in Appendix* **A**.
2. *ND: Not detectable (defined as* ≤ 0.05*).*

4 PACKAGING

4.1.1 The product shall be packaged in appropriate and clean packages or containers.

4.2 The packaging material which comes into contact directly with the product shall be sufficiently inert to preclude substances from being transferred to the product in quantities large enough to endanger human health or bring about an unacceptable change in the composition of the product or deterioration in its organoleptic properties.

5 MARKING AND/ OR LABELLING

5.1 The following shall be marked or labelled legibly and indelibly on each package or container:

a) Name of the product;
b) Brand name or trademark, if any;
c) Net content, in 'ml' or 'l';
d) Name and address of the manufacturer/ processor;
e) Name and address of the packer/ distributor;
f) Batch number or code number or a decipherable code marking;
g) Date of manufacture;
h) Date of expiry;
j) Date of repackaging, if relevant; and
k) Country of origin, in-case of imported products.

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

6 SAMPLING

6.1 A representative sample of the product for ascertaining conformity to the requirements of this Standard shall be obtained in accordance with the relevant clauses of **SLS 213**.

6.1.1 The sampling method shall be applied where compliance of a lot to the requirements of this Standard is to be assessed based on statistical sampling and inspection.

6.1.2 Where compliance with this Standard is to be assured based on manufacturer's control systems coupled with type testing and check tests or any other procedure, appropriate method of sampling and inspection shall be adopted.

6.2 Number of tests

6.2.1 Each package/ container selected as in relevant clauses of **SLS 213** shall be examined for packaging and marking and/ or labelling requirements given in Clause **5** of this Standard.

6.2.2 The laboratory sample prepared as in relevant clauses of **SLS 210** shall be inspected/ tested for the requirements given in Clause **3** of this Standard.

7 METHODS OF TEST

Tests shall be carried out as prescribed in **Part 1**, **2**, **3**, **4**, **8** and **6** or **10** of **SLS 572**.

8 CRITERIA FOR CONFORMITY

A lot shall be declared as conforming to the requirements of this Standard if the following conditions are satisfied:

8.1 Each package/ container examined as in Clause **6.2.1** satisfies the packaging and marking/ labeling requirements of this Standard.

8.2 The test results of the laboratory sample when tested as in **6.2.2** satisfy the requirements given in Clauses **3.2**, **3.3**, **3.4**, **3.5**, **3.6** and **3.7** of this Standard.

APPENDIX A
TYPICAL CHROMATOGRAM OF THE CHROMATOGRAPHIC ANALYSIS OF THE ESSENTIAL LEMONGRASS OIL
(*Cymbopogon flexuosus* AND *Cymbopogon citratus*)
(Informative)

A.1 GAS CHROMATOGRAPHIC ANALYSIS OF LEMONGRASS OIL

The following column and operating conditions have been found to be suitable for the determination of essential oil of lemongrass by the gas chromatographic method.

a) Detector – Flame Ionization Detector
b) Column: Capillary, Rtx-Wax bonded phase fused silica, 30 m long, and 0.25 mm internal diameter
c) Thickness of film: 0.25 μm
d) Stationary phase: Cross bond® Carbowax® polyethylene glycol
e) Oven temperature: 60 °C to 225 °C
f) Injector temperature: 230 °C
g) Detector temperature: 240 °C
h) Programme rate: 5 °C
j) Carrier gas: Argon
k) Split ratio: 50:1
m) Carrier gas flow rate: 1 ml/ min

A.2 PEAK IDENTIFICATION – MAJOR COMPOUNDS

A.2.1 Peak identifications of the major compounds of *C. flexuosus* and *C. citratus* are given respectively in Column **5** and **6** of Table **3**.

TABLE 3 – Peak identification of major compounds

Sl No	**Peak No.**	**Retention time**	**Compound**	**Relative abundance (%) *C. flexuosus***	**Relative abundance (%) *C. citratus***
(1)	(2)	(3)	(4)	(5)	(6)
i)	1	6.3	Limonene	5.6	ND
ii)	2	9.0	6-Methyl-5-heptene-2-one	0.8	0.5
iii)	3	15.2	Caryophyllene	0.5	0.1
iv)	4	17.2	Neral (citral b)	33.9	31.3
v)	5	18.4	Geranial (citral a)	47.1	43.9
vi)	6	18.8	Geranyl acetate	0.5	0.3
vii)	7	20.6	Geraniol	1.2	3.7

NOTE
ND: Not detectable (defined as ≤ 0.05*).*

A.2.2 Typical chromatograms of *Cymbopogon flexuosus* and *Cymbopogon citratus* are shown in Figure **1** and Figure **2** respectively.

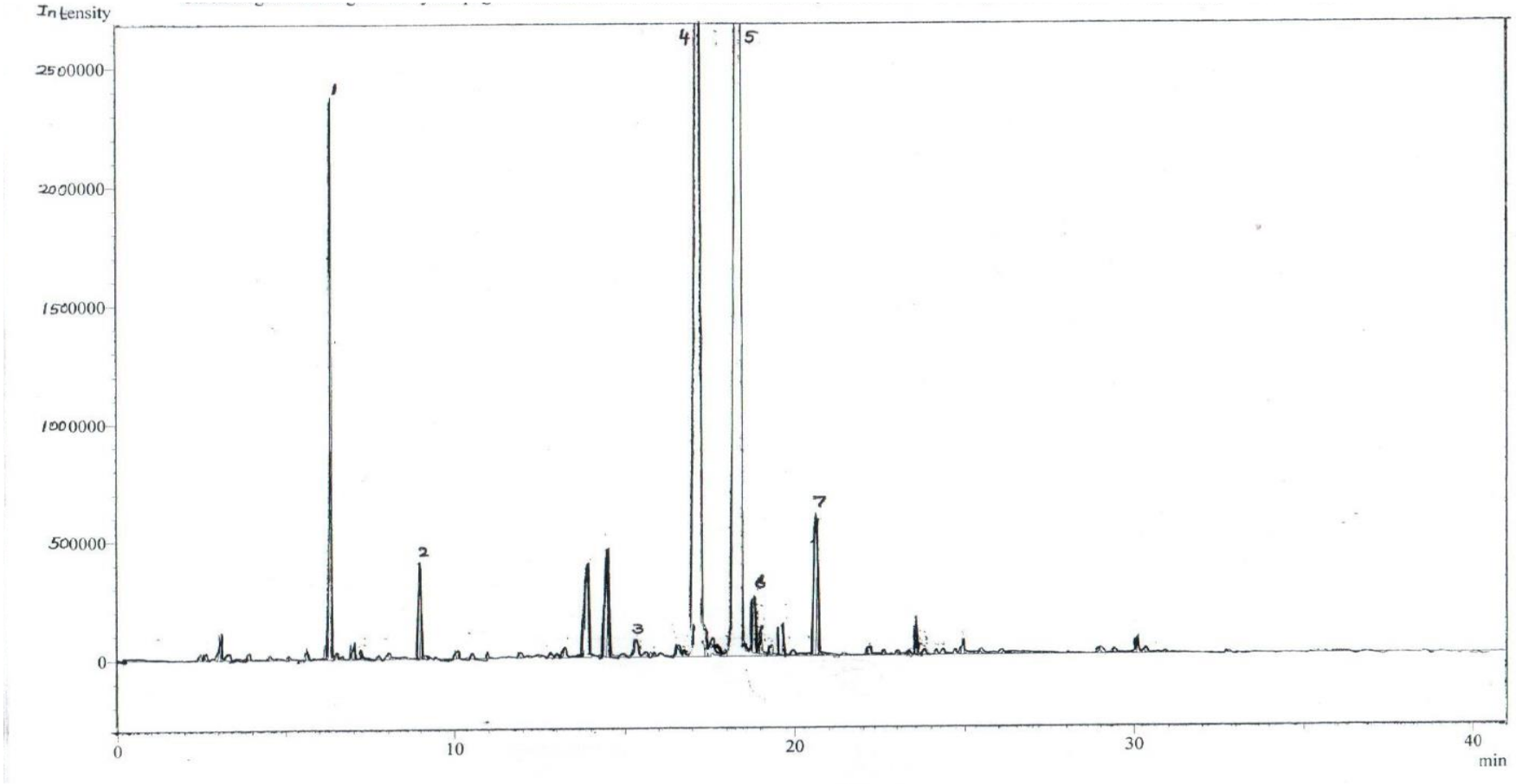

FIGURE 1: Chromatogram of *Cymbopogon flexuosus* essential oil

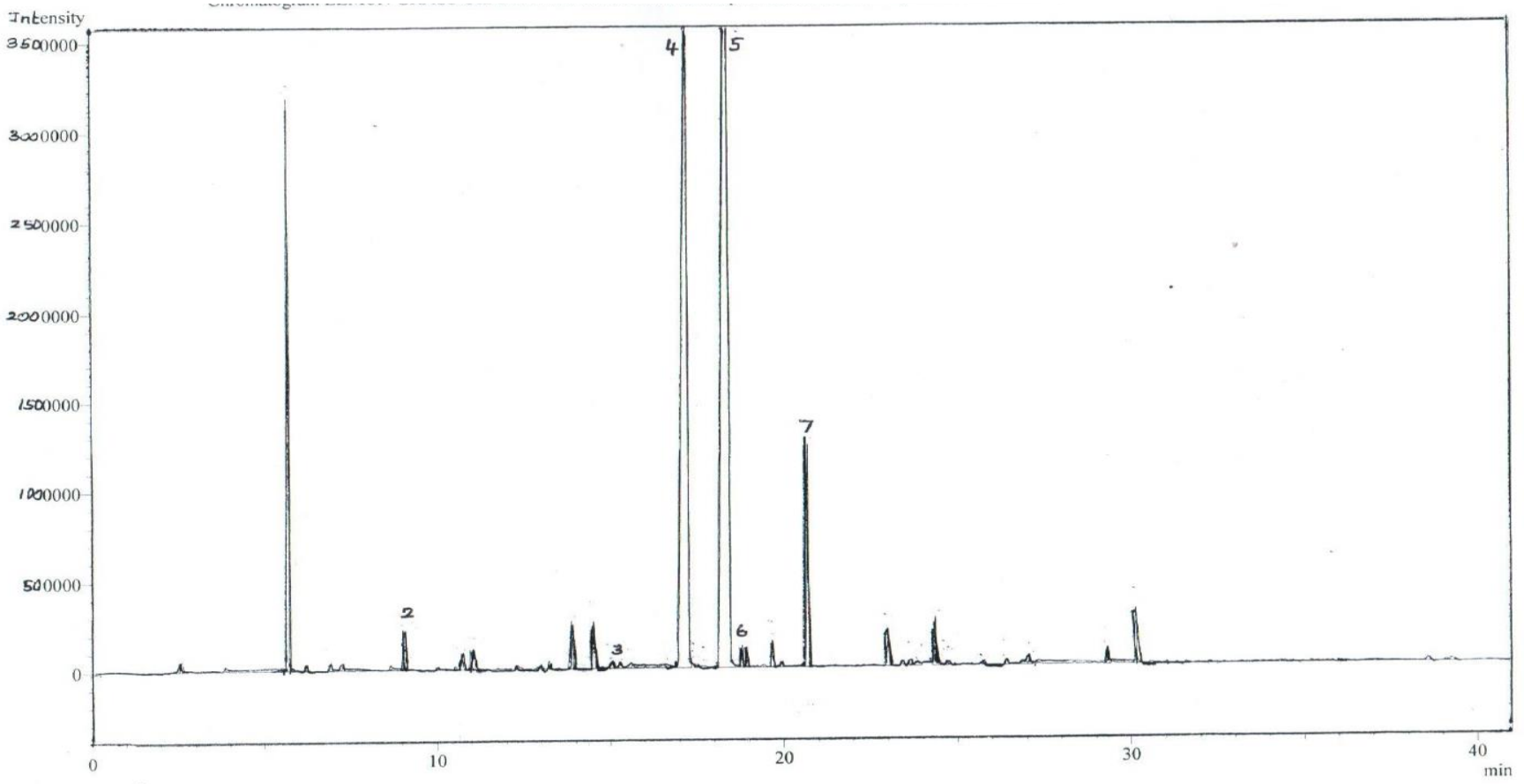

FIGURE 2: Chromatogram of *Cymbopogon citratus* essential oil

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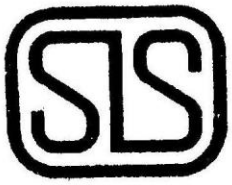
SLS CERTIFICATION MARK

The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI *which includes surveillance inspection of the factory, testing of both factory and market samples.*

Further particulars of the terms and conditions of the permit may be obtained from the Sri *Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.*



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SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

Printed at the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.