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பொதுசனக் கருத்துரைக்கான கட்டளை வரைவு

DRAFT STANDARD FOR PUBLIC COMMENT

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Sri Lanka Standard
SPECIFICATION FOR VERMICOMPOST
(SLS :)

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இவ்வரைவு இலங்கைக் கட்டளையெனக் கருதப்படவோ அன்றிப் பிரயோகிக்கப்படவோ கூடாது
This draft should not be regarded or used as a Sri Lanka Standard.

අදහස් එවිය යුත්තේ : ශ්‍රී ලංකා ප්‍රමිති ආයතනය, 17, වික්ටෝරියා පෙදෙස, ඇල්විටිගල මාවත, කොළඹ 08.

Comments to be sent to: SRI LANKA STANDARDS INSTITUTION, 17, VICTORIA PLACE, ELVITIGALA MAWATHA, COLOMBO 08.

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Introduction

This Draft Sri Lanka Standard has been prepared by the Sri Lanka Standards Institution and is now being circulated for technical comments to all interested parties.

All comments received will be considered by the SLSI and the draft if necessary, before submission to the Council of the Institution through the relevant Divisional Committee for final approval.

The Institution would appreciate any views on this draft which should be sent before the specified date. It would also be helpful if those who find the draft generally acceptable could kindly notify us accordingly.

All Communications should be addressed to:

The Director General
Sri Lanka Standards Institution,
17, Victoria Place,
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Colombo 08.

Draft Sri Lanka Standard
SPECIFICATION FOR VERMICOMPOST

DSLS:

Gr.

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Draft Sri Lanka Standard
SPECIFICATION FOR VERMICOMPOST

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 …….

Vermicompost, also called worm castings, worm humus or worm manure, is the end product of the breakdown of organic matter by various types of worms. The vermicompost created by earthworm activity is rich in nutrients in forms that are easily absorbed by plants, vitamins, growth hormones, enzymes including lipase, cellulase, and chitinase, as well as immobilized microorganisms. Even after the worms have expelled the enzymes, they continue to break down organic materials.

This Standard is subjected to the provisions under the Regulation of Fertilizer Act No. 68 of 1988, the National Environmental Act No. 47 of 1980, the Soil Conservation Act No. 25 of 1951, the Fauna and Flora Protection Ordinance No. 02 of 1937, the Plant Protection Act No. 35 of 1999, the Animal Diseases Act No. 59 of 1992 and Quarantine and Prevention of Diseases Ordinance No. 3 of 1897, and the regulations and amendments 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 following publications is gratefully acknowledged:

PNS BAFS 183 Organic soil amendments
IS 16702 Vermicompost - Specification

1 SCOPE

1.1 This Standard specifies the requirements and methods of sampling and tests for vermicompost.

1.2 This Standard does not cover vermicompost those contain, enriched and/ or fortified with alien, imported and/or genetically modified earth worms.

2 REFERENCES

Analytical methods for bio solid, United States Environmental Protection Agency (USEPA)

SLS 102	Rules for rounding off numerical values
SLS 124	Test sieves
SLS 428	Random sampling methods
SLS 645	Methods of test for fertilizers
	Part 1: Determination of Nitrogen content
	Part 2: Determination of Moisture and Ash content
	Part 4: Determination of Potassium content
	Part 5: Determination of Phosphorus content
	Part 6: Determination of Calcium and Magnesium content
	Part 8: Determination of pH
	Part 9: Determination of electrical conductivity
	Part 10: Determination of total organic carbon
	Part 11: Determination of arsenic, cadmium, chromium, lead and mercury contents
SLS 1324	Requirements for organic agriculture production and processing
SLS 1752	Guideline on good manufacturing practices for production of organic fertilizers and soil conditioners
SLS 1755	Fertilizers — Marking —Presentation and Declarations
SLS CEN TS 17780	Organic, organo-mineral and inorganic fertilizers. Detection of *Salmonella* spp.
DSLS ISO 3944	Fertilizers – Determination of bulk density (loose)
SLS ISO 14820-1	Fertilizers and liming materials - Sampling and sample preparation Part 1: Sampling
SLS ISO 14820-2	Fertilizers and liming materials - Sampling and sample preparation Part 2: Sample preparation

3 DEFINITIONS

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

3.1 batch: Vermicompost that are produced from 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 vermicompost: Form of compost derived from the casts of selected species of worms, processing and biodegradation of compostable organic materials in a controlled

process of vermicomposting. The vermicompost obtained are also termed vermicasts as they are expelled as casts from the earthworm gut.

4 TYPES

Vermicompost shall be of the following types:

a) Powder;
b) Pellet; and
c) Granular.

5 RAW MATERIALS

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

6 REQUIREMENTS

6.1 General requirements

6.1.1 Vermicompost shall be manufactured by a process adhering to Good Manufacturing Practices (GMP) requirements as prescribed in **SLS 1752**.

6.1.2 The product shall be dark brown to black in colour.

6.1.3 The product shall be free from any foul odour.

6.1.4 The particle size of powdered form of vermicompost shall not be more than 4.0 mm, that is minimum 90 per cent of vermicompost shall pass through 4.0 mm sieve. The sieves shall conform to **SLS 124**.

6.1.5 The product shall be free from any organisms and substances, which would be harmful or potentially injurious to human, animal, plant and other biota, and ecosystems as a whole. Self-declaration regarding such organisms and substances shall be submitted by the manufacturer if a request is made by the regulatory body.

6.2 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 – Physical requirements for Vermicompost

SI No. (1)	Characteristic (2)	Requirement (3)	Method of test (4)
i)	pH	6.5-8.5	**SLS 645: Part 8**
ii)	Moisture, max, per cent by mass	25.0	**SLS 645: Part 2**
iii)	Bulk density (g/cm^3)	0.7-0.9	**DSLS ISO 3944**
iv)	Electrical conductivity, dS/m, max.	4.0	**SLS 645: Part 9**
v)	Foreign matter	Free from visible non-biodegradable materials	**Appendix B**
vi)	Acid insoluble ash, max, per cent by mass	20	**SLS 645: Part 2**

6.3 Chemical requirements

The product shall conform to the requirements given in Table **2**, when tested according to the methods given in Column **4** of the Table **2**.

TABLE 2 – Chemical requirements for Vermicompost

SI No. (1)	Characteristic (2)	Requirement (3)	Method of test (4)
i)	Total Nitrogen content as N, per cent by mass, min.	1.5	**SLS 645: Part 1**
ii)	Total Potassium content as K_2O, per cent by mass, min.	1.0	**SLS 645: Part 4**
iii)	Total Phosphorus content as P_2O_5, per cent by mass, min.	1.5	**SLS 645: Part 5**
iv)	Total Magnesium content as MgO, per cent by dry mass, min.	0.5	**SLS 645: part 6**
v)	Total Calcium content as CaO, per cent by dry mass, min.	0.7	**SLS 645: part 6**
vi)	Total Organic carbon as C, per cent by mass, min.	20.0	**SLS 645: Part 10**
vii)	C;N ratio	10-25	**Appendix C**

6.4 Biological requirements

The product shall not exceed the limits for microorganisms given in the Table **3** when tested using the methods prescribed in Column **4** of the Table **3**.

TABLE 3 – Microbiological limits for vermicompost

SI No. (1)	**Test organism** (2)	**Limit** (3)	**Method of test** (4)
i)	Faecal Coliforms, MPN, per ml	Absent	**USEPA Method 1680**
ii)	*Salmonella*, per 25 ml	Absent	**SLS CEN/TS 17780**

6.5 Limits of potentially toxic elements

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

TABLE 4 - Limits of potentially toxic elements for vermicompost

SI No. (1)	**Elements** (2)	**Limit, mg/kg (maximum)** (3)	**Method of test** (4)
i)	Cadmium, as Cd	3.0	**SLS 645 Part 11***
ii)	Chromium, as Cr	50.0	
iii)	Lead, as Pb	50.0	
iv)	Mercury, as Hg	0.5	
v)	Nickel, as Ni	40.0	
vi)	Arsenic, as As	3.0	

***NOTE:** *Laboratories may use ICP-MS instead of ICP-OES for detection of potentially toxic elements.*

7 PACKAGING

Vermicompost shall be packed in a well sealed container which shall not provide deleterious effect on the product from the light, humidity and temperatures.

8 STORAGE

Vermicompost shall be stored in a cool, dark place.

9 MARKING AND/ OR LABELLING

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

a) Name of the product as “Vermicompost”;
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/Best before;
h) Primary nutrient content;
j) Crops for which it is intended;
k) Application methods and time;
m) Storage/disposal instructions; and
n) Safety precautions in handling and application.

9.2 The marking and labeling shall also be in accordance with **SLS 1755**.

10 SAMPLING

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

11 METHODS OF TEST

11.1 Tests shall be carried out as prescribed in Appendices **B and C** given in this Standard, **USEPA Method 1680, Part 1, Part 2, Part 4, Part 5, Part 6, Part 8, Part 9, Part 10 and Part 11** of **SLS 645, Part 1 and Part 2 of SLS ISO 14820, SLS ISO 3944** and **SLS CEN/ TS 17780.**

11.2 Unless otherwise specified, quality reagents, chemicals and distilled water shall be used in tests.

APPENDIX A

COMPLIANCE OF A LOT

The sampling scheme given in Appendix **A** shall be applied where compliance of a lot to the requirements of this Standard is to be assessed based on statistical sampling and inspection.

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 schemes of sampling and inspection should be adopted.

A.1 LOT

All units (packages/ containers) in a single consignment of material belonging to the same batch of manufacture or supply shall constitute a lot. If a consignment consists of different batches of the manufacture the containers of the same batch shall be separated and shall constitute a separate lot.

A.2 GENERAL REQUIREMENTS OF SAMPLING

In drawing, preparing, storing and handling samples, following precautions and directions shall be taken.

A.2.1 The sampling instruments shall be cleaned and dried when use.

A.2.2 When drawing samples for microbiological examination, the sampling instruments shall be sterilized.

A.2.3 Precautions shall be taken to protect the samples, the product being sampled and the sample container from adventitious contamination.

A.2.4 The samples shall be placed in clean and dry containers.

A.2.5 Samples shall be drawn from a protected place not exposed to dampness, air, light, dust or soot.

A.3 SCALE OF SAMPLING

A.3.1 Samples shall be tested from each lot separately for ascertaining conformity of material to the requirements of this Standard.

A.3.2 The sampling shall be drawn as per procedure specified in **SLS ISO 14820-1**, as appropriate for physical and chemical testing requirements.

A.3.3 The sample preparation shall be done as per the procedure specified in **SLS ISO 14820-2**, as appropriate for physical and chemical testing requirements.

A.3.4 Unopened package/ container or homogenous sample taken from products in bulk shall be selected at random for microbiological testing.

A.3.5 Preparation of homogenous sample from products in bulk shall be done as per the procedure given below. Sample shall be drawn from the top, middle and bottom portions of the bulk product using an appropriate sterilized sampling instrument under aseptic condition to form final sample for microbiological tests. The sample shall be put into sterile sample container and marked with necessary details of sampling. The two samples shall be drawn and approximately 250 g for each.

A.3.6 The packages or containers shall be selected at random. In order to ensure the randomness of selection, tables of random numbers as given in **SLS 428** shall be used.

A.4 NUMBER OF TESTS

A.4.1 Each package or container shall be selected as in Clause **A.3.2** shall be inspected at the point of sampling for packaging and marking and/or labelling requirements specified in Clause **6** and **8**.

A.4.2 Each package or container shall be selected as in Clause **A.3.2** and prepared as in Clause **A.3.3** shall be tested for the chemical and physical requirements specified in Clause **6.2, 6.3** and requirements of potentially toxic elements limits specified in Clause **6.5**.

A.4.3 Specimens selected as in Clause **A.3.4** and **A.3.5** shall be tested for the requirements of microbiological requirements specified in Clause **6.4**.

A.5 CRITERIA FOR CONFORMITY

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

A.5.1 Each package or container inspected as in Clause **A.4.1** shall satisfies the relevant requirements.

A.5.2 All test specimens tested as in Clause **A.4.2** shall satisfy the relevant and applicable requirements.

A.5.3 All test specimens tested as in Clause **A.4.3** shall satisfy the relevant and applicable requirements.

APPENDIX B
DETERMINATION OF VISIBLE CONTAMINANTS

B. 1 GENERAL

This Appendix sets out a method for determining the **v**isible contaminants with inorganic materials including stones, clay, glass, plastics, and metal etc.

B. 2 PRINCIPAL

The mass of a portion of the products is determined on an air dried aliquot of the sample.

B. 3 APPARATUS

B.3.1 Balance accurate to 0.01g

B.3.2 Weighing dishes (clean and dried) that are large enough to hold 200 ml or 500 ml

B.3.3 Tweezers

B.3.4 Sieve with 2 mm and 5 mm apertures

B. 4 PROCEDURE

B.4.1 Take a representative sample of the product (as-received) of 200 g (w)

B.4.2 Allow it to sun dry or oven dry
For products not derived from mixed solid waste, Screen the dried product sieve through a sieve with 2 mm apertures. For products derived from mixed solid waste, this step is omitted and visible contaminants are measured in the whole dried sample

B.4.3 For products not derived from mixed solid waste, Screen the dried product sieve through a sieve with 2 mm apertures. For products derived from mixed solid waste, this step is omitted and visible contaminants are measured in the whole dried sample

B.4.4 Remove by hand or tweezers from the >2 mm fraction all visible pieces of glass, hard Plastic, stones and metal. Determine their mass (m_1). Screen the >2 mm fraction through a sieve with 5 mm apertures. Discard the fine fraction. For products derived from mixed solid waste streams these contaminants are measured in the whole sample aliquot.

$$\text{Percentage of visible contaminants} = \frac{m1}{w} \text{ X } 100\%$$

B. 6 TEST REPORT

The test report shall contain the following:

B.6.1 Sample identification, including sufficient details to show the time elapsed between manufacture and testing of the product.

B.6.2 Percentage, of moisture in the product to the nearest 1%.
Balls or clods of material may be broken up during sieving; This should be reported to the manufacturer and discouraged.

B.6.3 Percentages of contaminants to two significant figures

APPENDIX C
DETERMINATION OF CARBON TO NITROGEN RATIO

C.1 CALCULATION

$$\text{Carbon to Nitrogen ratio} = \frac{C}{N}$$

Where;

C is the organic Carbon content per cent by mass of the material; and

N is the Nitrogen content, per cent by mass of the material.