



CD/K/559:2010  
ICS 67.120.30

## **EAST AFRICAN STANDARD**

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**Sardine oil — Specification**

**EAST AFRICAN COMMUNITY**

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

## 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

Sardine oil is an important fisheries product obtained from oil-sardine (*Sardinella longiceps*) fish. Recently a few modern oil plants have come into operation and more are expected to come up in future. With the increase in the price of vegetable oil, the demand for sardine oil as an industrial raw material for certain industries, is rising and is expected to rise more in future. It is, therefore, imperative that the quality of indigenously produced oil should be controlled so as to bring about expansion of its market as availability of sardine oil of desired quality will boost its demand. It is felt that the formulation of this standard would help in exercising quality control of sardine oil.

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

IS 5734:1970(R2005), *Specification for Sardine Oil*

CAC/RCP 52:2003(Rev. 4:2008), *Code of practice for fish and fishery products*

IS 4303-1:1975, *Code of hygienic conditions for fish industry — Part 1: Pre-processing stage*

IS 4303-2:1975, *Code of hygienic conditions for fish industry — Part 2: Canning stage*

Codex Alimentarius website: [http://www.codexalimentarius.net/mrls/vetdrugs/jsp/vetd\\_q-e.jsp](http://www.codexalimentarius.net/mrls/vetdrugs/jsp/vetd_q-e.jsp)

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

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

European Union: [http://ec.europa.eu/enterprise/sectors/pharmaceuticals/veterinary-use/maximum-residue-limits/index\\_en.htm](http://ec.europa.eu/enterprise/sectors/pharmaceuticals/veterinary-use/maximum-residue-limits/index_en.htm)

Assistance derived from these sources is hereby acknowledged.

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## Sardine oil — Specification

### 1 Scope

This standard prescribes the requirements and the methods of sampling and test for sardine oil.

### 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.

CAC/GL 21, *Principles for the establishment and application of microbiological criteria for foods*

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

CAC/GL 30, *Principles and guidelines for the conduct of microbiological risk assessment*

ISO 16035, *Animal and vegetable fats and oils — Determination of low-boiling halogenated hydrocarbons in edible oils*

CD/K/572:2010, *Fish and fisheries products — Methods of sampling*

CAC/RCP 52[CD/K/521:2010], *Code of practice for fish and fishery products*

EAS 35, *Edible salt — Specification*

EAS 12, *Drinking (potable water) — Specification*

EAS 38, *Labelling of prepackaged foods — Specification*

EAS 41, *Fruits, vegetables and derived products — Sampling and methods of test*

EAS 101 *Food stuffs — Methods of determining of arsenic content*

EAS 103, *Schedule for permitted food additives*

EAS 123, *Distilled water — Specification*

EAS 291, *Animal and vegetable fats and oils — Sampling*

EAS 305, *Animal and vegetable fats and oils — Sample preparation*

EAS 306, *Animal and vegetable fats and oils — Determination of peroxide value*

EAS 307, *Animal and vegetable fats and oils — Determination of acid value and acidity*

EAS 308, *Animal and vegetable fats and oils — Determination of unsaponifiable matter*

EAS 309, *Animal and vegetable fats and oils — Determination of iodine value*

EAS 310, *Animal and vegetable fats and oils — Determination of refractive index*

EAS 311, *Animal and vegetable fats and oils — Determination of moisture and volatile matter*

EAS 312, *Animal and vegetable fats and oils — Determination of insoluble impurities*

EAS 313, *Animal and vegetable fats and oils — Determination of saponification value*

EAS 314, *Animal and vegetable fats and oils — Determination of lead*

EAS 315, *Animal and vegetable fats and oils — Determination of copper, iron and nickel*

EAS 318, *Animal and vegetable fats and oils — Determination of soap content*

EAS 303, *Animal and vegetable fats and oils — Determination of solid fat content — Pulsed nuclear magnetic resonance method*

EAS 319, *Animal and vegetable fats and oils — Determination of melting point in open capillary tubes (slip point)*

### 3 Grades

3.1 The material shall be of two grades, namely, Grade 1 and Grade 2. Grade 1 is intended for food and pharmaceutical products, while Grade 2 for other industrial uses. Grade 1 shall satisfy the requirements given in 4.1, 4.2, 4.3.5 and SI No. (i) of Table 1 in addition to the requirements for Grade 2.

Table 1 — Requirements for sardine oil

S/No.	Characteristic	Requirement		Method of test
		Grade 1	Grade 2	
(1)	(2)	(3)	(4)	(5)
(i)	Free fatty acids as % oleic acid, w/w, Max	1	3	Annex A
(ii)	Moisture, % by weight, Max	0.5	0.5	
(iii)	Iodine value (Wijs)	145 to 180	145 to 180	
(iv)	Saponification value	185 to 205	185 to 205	
(v)	Unsaponifiable matter, % w/w, Max	2	2	
(vi)	Refractive index (40 °C)	1.473 9 to 1.477 1	1.473 9 to 1.477 1	

3.2 The level of contaminants in sardine oil shall conform to the limits specified in Table 2.

Table 2 — Limits for contaminants in sardine oil

Contaminants	Maximum level	Test method
Insoluble impurities, % m/m	0.05	EAS 312
Soap content, % m/m	0.005	EAS 318
Iron, mg/kg	1.5	EAS 315
Copper, mg/kg	0.1	EAS 315
Lead, mg/kg	0.1	EAS 314
Arsenic, mg/kg	0.1	EAS 101
Nickel, mg/kg	0.1	EAS 315

### 3.3 Pesticide residues

The maximum levels of pesticide residues in edible fats and oils shall conform to the internationally accepted levels recommended by Codex Alimentarius Commission.

## 4 Requirements

### 4.1 Fish

The product shall be prepared from oil-sardine (*Sardinella longiceps*) or its offal or from any other portion of the fish. The Grade 1 shall be from fresh or well preserved or frozen sound wholesome oil-sardine fish, either whole or dressed body portion (that is without head, entrails and tail fin).

### 4.2 Preparation

The product shall be prepared either (a) by cooking, pressing and separating oil from press-liquor by centrifugation or by any other suitable means or (b) by extraction with solvent or solvent mixtures. Grade 1 oil shall be prepared by the former method only, under hygienic conditions complying with CAC/RCP 1, CAC/RCP 52 and duly approved or licensed by the authorities concerned.

### 4.3 Finished product requirement

**4.3.1** Sardine oil shall be free from adulterants and other foreign matters in settled or suspended condition, and separated water. The product shall give a bright and clear liquid when heated to a temperature of 40°C.

**4.3.2** Sardine oil shall be free from any other kind of oil including mineral oils when tested according to the methods prescribed in ISO 16035.

**4.3.3** Sardine oil shall be free from foul and offensive putrefactive odour and should have only characteristic fish-oil odour.

**4.3.4** Sardine oil shall be of greenish/straw/light/golden yellow or light brown colour.

**4.3.5** Grade 1 shall produce a yellow or light brown colour and not a brown or dark-coloured mixture on saponification with N/2 alcoholic potassium hydroxide.

**4.3.6** Material shall also conform to the requirements given in Table 1.

## 5 Packing and marking

### 5.1 Packing

The material shall be packed in containers as agreed to between the purchaser and the vendor. Sardine oil intended for food and pharmaceutical products shall be packed in an inert atmosphere so as to prevent deterioration of the oil.

### 5.2 Marking

The containers shall be marked or labelled with the following particulars:

- a) Name and grade of oil,
- b) Name and address of the manufacturer,
- c) Net weight of contents,
- d) Date of manufacture in code,
- e) Trade-make (if any), and
- f) Batch/lot number in code (for Grade 1 oil only).

**5.2.1** Each container may also be marked with a Certification Mark.

## 6 Sampling

Representative samples of the material shall be drawn as prescribed in EAS 291.

## 7 Tests

7.1 Tests shall be carried out according to the methods prescribed in Table 1.

7.2 Pure chemicals and distilled water (see EAS 123) shall be used in test.

NOTE 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the analytical results.

7.3 Tests for all the characteristics and other requirements shall be conducted on the composite sample.

7.4 **Criterion of conformity** — A lot shall be declared as conforming to the requirements of this specification, if the test results for all the characteristics satisfy the relevant requirements as specified (see Clause 4).

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## Annex A (normative)

### Determination of free fatty acids

#### A.1 Apparatus

A.1.1 **Erlenmeyer Flask** - 250 ml capacity.

#### A.2 Reagent

**A.2.1 Ethyl Alcohol (95 Percent) or Methylated Spirit** – The alcohol should give a distinct and sharp point with phenolphthalein and shall be neutralized with alkali to a faint permanent pink colour before using.

**A.2.2 Indicator Solution** — 1 percent phenolphthalein in 95 percent ethanol; and for dark coloured oil, **0.025** percent of Dr Grubler's aniline blue in 99 percent isopropanol.

**A.2.3 Sodium Hydroxide Solution** — accurately standardized

#### A.3 Procedure

**A.3.1** Mix well and melt the sample completely to a liquid before weighing. Use Table A.1 to determine the quantities to be used with various ranges of fatty acids.

**Table A.1 — Determination of quantities for test**

Sl/No.	Free fatty acid range	Sample	Volume of alcohol	Strength of alkali
(1)	(2)	(3)	(4)	(5)
	%	g	ml	
(i)	0.002 – 0.2	56.4 ± 0.2	50	0.1 N
(ii)	0.2 to 1.0	28.2 ± 0.2	50	0.1 N
(iii)	1 and above	7.05 ± 0.05	75	0.25 N

**A.3.2** Weigh the designated size of sample into an Erlenmeyer flask. Add specified volume of hot neutralized (with phenolphthalein) alcohol and 2 ml of indicator. Titrate with alkali shaking vigorously until appearance of the first permanent pink colour of the same intensity as that of the neutralized alcohol before the addition of the sample. The colour should persist for 30 seconds.

#### A.4 Calculation

$$\text{Free fatty acids as oleic acid, percent} = \frac{\text{Volume of alkali} \times N \times 28.2}{\text{Weight of sample}}$$

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