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SPECIFICATION FOR GROUND COFFEE (*Second Revision*)

SRI LANKA STANDARDS INSTITUTION

Sri Lanka Standard
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(*Second Revision*)

SLS 258:2020

Gr. 8

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Sri Lanka.

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

Sri Lanka Standard
SPECIFICATION FOR GROUND COFFEE
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FOREWORD

This Standard was approved by the Sectoral Committee on Food products and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2020-05-27.

This Standard was first published in 1974 and revised in 1992. In this second revision, methods of tests were updated and limits for microbiological parameters and potentially toxic elements were introduced.

This Standard is subject to the 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 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 revision of this Standard, the valuable assistance derived from the following publications is gratefully acknowledged.

IS 3077: 1998- Roasted and ground coffee specification
EC No. 1137/2008, EU Regulation

1 SCOPE

This Standard prescribes the requirements and methods of sampling and tests for ground coffee.

2 REFERENCES

SLS	102	Rules for rounding off numerical values
SLS	124	Test sieves
SLS	143	Code of practice for general principles of food hygiene
SLS	428	Random sampling methods
SLS	467	Marking and labelling of pre-packaged foods
SLS	516	Methods of tests for microbiology of food and animal feeding stuffs Part 1/ Section 1: Horizontal method for the enumeration of Microorganisms/ Colony count at 30 °C by the pour plate technique Part 2/ Section 2: Horizontal method for the enumeration of yeasts and moulds/ Colony count technique in products with water activity less than or equal to 0.95 Part 3/ Section 2: Horizontal method for the detection and enumeration of coliforms/ Colony count technique/Most probable number technique

		Part 5: Horizontal method for the detection of *Salmonella* spp. Part 6/ Section 2: Horizontal method for the enumeration of coagulase-positive staphylococci (*Staphylococcus aureus* and other species)/Technique using rabbit plasma fibrinogen agar medium
SLS	697	Green coffee
SLS ISO	20481	Coffee and coffee products-Determination of the caffeine content using high performance liquid chromatography (HPLC)- Reference method

Official Methods of Analysis of the Association of Official Analytical Chemists (AOAC) 20th edition, 2016

3 DEFINITIONS

For the purpose of this Standard following definitions shall apply:

3.1 Ground coffee: Product obtained by grinding roasted green coffee beans of the plants *Coffea arabica* L. (Arabica coffee) or *Coffea canephora* Pierre ex Froehner (Robusta coffee) or *Coffea liberica* Hiern. (Libarica coffee)

3.2 Flavoured ground coffee: Coffee to which permitted natural or artificial flavouring substances are added

4 TYPES

4.1 Ground coffee

4.2 Flavoured ground coffee

NOTE: Above types may or may not be decaffeinated

5 REQUIREMENTS

5.1 Hygiene requirements

Ground coffee shall be processed, packaged, stored and transported under hygienic conditions prescribed in **SLS 143**.

5.2 General requirements

The product shall be prepared only from sound and mature green coffee beans conforming to **SLS 697**. The roasting shall be carried out to obtain the desired colour and aroma.

5.3 Product requirements

5.3.1 Ground coffee shall have the characteristic coffee colour, aroma and flavour and be free from foreign aroma and flavour (unintended) and added colouring substances.

NOTE
Aroma and flavour need to be characteristic to the combination of coffee and the added flavouring substances and/ or flavouring ingredients that has been added for flavouring purpose in case of flavoured ground coffee.

5.3.2 No substances shall be added to ground coffee except for flavouring substances and/ or other flavouring ingredients added for flavouring purpose in flavoured ground coffee. No substance shall be removed from ground coffee or flavoured ground coffee except for removal of caffeine in decaffeinated ground coffee or decaffeinated flavoured ground coffee.

5.3.3 The particle size of the product shall be such that 90 percent of the material shall pass through the aperture size 710 µm sieve (BS 22) when tested in accordance with method described in Appendix **B**.

5.3.4 Ground coffee shall show characteristic cells as illustrated in Figure **1** and Figure **2** when examined in accordance with the method prescribed in Appendix **G**.

5.3.5 Ground coffee shall also conform to the requirements given in Table **1** when tested in accordance with the method prescribed in Column **4** of the table.

TABLE 1- Requirements for ground coffee

SI No (1)	**Characteristic** (2)	**Requirement** (3)	**Method of rest** (4)
i)	Moisture, per cent by mass, max.	5.0	Appendix **C**
ii)	Total ash (on dry basis), percent by mass, max.	5.5	**AOAC 31.005**/Appendix **D**
iii)	Acid insoluble ash (on dry basis), per cent by mass, max.	0.5	Appendix **E**
iv)	Water soluble matter (on dry basis), per cent by mass.	25.0 to 35.0	Appendix **F**
v)	Caffeine (on dry basis), per cent by mass, min.	1.2*	**AOAC 15.020** / **SLS ISO 20481**

*****For decaffeinated ground coffee/ decaffeinated flavoured ground coffee the maximum caffeine content shall be 0.3 per cent by mass, on dry basis

5.3.6 Microbiological limits

Ground coffee shall comply with the microbiological limits given in Table **2** when tested according to the methods given in Column **4** of the table.

TABLE 2 – Microbiological limits

Sl No (1)	**Microorganism** (2)	**Limit** (3)	**Method of test** (4)
i)	Aerobic Plate Count, per g, max.	1×10^4	**SLS 516 Part 1 Section 1**
ii)	Coliforms, per gram, MPN, max.	10	**SLS 516 Part 3 Section 1**
iii)	*Salmonella*, in 25 g.	Absent	**SLS 516 Part 5**
iv)	*Staphylococcus aureus*, per g.	Absent	**SLS 516 Part 6 Section 1**
v)	Yeasts and Moulds, cfu, per g,max.	1×10^3	**SLS 516 Part 2 Section 2**

6 CONTAMINANTS

6.1 Potentially toxic elements

The product shall not exceed the limits given in Table **3** when tested in accordance with the methods prescribed in Column **4** of the table.

TABLE 3 – Limits for potentially toxic elements

Sl No (1)	**Potentially toxic element** (2)	**Limit** (3)	**Method of test** (4)
i)	Arsenic as As, mg/ kg, max.	0.5	**AOAC 986.15**
ii)	Lead as Pb, mg/ kg, max.	1.0	**AOAC 999.10**
iii)	Cadmium as Cd, mg/ kg, max.	1.0	**AOAC 999.10**

7 PACKAGING

7.1 The product shall be packaged in food grade containers or packages with barrier properties for moisture and which will safeguard the hygienic, and organoleptic properties of the product. The containers including the packaging material shall be made of substances which are safe and suitable for intended use and shall not impart any toxic substances or undesirable flavours to the product.

7.2 Ground coffee may also be vacuum packed or packed in an inert gas.

8 MARKING AND/ OR LABELLING

8.1 Each container shall be marked and/ or labelled legibly and indelibly with the following:

a) Name of the product as "Coffee" , "Ground coffee", or "Coffee powder" or "X- flavoured coffee" or "X-flavoured ground coffee" or "X- flavoured coffee powder", where X - denotes the flavour
b) Brand name or trade mark, if any;
c) Net mass, in g or kg;
d) Name and address of manufacturer and packer/distributor in Sri Lanka;
e) Country of origin, in case of imported products;
f) Batch number or code number or a decipherable code marking;
g) Date of manufacture;
h) Date of expiry;
j) List of ingredients in descending order of their proportions; if any and
k) Storage instructions as "Store in a cool dry place" or any other manufactures instructions.

8.2 Marking and/ or labeling shall be in accordance with **SLS 467**.

9 SAMPLING

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

10 METHODS OF TEST

Tests shall be carried out as prescribed in **SLS ISO 20481** and Appendices **B** to **G** of this Standard, **Section 1** of **Part 1, Section 2** of **Part 2**, **Section 1** of **Part 3**, **Part 5, Section 1** of **Part 6** of **SLS 516,** Methods of Analysis of the Association of Official Analytical Chemists (**AOAC**) 20th edition, 2016.

11 CRITERIA FOR CONFORMITY

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

11.1 Each container or package inspected as in **A.5.1** satisfies the packaging, marking and/or labelling requirements.

11.2 The test results on composite sample when tested as in **A.4.2** satisfy the relevant requirements given in **5.3.1**, **5.3.2**, **5.3.3**, **5.3.4 5.3.5**, and **6.1**.

11.5 Each sample tested as in **A.4.1** satisfies the microbiological requirements given in **5.3.6**.

APPENDIX A
SAMPLING

A.1 LOT

In any consignment, all the packages or containers of the same size, type and belonging to one batch of manufacture or supply shall constitute a lot.

A.2 GENERAL REQUIREMENTS OF SAMPLING

In drawing, preparing, sorting and handling samples, following precautions and directions shall be taken:

A.2.1 Samples for microbiological analysis shall be drawn first.

A.2.2 Samples shall be drawn in a protected place not exposed to damp air, dust or soot.

A.2.3 Samples shall be protected against adventitious contamination.

A.2.4 The sampling instruments shall be clean and dry when used. When drawing samples for microbiological examination, the sampling instruments shall be sterilized.

A.2.5 The samples shall be placed in clean and dry containers. The size of the sample containers shall be of such size that they are almost completely filled by the sample. When drawing samples for microbiological examination, the sample containers shall be sterilized.

A.2.6 The sample containers shall be sealed air-tight after filling and marked with the necessary details of sampling.

A.2.7 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the room temperature.

A.3 SCALE OF SAMPLING

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

A.3.2 The number of cartons or containers to be selected from a lot shall be in accordance with table **4**.

TABLE 4 – Scale of sampling

Number of containers/ packages in the lot (1)	Number of containers/ packages to be selected (2)
Up to 100	3
101 to 300	4
301 to 500	5
501 to 1 000	8
1 001 to 3 000	10
3 001 and above	13

A.3.3 The packages or containers shall be selected at random. In order to ensure randomness of selection random number table as given in **SLS 428** shall be used.

A.4 PREPARATION OF SAMPLES

A.4.1 Preparation of samples for microbiological analysis

Three packages or containers shall be selected from the packages or containers selected as in **A.3.2**. A sufficient quantity of material shall be drawn aseptically form each package or container. Material obtained from each package or container shall be transferred to separate sterile sample containers.

A.4.2 Preparation of the composite sample

Approximately an equal quantity of material shall be drawn from each package or container selected as in **A.3.2** and mixed to form a composite sample of required size. The composite sample thus obtained shall be transferred to a sample container.

A.5 NUMBER OF TESTS

A.5.1 Each package or container selected as in **A.3.2** shall be inspected for packaging and marking and/ or requirements.

A.5.2 The contents of all the packages or containers selected as in **A.3.2** shall be mixed thoroughly to form a composite sample. The composite sample thus obtained shall be tested for the requirements given in **5.3.1**, **5.3.2**, **5.3.3**, **5.3.4**, **5.3.5**, and **6.1** of this Standard.

A.5.3 Each container or package selected as in **A.3.2** satisfies the microbiological requirements given in **5.3.6**.

APPENDIX B
DETERMINATION OF PARTICLE SIZE

B.l APPARATUS

B.1.1 *Sieves,* 710 µm, conforming to **SLS 124**.

B.1.2 *Pan*, to fit the sieves.

B.1.3 *Shaking machine*, suitable size adjusted for 28 shakes/ minutes to 30 shakes/ minutes.

B. 2 PROCEDURE

B.2.1 Take a representative sample of l00 g by mixing thoroughly. Weigh the pan (**B.1.2**) and sieve (**B.1.1**) and record the mass (m_1). Pour the sample in the sieve and close. Fit the unit to the shaking machine. (**B.l.3**) and shake for 5 minutes. Re-weigh (m_2) the sieves and the pan. Take the difference ($m_2 - m_1$) and get the weight of the material retaining on the sieve.

B.2.2 Repeat this process in the same manner.

B.2.3 Take the average values of **B.2.1**and **B.2.2.**

APPENDIX C
DETERMINATION OF MOISTURE

C.1 APPARATUS

C.1.1 *Moisture dish,* tared, about 85 mm in diameter.

C.1.2 *Oven*, maintained at 103 $\pm$2^{o}C.

C.2 PROCEDURE

C.2.1 Weigh to the nearest milligram, about 5 g of the sample into the moisture dish (**C.1.1**) previously dried and cooled. Place the dish in an oven at 103 $\pm$2^{o}C (**C.1.2**) and dry for 6 hours. Cool the dish in a desiccator and weigh.

C.2.2 Repeat the process of drying, cooling and weighing at 30 minutes intervals until the difference between two successive weighing is less than one milligram. Record the lowest mass.

C.3 CALCULATION

$$\text{Moisture, per cent by mass} = \frac{m_1 - m_2}{m_1 - m} \times 100$$

where,

m is the mass, in g, of the empty dish
m_1 is the mass, in g, of the dish with the sample before drying; and
m_2 is the mass, in g, of the dish with the sample after drying.

APPENDIX D
DETERMINATION OF TOTAL ASH

D.1 APPARATUS

D.1.1 *Dish*, platinum or silica.

D.1.2 *Muffle furnace*, maintained at 525 ± 25 °C.

D.1.3 *Oven*, maintained at 103 ± 2 °C.

D.2 PROCEDURE

D.2.1 Weight, to the nearest milligram, about 5 g of the sample into the dish (**D.1.1**) previously dried and cooled. Heat at 103 ± 2 °C in an oven (**D.1.3**) until water is evaporated and then heat slowly over a flame until swelling ceases. Ignite in the muffle furnace (**D.1.2**) at 525 ± 25 °C until a grey ash is obtained. Cool the dish in a desiccator and weigh.

D.2.2 Repeat this process of igniting in the muffle furnace, cooling and weighing at 30 minute intervals until the difference between two successive weighing is less than one milligram. Record the lowest mass.

NOTE
Preserve the dish containing ash, for the determination of acid insoluble ash (see Appendix **E***)*

D.3 CALCULATION

Total ash (on dry basis),

$$\text{per cent by mass} = \frac{(m_2 - m)}{(m_1 - m)} \frac{\text{x } 10\,000}{(100 - \text{H})}$$

where,
m is the mass, in g, of the empty dish;
m_1 is the mass, in g, of the dish with the sample;
m_2 is the mass, in g, of the dish with the ash; and
H is the percentage of moisture as determined in Appendix **C**.

APPENDIX E
DETERMINATION OF ACID INSOLUBLE ASH

E.1 REAGENT

E.1.1 *Hydrochloric acid*, dilute, approximately 5 mol/ solution.

E.2 APPARATUS

E.2.1 *Muffle furnace*, maintained at 525 $\pm$ 25 ^{o}C.

E.2.2 *Oven*, maintained at 103 $\pm$ 2 ^{o}C.

E.3 PROCEDURE

E.3.1 Add 25 ml of the dilute Hydrochloric acid (**E.1.1**) to the ash containing dish (see Appendix **D**), cover with a watch glass and heat on a water batch for 10 minutes. Allow to cool and filter the contents in the dish through a slow ashless filter paper. Wash the filter paper until the washings are free from the acid. Return the filter paper and residue to the dish. Keep in an electric oven (**E.2.2**) maintained at 103$\pm$ 2 ^{o}C for about 3 hours. Ignite in the muffle furnace (**E.2.1**) at 525$\pm$ 25 ^{o}C for 1 hour. Cool the dish in a desiccator and weigh.

E.3.2 Repeat the process of igniting in the muffle furnace, cooling and weighing at 30 minute intervals until the difference between two successive weighing is less than one milligram. Record the lowest mass.

E.4 CALCULATION

Acid insoluble ash (on dry basis) per cent by mass $= \frac{(m_2 - m)}{(m_1 - m)} \frac{\text{x } 10\,000}{(100 - \text{H})}$

where,

m is the mass, in g, of the empty dish;
m_1 is the mass, in g, of the dish with the sample (coffee powder);
m_2 is the mass, in g, of the dish with acid insoluble ash; and
H is the percentage of moisture as determined in Appendix **C**.

APPENDIX F
DETERMINATION OF WATER SOLUBLE MATTER

F.1 APPARATUS

F.1.1 *Oven*, maintained at 103 $\pm$2 ^{o}C.

F.2 PROCEDURE

F.2.1 Weight, to the nearest milligram, about 2 g of the sample in a 500 ml Erlenmeyer flask and add 200 ml of water. Reflux over a low flame for 1 hour, cool and filter through a qualitative, medium fast filter paper, wash three times with 10 ml to 15 ml portions of water. Finally, make up the solution to 250 ml in a graduated flask. Shake well and pipette 50 ml of this solution to a tared dish and evaporate on a water bath. Dry for 1 hour in an oven at 103 $\pm$2 ^{o}C after complete evaporation, cool in a desiccator and weigh.

Repeat this process of heating, cooling and weighing at 30 minute intervals until the difference between two successive weighing is less than one milligram. Record the lowest mass.

F.3 CALCULATION

Water soluble matter (on dry basis), per cent by mass $= \frac{(m_2 - m_1)\ 50\ 000}{m\ (100\text{-H})}$

where,

m is the mass, in g, of the sample in Erlenmeyer flask;
m_1 is the mass, in g, of the empty dish;
m_2 is the mass, in g, of the dish with the dried water soluble matter; and
H is the percentage of moisture as determined in Appendix **C**.

APPENDIX G
MICROSCOPIC EXAMINATION

G.1 REAGENTS

G.1.1 *Chloral hydrate*, chloral hydrate: distilled water, 5: 2 solution

G.1.2 *Sodium hydroxide*, 20 g/l solution.

G.2 APPARATUS

G.2.1 *Microscope*, with a magnification of x 250.

G.3 PROCEDURE

G.3.1 Weigh about 1g of the sample and transfer it to a beaker containing 50 ml of the Sodium hydroxide solution (**G.1.2**). Stir the contents using a glass rod and boil for 3 to 4 minutes. Decant the supernatant liquid and add 50 ml of water, boil again and decant. Repeat this process until the residue is colourless.

Place a drop of this residue in Chloral hydrate (**G.1.1)** on a microscope slide and cover with a cover glass, gently boil over a small flame of microbunsen or a spirit lamp. Remove the slide from the flame as bubbles start escaping and return to the flame when bubbles cease to appear.

Repeat the process until the fragments are transparent and examine under the microscope (**G.2.1**) for characteristic cells of ground coffee given in figure **1** and figure **2**.

FIGURE 1
Photomicrograph of ground coffee showing thick walled sclerenchymatous boat shaped stone cells (sclereids) x 250

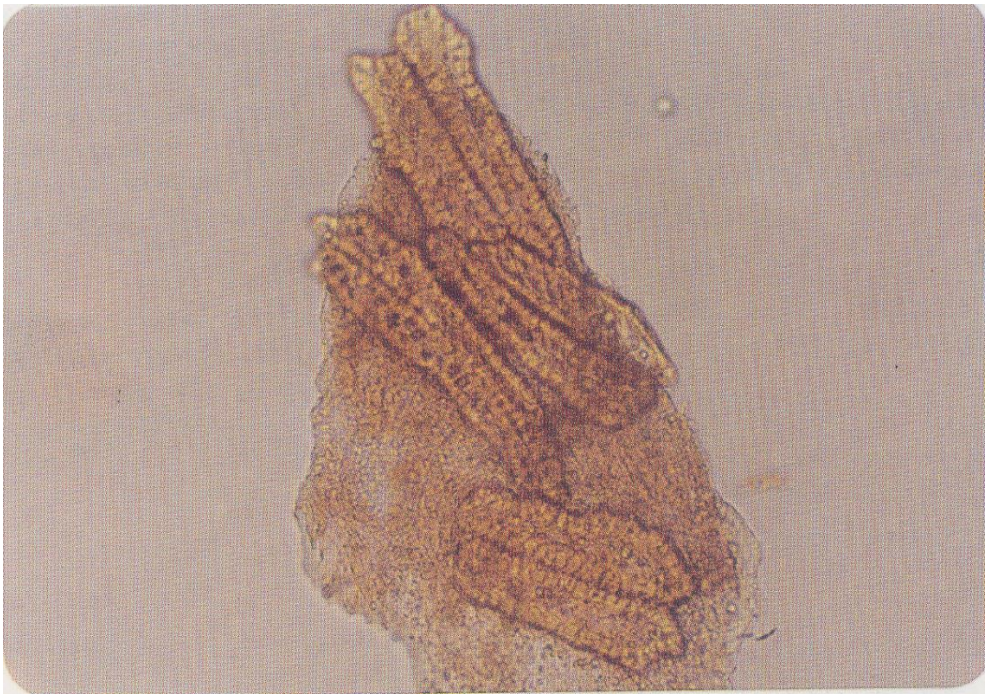

FIGURE 2

Photomicrograph of ground coffee showing thick walled sclerenchymatous boat shaped stone cells (sclereids) x 250

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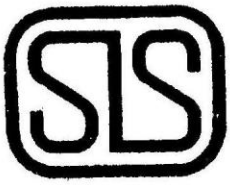

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SRI LANKA STANDARDS INSTITUTION

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