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பொதுசனக் கருத்துரைக்கான கட்டளை வரைவு

DRAFT STANDARD FOR PUBLIC COMMENT

(වෙනස්වීමට ඉඩ ඇත. திருத்தத்திற்குட்படக்கூடியது. Liable to alteration)

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வெளியிட்ட திகதி
Date of Issue } 2022-10-20

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Latest Date for Receipt of Comments } 2022-12-20

Draft Sri Lanka Standard
SPECIFICATION FOR MUSTARD, WHOLE AND GROUND
(FIRST REVISION) (DSLS 434 : .....)

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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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මෙම කෙටුම්පතට අදාල යෝජනා හා විවේචන නියමිත දිනට පෙර ලැබෙන්නට සැලැස්වුවහොත් අගය කොට සලකමු. තවද, මෙම කෙටුම්පත පිළිගත හැකි බැව් හැගෙන අය ඒ බව දන්වන්නේ නම් එය ආයතනයට උපකාරී වනු ඇත.

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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,
Elvitigala Mawatha,
Colombo 08.

Draft SRI LANKA STANDARD
SPECIFICATION FOR MUSTARD, WHOLE AND GROUND
(*First Revision*)

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 ……

Mustard seed, an oil seed is an important spice worldwide. The seeds are obtained from pods of mustard plant, belong to Brassica family. There are three different varieties. Black mustard (*Brassica nigra*) are the seeds which are commonly seen in South Asia. The seeds are sharp and more pungent than other two varieties. Brown mustard (*Brassica juncea*) are the seeds which are native to sub-Himalayan plains of Northern India. Brown mustard are less pungent and are slightly smaller than black mustard. White/ yellow mustard (*Brassica alba* or *Sinapis alba*) are the seeds which are light straw-yellow coloured and are slightly larger than the other two varieties. White seeds exhibit mild pungency.

Mustard seeds are rich in minerals such as Selenium and Magnesium. Mustard seeds are also low in calories and have antibacterial and antiseptic properties.

This Standard is subject to the restrictions imposed under 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 result of a test or an analysis, shall be rounded off in accordance with **SLS 102**. The number of significant places 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 following publications is gratefully acknowledged.

ISO 1237: 1981 Mustard seed – Specification
IS 2323: 2011 Spices and condiments - Mustard, whole and ground – Specification
Person's chemical analysis of food (8th edition, 1981)

1 SCOPE

1.1 This Standard specifies requirements and methods of sampling and test for black and/ or brown mustard (*Brassica nigra* or *Brassica* juncea) seeds and powder.

1.2 This Standard does not cover white/ yellow mustard (*Brassica alba* or *Sinapis alba*).

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 186 Methods of test for spices and condiments
Part 2: Determination of extraneous matter content
Part 3: Determination of total ash
Part 4: Determination of acid insoluble ash
Part 5: Determination of moisture content – Entrainment method
Part 7: Determination of non-volatile ether extract
Part 8: Determination of filth
Part 12: Determination of degree of fineness of grinding – Hand sieving method (Reference method)
SLS 310 Method for the sampling of spices and condiments
SLS 428 Random sampling methods
SLS 516 Methods of test for microbiology of food and animal feeding stuffs
Part 2: Horizontal method for the enumeration of yeasts and moulds
Section 2: Colony count technique in products with water activity less than or equal to 0.95
Part 5: Horizontal method for the detection of *Salmonella* spp.
Part 12: Horizontal method for the detection and enumeration of presumptive *Escherichia coli* (Most probable number technique)
SLS 910 Maximum residue limits for pesticides in food
SLS 1327 Code of hygienic practice for spices and other dried aromatic plants
Official methods of Analysis, Association of Official Analytical Chemists (AOAC) 20th edition, 2016

3 DEFINITIONS

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

3.1 mustard seed: Dried, hard and sound seeds obtained from fully matured (3 months to 3.5 months aged) mustard pods

3.2 ground mustard: Product obtained by grinding mature mustard seeds

3.3 extraneous and foreign matter: Matter other than mustard seeds

3.4 damaged seeds: Seeds with ruptured or broken seeds

4 TYPES

Black/ brown mustard shall be classified into the following:

4.1 Whole seed
4.2 Ground/ powdered

5 REQUIREMENTS

5.1 Hygiene

The product shall be harvested, processed, packaged, stored and transported under hygienic conditions as prescribed in **SLS 143** and **SLS 1327**.

5.2 Appearance

Brown to black colour round shaped seeds of 1 mm to 2 mm in diameter.

5.3 Odour and flavour

The product shall have pungent odour and characteristic flavour. It shall be free from rancidity and mustiness.

5.4 Mould, insect infestation and animal excreta

Mustard whole and ground shall be free from mould growth, living and dead insects, insect fragments and animal excreta, visible to the naked eye (corrected, if necessary, for abnormal vision), or using the required magnifying instrument. If the magnification exceeds ×10, this fact shall be mentioned in the test report. The proportion of insect damaged matter shall not exceed 1 per cent *(m/m)*.

In case of disputes, the method given in **Part 8** of **SLS 186** shall be applied.

5.5 Adulterants

No substances shall be added to or extracted from whole or ground mustard. Ground mustard shall be free from adulterants when examined through the microscope. It shall have characteristic microscopical features as depicted in Figure **2** given in Appendix **C**, when examined through the microscope.

5.6 Damaged seeds

Mustard seeds shall be whole and mature. Proportion of damaged seeds shall not exceed 2 per cent by mass.

5.7 Particle size

Dried mustard seeds shall be sufficiently ground such that the 95 per cent of the material shall pass through a sieve of 500 µm aperture size conforming to **SLS 124** when determined by the method specified in **Part 12** of **SLS 186**.

5.8 Other requirements

The product shall comply with the requirements specified in Table **1**, when tested according to the methods given in Column **5** of the Table.

TABLE 1 – Other requirements

Sl No	Characteristic	Requirement		Method of test
		Whole	Ground	
(1)	(2)	(3)	(4)	(5)
i)	Moisture content, per cent by mass, max.	10.0	7.0	**SLS 186: Part 5**
ii)	Total ash on dry basis, per cent by mass, max.	6.5	6.5	**SLS 186: Part 3**
iii)	Acid insoluble ash on dry basis, per cent by mass, max.	1.0	1.0	**SLS 186: Part 4**
iv)	Non-volatile ether extract on dry basis, per cent by mass, min.	28.0	28.0	**SLS 186: Part 7**
v)	Allyl isothiocyanate on dry basis, per cent by mass, min.	0.7	--	Appendix **B**

6 CONTAMINANTS

6.1 Microbiological limits

The product shall not exceed the limits given in Table **2** when tested according to the methods given in Column **4** of the table.

TABLE 2 – Microbiological limits for whole and ground mustard

Sl No	Organism	Limit	Method of test
(1)	(2)	(3)	(4)
i)	*Escherichia coli*, MPN per g	Absent	**SLS 516: Part 12**
ii)	*Salmonella*, per 25 g	Absent	**SLS 516: Part 5**
iii)	Moulds, per g, max.	1×10^4	**SLS 516: Part 2 Section 2**

6.2 Potentially toxic elements

The product shall not exceed the limits for potentially toxic elements given in Table **3** when tested according to the methods given 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.	0.1	**AOAC 986.15** or **2013.06**
ii)	Cadmium as Cd, mg/ kg, max.	0.1	**AOAC 999.11** or **2013.06**
iii)	Lead as Pb, mg/ kg, max.	0.2	**AOAC 999.11** or **2013.06**

6.3 Pesticide residues

The crop shall be cultivated and processed with special care under Good Agricultural Practices and Good Manufacturing Practices (**SLS 143** and **1327**), so that residues of those pesticides which may be required in the production do not remain or if practically unavoidable are reduced to the minimum level to comply with the maximum tolerable limits specified in **SLS 910**.

NOTE
It is not necessary to carry out this determination as a routine for all the samples. This should be tested in case of dispute and when required by the purchaser or vendor or when there is any suspicion of pesticide contamination.

6.4 Aflatoxins

The product shall not exceed the level 5.0 µg/ kg for aflatoxin B_1 and 10.0 µg/ kg for total aflatoxins, when determined according to the method given in **968.22** of **AOAC**.

6.5 Other contaminants

The product shall not contain contaminants or undesirable substances (residues of fumigants, mineral oils) in amounts which may present hazardous to the health of the consumer.

7 PACKAGING

The product shall be packaged in clean, sound, dry packages, made of food grade material which does not affect the product but which protects it from the ingress of moisture or loss of volatile matter.

8 MARKING AND/ OR LABELLING

Each package shall be marked and/ or labelled legibly and indelibly or a label shall be attached to the package with the following information.

a) Name of the product as “Mustard seed, whole” or “Whole mustard seed” or “Powdered mustard” or “Mustard powder” or “Ground mustard”, as applicable;
b) Brand name or trade name, if any;
c) Net mass, in ‘g’ or ‘kg’;

d) Instructions for storage and handling, if any;
e) Name and address of the manufacturer and packer or distributor in Sri Lanka;
f) The batch number or code number or a decipherable code marking;
g) Date of manufacture;
h) Date of expiry; and
j) Country of origin, in case of imported products.

9 METHODS OF TEST

Tests shall be carried out in accordance with the methods prescribed in **Appendix B** of this Standard, **Parts 2**, **3**, **4**, **5**, **7**, **8** and **12** of **SLS 186**, **Section 2 of Part 2**, **Parts 5** and **12** of **SLS 516** and Methods of Analysis of the Association of Official Analytical Chemists (**AOAC**), 20th edition, 2016.

10 CRITERIA FOR CONFORMITY

10.1 Each container examined as in clause **A.6.1** satisfies the packaging, marking and/ or labeling requirements. Each container examined as in **A.6.2** satisfies the relevant requirements given in Clauses **5.2** and **5.3**.

10.2 Each container tested as in **A.6.3** satisfies the requirement for moisture given in Clause **5.8**.

10.3 The composite sample tested as in **A.6.4** satisfies the requirements given in Clauses **5.4**, **5.5**, **5.6**, **5.7** and **5.8** (except moisture) and **6.2**, **6.3**, **6.4** and **6.5**.

10.4 Each sample tested as in **A.6.5** satisfies the requirements given in Clause **6.1**.

APPENDIX A
SAMPLING

A.1 LOT

In any consignment all the containers belonging to one batch of manufacture or supply shall constitute a lot.

A.2 GENERAL REQUIREMENTS OF SAMPLING

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

A.2.1 Samples shall be drawn in a protected place not exposed to damp, air, dust or soot.

A.2.2 The sampling instruments shall be cleaned and dried when use. 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. 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.2.5 The sample containers shall be sealed, air-tight after filling and marked with necessary details of sampling.

A.2.6 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

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

A.3.1 Sampling of whole mustard seeds from bulk containers

A.3.1.1 Representative samples of the product for ascertaining conformity to the requirements of this Standard shall be drawn in accordance with **SLS 310**.

A.3.2 Sampling of whole or ground mustard from retail containers

A.3.2.1 The number of retail containers to be selected from a lot shall be in accordance with Table **4**.

TABLE 4 - Scale of sampling

No of retail containers in the lot (1)	**No of containers to be selected** (2)
Up to 280	10
281 to 500	12
501 to 1 200	15
1 201 and above	20

A.3.2.2 The retail 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.

A.3.3 Sampling of ground mustard from bulk containers

Samples shall be taken from all bulk containers in the lot.

A.4 PREPARATION OF SAMPLES

A.4.1 Samples from retail containers

Sufficient quantity of material shall be drawn from each container selected as in **A.3.2.1** and mixed to form a composite sample of at least 1200 g whole mustard seeds or 700 g ground mustard as applicable and the composite sample thus obtained shall be transferred to a sealed air-tight sample container.

A.4.2 Samples from bulk containers

Sufficient quantity of material shall be drawn from five different places of each bulk container using an appropriate sampling instrument and mixed to form a composite sample of at least 1200 g whole mustard seeds or 700 g ground mustard as applicable. The sample thus obtained shall be transferred to a sample container and sealed air-tight.

A.5 REFERENCE SAMPLES

If a reference sample is required the size of the sample to be taken shall be three times the size given in **A.3.1**, **A.3.2** or **A.3.3** and the sample so obtained shall be divided into three equal parts using coning and quartering method. Samples shall be transferred into three sample containers and sealed air-tight. One such sample shall be marked for the purchaser, one for the supplier and the third shall be kept at a place agreed to between the purchaser and the supplier to be used in case of dispute.

A.6 NUMBER OF TESTS

A.6.1 Each container selected as in **A.3.1**, **A.3.2** or **A.3.3** shall be inspected for packaging and marking and/ or labeling requirements.

A.6.2 Each container selected as in **A.3.1**, **A.3.2** or **A.3.3** shall be inspected for the requirements given in **5.2** and **5.3**.

A.6.3 Samples drawn from each container selected as in **A.3.1**, **A.3.2** or **A.3.3** shall be tested individually for moisture content.

A.6.4 The composite sample obtained as in **A.3.1**, **A.3.2** or **A.3.3** shall be tested for the requirements given in **5.4** to **5.9** (except for the moisture content), and in **6.2**, **6.3**, **6.4** and **6.5**.

A.6.5 A sub sample of 05 units shall be drawn from the containers selected as in **A.3.1**, **A.3.2** or **A.3.3** and tested for microbiological limits given in **6.1**.

APPENDIX B
DETERMINATION OF ALLYL ISOTHIOCYANATE

B.1 PRINCIPLE

After two successive soakings of the sample, the first in water at a temperature of 70˚C and second in alcoholic medium, distillation of the allyl isothiocyanate liberated into an alcoholic ammonia solution; addition to the distillate of a solution of silver nitrate; titration of the excess silver nitrate with potassium or ammonium thiocyanate in the presence of ferric ammonium sulphate.

B.2 REAGENTS

B.2.1 Ethanol, 95 per cent (v/v).

B.2.2 Ammonia solution, C_{20} = 0.925 g/ml.

B.2.3 Nitric acid, C_{20} = 1.40 g/ml.

B.2.4 Silver nitrate, 0.1 N standard volumetric solution.

B.2.5 Potassium thiocyanate or Ammonium thiocyanate, 0.1 N standard volumetric solution.

B.2.6 Ferric ammonium sulphate solution, saturated when cold.

B.3 APPARATUS

Usual laboratory apparatus not otherwise specified, and the following items:

B.3.1 Grinding mill

B.3.2 Entrainment distillation apparatus (Figure 1)

B.3.3 Burette, graduated at 0.05-ml intervals

B.3.4 Analytical balance

B.4 PROCEDURE

B.4.1 Preparation of the sample

After careful mixing of the sample, take 15 g to 20 g and grind it.

B.4.2 Test Portion

Take about 2g of the ground sample and weigh it to the nearest 0.001 g.

B.4.3 Determination

Transfer the test portion to the pear-shaped flask of the distillation apparatus, add 80 ml of water previously heated to 70 ± 2 ˚C, close the flask with its ground glass stopper and leave to stand for 15 minutes. Then add 20 ml of the Ethanol (*see* **B.2.1**) and allow to soak for 45 minutes.

After the soaking, connect the flask quickly to the distillation apparatus. Distill, and collect the distillate in a conical flask containing a mixture of 5ml of the Ammonia solution (*see* **B.2.2**) and 10 ml of the Ethanol (*see* **B.2.1**). (Entrainment distillation lasts on an average for 5 minutes). The quantity of the distillate should be at least 100 ml.

Add to the distillate 10 ml of the Silver nitrate solution (*see* **B.2.4**) and leave for 12 hours at ambient temperature (the operation will be quicker if the conical flask is placed for one hour in a water bath heated to 70 ˚C to 80 ˚C).

Filter through a fine filter paper, rinse the flask and residue several times with hot distilled water (approximately 90 ˚C).

To the bulk filtrate and washings add 10ml of the Nitric acid (*see* **B.2.3**) and then titrate with the Potassium thiocyanate or Ammonium thiocyanate solution (*see* **B.2.5**) using the Ferric ammonium sulphate solution (*see* **B.2.6**) as indicator, until a persistent pink colour is obtained.

B.4.4 Carry out two determinations on the same prepared sample.

B.5 CALCULATION

$$\textit{Allyl isothiocyanate}\text{, per cent by mass} = 4.95\ \frac{(10 - v)}{10^3} \times \frac{100}{m} \times \frac{100}{100 - H}$$

where,

m is the mass, in grams, of the sample taken,

v is the volume, in milliliters, of the 0.1N Potassium or Ammonium thiocyanate solution used, and;

H is the moisture content of the seed determined by the method in **Part 5** of **SLS 186**.

Take as the result, the arithmetic mean of the two determinations if the requirement of repeatability (see B.5.2) is satisfied.

NOTE

If the standard volumetric solutions used are not of exactly the concentration indicated in **B.2**, *a suitable correction factor shall be used in calculating the result.*

B.5.2 Repeatability

The difference in the results of two tests carried out simultaneously or in rapid succession by the same analyst shall not exceed one per cent of the mean value.

B.6 NOTES ON PROCEDURE

B.6.1 During the analysis, all contact with Copper or rubber shall be avoided, especially in the distillation apparatus. Use cork or, ground glass stoppers.

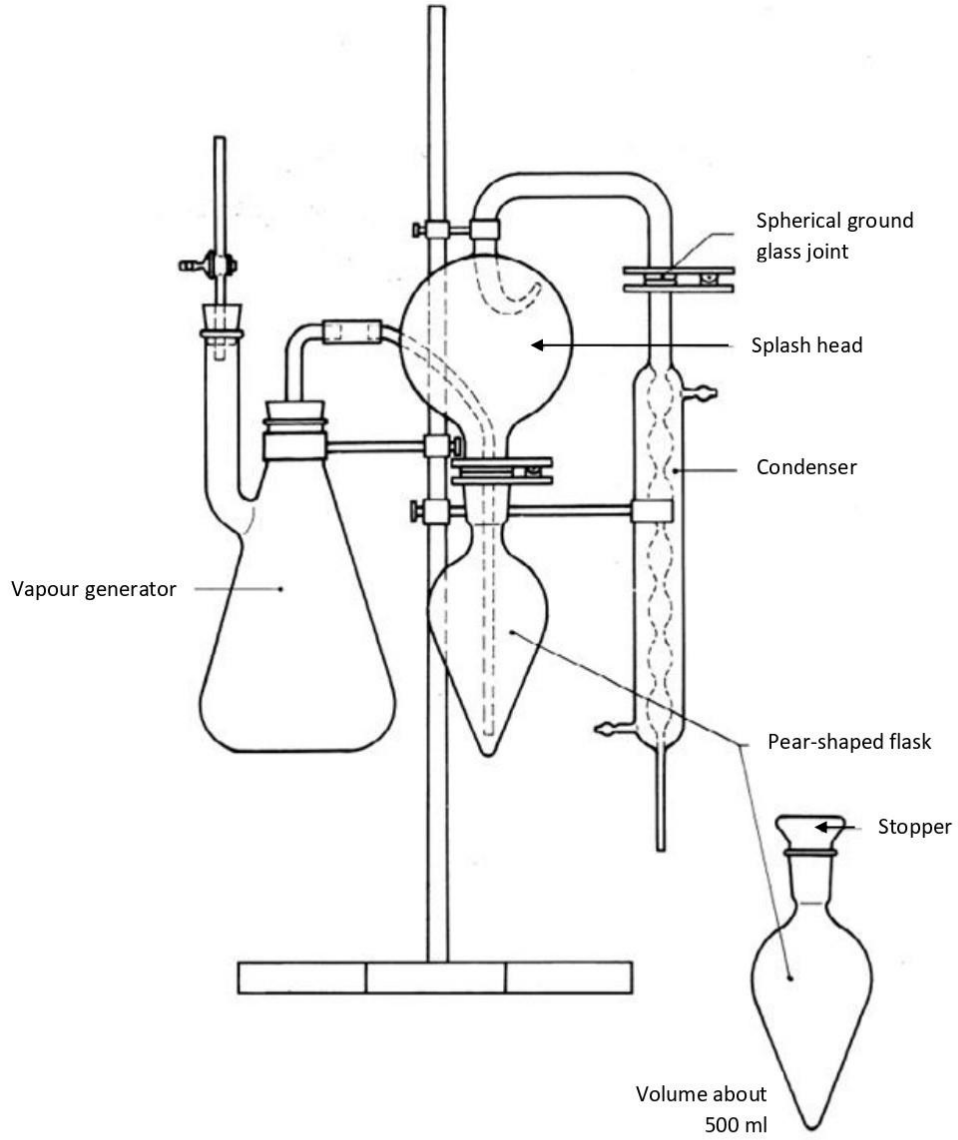

FIGURE 1 - Entrainment distillation apparatus

APPENDIX C
MICROSCOPICAL FEATURES OF BLACK MUSTARD

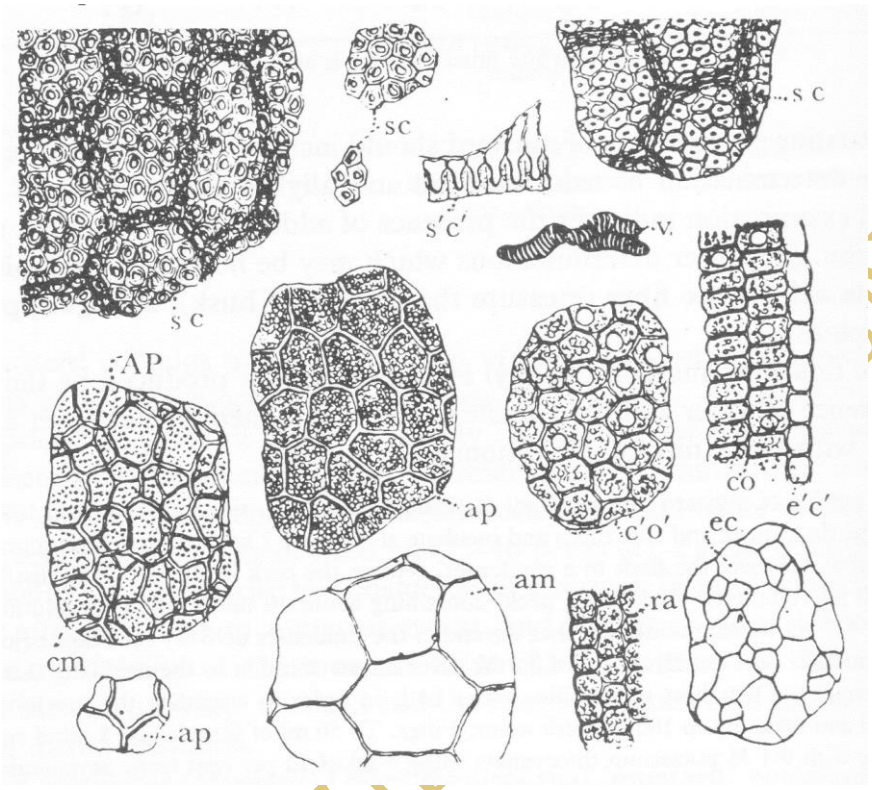

Figure 2 - Microscopical features of black mustard

Key;

am	is	Mucilaginous epidermis without distinct concentric striations
ap	is	Aleurone layer, isolated
AP	is	The same together with the membranous layer, cm
co	is	Margin of cotyledon in transverse section, with epidermis, e'c'
ec	is	Epidermis of cotyledon, surface view
ra	is	Radicle
sc	is	Sclerenchymatous layer surface view; the cells are brown and exhibit the characteristic polygonal network
s'c'	is	The same in profile, showing the characteristic thickenings
v	is	Debris of raphe

NOTE

The sample should preferably be prepared using de-fatted mustard seeds, obtained after treatment with ether and then alcohol.
