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EAST AFRICAN STANDARD

Canola and rapeseed — Specification and grading



EAST AFRICAN COMMUNITY

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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in East Africa. It is envisaged that through harmonized standardization, trade barriers which are encountered when goods and services are exchanged within the Community will be removed.

In order to meet the above objectives, the EAC Partner States have enacted an East African Standardization, Quality Assurance, Metrology and Test Act, 2006 (EAC SQMT Act, 2006) to make provisions for ensuring standardization, quality assurance, metrology and testing of products produced or originating in a third country and traded in the Community in order to facilitate industrial development and trade as well as helping to protect the health and safety of society and the environment in the Community.

East African Standards are formulated in accordance with the procedures established by the East African Standards Committee. The East African Standards Committee is established under the provisions of Article 4 of the EAC SQMT Act, 2006. The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

Article 15(1) of the EAC SQMT Act, 2006 provides that "Within six months of the declaration of an East African Standard, the Partner States shall adopt, without deviation from the approved text of the standard, the East African Standard as a national standard and withdraw any existing national standard with similar scope and purpose".

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

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Introduction

In the preparation of this East African Standard, the following sources were consulted extensively:

United States Standards for Canola, Effective February, 1992

Canola and rapeseed, Official Grain Grading Guide, August 1, 2009, Canadian Grain Commission

CODEX STAN 193:1995 (Rev.5:2009), *General Standard for Contaminants and Toxins in Foods*

CODEX STAN 228:2001 (Rev.1:2004), *General methods of analysis for contaminants*

Codex Alimentarius website: http://www.codexalimentarius.net/mrls/pestdes/jsp/pest_q-e.jsp

USDA Foreign Agricultural Service website: <http://www.mrlidatabase.com>

USDA Agricultural Marketing Service website: <http://www.ams.usda.gov/AMSV1.0/Standards>

USDA Plant Inspectorate Service website: http://www.aphis.usda.gov/import_export/plants

Grain Inspection, Packers and Stockyards Administration: <http://www.gipsa.usda.gov/GIPSA/webapp>

European Union: http://ec.europa.eu/sanco_pesticides/public

Assistance derived from these sources and others inadvertently not mentioned is hereby acknowledged.

This standard has been developed to take into account:

- the needs of the market for the product;
- the need to facilitate fair domestic, regional and international trade and prevent technical barriers to trade by establishing a common trading language for buyers and sellers.
- the structure of the CODEX, UNECE, USA, ISO and other internationally significant standards;
- the needs of the producers in gaining knowledge of market standards, conformity assessment, commercial cultivars and crop production process;
- the need to transport the product in a manner that ensures keeping of quality until it reaches the consumer;
- the need for the plant protection authority to certify, through a simplified form, that the product is fit for crossborder and international trade without carrying plant disease vectors;
- the need to promote good agricultural practices that will enhance wider market access, involvement of small-scale traders and hence making farming a viable means of wealth creation; and
- the need to ensure a reliable production base of consistent and safe crops that meet customer requirements.

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 Canola 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.

This standard 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.

Following Parameters are important in determination of QUALITY of Canola 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

Following SAFETY parameters are important:

- Pesticides residue
- Poisonous metals

Parameters by which grades of Canola and Rapeseed are differentiated

Important parameters by which grades can be differentiated in case of Canola 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

Contents

1	Scope	1
2	Normative references	1
3	Definitions and grading factors	2
4	Essential composition and quality factors	6
4.1	Basis of determination	6
4.2	Representative portion of canola or rapeseed for grading, grams	6
4.3	General quality requirements	6
4.4	Classification	7
4.5	Unclassified canola	11
4.6	Reject canola seeds	11
5	Contaminants	11
5.1	Pesticide residues	11
5.2	Heavy metals	11
5.3	Mycotoxin and chemical limits	12
5.4	Environment	12
6	Hygiene	12
7	Packaging	13
8	Marking or labelling	13
9	Sampling	13
	Annex A (normative) Determination of impurities, size, foreign odours, insects, and species and variety	14
	Annex B (normative) Determination of moisture content	15
	Annex C (informative) Model certificate of conformity with standards for farm produce	16
	Annex D (normative) Canola seed/rapeseed — Fact sheet	17
	Annex E (informative) Canola seed — Codex, EU and USA pesticide residue limits	23
	Annex F (informative) Sieves for assessing dockage and grading factors	27

Draft for comments only — Not to be cited as East African Standard

Canola and rapeseed — Specification and grading

1 Scope

This East African Standard applies to canola and rapeseed, the seeds of the genus *Brassica* from which the oil shall contain less than 2 percent erucic acid in its fatty acid profile and the solid component shall contain less than 30.0 micromoles of any one or any mixture of 3-butenyl glucosinolate, 4-pentenyl glucosinolate, 2-hydroxy-3-butenyl, or 2-hydroxy-4-pentenyl glucosinolate, per gram of air-dried, oil free solid. Before the removal of dockage, the seed shall contain not more than 10.0 percent of other grains for which standards have been established.

NOTE Canola and rapeseed are classes of the same botanical family. This standard describes dockage and grading procedures for canola and rapeseed. Canola has been used in the examples of grade names. If a sample of rapeseed is submitted for inspection, replace *Canola* with *Rapeseed*.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 605, *Pulses — Determination of impurities, size, foreign odours, insects, and species and variety — Test methods*

ISO 711, *Cereals and cereal products — Determination of moisture content (Basic reference method)*

ISO 712, *Cereals and cereal products — Determination of moisture content — Routine reference method*

ISO 5223, *Test sieves for cereals*

ISO 6639-1, *Cereals and pulses — Determination of hidden insect infestation — Part 1: General principles*

ISO 6639-2, *Cereals and pulses — Determination of hidden insect infestation — Part 2: Sampling*

ISO 6639-3, *Cereals and pulses — Determination of hidden insect infestation — Part 3: Reference method*

ISO 6639-4, *Cereals and pulses — Determination of hidden insect infestation — Part 4: Rapid methods*

ISO 13690, *Cereals, pulses and milled products — Sampling of static batches*

ISO 16050, *Foodstuffs — Determination of aflatoxin B₁, and the total content of aflatoxin B₁, B₂, G₁ and G₂ in cereals, nuts and derived products — High performance liquid chromatographic method*

CAC/RCP 1, *Recommended international code of practice — General principles of food hygiene*

EAS 38, *Labelling of prepackaged foods — Specification*

EAS 79, *Cereals and pulses as grain — Methods of sampling*

EAS 217, *Methods for the microbiological examination of foods*

ISO 22000:2005, *Food safety management systems — Requirements for any organization in the food chain*

OIML R87:2004, *Quantity of product in prepackages*

3 Definitions and grading factors

For the purpose of this East African Standard, the following definitions shall apply.

3.1

canola seed

canola is defined as seed of the species *Brassica napus* or *Brassica campestris* but containing less than 30 micromoles of specified glucosinolates per g of oil-free air-dry solids and not more than 2% erucic acid in the oil component, as a proportion of the total fatty acids content. The specified glucosinolates are any one or a mixture of 3-butenyl, 4-pentenyl, 2-hydroxy-3-butenyl and 2-hydroxy-4-pentenyl glucosinolates.

NOTE 1 The term canola applies to varieties that meet the canola standards for low levels of erucic acid and glucosinolates. Production of canola varieties is widespread.

NOTE 2 Rapeseed varieties are produced in small volumes, usually under contract. Shipments and submitted samples of rapeseed must be clearly identified as rapeseed.

3.2

broken

any broken canola that remains in the sample after cleaning and is otherwise sound is considered to be sound

3.3

colour

In assessing colour, consider

- The amount and degree of discolouration of the whole seed, such as from weathering
- The amount of rime (seeds densely and completely covered by rime are assessed as *Damage*)
- The proportion of crushed seeds which are only pale green or slightly immature and therefore not assessed as distinctly green

NOTE Whole seeds that are green may be as a result of thin seed coats of certain canola varieties. Whole green seeds of these varieties are not indicators of elevated chlorophyll levels and therefore are not considered distinctly green or assessed as part of colour evaluation. Only seeds which are distinctly green throughout when crushed are assessed as distinctly green.

3.4

commercially clean primary samples

commercially clean primary samples can have up to 0.5% for broken and reasonably sound canola or rapeseed deducted from the gross weight of the dockage. Primary samples are considered commercially clean when meeting the requirements set out in the table below after following normal cleaning procedures.

Table 1 — Definition of commercial cleanliness, canola

Grade name	Material remaining on top of round-hole sieve, including coarse grains %		Total net dockage %
	Roughage material such as wild oats, seed pods, knuckles	Total	
Grade 1	0.3	0.5	2.5
Grade 2	0.3	0.5	2.5
Grade 3	0.3	0.5	2.5

3.5

primary samples, not commercially clean

In not commercially clean primary samples, there is no allowance for broken and reasonably sound canola or rapeseed. All the material removed by the slotted sieve is assessed as dockage.

3.6

cleaning for grade improvement

if the grade of a delivery can be improved by additional cleaning, perform the cleaning and add the additional material to dockage. Cleaning for grade improvement can be done at any time. See Table 2.

Table 2 — Cleaning for grade improvement — Canola

Material to be removed	Equipment	Effect on composition of dockage
Weed seeds	Carter dockage tester with air setting at #7, or approved sieves	Weed seeds are added to dockage. Not more than 5.0% of sound canola may be removed for each single grade improvement achieved.
Damaged seeds	Carter dockage tester with air setting at #7, or approved sieves. NOTE The material originally removed by aspiration is to be reconstituted back into the sample prior to cleaning for improvement.	Weed seeds are added to dockage. Not more than 5.0% of sound canola may be removed for each single grade improvement achieved.

3.7**conspicuous admixture**

all matter other than canola including, but not limited to, flaxseed, yellow mustard, whole shrunken or broken kernels of other grains, ergot, sclerotinia, cow cockle, lamb's-quarters, cleavers, smartweed, ball mustard, pigweed and stones, which is conspicuous and readily distinguishable from canola without the use of magnification and which remains in the sample after the removal of machine separated dockage. Conspicuous admixture is added to machine separated dockage in the computation of total dockage.

3.8**contaminated grain**

grain containing any substance in sufficient quantity that the grain is unfit for consumption by persons or animals or is adulterated within the meaning of the regulations on food safety

3.9**crush**

one pass of the roller under firm pressure over a 100-seed stick on masking tape

3.10**damaged kernels**

canola and pieces of canola that are heat-damaged, sprout-damaged, distinctly green damaged, frost damaged, distinctly shrunken or shriveled, badly discoloured from mould, completely and densely covered with rime, tan coloured, insect damaged or otherwise materially damaged. Total damage is the total of damaged crushed seeds and any visually damaged uncrushed seeds.

3.11**distinctly green kernels**

distinctly green tolerances are applied to crushed seeds which are a distinct green throughout. Pale green or immature seeds are taken into account in the evaluation of colour. See *Colour*.

3.12**dockage**

all matter other than canola that can be removed from the original sample by use of an approved device according to prescribed procedures. Also, underdeveloped, shriveled, and small pieces of canola kernels that cannot be recovered by properly rescreening or recleaning. Machine separated dockage is added to conspicuous admixture in the computation of total dockage. The composition may further include:

- Material that remains on top of the round-hole sieve
- Material that passes through the slotted sieve
- Material removed by aspiration
- Material that passes over the No. 000 riddle
- Inseparable material, up to established grade tolerances, handpicked from the cleaned sample
 - In *reject canola*, dockage includes inseparable material handpicked from the cleaned sample up to the tolerance for the grade of the sample.
 - In *Sample* grades, inseparable material is not included as dockage. When the weight of the inseparable admixture exceeds 2.0% of the net weight, the admixture becomes a second reason for the sample grade. This is recorded in Remarks.

- Soft earth pellets handpicked from the cleaned sample
- Material removed by *Cleaning for grade improvement*

3.13

net weight of sample

the sample after cleaning and removal of dockage is referred to as the cleaned sample. Its weight is the net weight of the sample. Percentages by weight for grading refer to percentages of net weight.

3.14

kernel counts

- To do kernel counts you must have 500 grams of cleaned sample.
- All grading is done on representative portions divided down from the cleaned sample using a Boerner-type divider.

3.15

gross weight sample

the sample as it arrives is referred to as the uncleaned sample. Its weight is the gross weight of the sample.

3.16

hazardous substances in samples

any pesticide, herbicide or desiccant

3.17

earth pellets

- Hard earth pellets are pellets that do not crumble under light pressure. See *Stones*.
- Soft earth pellets are pellets that crumble under light pressure. See *Soft earth pellets*.

3.18

empty hulls

intact safflower seeds are called “achenes” which consists of the hull containing the seed. Empty hulls are achenes with intact hulls but which contain no seeds. This also includes hulls having less than one-third of the seed attached.

3.19

ergot

sclerotia (sclerotium, in singular) of the fungus, *Claviceps* species, which are associated with some seeds other than canola where the fungal organism has replaced the seed. A plant disease producing elongated fungal bodies that have a purplish-black exterior, a purplish-white to off white interior, and a relatively smooth surface texture.

3.20

fertilizer pellets

fertilizer pellets are typically either small, round and white or irregular shaped and pink or red. Fertilizer pellets are not considered a hazardous substance however there is no visible means of assuring that material resembling fertilizer pellets is not some other contaminant.

3.21

fireburnt

seeds charred or scorched by fire. A cross-section of a fireburnt seed resembles charcoal with numerous air holes. The air holes result in a low weight seed which crumbles easily under pressure.

3.22

foreign matter

foreign material in canola includes anything that is not canola, such as stones, ergot, sclerotinia, conspicuous admixture and inconspicuous admixture

3.19

heated, rotted or musty

heated refers only to seeds that are distinctly or badly binburnt. Heated seeds may have a heated odour. Crushed seeds may be

- Black—badly binburnt
- Dark chocolate brown—distinctly heated

- Light tan
 - light tan seeds without a heated odour are assessed as damaged
 - light tan seeds with a heated odour are assessed as heated
 - light tan seeds in combination with dark brown or black seeds, with or without a heated odour, are assessed as heated

3.20**inconspicuous admixture**

any seed which is difficult to distinguish from canola. This includes, but is not limited to, common wild mustard (*Brassica kaber* and *B. juncea*), domestic brown mustard (*Brassica juncea*), yellow mustard (*B. hirta*), and seed other than the mustard group.

3.21**inert material**

mineral matter such as stones, coal shale and hard and soft earth pellets

3.22**moisture**

water content in safflower seed as determined by an approved device and procedures

3.23**odour**

there is no numeric tolerance for odour. Consider

- The basic quality of the sample
- The type and degree of the odour
- The presence of visible residue causing the odour

3.24**poisonous, toxic and/or harmful seeds**

any seed which if present in quantities above permissible limit may have damaging or dangerous effect on health, organoleptic properties or technological performance such as Jimson weed — datura (*D. fastuosa* Linn and *D. stramonium* Linn.) corn cockle (*Agrostemma githago* L., *Machai Lallium remulenum* Linn.) Akra (*Vicia* species), *Argemone mexicana*, Khesari and other seeds that are commonly recognized as harmful to health

3.25**rime**

the lining of the pod adhered to the seed. Seeds that are completely and densely covered with white rime are classed as damaged in any grade. Seeds with light rime sparsely covering the seed coat are

- Classed as sound if not otherwise damaged
- Considered in the evaluation of colour. See *Colour*

3.26**Sclerotia (sclerotium, singular)**

dark colored or black resting bodies of the fungi *Sclerotinia* and *Claviceps*

3.27***Sclerotinia***

Genus name which includes the fungus *Sclerotinia sclerotiorum* which produces sclerotia. Canola is only infrequently infected, and the sclerotia, unlike sclerotia of ergot, are usually associated within the stem of the plants.

3.28**soft earth pellets**

Soft earth pellets are pellets that crumble under light pressure—if they do not crumble, they are considered stones. These pellets can be

- Earth and fertilizer pellets
- Any non-toxic material of similar consistency

3.29**sprouted**

those seeds having a ruptured seed coat in combination with either a rootlet that protrudes beyond the normal contour of the seed or distinct swelling of the seed. Seeds having a ruptured seed coat that are otherwise sound are only considered sprouted when found in combination with seeds meeting the definition of sprouted.

3.30**staghead**

staghead or white rust is a fungal disease of canola. It affects the flowering parts of the plant, resulting in distorted antler-like structures that are often covered by white or grey powdery spores. For grading, staghead bodies are considered *Conspicuous admixture*.

3.31**stones**

hard shale, coal, hard earth pellets, and any other non toxic materials of similar consistency. Fertilizer pellets are assessed as stones when constituting 1.0% or less of the net sample weight.

3.32**treated seed and other chemical substances**

- (a) Treated seed is grain that has been coated with an agricultural chemical for agronomic purposes. These seed dressings contain a dye to render the treated seed visually conspicuous. The colour of the dye varies depending upon the type of treatment and the type of grain. The coatings or stains may appear greasy or powdery and surface area distribution ranges from tiny flecks to complete coverage.
- (b) Other chemical substances refers to any chemical residues either adhering to the kernel or remaining in the sample and to samples having a chemical odour of any kind.

4 Essential composition and quality factors**4.1 Basis of determination**

Each determination of conspicuous admixture, ergot, sclerotinia, stones, damaged kernels, heat-damaged kernels, distinctly green kernels, and inconspicuous admixture is made on the basis of the sample when free from dockage. Other determinations not specifically provided for under the general provisions are made on the basis of the sample as a whole, except the determination of odor is made on either the basis of the sample as a whole or the sample when free from dockage. The content of glucosinolates and erucic acid is determined on the basis of the sample according to prescribed procedures.

4.2 Representative portion of canola or rapeseed for grading, grams

Table 1 — Representative portion of canola or rapeseed for grading, grams

Grading factor	Minimum	Optimum	Export
Conspicuous admixture	10	25	25
Damage	5	10	10
Distinctly green	5 crushes	10 crushes	10 crushes
Ergot	100	500	500
Excreta	working sample	working sample	working sample
Fireburnt	500	working sample	working sample
Heated	5 crushes	10 crushes	10 crushes
Inconspicuous admixture	1	5	5
Insect excreta	100	500	500
Odour	working sample	working sample	working sample
Rime	5	25	25
Sclerotinia sclerotiorum	100	500	500
Soft earth pellets	working sample	working sample	working sample
Staghead	10	25	25
Stones	100	working sample	working sample

4.3 General quality requirements

4.3.1 Canola shall meet the following general requirements/limits as determined using the relevant standards listed in Clause 2:

- a) shall consist of seed grains of the species *Brassica napus* or *Brassica campestris*;
- b) be sweet, hard, clean, wholesome, uniform in size, shape, colour and in sound merchantable condition;

- c) shall be free from a substance which renders it unfit for human or animal consumption or processing into or utilisation thereof as food or feed;
- d) shall be free of pests, live animals, animal carcasses, animal droppings, fungus infestation, added colouring matter, moulds, weevils, obnoxious substances, glass, metal, coal, dung, discoloration and all other impurities except to the extent indicated in this standard and must meet any other phytosanitary requirements specified by the importing country authority;
- e) shall be free from filth (impurities of plant and animal origin including insects, rodent hair and excreta) in amounts that represent a hazard to human health;
- f) shall be free from toxic or noxious seeds that are commonly recognized as harmful to health;
- g) shall be free from abnormal flavours, musty, sour or other undesirable odour, obnoxious smell and discolouration;
- h) shall be free from micro-organisms and substances originating from micro-organisms or other poisonous or deleterious substances in amounts that may constitute a hazard to human health.
- i) shall contain no chemical residues which exceed the prescribed maximum residue limit: Provided that:
 - (i) if the prescribed maximum residue limit of an importing country is lower than is permissible, the prescribed maximum residue limit of the importing country shall be complied with; and
 - (ii) the Food Safety Authority may grant permission for canola with a higher maximum residue limit, to be exported to countries where this higher residue limit is permissible: Provided that the export documents are accordingly endorsed with the name of the importing country;
- j) shall contain not more than 10 microgram per kilogram aflatoxin of which not more than 5 microgram per kilogram may be aflatoxin B1: Provided that:
 - (i) if the prescribed maximum aflatoxin limit of an importing country is lower than is permissible, the prescribed maximum aflatoxin limit of the importing country shall be complied with;
 - (ii) the Food Safety Authority may grant permission for canola with a higher maximum aflatoxin content to be exported to countries where this higher aflatoxin limit is permissible: Provided that the export documents are accordingly endorsed with the name of the importing country; and
 - (iii) an inspector shall verify compliance to the levels of aflatoxin by sampling and submitting samples for analysis of only certain consignments according to a risk-based plan.
- k) shall comply with the requirements for declared plant injurious organisms of phytosanitary importance as determined by the plant health protection agency.

4.3.2 Canola seeds shall be in form of well-filled seeds of uniform colour.

4.3.3 If canola seeds are presented in bags, the bags shall also be free of pests and contaminants. In addition the canola seeds shall comply with any conditions set by the importing country authority.

4.3.4 If canola seeds are rejected because pests or contaminants are found in inspected samples, the canola seeds are not to be re-presented for inspection unless they have been treated or cleaned.

4.3.5 Blending of rejected canola seed is not permitted as a treatment for insect infestation or as a method of cleaning for contaminants for which there is a nil tolerance

4.3.6 Brushing the outside of bags is not permitted as a remedy to remove pests or contaminants.

4.4 Classification

Canola seeds and rapeseed shall be classified into three grades on the basis of the tolerable limits established in Table 3, Table 4 and Table 5 which shall be additional to the general requirements set out in this standard.

Table 3 — Specific requirements for canola seed

Parameter	Specification			Method of test
	Grade 1	Grade 2	Grade 3	
Physical and Chemical Parameters				
Description	Canola is defined as seed of the species <i>Brassica napus</i> or <i>Brassica campestris</i> but containing less than 30 micromoles of specified glucosinolates per g of oil-free air-dry solids and not more than 2% erucic acid in the oil component, as a proportion of the total fatty acids content. The specified glucosinolates are any one or a mixture of 3-butenyl, 4-pentenyl, 2-hydroxy-3-butenyl and 2-hydroxy-4-pentenyl glucosinolates			
Oil 1.5% premium or deduction for each 1% above or below 42%	42% base level	42% base level	42% base level	
Moisture, max (%) 8.0 % max for immediate processing -if accepted over the maximum, 2% deduction for each 1% over maximum. For storage - if accepted over the maximum, 1.5% deduction for each 1% over maximum plus a drying charge	6.0	8.0	8.0	ISO 711/712
Free fatty acid 2% deduction for each 1% over base level, rejectable over 2.5%	1% base level	1.5% base level	2.0% base level	
Standard of quality	Minimum test weight kg/hl Rejectable if under this limit	62	62	62
	Degree of soundness	Reasonably well matured, sweet, good natural colour	Fairly well matured, sweet, reasonably good natural colour	May have the natural odour associated with low quality seed not distinctly sour, musty, rancid or any colour that would indicate serious deterioration
	Standard of cleanliness, commercially pure seed	Not more than 1.0% of other seeds that are conspicuous and that are not readily separable from canola, to be assessed as dockage	Not more than 1.5% of other seeds that are conspicuous and that are not readily separable from canola, to be assessed as dockage	Not more than 2% of other seeds that are conspicuous and that are not readily separable from canola, to be assessed as dockage
Protein	n/a	n/a	n/a	
Seed retention	n/a	n/a	n/a	
Germination	n/a	n/a	n/a	
Defective canola (Maximum % wt/wt based on cleaned half litre sample retained above 1.0mm round hole sieve)	Distinctly green	2.0	2.0	2.0
	Damaged	3.0	5.0	10.0
	Sprouted	5.0	5.0	5.0
	Heated	0.10	0.50	2.0
	Total defective	3.0	5.0	10.0
Broken or split, % by mass, max.	2.0	4.0	7.0	
Foreign matter, % by mass, max.	Ergot	0.05	0.05	0.05
	Stones	0.05	0.05	0.05
	Excreta	0.02	0.02	0.02
	Insect excreta	0.10	0.20	0.30
	Sclerotinia	0.05	0.10	0.15
	Conspicuous admixture	1.0	1.5	2.0
	Total	1.0	2.0	4.0
Inconspicuous admixture, % by mass, max.	5.0	5.0	5.0	
Seed Contaminants (maximum tolerance per half litre to apply to individual seeds, rejectable over)	Type 1 (alligator weed, giant sensitive plant, parthenium weed, saffron thistle, star burr, sinkwort, St. Johns wort, jute, Mexican poppy)	Nil	Nil	Nil
	Type 2 (Castor oil plant, coriander, darling pea, ragweed, rattlepod, poppy, crow garlic)	Nil	Nil	Nil
	Type 3 (a) (Cape Tulips, Dodder, Burrs (<i>Xanthium</i> spp.) – all except where otherwise stated, Wild Mignonette, Thornapple)	1	1	1
	Type 3 (c) (Common Heliotrope,)	3	3	3
	Type 4(a) (Skeleton Weed, Darnel, Hexham Scent, Mintweed, Nightshade)	2	2	2
	Type 5 (Sesbania pea)	65	65	65
Contaminants (Maximum per half litre unless otherwise stated, rejectable over unless deductions are stated as applying)	Chemicals not approved for canola	Nil	Nil	Nil
	Total aflatoxin (AFB1+AFB2+AFG1 +AFG2), ppb	10	10	10
	Aflatoxin B1 only , ppb	5	5	5
	Fumonison – Total ppb(FB1 + FB2 + FB3)	5	5	5
	Field insects Includes Rutherglen bugs, ladybirds, grasshoppers and wood bugs	10 large per ½ litre	10 large per ½ litre	10 large per ½ litre
	Field insects All species of aphid and all species of mites	100 small per ½ litre	100 small per ½ litre	100 small per ½ litre
	Snails Nil tolerance per 2.5 litre sample for any snails remaining above a 3.0 mm round hole screen. If one snail is found above the screen in the 0.5L sample, then a further four 0.5L samples should be taken. If a snail is found in any one of the subsequent samples, the load is to be rejected.	Nil above screen	Nil above screen	Nil above screen
	Tolerance of 1 snail per 0.5L sample , passing through a 3.0 mm round hole screen.	1 snail per ½ litre below screen	1 snail per ½ litre below screen	1 snail per ½ litre below screen
	Objectionable material (entire load)	Nil	Nil	Nil
	Other non-objectionable material (% by wt)	0.10	0.10	0.10

Table 4 — Specific requirements for non-GM canola seed

Parameter	Specification			Method of test
	Grade 1	Grade 2	Grade 3	
Physical and Chemical Parameters				
Description	Canola is defined as seed of the species <i>Brassica napus</i> or <i>Brassica campestris</i> but containing less than 30 micromoles of specified glucosinolates per g of oil-free air-dry solids and not more than 2% erucic acid in the oil component, as a proportion of the total fatty acids content. The specified glucosinolates are any one or a mixture of 3-butenyl, 4-pentenyl, 2-hydroxy-3-butenyl and 2-hydroxy-4-pentenyl glucosinolates. The adventitious presence of up to 0.9% of GM events approved by the relevant regulator is permitted			
Oil 1.5% premium or deduction for each 1% above or below 42%	42% base level	42% base level	42% base level	
Moisture, max (%) 8.0 % max for immediate processing -if accepted over the maximum, 2% deduction for each 1% over maximum. For storage - if accepted over the maximum, 1.5% deduction for each 1% over maximum plus a drying charge	6.0	8.0	8.0	ISO 711/712
Free fatty acid 2% deduction for each 1% over base level, rejectable over 2.5%	1.0% base level	1.5% base level	2.0% base level	
Standard of quality	Minimum test weight kg/hl Rejectable if under this limit	62	62	62
	Degree of soundness	Reasonably well matured, sweet, good natural colour	Fairly well matured, sweet, reasonably good natural colour	May have the natural odour associated with low quality seed not distinctly sour, musty, rancid or any colour that would indicate serious deterioration
	Standard of cleanliness, commercially pure seed	Not more than 1.0% of other seeds that are conspicuous and that are not readily separable from canola, to be assessed as dockage	Not more than 1.5% of other seeds that are conspicuous and that are not readily separable from canola, to be assessed as dockage	Not more than 2% of other seeds that are conspicuous and that are not readily separable from canola, to be assessed as dockage
Protein	n/a	n/a	n/a	
Seed Retention	n/a	n/a	n/a	
Germination	n/a	n/a	n/a	
Defective canola (Maximum % wt/wt based on cleaned half litre sample retained above 1.0mm round hole sieve)	Distinctly green	2.0	2.0	2.0
	Damaged	3.0	5.0	10.0
	Sprouted	5.0	5.0	5.0
	Heated	0.10	0.50	2.0
	Total defective	3.0	5.0	10.0
Broken or split, % by mass, max.	2.0	4.0	7.0	
Foreign matter, % by mass, max.	Ergot	0.05	0.05	0.05
	Stones	0.05	0.05	0.05
	Excreta	0.02	0.02	0.02
	Insect excreta	0.10	0.20	0.30
	Sclerotinia	0.05	0.10	0.15
	Conspicuous admixture	1.0	1.5	2.0
	Total	1.0	2.0	4.0
Inconspicuous admixture, % by mass, max.	5.0	5.0	5.0	
Seed Contaminants (maximum tolerance per half litre to apply to individual seeds, rejectable over)	Type 1 (Alligator Weed, Giant Sensitive Plant, Parthenium Weed, Saffron Thistle, Star Burr, Stinkwort, St. Johns Wort, Jute, Mexican Poppy)	Nil	Nil	Nil
	Type 2 (Castor oil plant, coriander, darling pea, ragweed, rattlepod, opium poppy, crow garlic)	Nil	Nil	Nil
	Type 3 (a) (Cape Tulips, Dodder, Burrs (<i>Xanthium</i> spp.) – all except where otherwise stated, Wild Mignonette, Thornapple)	1	1	1
	Type 3 (c) (Common Heliotrope)	3	3	3
	Type 4(a) (Skeleton Weed, Darnel, Hexham Scent, Mintweed, Nightshade)	2	2	2
	Type 5 (<i>Sesbania</i> pea)	65	65	65
Contaminants (Maximum per half litre unless otherwise stated, rejectable over unless deductions are stated as applying)	Chemicals not approved for canola	Nil	Nil	Nil
	Total Aflatoxin (AFB1+AFB2+AFG1 +AFG2), ppb	10	10	10
	Aflatoxin B1 only , ppb	5	5	5
	Fumonison – Total ppb(FB1 + FB2 + FB3)	5	5	5
	Field insects Includes Rutherglen bugs, ladybirds, grasshoppers and wood bugs	10 large per ½ litre	10 large per ½ litre	10 large per ½ litre
	Field insects All species of aphid and all species of mites	100 small per ½ litre	100 small per ½ litre	100 small per ½ litre
	Snails Nil tolerance per 2.5 litre sample for any snails remaining above a 3.0 mm round hole screen. If one snail is found above the screen in the 0.5L sample, then a further four 0.5L samples should be taken. If a snail is found in any one of the subsequent samples, the load is to be rejected.	Nil above screen	Nil above screen	Nil above screen
	Tolerance of 1 snail per 0.5L sample , passing through a 3.0 mm round hole screen.	1 snail per ½ litre below screen	1 snail per ½ litre below screen	1 snail per ½ litre below screen
	Objectionable material (entire load)	Nil	Nil	Nil
	Other non-objectionable material (% by wt)	0.10	0.10	0.10

Table 5 — Specific requirements for rapeseed

Parameter	Specification			Method of test
	Grade 1	Grade 2	Grade 3	
Physical and Chemical Parameters				
Description	Rapeseed tended for delivery shall be free from any uncharacteristic odours, live stored product insect infestation and any nominated commercially unacceptable contaminant			
Oil 1.5% premium or deduction for each 1% above or below 42%	42% base level	42% base level	42% base level	
Moisture, max (%) 8.0 % max for immediate processing -if accepted over the maximum, 2% deduction for each 1% over maximum. For storage - if accepted over the maximum, 1.5% deduction for each 1% over maximum plus a drying charge	6.0	8.0	8.0	ISO 711/712
Free fatty acid 2% deduction for each 1% over base level, rejectable over 2.5%	1.0% base level	1.5% base level	2.0% base level	
Standard of quality	Minimum test weight kg/hl Rejectable if under this limit	n/a	n/a	n/a
	Degree of soundness	Reasonably well matured, sweet, good natural colour	Fairly well matured, sweet, reasonably good natural colour	May have the natural odour associated with low-quality seed, not distinctly sour, musty, rancid, or any odour that would indicate serious deterioration
	Standard of cleanliness, commercially pure seed	Not more than 1.0% of other seeds that are conspicuous and that are not readily separable from rapeseed	Not more than 1.5% of other seeds that are conspicuous and that are not readily separable from rapeseed	Not more than 2% of other seeds that are conspicuous and that are not readily separable from rapeseed
Protein	n/a	n/a	n/a	
Seed Retention	n/a	n/a	n/a	
Germination	n/a	n/a	n/a	
Defective rapeseed (Maximum % wt/wt based on cleaned half litre sample retained above 1.0mm round hole sieve)	Distinctly green	2.0	2.0	2.0
	Damaged	3.0	5.0	10.0
	Sprouted	5.0	5.0	5.0
	Heated, dead, discoloured	0.10	0.50	2.0
	Total defective	3.0	5.0	10.0
Broken or split, % by mass, max.	2.0	4.0	7.0	
Unripe, shriveled and slightly damaged, % by mass, max.	1.5	3.0	4.0	
Small atrophied seeds, % by mass, max.	5.0	10.0	20.0	
Foreign matter, % by mass, max.	Ergot	0.05	0.05	0.05
	Excreta	0.02	0.02	0.02
	Insect excreta	0.10	0.20	0.30
	Sclerotinia	0.05	0.10	0.15
	Conspicuous admixture	1.0	1.5	2.0
	Stones	0.05	0.05	0.05
	Total	1.0	1.5	2.0
Inconspicuous admixture, % by mass, max.	5.0	5.0	5.0	
Seed Contaminants (maximum tolerance per half litre to apply to individual seeds, rejectable over)	Type 1 (Alligator Weed, Giant Sensitive Plant, Parthenium Weed, Saffron Thistle, Star Burr, Stinkwort, St. Johns Wort, Jute, Mexican Poppy)	Nil	Nil	Nil
	Type 2 (Castor oil plant, coriander, darling pea, ragweed, rattlepod, opium poppy, crow garlic)	Nil	Nil	Nil
	Type 3 (a) (Cape Tulips, Dodder, Burns (Xanthium spp.) – all except where otherwise stated, Wild Mignonette, Thornapple)	1	1	1
	Type 3 (c) (Common Heliotrope)	3	3	3
	Type 4(a) (Skeleton Weed, Darnel, Hexham Scent, Mintweed, Nightshade)	2	2	2
	Type 5 (Sesbania pea)	65	65	65
Contaminants (Maximum per half litre unless otherwise stated, rejectable over unless deductions are stated as applying)	Chemicals not approved for rapeseed	Nil	Nil	Nil
	Total aflatoxin (AFB1+AFB2+AFG1 +AFG2), ppb	10	10	10
	Aflatoxin B1 only , ppb	5	5	5
	Fumonison – Total ppb(FB1 + FB2 + FB3)	5	5	5
	Field Insects Includes Rutherglen bugs, ladybirds, grasshoppers and wood bugs	10 large per ½ litre	10 large per ½ litre	10 large per ½ litre
	Field insects All species of aphid and all species of mites	100 small per ½ litre	100 small per ½ litre	100 small per ½ litre
	Snails Nil tolerance per 2.5L sample for any snails remaining above a 3.0 mm round hole screen. If one snail is found above the screen in the 0.5L sample, then a further four 0.5L samples should be taken. If a snail is found in any one of the subsequent samples, the load is to be rejected.	Nil above screen	Nil above screen	Nil above screen
	Tolerance of 1 snail per 0.5L sample , passing through a 3.0 mm round hole screen.	1 snail per ½ litre below screen	1 snail per ½ litre below screen	1 snail per ½ litre below screen
	Objectionable material (entire load)	Nil	Nil	Nil
	Other non-objectionable material (% by wt)	0.10	0.10	0.10

4.5 Unclassified canola

Shall be canola seeds which do not fall within the requirements of Grades 1, 2 or 3 of this standard but are not rejected canola seeds.

4.6 Reject canola seeds

Reject canola seeds are those that:

- (a) Does not meet the requirements for the Grade Nos. 1, 2 or 3; or
- (b) Has a musty, sour, or commercially objectionable foreign odour; or
- (c) Is heating or otherwise of distinctly low quality.

5 Contaminants

5.1 Pesticide residues

Canola seed shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for this commodity. The limits listed below were current as of the dates indicated. Annex E provides current MRLs for the USA, EU and Codex markets.

Table 5 — Maximum pesticide residue limits and extraneous maximum residue limits in rapeseed (current as at 2009-06-09)

Type	Unit symbol	Limit	Method of test	Notes
CARBENDAZIM	mg/kg	0.05(*)		
CARBOFURAN	undef	0.05(*)		
CHLORMEQUAT	mg/kg	5		
CLETHODIM	mg/kg	0.5		
CYCLOXYDIM	mg/kg	2		
CYFLUTHRIN	mg/kg	0.07		
DIFENOCONAZOLE	mg/kg	0.05		
DIMETHIPIN	undef	0.2		
DIQUAT	mg/kg	2		
ESFENVALERATE	undef	0.01(*)		
FENBUCONAZOLE	mg/kg	0.05(*)		
FLUDIOXONIL	undef	0.02(*)		Interim MRL (2005-2009)
FLUSILAZOLE	mg/kg	0.1		
GLUFOSINATE-AMMONIUM	mg/kg	5		
GLYPHOSATE	undef	20		
IMIDACLOPRID	mg/kg	0.05(*)		
IPRODIONE	mg/kg	0.5		
METHIDATHION	mg/kg	0.1		
METHIOCARB	mg/kg	0.05(*)		
METHOMYL	mg/kg	0.05		
PERMETHRIN	mg/kg	0.05(*)		
PIRIMICARB	undef	0.05		
PROCHLORAZ	undef	0.7		
PROPICONAZOLE	undef	0.02		
TEBUCONAZOLE	mg/kg	0.05		
TEBUFENOZIDE	mg/kg	2		
THIACLOPRID	mg/kg	0.5		
VINCLOZOLIN	mg/kg	1		

5.2 Heavy metals

Canola seed shall be free from heavy metals in amounts which may represent a hazard to health. If present, they shall not exceed the limits established in Table 6.

Table 6 — Heavy metal contaminant limits

	Parameter	Limit	Test method
i)	Arsenic (As), ppm max.	1.10	EAS 101 or EAS 100
ii)	Copper (Cu), ppm max.	30.0	EAS 100
iii)	Lead (Pb), ppm max.	2.50	EAS 100
iv)	Cadmium (Cd), ppm max.	1.50	EAS 100
v)	Tin, Sn	250.0	
vi)	Zinc, Zn	50.0	
vi)	Mercury (Hg), ppm max.	1.0	EAS 100
vii)	Methyl mercury, calculated as Hg	0.25	

5.3 Mycotoxin and chemical limits

Canola seed shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

5.3.1 Uric acid shall not exceed 100 milligrams per kilogram.

5.3.2 Total aflatoxin levels in canola seed for human consumption shall not exceed 10 ppb with B₁ not exceeding 5 ppb when tested according to ISO 16050.

5.4 Environment

Canola seed shall be produced, processed and handled under conditions complying with the stipulations of relevant environmental regulations and therefore conform to cleaner production technological practices.

6 Hygiene

6.1 It is recommended that the produce covered by the provisions of this Standard be prepared and handled in accordance with the appropriate sections of CAC/RCP 1, ISO 22000, and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.

6.2 The produce should comply with any microbiological criteria established in accordance with CAC/GL 21.

6.3 To the extent possible in good agricultural practice, the products shall be free from objectionable mater.

6.4 When tested by appropriate standards of sampling and examination listed in Clause 2, the products:

- shall be free from microorganisms in amounts which may represent a hazard to health and shall not exceed the limits stipulated in Table 4;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from microorganisms in amounts which may represent a hazard to health.

Table 7 — Microbiological limits for canola seed

	Type of micro-organism	Limits	Test method
i)	Yeasts and moulds, max. per g	10 ²	EAS 217
ii)	<i>S.aureus</i> per 25 g	Nil	
iii)	<i>E. Coli</i> , max. per g	Nil	
iv)	<i>Salmonella</i> , max. per 25 g	Nil	

7 Packaging

7.1 Canola seed shall be packed suitable packages which shall be clean, sound, free from insects, fungal infestation and the packing material shall be of food grade quality.

7.2 Canola seed shall be packed in containers which will safeguard the hygienic, nutritional, technological and organoleptic qualities of the products.

7.3 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They shall not impart any toxic substance or undesirable odour or flavour to the product.

7.4 The net weight of the canola seed in a package shall comply with OIML R87.

7.5 Each package shall contain canola seed of the same type and of the same grade designation.

7.6 Each package shall be securely closed and sealed.

8 Marking or labelling

8.1 In addition to the requirements in EAS 38, each package shall be legibly and indelibly marked with the following:

- i) product name as "Canola seeds";
- ii) variety;
- iii) grade;
- iv) name, address and physical location of the manufacturer/ packer/importer;
- v) lot/batch/code number;
- vi) net weight, in g/kg;
- vii) the declaration "Food for Human Consumption";
- viii) storage instruction as "Store in a cool dry place away from any contaminants";
- ix) crop year;
- x) packing date;
- xi) expiry date or best before _____ month _____ year;
- xii) a declaration of the product lifespan;
- xiii) instructions on disposal of used package;
- xiv) country of origin;
- xv) a declaration on whether the canola was genetically modified or not.

8.2 A declaration of any inaccurate information in marking/labelling is prohibited and shall be punishable by law under the statutes of the Partner States.

8.3 The authorized packer shall observe all instructions regarding testing, grading, packing, marking, sealing and maintenance of records applicable to the product.

9 Sampling

Sampling shall be done in accordance with the EAS 79/ISO 13690.

Annex A
(normative)

Determination of impurities, size, foreign odours, insects, and species and variety

These shall be determined in accordance with ISO 605, *Pulses — Determination of impurities, size, foreign odours, insects, and species and variety — Test methods*

Draft for comments only — Not to be cited as East African Standard

Annex B
(normative)

Determination of moisture content

Moisture content shall be determined in accordance with the following standards:

- ISO 711, *Cereals and cereal products — Determination of moisture content (Basic reference method)*
- ISO 712, *Cereals and cereal products — Determination of moisture content — Routine reference method*

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Annex C
(informative)

Model certificate of conformity with standards for farm produce

1. Trader:	Certificate of conformity with the Community marketing standards applicable to fresh fruits and vegetables No. (This certificate is exclusively for the use of inspection bodies)		
2. Packer identified on packaging (if other than trader)	3. Inspection body		
	4. Place of inspection/country of origin ⁽¹⁾	5. Region or country of destination	
6. Identifier of means of transport	7. <input type="checkbox"/> Internal <input type="checkbox"/> Import <input type="checkbox"/> Export		
8. Packages (number and type)	9. Type of product (variety if the standards specifies)	10. Quality Class	11. Total net weight in kg
<p>12. The consignment referred to above conforms, at the time of issue, with the Community standards in force, vide:</p> <p><u>CD/K/469:2010, Canola and rapeseed — Specification and grading</u></p> <p>_____</p> <p>Customs office foreseen Place and date of issue</p> <p>Valid until (date):</p> <p>Signatory (name in block letters):</p> <p>Signature Seal of competent authority</p>			
13. Observations:			
⁽¹⁾ Where the goods are being re-exported, indicate the origin in box 9.			

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Annex D
(normative)

Canola seed/rapeseed — Fact sheet

D.1 *Brassica campestris*



Authority	L.
Family	Magnoliopsida:Dilleniidae:Capparales:Cruciferae
Synonyms	
Common names	Bird rape, Field mustard, Summer turnip rape, Polish rape, Toria, Sarson, Navette d'hiver, Navette d'ete, wild turnip
Editor	
Ecocrop code	3844

Description

A herbaceous plant with a slender, erect, branched stem and a taproot reaching 30-100 cm in height. It has broad-based, stem-clasping leaves and the flowers yellow to cream.

Uses An edible oil used in cooking is extracted from the seeds.

Killing temperature

Bird rape is resistant to frost at all stages of growth.

Growing period

Annual, growing 60-340 days.

Further information

Scientific synonyms: *B. campestris* var. *olifera* subvar. *biennis* (winter turnip rape), *B. campestris* var. *olifera* subvar. *annua* (summer turnip rape). Seed yields of 3.2-3.5 t/ha are considered good, while yields about 1.0-2.2 t/ha are more usual.

D.2 *Brassica juncea*



Authority	(L.) Czern.
Family	Magnoliopsida:Dilleniidae:Capparales:Cruciferae
Synonyms	<i>Sinapis juncea</i> L.
Common names	Leaf mustard, Brown mustard, Indian mustard, Leaf mustard cabbage, Mustard greens, Chinese mustard, White mustard, Moutarde de Chine, Mostaza de la Rierra, Kai Choy, Kaai Ts'oi, Sesawi, Sarson kaag, Brown mustard, Rai.
Editor	
Ecocrop code	548

Description

A herbaceous plant with an erect, branched stem up to 1 m tall, with a taproot reaching 60-80 cm in depth. Flowers yellow to cream.

Uses

The seeds contain 25-35% of an edible oil used in cooking. The basal leaves are stalked, up to 20 cm long. The pungent leaves are used as aromatic potherbs, in mixed salads, and as cooking vegetables.

Growing period

Annual. Leaves may be harvested 30-40 days from transplanting or 50-70 days from sowing, the plant mature in 75-100 days.

Further information

Scientific synonyms: *B. lanceolata*, *B. cernua*, *Synapis juncea*, *S. ramosa*. Leaf mustard is possibly of Chinese origin. In tropical areas optimum growing conditions can be found in the lowland at elevations up to 2000 m. A dry season after the emergence of fruit will hamper the development of seeds, thus causing severe loss of yield. Leaf yields may be 50-60 t/ha and average seed yield 0.8-1.5 t/ha.

D.3 Brassica napus



Authority L.
Family Magnoliopsida:Dilleniidae:Capparales:Cruciferae
Synonyms *B. napus* L. ssp. *oleifera* (Moench) Metzg., *B. napus* L. var. *oleifera* (Moench) Delile (ssp. *napus*), *B. napus* L. ssp. *napobrassica* (L.) O. Schwarz, *B. napus* L. ssp. *napus sensu* Hämet-Ahti et al.
Common names rape, olraps, colza, raapzaad, rypsi, raps, rapsi, oil-seed rape, canola, rutabaga, fodder rape, hungry gap kale, winter oil seed rape, swede rape, Siberian kale, rape seed, swede; Argentine rape, Colza d'hiver, Colza d'ete.
Editor
Ecocrop code 549

Description

A herb, 0.5-2 m tall with a strongly branched stem. Basal leaves of flowering plant stalked, highest leaves sessile and clasping stem. Flowers with 11-15 mm long, pale to bright yellow petals.

Uses The seeds are extracted for an oil used especially in margarine and for cooking. Newly bred cultivars with a high content of erucic acid are used for extraction of industrial oil. It is also used as a fodder crop.

Killing temperature —Rape is resistant to frost at all stages of growth. Unhardened plants can survive -4°C, while fully-hardened spring type rapeseed can survive -10 to -12°C, and hardened winter rapeseed can survive short periods of exposure to -15 to -20°C.

Growing period —Annual or biennial herb. Spring cultivars growing 85-160 days, and winter cultivars 160-340 days.

Further information Swede rape is native of Europe. It is a temperate crop but it can be grown in the tropics at elevations between 1500-2200 m. Yields of 2-4 t/ha are considered good, while yields of 0.5-2 t/ha are more usual.

D.4 Canola (Rapeseed)

D.4.1 History

Canola is a name applied to edible oilseed rape. This plant belongs to the mustard family along with 3,000 other species. Close relatives of this crop have been cultivated for food since the earliest recordings of man. Rapeseed has been important to Europe since the 13th century as a source of food and oil for fuel. Rapeseed production became popular in North America during World War II as a source of lubricants. Its oil has the property of adhering well to moist metal, making it an ideal lubricant for marine engines.

The name "canola" was registered in 1979 by the Western Canadian Oilseed Crushers Association to describe "double-low" varieties. Double low indicates that the processed oil contains less than 2% erucic acid and the meal less than 3 mg/g of glucosinolates. Erucic acid is a fatty acid that has been related to heart disease. Glucosinolates have breakdown products that are toxic to animals. Both characteristics make rapeseed products poor candidates for animal consumption.

In the early 1960s, Canadian plant breeders isolated single lines free of erucic acid and began programs to develop double low varieties.

Today annual worldwide production of canola is approximately 7.5 million tons on 4 million acres. Canada accounts for 15% of the world production and the European Economic Community for nearly 17%. The United States produces less than 1% of the world production. Minnesota and North Dakota are the major U.S. production states with about 20,000 acres. Canola ranks 5th in production among the world's oilseed crops following soybeans, sunflowers, peanuts and cottonseed.

D.4.2 Uses

D.4.2.1 Oil and protein

Like soybean, canola contains both high oil content as well as high protein content. It contains about 40% oil and 23% protein compared to 20 and 40%, respectively, for soybean. Like soybean, when the oil is crushed out, it leaves a high quality, high protein (37%) feed concentrate which is highly palatable to livestock. Commercial varieties of canola were developed from two species; *Brassica napus* (Argentine type) and *Brassica campestris* (Polish type). Both species of canola produce seed that is high in polyunsaturated fatty acids (oleic, linoleic, and linolenic).

D.4.2.3 Forages

Another potential for canola is as an annual forage. Historically, it was used as a forage for field-raised swine and poultry. Canola can produce 1.0 to 2.0 tons of dry matter per acre in a single season. A study conducted in Kansas found winter rapeseed forage to have crude protein of 21-33%, compared to 24% for winter wheat foliage.

D.4.3 Growth habits

Both fall and spring seeded types of canola are available. Canola growth is characterized by six main growth stages. Much of the management of this crop is related to the length of time and plant characteristics within each of these stages. Stage 0 is preemergence. The germinating seedling may take from 4 to 10 days to emerge. During this time it is susceptible to many soil borne pathogens. In Canada, seed protectant fungicides are often used on spring types, however effective materials have not been registered for use in the U.S. Speed of emergence depends on soil temperature and moisture, seed soil contact, and depth of planting. Stage 1 is the seedling stage where the very young plant has just emerged from the soil. Cotyledons are pushed through the soil surface by an active hypocotyl. At this stage, the seedling is still vulnerable to many soil pathogens, and to flea beetle infestation. Both pests are detrimental to stand establishment. Since the early canola crop is a poor competitor, it is extremely important to get a good stand.

Stage 2 is the rosette stage characterized by an increasing leaf area index. Spring canola will remain in this vegetative stage for several weeks. Winter canola also stays in this stage for several weeks in

the spring. Near the end of Stage 2, the crop is nearing its maximum leaf area index and at that point is a much better competitor. Increasing day length and temperatures initiate bolting and the beginning of Stage 3, the bud stage. The plants reach their maximum leaf area index at this time along with 30 to 60% of its total dry matter. A large accumulation of foliage is required to provide adequate sugars during flowering and pod fill.

Flowering begins Stage 4 and continues for 14 to 21 days. Three to five flowers open per day and 40 to 55% of the flowers that open will develop pods. Ripening, or Stage 5, begins when the petals fall from the last formed flower on the main stem. Pod fill is complete 35 to 45 days after flower initiation, and the seeds contain about 40% moisture at this point. The crop is considered ripe and ready for swathing when 30 to 40% of the seed from pods on the main stem have turned color. Spring varieties of *B. napus* mature 74 to 140 days after seeding and *B. campestris* in 66 to 111 days.

D.4.4 Environment requirements

D.4.4.1 Climate

Canola is widely adapted, particularly to the cool extremes of the temperate zones. Minimum temperatures for growth have been reported to be near 0 °C. The crop will germinate and emerge with soil temperatures at 5 °C but the optimum is 10 °C. Winter annual varieties are grown where adequate snow covers or mild winters are common. The crop has been produced successfully in Michigan without benefit of snow cover. Planting date has a dramatic effect on survival however.

D.4.4.2 Soil

Canola does best on medium textured, well drained soils. The crop is tolerant of a soil pH as low as 5.5 and saline conditions. Because of its tolerance to salinity, canola has been used as the first crop on newly drained dikes in the Netherlands. Canola requires approximately 406 mm to 460 mm of water through its growing season, with 200 mm to 210 mm used by annual varieties in July near flower and pod fill.

D.4.5 Cultural practices

D.4.5.1 Seedbed preparation

Stand establishment is very important with canola because of its lack of early competitiveness. Seeding into a smooth, firm seedbed helps maintain a uniform seeding depth and even emergence. Seedbed preparation is usually done with a shallow (100-127 mm) tillage operation. Recent research, however, has shown some success establishing canola with reduced tillage.

D.4.5.2 Method and rate of seeding

Canola is usually seeded with the small seed attachment of a grain drill to a depth of 12.7 mm to 25.4 mm. Rows should be spaced 178 mm or less. Research has shown highest yields with 3-inch row spacings. Canola should be seeded at 4-5 lb/a if drilled and 7-8 lb/a if broadcast depending on seed size and soil texture. Stands should be around 6-8 plants per square foot for highest yields. Canola stands of this density can withstand up to a 2/3 kill before reseeding is more profitable than maintaining the existing crop.

D.4.5.3 Variety selection

There are several varieties of oilseed rape available particularly from Canadian sources. Recently released varieties which meet the qualifications to be called canola are:

Andor—Released by University of Alberta in 1981 with distribution rights to Can-Alta Seeds Ltd., Red Deer, Alberta.

Global—Developed by Svalof A. B., Plant Breeding Station, Sweden. Distributed by Bonis and Company Ltd., Lindsay, Ontario, Canada.

Hyola 70—Hybrid developed by Contiseed Ltd. (Canada) to be marketed in U.S. in 1988, by Contiseed, Huron, SD.

OAC Triton—Tolerant of triazine (Sencor, Lexone, atrazine, etc.) herbicides. Originated by University of Guelph, Ontario. Licensed in 1984.

Regent—Originated by University of Manitoba. Licensed in 1977.

Topas—Reported to have moderate resistance to Sclerotinia. Developed by Svalof A. B., Plant Breeding Station, Sweden. Distributed by Bonis and Company Ltd., Lindsay, Ontario, Canada.

Tower—Originated by University of Manitoba. Licensed in 1974.

Tribute—Tolerant of triazine herbicides (Sencor, Lexone, atrazine, etc.). Better oil quality than OAC Triton but much lower seed yield than Westar. Originated by Agriculture Canada, Saskatoon, and University of Guelph, Ontario. Licensed in 1985.

Westar—Originated by Agriculture Canada, Saskatoon. Licensed in 1982. Production of certified seed limited to Canada.

Candle—Originated by Agriculture Canada, Saskatoon. Licensed in 1977.

Tobin—Originated by Agriculture Canada, Saskatoon. Licensed in 1981. Production of certified seed limited to Canada.

D.4.5.4 Weed control

The best weed control practices are tillage, establishment of a good stand, and weed control in previous crops. Cruciferous weeds (wild radish, wild mustard, pennycress and shepherd's purse) are nearly impossible to control in the crop.

Cultural: As with small grains, the weed control in canola is primarily from the crop itself. Follow all recommended cultural practices to assure a dense vigorous crop that competes well with weeds. Select fields with minimal weed pressure and try to avoid those with weeds in the mustard family.

Mechanical control measures cannot be used in canola. A rotary hoe would kill many crop plants and row cultivation is not feasible because of the narrow row spacing.

Chemical: Treflan is the only herbicide registered in the United states for use in canola. Treflan and Poast are registered in Canada. Treflan is applied preplant incorporated and gives good annual grass control, but misses ragweed, mustard, and lady's thumb smartweed. Poast is used for postemergence control of annual grasses, quackgrass and volunteer cereals.

D.4.5.5 Diseases and their control

White mold (*Sclerotinia* stem rot) can be a serious disease after flowering in seasons with cool, moist growing conditions. Infection occurs when dropped petals contact the stem and spores germinate on the dead petals. Bleached stem lesions occur around the initial infection, then white mold and black fungal bodies grow inside and outside the stem. Sudden wilting and premature dying of individual plants are usually the first noticeable symptoms. Since white mould is a problem in several other crops, its occurrence in canola must be carefully monitored. Avoid planting canola following such crops as soybeans and dry edible beans or sunflower.

D.4.5.6 Insects and other predators and their control

Many insects may infest canola at various stages of its growth. Probably the greatest problem is caused by the flea beetle, a shiny black beetle about 10 to 15 mm long which attacks canola particularly at emergence, although it can be a problem later as well. Hot, sunny weather promotes feeding damage. Most growers control flea beetles with a granular insecticide mixed with the seed, but other seed-applied formulations and postemergence insecticides are also available. Seed-applied

insecticides provide protection for about half as long as the granular materials. Flea beetle has not been a problem with winter canola types.

Diamondback moth larvae can be a problem in dry years. The larvae are pale yellow to light green, 11 to 13 mm in length, and frequently hang by a spun thread. Larvae eat flowers and young pods, and peel older tissue. Seeds under peeled pods often fail to develop properly. Spraying with one of the recommended insecticides can be justified in situations where there are over 20 larvae per plant.

D.4.5.7 Harvesting

Timely harvest of canola is critical to prevent shattering. When pods first begin to yellow, the crop needs to be checked on a 3 to 4 day schedule. Harvest maturity can only be determined by observing the colour of the seed. In canola that stands well, 30 to 40% of the seed on the main stem needs to be brownish-red in colour prior to swathing. This corresponds to about 30 to 35% seed moisture. Canola does have a tendency to lodge, particularly with over-fertilization of susceptible varieties. In severely lodged canola, swathing should be done when 40 to 50% of the seed in exposed pods has turned colour.

Shattering can account for significant crop losses, therefore harvesting must not be delayed. Canola should be cut high on the stem and lightly pushed into the stubble with a windrower to prevent blowing. The crop is combined when it has dried to near 10% moisture. Direct combining with the use of a desiccant is possible in canola that is standing well, but determining application time is difficult and field losses are higher. The cylinder speed should be set at 450-1000 RPM and the cylinder concave clearance at 3/16 to 1/2 inch. Losses should be evaluated for further refinement of these adjustments. Canola that is to be stored for six months or more must be dried to near 8% moisture.

D.4.5.8 Drying and storage

Rapeseed must be handled and stored carefully. Tight storage bins are required. Seed can sweat in storage even at 9 to 20% moisture content. Inspection is required to prevent heating and spoilage in the bin. The small seed restricts air flow, so thin layers are necessary for drying wet seed. If much straw is present a scalper should be used to clean the crop.

Annex E (informative)

Canola seed — Codex, EU and USA pesticide residue limits

Users are advised that international regulations and permissible Maximum Residue Levels (MRL) frequently change. Although this International MRL Database is updated frequently, the information in it may not be completely up-to-date or error free. Additionally, commodity nomenclature and residue definitions vary between countries, and country policies regarding deferral to international standards are not always transparent. This database is intended to be an initial reference source only, and users must verify any information obtained from it with knowledgeable parties in the market of interest prior to the sale or shipment of any products. The developers of this database are not liable for any damages, in whole or in part, caused by or arising in any way from user's use of the database.

Results Key

MRL values in *{Italics}* are more restrictive than US

--- indicates no MRL value is established.

Cod, EU, etc. indicates the source of the MRL and EXP means the market defers to the exporting market.

All numeric values listed are in parts per million (ppm), unless otherwise noted

Canola seed

	US 1	Cod	EU
Acetamiprid	---		---
	1. This MRL is established for canola, seed.		
	US 2	Cod	EU
Azoxystrobin	---	---	---
	2. This MRL is established for canola, seed.		
	US 3	Cod	EU
Boscalid	5	---	---
	3. This MRL is established for canola, seed.		
	US 4	Cod	EU
Carboxin	---	---	---
	4. This MRL is established for Canola, seed		
	US	Cod	EU
Carfentrazone-ethyl	0.1	---	---
	US 5	Cod	EU
Clethodim	---	0.5	---
	5. This MRL is established for canola, seed.		
	US 6	Cod	EU
Clopyralid	---	---	---
	6. This MRL is established for canola, seed.		
	US 7	Cod	EU
Clothianidin	---	---	---
	7. This MRL is established for canola, seed.		
	US 8	Cod	EU
Difenoconazole	---	---	---
	8. This MRL is established for canola, seed.		
	US 9	Cod	EU
Ethalfuralin	---	---	---
	9. This MRL is established for canola, seed.		
	US 10	Cod	EU
Ethametsulfuron-methyl	---	---	---
	10. This MRL is established for canola, seed.		

	US 11	Cod	EU
Gamma Cyhalothrin	---	---	---
	11. This MRL is established for canola, seed.		
	US 12	Cod	EU
Glufosinate-ammonium	---	---	---
	12. This MRL is established for canola, seed.		
	US 13	Cod	EU
Glyphosate	---	---	---
	13. This MRL is established for canola, seed.		
	US 14	Cod	EU
Imazethapyr	---	---	---
	14. This MRL is established for canola, seed.		
	US 15	Cod	EU
Imidacloprid	---	---	---
	15. This MRL is established for canola, seed.		
	US 16	Cod	EU
Lambda Cyhalothrin	---	---	---
	16. This MRL is established for canola, seed.		
	US	Cod	EU
Mefenpyr-diethyl	0.02	---	---
	US	Cod	EU
Pyriproxyfen	0.2	---	---
	US 17	Cod	EU
Quizalofop-ethyl	---	---	---
	17. This MRL is established for canola, seed.		
	US	Cod	EU
Sethoxydim	35	---	---
	US 18	Cod	EU
Tebufenozide	---	---	---
	18. This MRL is established for canola, seed.		
	US 19	Cod	EU
Tepraloxydim	---	---	---
	19. This MRL is established for canola, seed.		
	US 20	Cod	EU
Thiamethoxam	---	---	---
	20. This MRL is established for canola, seed.		
	US 21	Cod	EU
Thifensulfuron-methyl	---	---	---
	21. This MRL is established for canola, seed.		
	US 22	Cod	EU
Tribenuron Methyl	---	---	---
	22. This MRL is established for canola, seed.		

Rapeseed

	US 1	Cod	EU
Acetamiprid	0.01	---	0.01
	1. Canola, seed		
	US 2	Cod	EU
Azoxystrobin	0.5	---	0.5
	2. This MRL applies to rapeseed. The US maintains a separate MRL for canola seed.		
	US	Cod	EU 3
Bifenthrin	0.05	---	0.1
	3. European Union does not maintain a specific MRL for the Bifenthrin/Rape, seed combination, but does maintain an MRL of 0.1 PPM for its "Oilseeds" group.		
	US 4	Cod	EU
Boscalid	3.5	---	{0.2}
	4. Canola, seed		
	US 5	Cod	EU 6
Captan	0.05	---	{0.02}
	5. This MRL is established for rapeseed, seed. 6. European Union does not maintain a specific MRL for the Captan/Rape, seed combination, but does maintain an MRL of 0.02 PPM for its "Oilseeds and Oilfruits" group.		
	US 7	Cod	EU
Carboxin	0.03	---	0.1
	7. Canola, seed		
	US	Cod	EU 8
Carfentrazone-ethyl	0.1	---	{0.02}
	8. European Union does not maintain a specific MRL for the Carfentrazone-ethyl/Rape, seed combination, but does maintain an MRL of 0.02 PPM for its "Oilseeds" group.		
	US 9	Cod	EU
Clethodim	0.5	0.5	1
	9. Canola, seed		
	US 10	Cod	EU
Clopyralid	3	---	{0.5}
	10. Rapeseed, seed and Canola, seed		
	US 11	Cod	EU
Clothianidin	0.01	---	0.02
	11. Canola, seed		
	US	Cod	EU
Deltamethrin	0.2	---	{0.1}
	US 12	Cod	EU
Difenoconazole	0.01	0.05	0.5
	12. Canola, seed		
	US	Cod	EU
Endosulfan	0.2	---	{0.1}
	US	Cod	EU
Ethalfuralin	0.05	---	{0.02}
	US 13	Cod	EU
Ethamsulfuron-methyl	0.02	---	---
	13. Rapeseed, seed and Canola, seed		
	US	Cod	EU 14
Fludioxonil	0.01	0.02	0.05
	14. European Union does not maintain a specific MRL for the Fludioxonil/Rape, seed combination, but does maintain an MRL of 0.05 PPM for its "Oilseeds and Oilfruits" group.		

	US 15	Cod	EU
Gamma Cyhalothrin	0.15	---	---
	15. Canola, seed		
	US 16	Cod	EU
Glyphosate	20	20	{0.1}
	16. Rapeseed, seed and Canola, seed		
	US	Cod	EU
Imidacloprid	0.05	0.05	0.1
	US 17	Cod	EU 18
Lambda Cyhalothrin	1	---	{0.05}
	17. Canola, seed		
	18. European Union does not maintain a specific MRL for the Lambda Cyhalothrin/Rape, seed combination, but does maintain an MRL of 0.05 PPM for its "Oilseeds" group.		
	US 19	Cod	EU
Metconazole	0.04	---	0.1
	19. Canola seed		
	US	Cod	EU 20
Methyl Parathion	0.2	---	{0.05}
	20. European Union does not maintain a specific MRL for the Methyl Parathion/Rape, seed combination, but does maintain an MRL of 0.05 PPM for its "Oilseeds" group.		
	US	Cod	EU 21
Prothioconazole	0.15	---	{0.05}
	21. European Union does not maintain a specific MRL for the Prothioconazole/Rape, seed combination, but does maintain an MRL of 0.05 PPM for its "Oilseeds" group.		
	US	Cod	EU 22
Pyraclostrobin	0.45	---	{0.02}
	22. European Union does not maintain a specific MRL for the Pyraclostrobin/Rape, seed combination, but does maintain an MRL of 0.02 PPM for its "Oilseeds and Oilfruits" group.		
	US 23	Cod	EU
Quizalofop-P-ethyl	1	---	{0.5}
	23. Canola, seed		
	US	Cod	EU
Sethoxydim	35	---	{1}
	US 24	Cod	EU
Tebufenozide	2	2	2
	24. Canola, seed		
	US 25	Cod	EU 26
Thiamethoxam	0.02	---	0.05
	25. Rapeseed, seed and Canola, seed		
	26. European Union does not maintain a specific MRL for the Thiamethoxam/Rape, seed combination, but does maintain an MRL of 0.05 PPM for its "Oilseeds and Oilfruits" group.		
	US 27	Cod	EU 28
Thifensulfuron-methyl	0.02	---	0.05
	27. Canola, seed		
	28. European Union does not maintain a specific MRL for the Thifensulfuron-methyl/Rape, seed combination, but does maintain an MRL of 0.05 PPM for its "Oilseeds and Oilfruits" group.		
	US 29	Cod	EU 30
Tribenuron Methyl	0.02	---	{0.01}
	29. Canola, seed		
	30. European Union does not maintain a specific MRL for the Tribenuron Methyl/Rape, seed combination, but does maintain an MRL of 0.01 PPM for its "Oilseeds and Oilfruits" group.		
	US	Cod	EU
Trifluralin	0.05	---	0.15
	US	Cod 31	EU
Zeta-Cypermethrin	0.2	0.2	0.2
	31. The MRL is established for the sum of cypermethrin and zeta-cypermethrin. Codex does not maintain a specific MRL for the Zeta-Cypermethrin/Rape, seed combination, but does maintain an MRL of 0.2 PPM for its "Oilseed except peanut" group.		

Annex F
(informative)

Sieves for assessing dockage and grading factors

Type	Sieve name	Hole size (millimetres)	Manufacturer's designation (inches)
Round-hole	No. 4.5	1.79	4 ¹ / ₂ /64
	No. 5	1.98	5/64
	No. 5.5	2.18	5 ¹ / ₂ /64
	No. 6	2.38	6/64
	No. 6.5	2.58	6 ¹ / ₂ /64
	No. 7	2.78	7/64
	No. 7.5	2.98	7 ¹ / ₂ /64
	No. 8	3.18	8/64
	No. 8.5	3.37	8 ¹ / ₂ /64
	No. 9	3.57	9/64
	No. 10	3.97	10/64
	No. 11	4.37	11/64
	No. 12	4.76	12/64
	No. 14	5.56	14/64
	No. 15	5.95	15/64
	No. 16	6.35	16/64
	No. 17	6.75	17/64
	No. 18	7.14	18/64
	No. 20	7.94	20/64
	No. 21	8.33	21/64
	No. 22	8.73	22/64
	No. 24	9.52	24/64

Type	Sieve name	Hole size (millimetres)	Manufacturer's designation (inches)
Slotted	No. 3	1.19 x 7.94	3/64 x 5/16
	No. 4.5	1.79 x 12.70	4 ¹ / ₂ /64 x 1/2
	No. 5	1.98 x 19.05	5/64 x 3/4
	No. 6	2.38 x 19.05	6/64 x 3/4
	No. 8	3.18 x 19.05	8/64 x 3/4
	No. 9	3.57 x 19.05	9/64 x 3/4
	No. 11	4.37 x 19.05	11/64 x 3/4
	No. 12	4.76 x 19.05	3/16 x 3/4
	No. .064	1.60 x 9.53	0.064 x 3/8
	No. .028	0.71 x 11.90	0.028 x 15/32
	No. .032	0.81 x 11.90	0.032 x 15/32
	No. .035	0.89 x 11.90	0.035 x 15/32
	No. .038	0.96 x 11.90	0.038 x 15/32
	No. .040	1.02 x 11.90	0.040 x 15/32
	Buckwheat	No. 5	triangle with 1.98 mm inscribed circle
No. 6		triangle with 2.26-mm inscribed circle	triangle with 0.089-inch inscribed circle
Wire	No. 3 x 16	3 x 16 mesh per 25.4 mm	3 x 16 wire mesh per inch
	No. 4 x 14	4 x 14 mesh per 25.4 mm	4 x 14 wire mesh per inch
	No. 10 x 10	10 x 10 mesh per 25.4 mm	10 x 10 wire mesh per inch
	No. 9 x 9	9 x 9 mesh per 25.4 mm	9 x 9 wire mesh per inch

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