

MANUAL ON STANDARDS OF MUSTARD AND RAPESEED

1. INTRODUCTION

Promotion of standardization and grading of agricultural commodities is an important aspect of agricultural marketing. The agricultural commodities are heterogeneous and hence it is very essential to grade these commodities as per standards to command better price either at domestic or international market. Sale of Mustard and Rapeseed is offered on the basis of variety, wholesomeness, appearance, colour, presence of foreign matter, damaged seeds, broken seeds, admixture of inferior variety, moisture, harmful contaminants, etc. A quality grain is that which meets the end user specifications with respect to range of pre-determined Quality and Safety standards.

2. OBJECTIVE

The Manual has been designed with the objectives to

- i. Create awareness about standards prescribed by various organizations for domestic and international markets so as to raise quality consciousness among the farmers, entrepreneurs and other market functionaries with the objective to equip them better to face the global competition in the post WTO era.
- ii. provide details of various parameters responsible for quality; and
- iii. describe the advantages of grading & standardization so that farmers may get prices commensurate with the quality produced by them.

3. IMPORTANT PARAMETERS RESPONSIBLE FOR QUALITY

3.1 Following Parameters are important in determination of QUALITY of Mustard and Rapeseed:

- Foreign matter
- Dead ,badly discoloured and damaged
- Unripe shriveled and slightly damaged
- Small atrophied seeds
- Admixture of other varieties of mustard
- Moisture content

3.2 Following SAFETY parameters are important:

- Pesticides residue
- Poisonous metals

3.3 Parameters by which grades of Mustard and Rapeseed are differentiated

Important parameters by which grades can be differentiated in case of Mustard and Rapeseed are

- Foreign matter
- Dead /badly discoloured and damaged seeds
- Unripe shriveled and slightly damaged seeds
- Small atrophied seeds
- Admixture of other varieties of mustard

4. STANDARDS APPLICABLE FOR PURCHASES BY NATIONAL AGRICULTURAL COOPERATIVE MARKETING FEDERATION OF INDIA LTD. (NAFED).

4.1 The main objectives of the NAFED are

- a) Providing marketing support to the farmers through its commercial purchases.
- b) Acting as an Agency of Government of India for purchases under Market Intervention Scheme (MIS).
- c) Assisting farmers by supply of agricultural inputs .

4.2 To meet these obligations, the NAFED make purchases of Mustard and Rapeseed and for this purpose following standards for all varieties of Mustard and Rapeseed are applicable.

GRADE SPECIFICATIONS OF RAPESEED/MUSTARD PRESCRIBED BY THE GOVT. OF INDIA FOR PRICE SUPPORT SCHEME DURING 2005-2006 MARKETING SEASON

S.No.	Special characteristics	Maximum limits of tolerance (% by weight) for FAQ
1.	Impurities/foreign matter (including Tara Mira)	2
2.	Admixture with other types (including Toria)	10
3.	Unripe, Shriveled or immature	4
4.	Damaged & weeviled	2
5.	Small atrophied seeds	10
6.	Moisture content	8

NOTE: Presence of all non-edible oilseeds, like Castor, Mahua, Neem is prohibited. Also prohibited is the presence of *Argemone* seeds.

DEFINITIONS:

1. Impurities & Foreign matter includes dust, dirt, stones, lumps of earth, chaff, stems/straw, Taramira and any other impurity;
2. Admixture means other type of SARSON (including Toria);
3. Unripe and shriveled or immature seeds are those which are not properly developed;
4. Damaged and weevilled seeds are those which are internally damaged or discoloured, damage and discolouration materially affecting the quality;
5. Small atrophied seeds means seeds not retained in sieves with 14 meshes per linear inch (10= 2.54 cms.). This factor will not be applicable to the *juncea* or *nigra* group of seeds.

5. STANDARDS APPLICABLE FOR STORAGE OF MUSTARD AND RAPESEED

5.1 CENTRAL WAREHOUSING CORPORATION (CWC) : The CWC works as an agent of the government for purchase, sale, storage and distribution of agricultural and industrial commodities, seeds, fertilizers and notified commodities for individual, cooperatives and other institutions in the country. CWC provides modern efficient warehousing to ensure maximum returns to the growers with better opportunities. It provides scientific facilities to the farmers for the stock of agricultural produce at a reasonable cost. CWC issues Warehouse Receipts to a person depositing goods in the warehouse. The banking institutions accept the Warehouse Receipts as co-lateral security for grant of loans to the holder of the Warehouse Receipt on its being endorsed and delivered to them. Thus, warehousing plays an active role in marketing and also provides socio-economic gains to the farmers, who otherwise get exploited by the middlemen and are forced to have distress sales.

5.1.1 Standards of Central Warehousing Corporation

General Characteristics

Mustard seeds to be accepted in ware house shall be :

- (a) Free from visible moulds and insect infestation live or dead, any other deleterious substance and musty odour
- (b) Free from harmful seeds such as *Argemone* seeds.
- (c) Reasonably dry, and
- (d) In sound merchantable condition, having the pungent characteristic smell of the variety of the mustard supplied.

Special Characteristics:

The grading may be done on the basis of extraneous matter, damaged, discoloured and dead seeds, shriveled, immature and slightly damaged seeds, admixture of other varieties of mustard, the presence of small atrophied seeds, and presence of whole sound seeds present in the sample.

Specification:

Grade designation	Foreign matter seeds	Maximum limit of tolerance % by weight					by weight
		Damaged Moisture discoloured & dead seed	Shriveled & immature & slightly damaged	Admixture of variety other than named	Small atrophied seeds	Whole sound of the variety of mustard by weight (Min.)	
1	2	3	4	5	6	7	8
Grade-1 (Special)	1.0	1.0	1.5	3.0	5.00	92	7
Grade-II (Standard)	3.0	2.0	4.0	10.0	10.00	80	7
Grade-III (General)	5.0	3.0	3.0	15.0	20.00	60	7

Adopted from IS : 2799-1964

5.1.2. Definition of refraction in grades

Foreign matter: includes dust, dirt, stone, lumps of earth, chaff, stem, food grains including oilseeds of any other kind or any other impurity.

Damaged, discoloured and dead seeds: These include seeds that are appreciably damaged or discoloured, so as to affect the quality of the material and also include dead seeds which are duds and can be easily crushed in fingers.

Admixture of varieties: The proportion of admixture of varieties of mustard other than the variety named shall not be more than 15 percent

Small atrophied seeds: These include shrunken or shriveled seeds resulting in the diminution of the normal size.

6. STANDARDS APPLICABLE FOR DOMESTIC MARKET

6.1 The Prevention of Food Adulteration Act, 1954 (PFA Standards)

Prevention of Food Adulteration Rules, 1955 (PFA Rules) have been notified to carry out the provisions of the Prevention of Food Adulteration Act, 1954. These rules define the standards of quality and fix the limit of variability permissible in respect of article of food. These rules also provide guidelines for packing and labeling of an article of food. Standards framed under the provisions of the Rules are popularly called PFA standards. PFA standards prescribe minimum limit for Quality as well as Safety parameters. PFA standards are minimum standards and are **mandatory**. They do not differentiate between Quality. **Food articles being sold in the market should comply with PFA standards.** Standards of Mustard and Rapeseed prescribed in PFA Rules, 1955 are as follows :

6.1.1 QUALITY PARAMETERS

Description: MUSTARD (Rai, Sarson) WHOLE means the dried seeds of *Brassica alba* (L). *Boiss* (Safed rai), *Brassica campestris* L. var. *dichotoma* (Kali Sarson), *Brassica Campestris*, L. Var. yellow Sarson, Syn. *Brassica campestris* L, var. *glauca* (Pili Sarson), *Brassic, campestris* L. Var. *toria* (Toria), *Barassica juncea*, (L). Cosset Czern (Rai, Lotni) and *Brassica nigra* (L). Koch (Benarasi rai).

Extraneous matter : Not more than 7.0 per cent by weight.

Insect damaged matter: Not more than 5 per cent by weight .

- It shall be free from seeds of *Argemone maxicana* Linn.
- It shall be free from added colouring matter .

Explanation:

Extraneous matter : includes dust, dirt, stones, lumps of earth, chaff, stem, straw, edible foodgrains, edible oilseeds of any other variety or any other impurity.

Insect damaged matter: Insect damaged seeds are seeds that are partially or wholly bored by insects.

6.1.2 SAFETY PARAMETERS

Limits for insecticides and pesticides

Following maximum limits are prescribed for residues of insecticides and pesticides

Sl.No.	Name of insecticides	Tolerance Limit mg/kg. (ppm)
1.	Cypermethrin (sum of isomers) (fat soluble residue)	0.20
2.	Carbofuran(Sum of carbofuran and 3-hydroxy carbofuran expressed as carbofuran)	0.10
3.	Iprodione	0.5
4.	Phenthoate	0.03
5.	Phorate (sum of phorate, its oxygen analogue and their sulphoxide and sulphones, expressed as phorate)	0.05
6.	Phosalone	0.05
7.	Trichlorfon	0.1

Poisonous Metals

Following limits are prescribed for poisonous metals

	Name of the Poisonous metal	parts per million by weight
1	Lead	2.5
2	Copper	30.0
3	Arsenic	1.1
4	Tin	250.0
5	Zinc	50.0
6	Cadmium	1.5
7	Mercury	1.0
8	Methyl Mercury	0.25
	(Calculated as the element)	

7.STANDARDS FOR GRADING

7.1 GRADING - Grading provides description of the quality of the consignment and assists in the formation of a legally binding agreement. It facilitates proper marketing of agricultural commodities. It also ensures that agricultural commodities move through the market faster and without obstructions. This also facilitates transactions without physical verification by the distant buyers.

Advantages of Grading

- It brings confidence between the buyer and the seller.

- It facilitates interstate and international marketing.
- Disputes in the market can be solved amicably.
- Stability of the price is ensured.
- Farmers can take loans easily from the banks on the basis of grades of produce stored in the godown
- Arbitrary fixation of price by middlemen is eliminated.
- Brings about improvement of the crop.
- Reduces risk of producer and seller in transactions.
- Future marketing is facilitated. Grades become a commercial measure of quality.
- It also helps in implementation of contract farming.

7.2 AGRICULTURAL PRODUCE (GRADING & MARKING) ACT, 1937 (AGMARK STANDARDS).

Standards of various agricultural commodities prescribed under the provisions of the Agricultural Produce (Grading & Marking) act, 1937 are popularly called AGMARK Standards. AGMARK standards comply with minimum standards of quality & safety prescribed in Prevention of Food Adulteration Rules, 1955. In addition AGMARK standards differentiate between quality by having three grades for Mustard and Rape seed. The grades are differentiated on the basis of foreign matter, dead badly discoloured and damaged, unripe shriveled and slightly damaged ,small atrophied seeds, admixture of other varieties of seed etc .

7.2.1 AGMARK Standards of Mustard and Rapeseed

Grade designation and definition of quality of Mustard and Rapeseed comprising *Brassica campestris var. sarson/toria Dichotoma/and Brassica juncea/Brassica nigra (Rai)* grown in India.

Special characteristics

Maximum percentage by weight					
Grade Designation	Foreign matter	Dead, badly discoloured and damaged	Unripe shriveled and slightly damaged	Small atrophied seeds	Admixture* of other varieties of mustard
(1)	(2)	(3)	(4)	(5)	(6)
Special	1.0	1.0	1.5	5.0	5.0
Standard	2.0	1.5	3.0	10.0	10.0
General	3.0	2.0	4.0	20.0	15.0

*This will not apply to *Brissica juncea* or *Brissica nigra* if mixed with *Brassica campestris* var sarsons/ton dichotoma.

General characteristics

The seeds shall-

- have shape, size, colour and pungency characteristic of the variety /form.
- be mature, hard, wholesome and well dried, moisture not exceeding 6 per cent.
- not have any trace of *Argemone* seeds.

- (d) be free from moulds or insect damage and deleterious substances.
- (e) not bear the grains of any other species, and
- (f) be in a sound merchantable condition .

NOTE:

1. Foreign matter includes dust, dirt, stones, lumps of earth, chaff, stems or straw, food grains including oilseeds of any other variety or any other impurity.
2. Dead seeds include seeds which are duds and can easily be crushed by hands.
3. Badly discoloured and damaged seeds are those seeds which are internally damaged or discoloured, damage and discolouration materially affecting the quality.
4. Unripe and shriveled seeds are those seeds which are not properly developed.
5. Slightly damaged seeds are those seeds which are superficially damaged or discoloured, damage and discolouration not materially affecting the quality.
6. Small atrophied seeds means seeds not retained in sieves with 14 meshes per linear inch (1ö=2.54 cm.) The factor will not be applicable to the *juncea* or *nigra* group of seeds.
7. Other coloured seeds mean seeds of any colour other than that of the specific variety or form.

7.2.2 Safety Standards

Maximum tolerance limits for various food safety parameters such as poisonous metals, pesticide residues, etc. are as prescribed in Prevention of Food Adulteration Rules, 1955.

8. STANDARDS APPLICABLE FOR INTERNTIONAL TRADE.

8.1 THE INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

International Organization for Standardization (ISO) is a worldwide federation of national standards bodies from different countries. The mission of ISO is to promote the development of standardization and related activities in the world with a view to facilitating the international exchange of goods and services, and to developing cooperation in the sphere of scientific, technological and economic activities.

8.1.1 The International Organization for Standardization specifies the following requirements for Mustard seed

Description

Mustard seed is the dried clean seed of one or more of the following plants:

- *Sinapis alba* Linnaeus - White mustard, yellow mustard;
- *Brassica nigra*
(Linnaeus) W.D.J.Koch - Black mustard;
- *Brassica juncea*
(Linnaeus) Czernajew
and Cosson in Czernajew - Indian mustard.

Odour and flavour

The odour and flavour of the seeds when ground and moistened shall be fresh and pungent, and free from rancidity and mustiness.

Freedom from moulds, insects, etc.

The seeds shall be free from living insects, mites and moulds, and shall be practically free from dead insects, insect fragments and rodent contamination visible to the naked eye (corrected, if necessary, for abnormal vision), using such magnification as may be necessary in any particular case.

Extraneous matter, shrivelled and damaged seeds

The seeds shall be whole and mature and shall not contain more than 0.7 % (m/m) of extraneous matter or other vegetable material . Extraneous seeds include charlock (*Sinapis arvensis* Linnaeus), rape (*Brassica napus* Linnaeus), and *Melilotus* species, The proportion of damaged or shrivelled mustard seeds shall not exceed 2% (m/m).

Chemical requirements

The mustard seed shall comply with the following requirements.

Characteristics	Requirement
Loss in mass at 103 ⁰ C %(m/m), max.	10
Total ash ,%(m/m) On dry basis, max.	6.5
Acid insoluble ash % (m/m) on dry basis,max.	1.0
Non-volatile ether extract % (m/m) on dry basis,min.	28
Allyl isothiocyanate, % (m/m) on dry basis a) in B . <i>nigra</i> ,min b) in B. <i>juncea</i> ,min	1.0 0.70
p-hydroxybenzyl isothiocyanate % (m/m) on dry basis in <i>Sinapsis alba</i> , Min.	2.3

8.1.2 Safety Standards for Mustard and Rapeseed are not prescribed.

8.2 CODEX ALIMENTARIUS COMMISSION (CAC)

Codex Alimentarius Commission (CAC) implements joint FAO/WHO Food Standards Programme. The purpose of the CAC programme is to protect the health of consumers and ensure

fair practices in the food trade. The CAC is a collection of internationally adopted food standards presented in a uniform manner. Sanitary and Phyto-Sanitary Agreement and Technical Barriers to Trade Agreement of World Trade Organisation recognizes standards framed by CAC with respect to safety and quality aspects of food items.

8.2.1 Quality Standards for Mustard and Rapeseed are not prescribed.

8.2.2 Safety Standards For Mustard and Rapeseed :

Pesticide Residues:

Mustard and Rapeseed shall comply with following maximum pesticide residue limits.

(a) Mustard Seed

Sl.No.	PESTICIDE	MRL	(Mg/kg)
1.	TERBUFOS	MRL	0.05

(b) Rapeseed

Sl.No.	PESTICIDE	MRL or EMRL	(Mg/kg)
1	CARBENDAZIM	MRL	0.1
2	CYCLOXYDIM	MRL	2.0
3.	CYFLUTHRIN	MRL	0.05
4	DIMETHIPIN	MRL	0.1
5.	DIQUAT	MRL	2.0
6.	FLUCYTHRINATE	MRL	0.05
7.	FLUSILAZOLE	MRL	0.05
8.	GLUFOSINATE-AMMONIUM	MRL	5.0
9.	GLYPHOSATE	MRL	10.0
10.	IPRODIONE	MRL	0.5
11.	LINDANE	MRL	0.05
12.	METHAMIDOPHOS	MRL	0.1
13.	METHIDATHION	MRL	0.1
14.	METHIOCARB	MRL	0.05
15.	PERMETHRIN	MRL	0.05
16.	PIRIMICARB	MRL	0.2
17.	PROCHLORAZ	MRL	0.5
18.	PROPICONAZOLE	MRL	0.05
19.	TEBUCONAZOLE	MRL	0.05
20.	TERBUFOS	MRL	0.05
21.	VINCLOZOLIN	MRL	1.0