

SRI LANKA STANDARD 1702:2021
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SPECIFICATION FOR
LIQUID ORGANIC FERTILIZERS

SRI LANKA STANDARDS INSTITUTION

SLS 1702:2021

**Sri Lanka Standard
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SRI LANKA STANDARDS INSTITUTION
17, Victoria Place,
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Sri Lanka.**

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FOREWORD

This Sri Lanka Standard was approved by the Sectoral Committee on Agriculture and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2021-03-24.

Liquid organic fertilizers are concentrated liquids that are added to water and applied to the soil and/ or foliage. Liquid organic fertilizers provide soluble and easily available nutrient to the crops. Furthermore, they give plant nutrient in a faster-acting form than solid fertilizer. Liquid organic fertilizers consist of primary nutrient and may contain beneficial microorganisms and/or micronutrients.

This Standard is subjected to the provisions under the Fertilizer Act No. 68 of 1988, the National Environmental Act No. 47 of 1980 and the regulations framed thereunder, and any other regulatory and statutory requirements wherever applicable.

Guidelines for the determination of compliance of a lot to the requirements of this Standard based on statistical sampling and inspection are given in Appendix A.

All values given in this Standard are in SI units.

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 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 preparation of this Standard, the valuable assistance derived from the publications of European Council and Bureau of Philippine Standards is gratefully acknowledged.

1 SCOPE

The Standard specifies the requirements and methods of sampling and test for liquid organic fertilizers used especially in organic agriculture.

2 REFERENCES

- SLS 83 SI units and recommendations for use of their multiples and of certain other units
- SLS 102 Rules for rounding off numerical values
- SLS 428 Random sampling methods
- SLS 645 Methods of test for fertilizers
Part 1: Determination of Nitrogen content
Part 4: Determination of Potassium content
Part 5: Determination of Phosphorous content
- SLS 516 Methods of test for microbiology of food and animal feeding stuffs
Part 3: Detection and enumeration of coliforms, faecal coliforms and Escherichia coli
Part 5: Horizontal method for the detection of Salmonella spp.
- SLS 1324 Requirements for organic agriculture production and processing
- SLS 1526 Method of test for determination of soil pH
- DSLS ISO 11265 Soil quality - Determination of the specific electrical conductivity
- Official Methods of Analysis of the Association of Official Analytical Chemists (AOAC), 20th Edition, 2016

3 DEFINITIONS

For the purpose of this Standard, the following definitions shall apply:

3.1 batch: Liquid organic fertilizers that are produced from the same type of materials, at the same time and location, by the same manufacturer/producer, or made during the same cycle or period of manufacture.

3.2 liquid organic fertilizers: Any product in liquid form, of plant (except byproducts from petroleum industries) or animal origin, which has undergone substantial decomposition that can supply available nutrients to plants. This may be enriched by microbial inoculants and naturally occurring minerals or any substances listed in the **SLS 1324**.

3.3 liquid form: A suspension and/or a solution, where a suspension is a two-phase dispersion in which solid particles are maintained in suspension in the liquid phase, and a solution is a liquid that is free of solid particles, or a gel and includes pastes.

NOTE:

The suspension should be solubilized after further dilution.

3.4 naturally occurring minerals: Materials that are directly mined from mineral deposits and only subjected to physical processes including crushing, drying and sieving.

3.5 plant nutrient: Chemical element, which is essential for plant growth.

3.6 primary nutrient: Elements nitrogen, phosphorus and potassium only.

4 REQUIREMENTS

4.1 General requirements

4.1.1 Organic liquid fertilizers shall be in liquid form.

4.1.2 The raw materials used shall be accordance with substances listed in the Appendix A of the **SLS 1324**.

4.1.3 The product shall be biodegradable.

4.1.4 Organic liquid fertilizers shall not contain any artificial colours.

4.1.5 The product shall not contain substances that are likely to be harmful or injurious to vegetation, animals, soil health, public health or the environment when used according to its intend use specified by the label.

4.1.6 The product shall not contain any poisonous residues, when applied in amounts commonly used or as specified in the directions for use.

4.2 Chemical and physical requirements

The product shall conform to the requirements given in Table 1, when tested according to the methods given in Column 4 of the Table 1.

TABLE 1 – Chemical and physical requirements for liquid organic fertilizers

SI No. (1)	Characteristic (2)	Requirement (3)	Method of test (4)
i)	pH	6.0-8.5	SLS 1526
ii)	Electrical conductivity, dS/m, max.	20.0	DSLS ISO 11265
iii)	Total Nitrogen content as N, per cent by mass, min.	1.0	SLS 645: Part 1
iv)	Total Potassium content as K ₂ O, per cent by mass, min.	0.5	SLS 645: Part 4
v)	Total Phosphorus content as P ₂ O ₅ , per cent by mass, min.	0.5	SLS 645: Part 5

Continued table 1

vi)	Total primary nutrient, (N+ P ₂ O ₅ + K ₂ O) per cent by mass, min	2.0	SLS 645: Part 1, SLS 645: Part 4, SLS 645: Part 5 Appendix B
vii)	Organic carbon per cent by mass, min.	5.0	

4.3 Microbiological requirements

The product shall not exceed the microbiological limit given in Table 2 when tested according to the method prescribed in Column 4 of the Table 2.

TABLE 2 – Microbiological limits for liquid organic fertilizers

SI No. (1)	Test organism (2)	Limit (3)	Method of test (4)
i)	Faecal <i>coliform</i> MPN, per ml	Absent	SLS 516: Part 3
ii)	<i>Salmonella</i> , per 25 ml	Absent	SLS 516: Part 5

4.4 Requirement for limits of potentially toxic elements

The product shall not exceed the limits for potentially toxic elements given in Table 3, when tested as prescribed in Column 4 of the Table 3.

TABLE 3 - Limits for potentially toxic elements for liquid organic fertilizers

SI No. (1)	Elements (2)	Limit, mg/kg (maximum) (3)	Method of test (4)
i)	Arsenic, as As	0.5	AOAC 2006.03
ii)	Cadmium, as Cd	0.5	AOAC 2006.03
iii)	Chromium, as Cr	0.5	AOAC 2006.03
iv)	Lead, as Pb	1.0	AOAC 2006.03
v)	Mercury, as Hg	0.5	AOAC 2006.03*

*EPA 7473 can be used as alternative method for Hg determination.

5 PACKAGING

The product shall be packaged in sound and strong compatible bottles, containers or packages. Suitable packaging materials include plastic or glass or any other non-rusty materials. The product may also be supplied in bulk containers agreed upon between the purchaser and the vendor.

6 MARKING AND/ OR LABELLING

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

- a) Name of the product as “Liquid Organic Fertilizers”;
- b) Name and address of the manufacturer, packer or distributor;
- c) Registered trade mark if any;
- d) Batch or code number;
- e) Net content in metric units;
- f) Date of manufacture;
- g) Date of expiry;
- j) Primary nutrient content;
- k) Crops for which it is intended;
- m) Dilution ratio/ Instructions for use; and
- n) Storage/disposal instructions;

7 SAMPLING

Representative samples of the product for ascertaining conformity to the requirements of this Standard shall be drawn as prescribed in Appendix A.

8 METHODS OF TEST

Tests shall be carried out as prescribed in Appendix B given in this Standard, **SLS 1526, DSLS ISO 11265, Part 1, Part 4 and Part 5 of SLS 645, Part 3 and Part 5 of SLS 516 and Official Methods of Analysis of the Association of Official Analytical Chemists (AOAC).**

9 CRITERIA FOR CONFORMITY

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

9.1 Each container inspected as in **A.4.1** satisfies the packaging and marking and/or labelling requirements of this Standard.

9.2 The test results of the sample when tested as in **A.4.2** satisfy the requirements given in **4.2, 4.3 and 4.4** of this Standard.

APPENDIX A COMPLIANCE OF A LOT

A.1 LOT

A.1.1 In a single consignment all the packages containing product belonging to the one batch of manufacture, or supply shall constitute a lot.

A.1.2 If the consignment is declared to consist of different batches of manufacture, containers of the same batch shall be grouped together and each group so formed shall constitute a separate lot.

A.2 SCALE OF SAMPLING

A.2.1 Samples shall be tested from each lot for ascertaining its conformity to the requirements of this Standard.

A.2.2 All finished products shall be subjected to lot sampling for laboratory analysis in accordance with Table 4.

A.2.3 The containers shall be selected at random. In order to ensure randomness of selection, tables of random numbers as given in **SLS 428** shall be used.

TABLE 4 - Scale of sampling for liquid organic fertilizers

Number of containers** in the lot (1)	Number of Containers to be selected (2)
≤50	1
51 to 100	2
101 to 300	3
301 to 500	4
More than 500	5

** 1 container should be at least 1 L

A.4 NUMBER OF TESTS

A.4.1 Each container selected as in **A.2.2** shall be inspected for packaging and marking and/or labelling requirements given in Clauses **5** and **6** of this Standard.

A.4.2 Each container selected as in **A.2.2** shall be tested separately for the requirements given in **4.2**, **4.3** and **4.4** of this Standard.

APPENDIX B
DETERMINATIO OF ORGANIC CARBON (WALKLEY – BLACK METHOD)

B.1 APPARATUS

B.1.1 Erlenmeyer flask

B.2 REAGENTS

B.2.1 Potassium dichromate solution – Dissolve 49.04 g of potassium dichromate dried at 200°C for 2 hours.

B.2.2 Sulfuric acid- concentrated

B.2.3 Phosphoric acid (85 per cent)

B.2.4 Diphenylamine indicator – Dissolve 0.5 g diphenylamine in 20 ml of distilled water. Add 100 sulfuric acid and mix.

B.2.5 Ferrous sulfate solution (0.5 N) - Dissolve 140 g of ferrous sulfate of 200 g of ferrous ammonium sulfate in 15 ml concentrated sulfuric acid and make up to 1000 ml with distilled water.

B.3 PROCEDURE

B.3.1 Weigh 0.025 g of the sample. Transfer to the Erlenmeyer flask using 10 ml of Potassium dichromate. Add 20 ml of Sulfuric acid. If the colour changes immediately to green, reduce the sample. Leave for 30 minutes and dilute to 200 ml.

B.3.2 Add 10 ml of 85 per cent Phosphoric acid, then add 1.0 ml Diphenylamine indicator. Titrate against Ferrous sulfate solution till the colour changes to blackish green. Perform a black titration.

B.4 CALCULATION

$$\text{Organic matter per cent by mass} = \frac{(V_b - V_s) N \times 0.399}{M}$$

Where;

N is the normality of Ferrous sulfate solution;

V_s is the volume in milliliters of ferrous sulfate used for the sample;

V_b is the volume in milliliters of Ferrous sulfate used for the black; and

M is the mass in grams of the sample used.

