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DRAFT TANZANIA STANDARD

Refined edible rapeseed (canola) oil – Specification

TANZANIA BUREAU OF STANDARDS

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0 Forewords

This draft Tanzania Standard was primarily prepared in view of the need to safeguard the consumer and to guide manufacturers and traders of edible rapeseed oil, as well as regulators. Therefore, this draft Tanzania Standard will lead producers, exporters and importers in achieving the quality and safety of the rapeseed edible oil.

In the preparation of this Tanzania Standard considerable help was derived from:
Codex-Stan 210: 1999 (amended 2015), *Codex standard for named vegetable oils* published by Codex Alimentarius Commission

In reporting the results of a test or analysis made in accordance with this draft standard, if the final value, observed or calculated is to be rounded off, it shall be done in accordance with TZS 4 (see clause 2).

1.0 Scope

This draft Tanzania Standard prescribes the requirements, methods of sampling and test for refined edible rapeseed (canola) oil.

2.0 Normative References

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

TZS 4, *Rounding off numerical values*

TZS 54, *Animal and Vegetable fats and oils – Sampling*

TZS 1322, *Oils and fats Sampling and test methods – Purity tests*

TZS 76, *Methods for determination of arsenic*

TZS 268, *General atomic absorption – Spectro-Photometric method for determination of lead in food stuffs*

TZS 538, *Packaging and labeling of foods*

TZS 1324, *Animal and vegetable fats and oils – Determination of peroxide value-Iodometric (visual) end point determination*

TZS 1325, *Animal and vegetable fats and oils – Determination of saponification value*

TZS1326, *Animal and vegetable fats and oils – Determination of moisture and volatile matter*

TZS 1327, *Animal and vegetable fats and oils – Determination of iodine value*

TZS 1328, *Essential oils – Determination of relative density at 20 ^{0}C – Reference method*

TZS 1329, *Animal and vegetable fats and oils – Determination of refractive index*

TZS 1330, *Animal and vegetable fats and oils – Determination of lovibond colour*

TZS 1331, *Animal and vegetable fats and oils – Determination of acid value and acidity*

TZS 1332, *Animal and vegetable fats and oils – Determination of unsaponifiable matter-method using diethyl ether extraction*

TZS 1335, *Animal and vegetable fats and oils – Determination of copper, iron and nickel content-graphite furnace atomic absorption*

TZS 1336, *Animal and vegetable fats and oils – Determination of insoluble impurities content*

TZS 109, *Food processing units – Code of hygiene – General*

TZS 115, *Permissible food additive and levels of use – Schedule*

TZS 1370, *Animal and vegetable fats and oils – Determination of tocopherol and tocotrienol content by HPLC*

TZS 1369, *Animal and vegetable fats and oils – Determination of method butylhydroxyanisole (BHA) and butylhydroxytoluene (BHT) – Gas-liquid chromatographic*

TZS 288(Part 2), *Animal and vegetable fats and oils – Analysis by gas chromatography of methyl esters of fatty acids*

3.0 Terms and definitions

For the purpose of this draft Tanzania Standard the following terms and definitions shall apply:

3.1 Refined edible rapeseed oil

Oil produced from low erucic acid seeds of *Brassica napus* L., *Brassica campestris* L and *Brassica juncea* L species and subjected to refining processes.

3.2 Food additive

Any substance not normally consumed as food by itself and not normally used as a typical ingredient of refined edible rapeseed oil whether or not, it has nutritive value, the intentional addition of which to refined edible rapeseed oil for technological (including organoleptic) purposes in the manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such refined edible rapeseed oil results, or may be reasonably expected to result (directly or indirectly), in it or its by-products becoming a component of or otherwise affecting the characteristics of such refined edible rapeseed oil. The term does not include contaminants or substances added to refined edible rapeseed oil for maintaining or improving nutritional qualities.

4.0 Requirements

4.1 General requirements

4.1.1 It shall be clear and free from adulterants, sediments, suspended and other foreign matter and separated water.

4.1.2 Be free from admixture with other oils when tested according to TZS 1322 (see clause 2)

4.1.3 The clarity of refined edible rapeseed oil shall be judged by the absence of turbidity after keeping the filtered sample at 30 °C for 24 hours.

4.1.4 The refined edible rapeseed oil shall not contain more than 2 % erucic (as % of total fatty acids) acid when determined according to TZS 288 part 2 (see clause 2)

4.2 Specific requirements

4.2.1 Refined edible rapeseed oil shall have the physical and chemical requirements as shown in table 1

Table 1 — Physical and chemical requirements of refined edible rapeseed oil

Characteristic	**Requirement**	**Test method**
Relative density (20 ^{o}C/ water at 20 ^{o}C)	0.910 to 0.920	TZS 1328
Refractive index at 40 ^{0}C	1.4650 – 1.4690	TZS 1329
Saponification value (mg KOH/g oil	168 to 181	TZS 1325
Iodine value (Wij's)	94 to 120	TZS 1327
Colour in a 5¼ inch cell on lovibond scale max.	1.5 R	TZS 1330
Unsaponifiable matter, percent by mass, max	2 or g/kg 20	TZS 1332
Acid value, mg KOH/g oil, max.	0.6	TZS 1331
Peroxide value, meq peroxide oxygen/kg oil, max.	10	TZS 1324
Moisture and volatile matter at 105 ^{o} C, % m/m, max	0.2	TZS 1326
Insoluble impurities, % m/m, max	0.05	TZS 1336
Soap content, % m/m	0.005	TZS 1322

4.2.2 The refined edible rapeseed oil shall have the following fatty acid composition as determined by TZS 288 part 2 (see clause 2) (% total fatty acids) under table 2 below,

Table 2: fatty acid composition of refined edible rapeseed(canola)oil

C6:0	ND
C8:0	ND
C10:0	ND
C12:0	ND
C 14:0	ND – 0.2
C 16:0	2.5 – 7.0
C 16:1	ND – 0.6
C 17:0	ND – 0.3
C 17:1	ND – 0.3
C 18:0	0.8 – 3.0
C 18:1	51.0 – 70.0
C 18:2	15.0 – 30.0

C 18:3	5.0 – 14.0
C 20:0	0.2 – 1.2
C 20:1	0.1 – 4.3
C 22:0	ND – 0.6
C 22:1	ND - 2.0
C 22:2	ND – 0.1
C 24:0	ND – 0.3
C 24:1	ND – 0.4

Where

ND - non detectable, defined as ≤ 0.05 %

4.3 Food additives

Refined edible rapeseed oil may contain the following food additives:

4.3.1 It may contain antioxidants and synergist as appear in table 2 and 3: -

4.3.1.1 *Antioxidants*

Table 3 – Permitted antioxidants in refined edible rapeseed oil

Additive	Maximum use level	Methods of tests (see clause 2)
Ascorbyl palmitate	500 mg/kg (Singly or in combination)	Annex A
Ascorbyl stearate		
Tocopherol, d-*alpha*-	300 mg/kg (Singly or in combination)	TZS 1370
Tocopherol concentrate, mixed		
Tocopherol, dl-*alpha*		
Butylated hydroxyanisole (BHA)	175 mg/kg	TZS 1369
Butylated hydroxytoluene (BHT)	75 mg/kg	TZS 1369

4.3.1.2 *Antioxidant synergists*

Table 4: Permitted antioxidants synergists in refined edible rapeseed oil

Additive	Level of use
Citric acid	GMP
Sodium dihydrogen citrate	GMP
Trisodium citrate	GMP

4.3.2 Refined edible rapeseed oil may contain additives which are prescribed in TZS 115 (see clause 2) for the purpose of restoring natural properties lost in processing as long as the added additives does not deceive or mislead the consumer by concealing damage or inferiority or by making the product appear to be of greater than actual value.

5.0 Contaminants

The level of heavy metal contaminants in refined edible rapeseed oil shall conform to the limits specified in table 4.

Table 5 — Limits for heavy metal contaminants in refined edible rapeseed oil

Contaminant	Maximum level	Test method
Iron, mg/kg	1.5	TZS 1335
Copper, mg/kg	0.1	TZS 1335
Lead, mg/kg	0.1	TZS 268
Arsenic, mg/kg	0.1	TZS 76
Nickel, mg/kg	0.1	TZS 1335

6.0 Hygiene

Refined edible rapeseed oil shall be produced, processed, handled and traded in accordance with TZS 109 (see clause 2).

7.0 Sampling and test methods

7.1 Sampling

The material shall be sampled as prescribed in TZS 54 (see clause2).

7.2 Test methods

7.2.1 Quality of reagents

Unless specified otherwise, analytical grade chemicals and distilled water shall be used in tests.

7.2.2 Testing shall be in accordance with TZS 1322 (see clause 2) and as provided in the respective Tables of this Tanzania Standard.

8.0 Packaging, marking and labeling

8.1 Refined edible rapeseed oil shall be supplied in suitably sealed and closed food grade containers of material protecting the product from spoilage or contamination without adversely affecting the physical, chemical and sensory quality of the product.

8.2 Refined edible rapeseed oil shall be marked and labeled in accordance with TZS 538 (see clause 2). In labeling, Kiswahili or Kiswahili and English shall be used. In addition, each container of refined edible rapeseed oil shall be legibly and indelibly marked with the following information:

a) Name of the product (Refined edible rapeseed/canola oil)

b) Physical and postal address of the manufacturer and/or packer

c) Date of manufacture and expiry date

d) A complete list of ingredients in descending order of proportion

e) Net content

f) Batch number

g) Manufacturer’s registered trade mark

h) Country of origin

8.3 The containers shall also be marked with the TBS Standards Mark of Quality.

NOTE – The TBS Standards Mark of Quality may be used by the manufacturers only under licence from TBS. Particulars of conditions under which the licences are granted, may be obtained from TBS.

Annex A

Determination of ascorbyl palmitate

A-1 Principle

The product form is dissolved in ethanol containing 0.2 % of oxalic acid as stabilizer. This solution is analyzed using reversed-phase HPLC monitored with a UV-detector set at 254 nm.

A-2 Reagents and equipment

-Methanol
-Ethanol
-1, 2-Dithiothreitol Acetic acid,
-Sodium acetate trihydrate,
-Oxalic acid dihydrate,
-Ascorbyl palmitate
-Laboratory balance, sensitivity 0.01 g
-Analytical balance, sensitivity 0.001 mg
-Centrifuge
-Glass ware (volumetric flasks, pipettes)
-Ultrasonic bath
-HPLC Apparatus

A-3 Extraction solution

Dissolve 2 g of oxalic acid dihydrate in a 1 L volumetric flask in ethanol and fill up to the mark.

A-4 Acetate buffer pH 3.8

Dissolve 36.8 g sodium acetate trihydrate in approximately 800 ml of water, add 101 ml acetic acid and fill up to 1000 ml with water. Check the pH and, if necessary, adjust to 3.8 using aqueous sodium hydroxide solution or diluted acetic acid.

A-5 Mobile phase

Mix in a 1 L volumetric flask 20 ml of acetate buffer pH 3.8, 130 ml of water and fill up to the mark with methanol.

A-6 Standard solution

Weigh accurately approximately 50 mg of ascorbyl palmitate standard in a 50 ml volumetric flask and dilute to the mark with extraction solution. This is the stock solution. Prepare from this solution a 1:10 dilution with the same extraction solution. This is dilution A.

Prepare from this solution A 1:10 dilution with the same extracting solution. This is solution B. The final concentration should approximately contain 10.0 µg/ml. Prepare every day freshly and store refrigerated.

A-7 Sample preparation and extraction

Weigh accurately approximately 0.5 g of the sample in a 25 ml volumetric flask. The flask is filled to the mark with extracting solution.

Shake the resulting suspension vigorously. Sonicate for 5 minutes at room temperature and centrifuge or filter through a 0.45 µm filter. 20µl of the clear solution are injected into the HPLC line.

HPLC-conditions

Stationary Phase	Nucleosil 100-5 C18 5µm, 125x4.0 mm
Mobile Phase	20 ml buffer, 130 ml water, make up to 1000 ml with methanol
Flow	0.8 ml/min
Temperature	ambient
Injection volume	20 µl
Detection	254 nm (Range 0.1)
Standard	10.0 µg/ml
Retention Time	ca. 6-8 min
Quantification	external standard method, peak area

A-8 Calculation

Calculate the content using the following equation:

$$\text{mg ascorbyl palmitate/kg} = \frac{A_S \times c \times F}{A_{ST} \times S_W}$$

Where:

A_S	is the peak area for ascorbyl palmitate obtained with the sample solution, in area units;
A_{ST}	is the peak area for ascorbyl palmitate obtained with the standard test solution, in area units;
F	is the dilution factor
c	is the concentration of ascorbyl palmitate in the standard test solution [µg/ml]
S_W	is the sample weight in g.

A-9 Remarks

The retention times can vary due to aging of the columns. Usually a regeneration of the column can be achieved by pumping methanol containing 5 % water through the column for 5-6 hours.