

## EAST AFRICAN STANDARD

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### Fresh and frozen scallop — Specification



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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East African Community

P O Box 1096

**Arusha**

Tanzania

Tel: 255 27 2504253/8

Fax: 255-27-2504481/2504255

E-Mail: [eac@eachq.org](mailto:eac@eachq.org)

Web: [www.each.int](http://www.each.int)

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## Introduction

This standard for fresh or frozen scallop meats, scallops with roe attached, and whole scallops defines minimum acceptability for taint, decomposition, unwholesomeness and other requirements, other than weight, and describes methods for determining that acceptability.

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

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.mrlatabase.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.

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

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## Fresh and frozen scallop — Specification

### 1 Scope

This standard applies to all fresh or frozen or previously frozen shucked-scallop meats (adductor muscle) with or without roe attached and whole scallops from any species of the family *Pectinidae*. Fresh or frozen scallops shall be prepared from sound, wholesome raw material processed using good manufacturing practices.

### 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*

CAC/GL 31, *Guidelines for the sensory evaluation of fish and shellfish in laboratories*

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 103, *Schedule for permitted food additives*

EAS 123, *Distilled water — Specification*

ISO 4831, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of coliforms — Most probable number technique*

ISO 4832, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coliforms — Colony-count technique*

ISO 4833, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of microorganisms — Colony-count technique at 30 degrees C*

ISO 6579, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of *Salmonella* spp.*

ISO 6887-1, *Microbiology of food and animal feeding stuffs — Preparation of test samples, initial suspension and decimal dilutions for microbiological examination — Part 1: General rules for the preparation of the initial suspension and decimal dilutions*

ISO 6887-3, *Microbiology of food and animal feeding stuffs — Preparation of test samples, initial suspension and decimal dilutions for microbiological examination — Part 3: Specific rules for the preparation of fish and fishery products*

ISO 6888-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 1: Technique using Baird-Parker agar medium*

ISO 6888-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 2: Technique using rabbit plasma fibrinogen agar medium*

ISO 6888-3, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 3: Detection and MPN technique for low numbers*

ISO 7251, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of presumptive Escherichia coli — Most probable number technique*

ISO 7937, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of Clostridium perfringens — Colony-count technique*

ISO 13720, *Meat and meat products — Enumeration of Pseudomonas spp.*

ISO 17239, *Fruits, vegetables and derived products — Determination of arsenic content — Method using hydride generation atomic absorption spectrometry*

ISO 6634, *Fruits, vegetables and derived products — Determination of arsenic content — Silver diethyldithiocarbamate spectrophotometric method*

ISO 21567, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Shigella spp.*

ISO/TS 21872-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of potentially enteropathogenic Vibrio spp. — Part 1: Detection of Vibrio parahaemolyticus and Vibrio cholerae*

ISO/TS 21872-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of potentially enteropathogenic Vibrio spp. — Part 2: Detection of species other than Vibrio parahaemolyticus and Vibrio cholerae*

ISO 11290-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of Listeria monocytogenes — Part 1: Detection method*

ISO 11290-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of Listeria monocytogenes — Part 2: Enumeration method*

### 3 Description

#### 3.1 Product definition

A **scallop** is a marine bivalve mollusc of the family **Pectinidae**. Scallops are a cosmopolitan family, found in all of the world's oceans. Many scallops are highly prized as a food source. The brightly-colored, fan-shaped shells of some scallops with their radiating fluted pattern are valued by shell collectors.

The name "scallop" is derived from the Old French *escalope*, which means "shell".

Like the true oysters (family Ostreidae), scallops have a central adductor muscle, and thus the inside of their shells has a characteristic central scar, marking the point of attachment for this muscle. The adductor muscle of scallops is larger and more developed than that of oysters, because they are active swimmers; scallops are in fact the only migratory bivalve. Their shell shape tends to be highly regular, recalling one archetypal form of a seashell, and because of this pleasing geometric shape, the scallop shell is a common decorative motif. They also possess eyes with a lens and retina, which

are more complex compared to other bivalves. Their eyes can't see shapes, but can detect light and motion.

Most scallops are filter feeders, and eat plankton. Coincidentally, the plankton can include scallop larvae. Siphons bring water over a filtering structure, where food becomes trapped in mucus. Next, the cilia on the structure moves the food toward the mouth. Then, the food is digested in the stomach and digestive gland. Waste is passed on through the intestine and exits via the anus.

Most scallops are free-living, but some species can attach to a substrate by a structure called a byssus, or even be cemented to their substrate as adults (e.g. *Hinnites spp.*). Other scallops can extend a "foot" from between their valves (shell). By then contracting the foot, they can burrow themselves deeper into sand. A free-living scallop can swim, by rapidly opening and closing its shell. This method of locomotion is also a defensive technique, protecting it from threatening predators. Some scallops can make an audible soft popping sound as they flap their shells underwater, leading one seafood vendor to dub them "singing scallops".

The scallop family is unusual in that some members of the family are dioecious (males and females are separate), while other are simultaneous hermaphrodites (both sexes in the same individual) and a few are protoandrous hermaphrodites (males when young then switching to female). Red roe is that of a female, and white, that of a male. Spermatozoa and ova are released freely into the water during mating season and fertilized ova sink to the bottom. After several weeks, the immature scallop hatches and the larvae drift in the plankton until settling to the bottom again to grow, usually attaching by means of byssal threads. Some scallops, such as the Atlantic bay scallop *Argopecten irradians* are short lived, while others can live 20 years or more. Age can often be inferred by annuli, the concentric rings of their shells.

### **3.2 Forms of product presentation**

#### **3.2.1 Adductor Muscle Only**

- a) Fresh — Whole adductor muscles.
- b) IQF — Individually quick-frozen whole adductor muscles.
- c) Block — Whole adductor muscles frozen together in a uniform block.

#### **3.2.2 Adductor Muscle with Roe Attached**

- a) Fresh — Whole adductor muscles with roe attached.
- b) IQF — Individually quick-frozen whole adductor muscles with roe attached.
- c) Block — Whole adductor muscles with roe attached frozen together in a uniform block.

#### **3.2.3 Whole Scallops**

- a) Fresh — Live scallops marketed in the shell.
- b) IQF — Individually quick-frozen whole scallops marketed in the shell.

#### **3.2.4 Other Presentations**

Any other presentation of the product may be permitted provided that it:

- a) is sufficiently distinctive from the forms of presentation set out above;
- b) meets all Canadian regulatory requirements; and
- c) is adequately described on the label and in accordance with all regulatory labelling requirements.

## 4 Essential composition and quality factors

### 4.1 Shellfish

Canned scallops shall be prepared from sound shellfish of the species designated in 3.1 which are alive immediately prior to the commencement of processing and of a quality suitable for human consumption.

### 4.2 Other ingredients

The packing medium and all other ingredients used shall be of food grade quality and conform to all applicable East African Standards.

### 4.3 Final product

Products shall meet the requirements of this Standard when lots examined in accordance with Section 10 comply with provisions set out in Section 9. Products shall be examined by the methods given in Section 8.

## 5 Food additives

Only the use of the following additives is permitted.

<b>Additive</b>	<b>Maximum Level in the final product</b>
<u>Acidity Regulators</u>	
330 Citric acid	GMP 10 mg/kg expressed as P <sub>2</sub> O <sub>5</sub> , singly or in combination (includes natural phosphate)
338 Orthophosphoric acid	
450 Disodium diphosphate	
<u>Sequestrant</u>	
385 Calcium disodium EDTA 250 mg/kg	
<u>Flavour Enhancer</u>	
621 Monosodium glutamate	GMP

## 6 Hygiene and handling

6.1 The final product shall be free from any foreign material that poses a threat to human health.

6.2 When tested by appropriate methods of sampling and examination prescribed by the Codex Alimentarius Commission (CAC), the product:

- (i) shall be free from micro-organisms capable of development under normal conditions of storage; and
- (ii) shall not contain any other substance including substances derived from microorganisms in amounts which may represent a hazard to health in accordance with standards established by the CAC; and
- (iii) shall be free from container integrity defects which may compromise the hermetic seal.

6.3 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of CAC/RCP 1 and CAC/RCP 52.

6.4 The material shall also satisfy the limits for heavy metals and microbiological activity prescribed in Table 1.

**Table 1 — Microbiological and heavy metal limits for canned tuna and bonito**

Type of contaminant		Maximum limit (mg/kg)	Method of test
(i)	Microbiological requirements	Shall be commercially sterile	See J.5.1; CD/K/551:2010
(i)	Arsenic	1.0	EAS 41
(iii)	Copper	0.4	EAS 41
(iv)	Tin	250.0	EAS 41
(v)	Mercury	0.5	EAS 41
(vi)	Lead	0.3	EAS 41
(vii)	Cadmium	0.3	EAS 41
(viii)	Zinc	50.0	EAS 41
(ix)	Histamine content, mg/100 crab meat, max	20.0	Annex B

## 7 Labelling

In addition to provisions of EAs 38 the following specific provisions apply:

### 7.1 Name of the food

The name of the product shall be "Scallops" or "Scallop Meats" except as noted below:

- a) Scallops of the species *Argopecten gibbus* and *Argopecten irradians* shall be designated as "Calico Scallops" and "Bay Scallops" respectively.
- b) If desired, "X Scallops" may be used where "X" is the name of a country or geographic area from which the scallops originate, or where "X" is the common name of the species.
- c) Whole scallops and scallops with roe attached shall be designated as such.
- d) Pieces of scallop meats shall be identified with an appropriate name such as "Scallop Pieces".
- e) Any descriptive terms used must accurately represent the contents of the container.
- f) Green Tube is defined as the rear portion of the intestinal tract which is normally green in colour but may be white or gray.
- g) Viscera is defined as all internal organs including roe, but does not include the rear portion of the intestinal tract, referred to as the "green tube".
- h) Adductor Muscle With Roe Attached: It is recognized that viscera for Adductor Muscle With Roe Attached means all viscera except the roe.

**7.1.2** In addition, the label shall include other descriptive terms on the can that will avoid misleading or confusing the consumer.

## 8 Sampling, examination and analyses

### 8.1 Sampling

**8.1.1** The sampling and tolerance plans in CD-K-572:2010 shall be used to determine the acceptability of the lot. The sampling plans dictate the minimum sample size to be taken. If in the opinion of the inspector it is necessary to obtain more than the minimum sample size specified, the

number of sample units taken must correspond to a sample size in the plan with a corresponding acceptance number.

**8.1.2** Sampling of lots for the sensory examination of the product shall be in accordance with CD-K 572:2010 except that a lower acceptance number for decomposition shall be used as indicated in the sampling tables. The tables specify the minimum number of sample units to be used for the following types of inspections:

- a) Level I — Sensory examinations of all products subject to inspection other than lots which are subject to reinspection.
- b) Level II — Sensory examinations of all products which are under reinspection.

**8.1.3** The sample unit shall consist of a container of scallops and the entire contents thereof. For IQF and fresh bulk packages 2.00 kilograms or greater, a 1 kilogram sub-sample of product may be obtained if the sub-sample is representative. When sub-samples are taken, each sub-sample shall be obtained from a different unit. If a representative sub-sample cannot be obtained the entire unit must be examined.

### **8.2 Sensory and physical examination**

Samples taken for sensory and physical examination shall be assessed by persons trained in such examination and in accordance with CAC/GL 31.

### **8.3 Determination of net weight**

Net weight of all sample units shall be determined by the following procedures:

- (i) Weigh the unopened container.
- (ii) Open the container and remove the contents.
- (iii) Weigh the empty container, including the end and any wrapping material, after removing excess liquid and adhering meat.
- (iv) Subtract the weight of the empty container and any wrapping material from the weight of the unopened container. The resultant figure is the net content.

### **8.4 Determination of drained weight**

The drained weight of all sample units shall be determined by the following procedures:

- (i) Maintain the container at a temperature of between 20 °C and 30 °C for a minimum of 12 hours prior to examination.
- (ii) Open the container and distribute the contents on a pre-weighed circular sieve having a wire mesh with square openings of 2.8 mm x 2.8 mm.
- (iii) Remove all wrapping material and incline the sieve at an angle of approximately 17-20° and allow the meat to drain two minutes, measured from the time the product is poured onto the sieve.
- (iv) Weigh the sieve containing the drained scallop.
- (v) Determine the weight of drained shellfish by subtracting the mass of the sieve from the mass of the sieve with drained product.

### **8.5 Examination**

The methodology described in this section outlines the procedure for the examination of scallop products. The examination shall be made on final products in the fresh, frozen and/or defrosted state for tainted, decomposed or unwholesome conditions and for failure to meet standards of identity.

### 8.5.1 Examination for frozen state defects

The frozen scallops in the container are examined for the presence of freezer burn, i.e., dehydration which can only be removed with a knife or other sharp instrument.

#### 8.5.1.1 Dehydration — Block

The area affected by dehydration is measured and the total surface area of the block is determined. Inspectors shall then determine the percent area affected by using the following calculation:

$$\% \text{ of dehydration} = \frac{\text{Area affected}}{\text{Total surface area}} \times 100$$

#### 8.5.1.2 Dehydration - IQF

In the case of IQF scallops, the weight of individual scallops affected by dehydration is determined. The total weight of scallops in the sample unit is also determined. Inspectors shall then calculate the percentage of scallops affected by using the following calculation:

$$\% \text{ of scallops affected} = \frac{\text{Weight of affected scallops}}{\text{Weight of scallops in sample unit}} \times 100$$

### 8.5.2 Examination of Fresh or Defrosted Scallop Packs

The fresh or defrosted sample unit is examined in its entirety for defects.

### 8.5.3 Determining the Cause for Rejection of a Sample Unit

Scallops within the sample units shall be classified according to whether they are acceptable or not acceptable. If not acceptable, the scallops will be classified as decomposed, tainted or unwholesome. Should the scallops be both tainted and decomposed, for the purpose of the application of this standard and the interpretation of the sampling plan, the scallops are deemed to be decomposed. In the case of tainted and/or decomposed scallops, the affected scallops are weighed to determine the percent of the sample unit which is affected in each category. The calculation is performed as follows:

$$\% \text{ Decomposed scallops} = \frac{\text{Weight of scallops affected}}{\text{Actual weight of sample}} \times 100$$

$$\% \text{ Tainted scallops} = \frac{\text{Weight of scallops affected}}{\text{Actual weight of sample}} \times 100$$

### 8.5.4 Classification of defectives

A sample unit of scallops shall be classified as defective when one or more of the following conditions are encountered:

- a) **Decomposed:** When more than 10% of the actual weight of the scallops, as calculated in section 8.3 are found to be decomposed, the sample unit is considered decomposed as described in section 9.2.
- b) **Tainted:** When more than 10% of the actual weight of the scallops, as calculated in section 8.3 are found to be tainted, the sample unit is considered tainted as described in section 9.1.
- c) **Tainted/Decomposed:** The sample unit is considered tainted/decomposed when assessed individually and the quantity of tainted or decomposed scallops is each less than 10%, as calculated in section 8.3, but when in combination the quantity of tainted and decomposed scallops exceeds 10% of the actual weight, the sample unit is tainted/decomposed as described in section 9.3.

d) **Unwholesome** when:

- i) the sample unit is affected by the presence of **foreign material** which exceeds the tolerance described in section 6.4.1 b) or c); or
- ii) the sample unit is affected by the presence of **undesirable parts** which exceeds the tolerance described in 9.4.2; or
- iii) the sample unit is affected by the presence of **other defects** which exceeds the tolerances as described in section 9.4.3.

e) **Standard of identity** when:

- i) the count of scallop meats in the sample unit is greater than the declared count; or
- ii) a unit labelled as scallop meats contains more than 5% by weight of Scallop Pieces.

## 9 Definition of defects

### 9.1 Taint

A unit will be considered tainted when more than 10% of the actual weight is affected by any of the following conditions:

a) **Rancid**

- Odour characterised by the distinct or persistent odour of oxidized oil; or
- Flavour characterised by that of oxidized oil which leaves a distinct bitter aftertaste.

b) **Abnormal**

- Distinct and persistent uncharacteristic odours or flavours such as metallic, burnt or acrid and not defined as rancid or decomposed.

### 9.2 Decomposition

A unit will be considered decomposed when more than 10% of the actual weight is affected by the following condition:

Odour or Flavour — Persistent, distinct and uncharacteristic odour or flavour associated with spoilage, including but not limited to the following: ammonia, bilge, faecal, fruity, hydrogen sulphide, musty, putrid, saltfish-like, vegetable, turnip or yeasty.

### 6.3 Taint/Decomposed

A sample unit shall be classified as defective when more than 10% of the actual weight of the sample unit is affected by any combination of tainted or decomposed conditions.

### 6.4 Unwholesome

#### 6.4.1 Foreign material

- a) **Critical foreign material** — A lot will be considered defective for all forms of product presentation when any of the following conditions are found:
  - i) the presence of any material which poses a threat to human health (such as glass, etc.); or

- ii) distinct and persistent odour or flavour of any material which poses a threat to human health (such as solvents, fuel oil, etc.).
- b) **Foreign material** — A unit will be considered defective for all forms of product presentation when the following condition is found:
  - the presence of readily detectable material which has not been derived from scallops but does not pose a threat to human health (such as insect pieces, wood, etc., except sand and seaweed as described below).
- c) **Habitat-related foreign material** — A unit will be considered defective for all forms of product presentation when any of the following conditions are found:
  - i) piece(s) of seaweed which measures 25 mm in any dimension singularly or in combination, based on a unit size of 1 kg and pro-rated to smaller or larger sample units; or
  - ii) the presence of sand affecting more than 10% of the sample unit by weight.

#### 6.4.2 Undesirable parts

A unit will be considered defective for all forms of product presentation when the following condition is found:

- piece(s) of shell fragments which measure greater than 10 mm in any dimension singularly or in combination, based on a unit size of 1 kg and pro-rated to smaller or larger sample units.

#### 6.4.3 Other defects

A lot will be considered defective for all forms of product presentation when any of the following conditions are found:

- a) **Moisture content** — Scallop meats exceeding the action level of 81.0% for moisture content.
- b) **Viscera excluding green tube** — Scallop meats, scallops with roe attached, and whole scallops must satisfy the requirement of the policy relating to biotoxins (see Annex A).

NOTE The presence of a trace amount of membrane or a stain, due to viscera, roe, etc. is not a defect for the purpose of this standard.

A unit will be considered defective for all forms of product presentation when any of the following conditions are found:

- c) **Workmanship defect: Viscera excluding green tube** — The presence of viscera affecting more than 10% of the sample by weight, where it has been demonstrated that the toxicity associated with the viscera satisfies the requirements of the policy relating to biotoxins according to section 9.4.3 b).
- d) **Dehydration (Freezer Burn)**
  - i) Block: More than 10% of the surface area of the sample unit is affected by dehydration.
  - ii) IQF: More than 10% of the scallops by weight, in the sample, are affected by dehydration.
- e) **Parasites** — For packs of 1 kg and greater, when the number of parasites per kg of sample unit is equal to or greater than 2.

For packs of less than 1 kg, when an average parasite per kg of the total sample is equal to or greater than 1.

**Example:**

A sample consisting of 13 sample units each weighing 500 grams would be considered defective if 7 or more parasites were found.

- Total weight of sample:  $500 \text{ g} \times 13 = 6.5 \text{ kg}$
- Parasites per kilogram:  $7 \text{ parasites}/6.5 \text{ kg} = 1.07$

Calico Scallops: For the species *Agropectin gibbus*, the presence of parasites affecting equal to or greater than 10% of the sample by weight.

- f) **Green Tube** — When the rear portion of the intestinal tract, the "green tube", is longer than the catch muscle and more than 10% by weight of the scallops in the pack are affected by the presence of the "green tube" (see Annex C).

## 6.5 Standard of identity

- a) **Size designation** — When a count range is declared, a sample unit will be considered defective if the count is greater than the range specified on the label.
- b) **Scallop meats** — A 5% tolerance by sample weight will be applied to the presence of pieces of scallop meats found in scallop packs. Product exceeding this tolerance shall be identified with an appropriate name such as "Scallop Pieces".

"Scallop Pieces"

When the product is graded according to count, a scallop is considered to be a scallop piece when the weight of the scallop piece is less than fifty percent (50%) of the average weight of ten (10) whole scallops representing the highest count in the pack.

Example: 30-40 count pack

- Average weight of ten (10) whole scallops representing the highest count in the pack: In this example, add together the weight of ten whole scallops representing the 40 count and divide the total weight by ten.  $(11.4 + 11.6 + 11.4 + 11.6 + 11.8 + 11.6 + 11.8 + 11.6 + 11.6 + 11.4)/10 = 11.58 \text{ grams}$
- Fifty percent (50%) of the average weight:  $11.58 \times .5 = 5.79 \text{ grams}$
- Scallop Piece: any piece of scallop less than 5.79 grams.

When the product is not graded according to count, a scallop will be considered to be a scallop piece when the weight of the scallop piece is less than fifty percent (50%) of the average weight of ten (10) whole scallops contained in the pack.

Example:

- average weight of ten (10) whole scallops contained in the pack: Add together the weight of ten whole scallops in the pack and divide the total weight by ten.  $(9.1 + 9.3 + 9.5 + 9.5 + 9.4 + 9.6 + 9.4 + 9.3 + 9.2 + 9.2)/10 = 9.35 \text{ grams}$
- fifty percent (50%) of the average weight:  $9.35 \times .5 = 4.67 \text{ grams}$
- Scallop Piece: any scallop piece less than 4.67 grams.

## 10 Lot acceptance

A lot shall be considered as meeting the requirements of this standard when:

- (i) not any single instance of critical foreign matter occurs; or

- (ii) there is no occurrence of viscera which presents a health and safety hazard due to the presence of marine biotoxin; or
- (iii) scallop meats do not exceed the action level for moisture; or
- (iv) the total number of sample units found defective for taint, decomposition or unwholesomeness, individually or in combination, does not exceed the acceptance number for the sample size designated in the sampling plans in CD-K-572:2010; or
- (v) the total number of sample units found defective for decomposition does not exceed the acceptance number (c) shown in parentheses for the sample size designated in the sampling plans in CD-K-572:2010; or
- (vi) the average net weight and the average drained weight of all sample units examined is not less than the declared weight and provided there is no unreasonable shortage in any individual container;
- (vi) the Food Additives, Hygiene and Labelling requirements of Sections 5, 6, and 7 are met.
- (vii) the total number of sample units found defective for standards of identity (style of presentation) and size designation or count range (if a size designation or count range is declared), does not exceed the acceptance number for the sample size designated in the sampling plans.



Frozen scallops



Fresh scallops



Prepared scallops

East African Standard

Draft



Live scallops

Draft for comments only

Standard



Prepared scallops

Draft for comments only — Not to be used

**Annex A**  
(normative)

**Marine biotoxins in scallops**

Marine biotoxins constitute a health and safety hazard associated with scallops. Marine biotoxins accumulate predominantly in the viscera of the scallop, although low levels of amnesic shellfish poison and paralytic shellfish poison may occur in the adductor muscle. Processors and importers of scallops in are required to control the chemical hazard of marine biotoxins in scallops.

Control is accomplished by:

- a) producing scallops which are free of viscera, as determined by a sampling plan described by the International Commission on Microbiological Specifications for Foods (ICMSF). That is, for any lot size, sample size (n) = 5; acceptance number (c) = 0; or
- b) if lots contain viscera in excess of the incidence described above in (a), test the lot for toxicity in accordance with Annex D.

<sup>1</sup> See ICMSF "Microorganisms in Foods 2, Sampling for Microbiological Analysis: Principles and Specific Applications", Ch. 3, Table 2, pg. 22.

**Annex B**  
(normative)**Determination of histamine****B.1 Introduction**

**B.1.1 Principle** — Histamine is extracted with methanol and derivatized with o-phthalaldehyde (OPT) to generate the fluorescent product. This method is used to determine the histamine content in raw, pre-cooked, and canned tuna.

**B.1.2 Interference** — All methods of histamine determination are overwhelmed with interfering substances which have to be removed in order to accurately measure the histamine present. The two naturally occurring substances that cause the most interference are histamine and spermidine since they also react with OPT to form fluorescent products. However, spermidine, the major contaminant in extracts can be separated from histamine on cellulose phosphate cation-exchange columns. There is also variability due to the pH and temperature sensitivity of the o-phthalaldehyde-histamine fluorophor. Because of the ubiquity of interfering fluorophors, all reagents used must be of the highest obtainable purity. Exposure of any of the materials involved to rubber or silicones may produce erratic results. It is recommended that polyethylene labware be used in place of glass, due to an observed loss of fluorescence. All labware should be acid-washed and rinsed in distilled water prior to use. New solution must be prepared after four to seven days, due to an observed increase in blank readings.

**B.1.3 Summary of method** — The histamine-containing material are homogenized and extracted with methanol. The extract can then be passed through an anion exchange column to remove any remaining interfering substances. The elutant is reacted with the OPT reagent and allowed to stand for 4 minutes. The mixture is acidified with  $H_3PO_4$  and the corresponding fluorescence is read on a calibrated instrument.

**B.2 Material required**

TD-360 Min-Fluorometer with U.V. optical configuration of (P/N 36000-010) 10 mm x 10 mm Methacrylate fluorescence cuvettes (P/N 7000-959).

**B.2.1 Labware** — All re-usable labware (glass, polyethylene, Teflon etc.) should be cleaned by soaking in laboratory grade detergent and water for 4 h, rinsed with tap water, deionized water, and methanol. It is recommended that polyethylene ware be used due to absorbency observed when using glass.

**B.2.1.1 Assorted Class A** calibrated pipettes

**B.2.1.2 Graduated cylinder** — 100 ml.

**B.2.1.3 Assorted Volumetric Flasks** — For preparing dilution standards.

**B.2.2 Chromatographic Columns (Kontes M.K 422250).**

**B.3 Reagents and standards**

**B.3.1 Ion Exchange Resin** — Sigma 1 x 8-200, chloride form 100-200 mesh: or BioRad AG1- x 8, 50-100 mesh, chloride form, Cat. No. 140-1431, or equivalent.

**B.3.2 Ion Sodium Hydroxide** — Dissolve 40 g NaOH in 1 Litre of distilled water.

**B.3.3 2.0N Sodium Hydroxide** — Dissolve 80 g NaOH in 1 Litre of distilled water.

**B.3.4 Histamine Dihydrochloride** — MCB X 0440 or J.T. Baker 1-N330.

**B.3.5 1.0N Hydrochloric Acid** — Add 83 ml concentrated HCL to about 500 ml distilled water. Cool and bring to 1-litre volume with distilled water.

**B.3.6 0.1N Hydrochloric Acid** — Add 100-mL 1N HCl to about 500-mL distilled water. Cool and bring to 1-Litre volume with distilled water.

### **B3.7 Methanol Reagent Grade**

**B3.8 0.1 % o-phthalaldehydol (OPT reagent)** — Phthalic dicarboxaldehyde (Aldrich, Milwaukee, WI), or o-phthaldialdehyde (Sigma, St. Louis, MO)  $C_6H_4(CHO)_2$ . F.W, 134.13. Dissolve 0.10 g OPT in 100-mL methanol. Store in an amber bottle and refrigerate when not in use. Prepare fresh weekly.

**B.3.9 3.57N Phosphoric Acid** — Add 121.8 ml of 85 %  $H_3PO_4$  to about 500-mL distilled water. Bring to 1- litre volume with distilled water.

**B.3.10 Histamine Standard Solution A, 1 mg Hm/ml** — Weigh 0.1656 g of histamine dihydrochloride into 100-ml volumetric flask. Dissolve in, and dilute to volume with 0.1N HCl.

**B.3.11 Histamine Standard Solution B, 10  $\mu$ g Hm/ml** — Dilute 1.0 ml Solution A to 100 ml with 0.1N HCL.

**B.3.12 Histamine Standard Solution A1 (This is our control solution)** — Dilute 1.0 ml Solution A to 100 ml with methanol.

**B.3.13 Histamine Standard Solution C, 0.1 mg Hm/ml** — Dilute 1.0 ml Solution B to 100 ml with 0.1N HCl.

**B.3.14 Histamine Standard Solution D, 0.2 M 0.2 M Hm/ml** — Dilute 2.0 ml Solution B to 100 ml with 0.1 N HCl.

**B.3.15 Histamine Standard Solution E, 0.3 mg Hm/ml** — Dilute 3.0 ml Solution B to 100 ml with 0.1N HCl.

NOTE Prepare Solution A and B monthly. Prepare Solutions C, D, E, and A1 weekly. Refrigerate solutions when not in use.

## **B.4 Preparation**

### **B.4.1 Resin preparation**

**B.4.1.1** Place 20 g of ion exchange resin in a beaker.

**B.4.1.2** Add 2 N sodium hydroxide to the resin in a ratio of 15 ml per gram of resin.

**B.4.1.3** Mix well and allow the resin to settle for a minimum of 15 minutes, but no more than 30 minutes. Decant liquid and repeat with additional 2 N sodium hydroxide.

**B.4.1.4** Wash resin thoroughly with distilled water to remove traces of the sodium hydroxide until pH is less than or equal to 8.5.

**B.4.1.5** Slurry resin with distilled water and transfer to a funnel containing a fluted filter paper. Thoroughly wash with distilled water.

**B.4.1.6** Transfer resin to a suitable container and make sure the distilled water level is above the resin level at all times.

### **B.4.2 Column preparation**

**B.4.2.1** Slurry sufficient prepared resin into each column to form a bed 8 cm in height. Maintain a liquid level above the top of the resin at all times.

**B.4.2.2** Refill columns with fresh resin at least twice per week.

## **B.5 Instrument set-up**

**B.5.1** Check that light source and filter holder are installed in your TD-360 Mini-Fluorometer. Turn on the instrument and allow to warm-up. For additional assistance, refer to your TD-360 Operating Manual.

**B.5.2 Blank with a reagent blank** — Calibrate instrument with the prepared histamine standard Solution E. Enter standard value of 3 000 mg/lm. Remember later to divide all reading by 10 000 to get mg Hm/ml of sample.

**B.5.3** Analyze Histamine Standard Solutions C and D like you would a sample. You now have a standard curve for your samples.

## **B.6 Procedure**

### **B.6.1 Sample preparation**

**B.6.1.1** Blend fish in a warring blender with an equal weight of deionized water to produce a 1:1 slurry.

**B.6.1.2** Transfer 10.0 g of the slurry to a 150-ml beaker. Add 40.0 ml of methanol and mix thoroughly.

**B.6.1.3** Using Whatman No.1 filter paper, or equivalent, filter the mixture into a suitable container. If the filtrate is to be saved for later analysis, refrigerate in a closed container.

NOTE Evaporation of methanol from the filtrate can cause erroneous results.

### **B.6.2 Histamine elusion**

**B.6.2.1** Pass 15-20-ml distilled water through the exchange column and discard.

**B.6.2.2** Place a 50-ml volumetric flask containing 5 ml in HCl at the column outlet.

**B.6.2.3** Pipette 1.0 ml of filtrate (methanol extract) onto the resin bed with 5.10 ml distilled water.

**B.6.2.4** Immediately initiate column flow. Flow should be maintained at a rate grater than 3 ml/min.

**B.6.2.5** When liquid level is slightly above the resin, add about 5-ml distilled water and allow it to flow through the resin. Repeat with distilled water in larger increments until total water through column is about 40 ml.

**B.6.2.6** *Discontinue Column Flow*

**B.6.2.7** Remove volumetric flask and bring to 50-ml volume with distilled water. Store column effluent in the refrigerator if necessary to postpone determination for more than 2 h.

### **B.6.3 Controls and blanks**

**B.6.3.1** At the beginning of a set of analysis, and again at the end, pass 1 ml of Solution A1 through one of the columns and proceed through the procedure as though it were a fish extract. Fluorescence readings should be very similar to Solution D reading. If readings are not within 20 per cent of Solution D, all analysis performed at the same time are suspect and should be repeated.

### **B.6.4 Histamine determination**

**B.6.4.1** Into separate 25-ml glass stoppered flask, pipette 5.0 ml of 0.1 HCl (Blank); Solutions C, D and E: and each diluted column effluent.

**B.6.4.2** Add 10 ml 0.1N HCl to each flask.

**B.6.4.3** Add 3 ml in NaOH. Mix thoroughly.

**B.6.4.4** Within 5 minutes, add 1 ml OPT solution and mix thoroughly.

**B.6.4.5** After exactly 4 minutes, add 3 ml 3.57 N H<sub>3</sub>PO<sub>4</sub> and mix immediately.

**B.6.4.6** Let solutions stand for 15-20 minutes and then determine the fluorescence intensities on the TD-360 Min-fluorometer. If a sample reading is greater than that of Solution E, dilute 25 ml of the column effluent to 100 ml with 0.1N HCl and proceed from B.6.4.1.

**CAUTION!** Fish with high salt content may cause problems with the resin necessitating more frequent changing of columns.

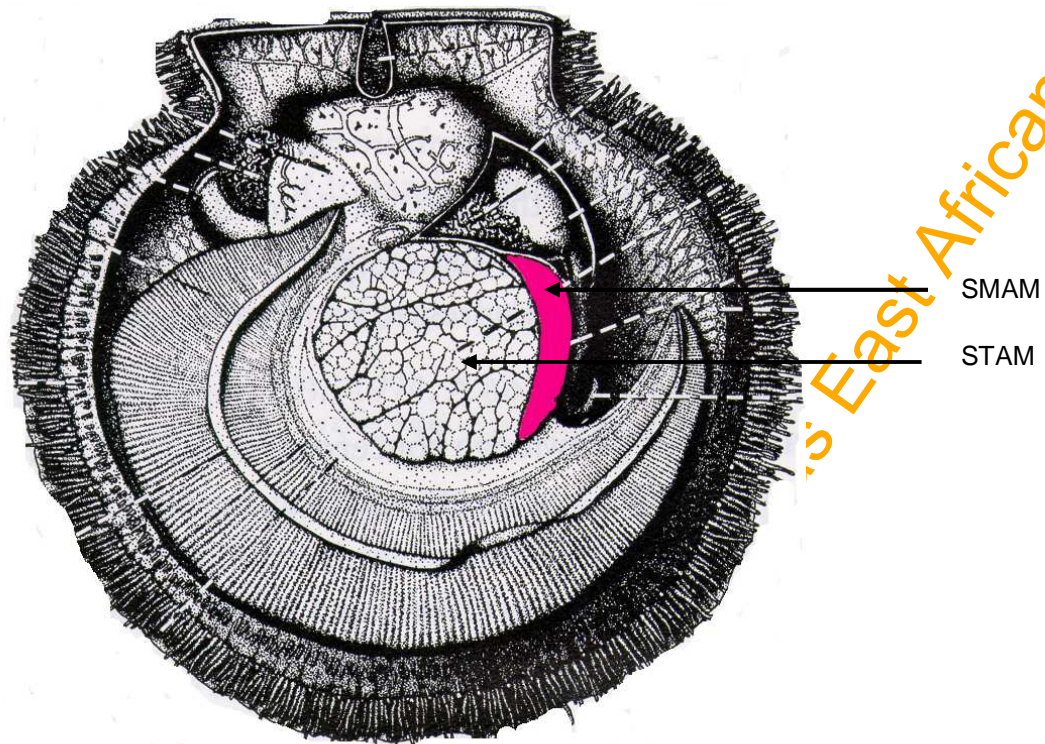
**B.6.4.7** If sample dilution was necessary in B.6.4.6, multiply the obtained result by 4.

**B.6.4.8** After all readings are obtained, divide all results by 10, 1 000 to get histamine concentration in mg Hm/ml

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**Annex C**  
(normative)

**Adductor muscle in scallops**



SMAM Smooth adductor muscle also known as the “catch muscle”

STAM Striated adductor muscle also known as the “scallop meat”

**Annex D**  
(normative)

**Guidelines for chemical contaminants and toxins in fish and fisheries products**

CONTAMINANTS	PRODUCT TYPE	ACTION LEVEL <sup>1</sup>
Mercury	All fish products (except swordfish, shark, fresh and frozen tuna, escolar, orange roughy and marlin)	0.5 ppm
	Swordfish, shark, fresh and frozen tuna, escolar, orange roughy and marlin	1.0 ppm
Arsenic	Fish protein concentrate	3.5 ppm
Lead	Fish protein concentrate	0.5 ppm
Fluoride	Fish protein concentrate	150 ppm
2,3,7,8 TCDD (Dioxin)	All fish products	20 ppt *UNDER REVIEW*
DDT and Metabolites (DDD and DDE)	All fish products	5.0 ppm
PCB	All fish products	2.0 ppm *UNDER REVIEW*
Piperonyl butoxide	Dried Cod	1.0 ppm
Other agricultural chemicals or their derivatives	All fish products	0.1 ppm

<sup>1</sup> Based on contaminants level of edible weight

**NOTES:**

**SAMPLING:** Samples to consist of a minimum of 5 units representative of the lot. Analysis may be carried out on a composite of all sample units.

**CRITERIA FOR ACTION:** A lot of fish will be considered reject if the sample value exceeds the action level. Fish or fish products exceeding these guidelines may be permitted for export if they do not violate regulations of the importing country.

Toxin	Product Type	Action Level
Histamine <sup>2</sup> (Scombroid Poisoning)	Enzyme Ripened Products (e.g. anchovies, anchovy paste, fish sauce)	20 mg / 100 g
	All other scombroid fish products(e.g. canned or fresh or frozen tuna, mackerel, mahi-mahi)	10 mg / 100 g
Saxitoxins (PSP) <sup>3</sup>	Molluscan shellfish (edible portion)	80 µg/100 g
Domoic Acid (ASP) <sup>3</sup>	Molluscan shellfish (edible portion)	20 µg/g
DTX-1 and Okadaic Acid	Molluscan shellfish (edible portion)	20 µg/100 g
(DSP) <sup>3</sup>	Molluscan shellfish (digestive tissue)	1 µg/g
Pectenotoxins:	Molluscan shellfish (edible portion)	20 µg/100 g
PTX-2, PTX-2 seco acid, PTX-2 seco acid 7 epi	Molluscan shellfish (digestive tissue)	1 µg/g

**ADDITIONAL COMMENTS:****Histamine<sup>2</sup>**

- Samples are collected according to Sampling Plan 1 (AQL 6.5) for Initial Inspection and Sampling Plan 2 (AQL 6.5) for Reinspection.
- Any sample exceeding 50 mg/100 g will result in the lot being rejected with no right to reinspection.
- The acceptance number is that corresponding to the number for decomposition.

**PSP, ASP and DSP<sup>3</sup>** (Paralytic Shellfish Poisoning, Amnesic Shellfish Poisoning - Domoic Acid, Diarrhetic Shellfish Poisoning - Okadaic Acid and/or DTX-1)

- Procedures for closures of shellfish areas, and possible recall of product due to samples of shellfish containing toxin levels equal to or greater than the above action levels shall be as regulated or in relevant East African Standards.
- The minimum acceptable sample is that which when shucked will produce 100 g of drained meats from 5 pooled sub-samples. Depending on the size of animals, the total number of shellfish required varies from 3 (geoducks) to 25 (pink scallops).

## BACKGROUND LEVELS FOR NON-PERMITTED ADDITIVES

ADDITIVE 4	PRODUCT TYPE	BACKGROUND LEVEL <sup>5</sup>
Nitrites	All fish and fish products (except marine mammal meat <sup>6</sup> )	15 ppm (see note 2)
Nitrates	All fish and fish products	15 ppm (see note 2)
Sulphites <sup>7</sup>	Clams (raw and canned)	10 ppm
Phosphates <sup>8</sup>	Shrimp (raw, cooked and canned)	1.60 %
	Scallops (raw)	1.47 %
	Fish fillets	1.37 %
	Crab (raw and cooked)	1.70 %
	Lobster (raw and cooked)	1.47 %
	Surf clams (raw and cooked)	1.00 %

<sup>4</sup> The compounds listed in this table are food additives; however some background levels may occur naturally in some foods.

<sup>5</sup> When the additive **is not** permitted, then the action level is the background level or detection limit; when the additive **is** permitted, then the action level is the background level or detection limit **plus** the permitted amount.

<sup>6</sup> Marine mammals, including seals are included in the definition of "fish". Sodium nitrite is permitted in marine mammal meats at the maximum level of 200 ppm.

<sup>7</sup> Calculated as sulphur dioxide.

<sup>8</sup> Calculated as sodium phosphate, dibasic.

**NOTES:**

1. If a processor can provide reliable data for naturally occurring background levels that are higher than those shown above, this may be considered before product action is taken.
2. Some herbs, including parsley, contain high levels of naturally occurring nitrates. This has to be considered when nitrates are detected in fish products containing herbs as an ingredient.

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