



CD/K/572:2010
ICS 67.120.30

EAST AFRICAN STANDARD

Fish and fisheries products — Methods of sampling

EAST AFRICAN COMMUNITY

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.

© East African Community 2010 — All rights reserved*

East African Community

P O Box 1096

Arusha

Tanzania

Tel: 255 27 2504253/8

Fax: 255-27-2504481/2504255

E-Mail: eac@eachq.org

Web: www.each.int

Introduction

East Africa has a large export potential in fish and fisheries products. There is ample scope for further increase of export as well as internal trade of fish and fisheries products if proper quality control measures are taken.

This standard is intended to introduce uniform methods of sampling to be adopted by various agencies for fish and fisheries products. This standard provides sampling requirements to help in exercising proper quality control of fish and fisheries products.

For the purpose of sampling, fish and fishery products have been broadly classified into following groups:

- a) Canned fish,
- b) Fresh fish,
- c) Frozen fish,
- d) Dry-salted and dried fish, and
- e) Fish oils.

For each of these groups, a suitable sampling plan has been recommended.

This standard is applicable only to fish and fishery products belonging to the above five categories packed in containers.

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

IS 11427:1985, *Methods of Sampling for Fish and Fisheries Products*

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

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

Assistance derived from these sources is hereby acknowledged.

Contents

1	Scope	1
2	Normative references	1
3	Definitions	1
4	Sampling policy	6
4.1	General	6
4.2	Sampling plans and inspection levels	6
4.3	Requirements of sampling	6
5	Procedures	7
5.1	Required equipment	7
5.2	Locating and identifying the lot	8
5.3	Defining the lot	8
5.4	Defining a sample unit	8
5.5	Determining the number of sample units required	9
5.6	Selecting sample units	12
5.7	Labeling samples	12
5.8	Sample storage and transportation	13
5.9	Receipt by laboratory	14
5.10	Sampling for external organizations	15
6	Sampling of canned fish	15
6.1	Deficiencies	15
6.2	Lot	15
6.3	Scale of sampling	15
6.4	Number of tests and criteria for conformity	16
7	Sampling of fresh fish	16
7.1	Scale of sampling	16
7.2	Number of tests	17
7.3	Criteria for conformity	17
8	Sampling of frozen fish	17
8.1	Scale of sampling	17
8.2	Number of tests	18
8.3	Criteria for Conformity	18
9	Sampling of dried and dry-salted fish	18
9.1	Scale of sampling	18
9.2	Number of tests and criteria for conformity	18
10	Sampling of fish oils	19
10.1	Scale of sampling	19
10.2	Preparation of test samples	19
10.3	Number of tests and criteria for conformity	20
	Annex A (normative) Sampling plans	21
	Annex B (normative) Categorization of chemical analyses	23
	Annex C (normative) Systematic random sampling	24
	Annex D (informative) Explanatory notes on acceptance sampling	27
	Annex E (informative) Operating characteristic curves	29

Fish and fisheries products — Methods of sampling

1 Scope

This East African Standard prescribes the scale of sampling and criteria for conformity for fish and fishery products packed in containers to decide the conformity or otherwise of various consignments offered in the market.

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*

CAC/GL 48, *Model certificate for fish and fishery products*

CAC/RCP 52, *Code of practice for fish and fishery products*

CAC/GL 53, *Guidelines on the judgement of equivalence of sanitary measures associated with food inspection and certification systems*

EAS 38, *Labelling of prepackaged foods — Specification*

3 Definitions

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

3.1

ammonia

The odour/flavour stimulus usually associated with ammonia production from such processes as protein breakdown and illustrated by ammonia-based cleaning compounds.

3.2

Aseptic Sampling

sampling performed using sterile apparatus and methodologies to prevent microbiological contamination of the sample.

3.3

Attribute Sampling Plan

the decision to accept or reject a lot is dependent on the number of sample units which have or do not have a particular attribute, property or characteristic.

3.4

Bilge

The odour/flavour stimulus associated anaerobic bacterial growth and which is illustrated by the intense rank odour of bilge water.

3.5

Blocks

Cohering fish flesh consisting of fillets, pieces of fillets or minced fish flesh which have been frozen in uniform rectangular shapes for further processing.

3.6

Boned

Fish fillets in which a major effort has been made to remove bones including pin bones.

3.7

Boneless

Fish fillets in which the processor has removed all bones including pin bones from the product.

3.8

Broken

With respect to fresh and frozen shrimp, a portion of shrimp containing less than five segments for counts less than 150/kg and less than 4 segments for counts greater than 150/kg. Also known as pieces.

3.9

Candling

The process used in the detection of parasites by placing fillets on a clear translucent lighted surface.

3.10

Cartilage

With respect to crustaceans, this term is used to refer to hard or pliable chitinous endoskeletal structures such as tendons or connective tissues.

3.11

Chalky

Texture Dry and powdery, leaving the sensation of a chalky solution in the mouth.

3.12

Container

any type of receptacle, package, wrapper, or confining band used in packing or marketing fish.

3.13

Consumer

the final user of a product.

3.15

Cull

removal of non-compliant units from a lot.

3.16

Defrosted

Fish A process by which fish is changed from the frozen state to a thawed state under controlled time and temperature conditions such that the internal product temperature does not exceed 4bC after the thawing has been completed.

3.17

Dehydration

A white or yellow abnormality on the surface of frozen fish which masks the colour of the flesh and penetrates below the surface. This defect caused by the sublimation process can only be removed with a knife or other sharp instrument.

3.18

Destructive Inspection

an inspection in which the container or product is destroyed, modified or rendered unusable.

3.19**Distinct¹**

Capable of being readily perceived (by sight, smell, touch or taste) through a sharp clear unmistakable impression, not blurred, obscured or indefinite.

3.20**Faecal**

The odour/flavour stimulus such as that associated with sewage.

3.21**Feedy**

The odour/flavour stimulus resulting from the food consumed by the fish.

3.22**Fillets**

Slices of fish flesh of irregular size and shape have been removed from the carcass of the fish by cuts made parallel to the backbone, and from which all internal organs, head, fins, bones, except intramuscular or lateral bones and all discolored flesh have been removed; or, slices of fish flesh described above that have been cut into sections.

3.23**Fresh**

Natural raw fillets or minced fish which has not been changed to any other state by freezing, cooking, curing, etc.

3.24**Frozen**

Fish that has been changed from the natural (fresh) state to that in which the thermal centre of the product has been frozen to a temperature of -21°C or colder, and the fish is maintained at a temperature of -26°C or colder.

3.25**Fruity**

The odour/flavour stimulus such as that associated with citrus fruits.

3.26**Head**

With respect to shrimp, the cephalothorax, or any portion thereof large enough to contain an eye.

3.27**Honeycombing**

A condition characterized by decomposition of the flesh resulting in pitting of the meat, occurring sometimes on the surface of the cut of the meat, but more often in between the layers of fish flesh and corroborated by the presence of histamine.

3.28**Hydrogen Sulphide**

The odour/flavour stimulus associated with rotten eggs. A reference is hydrogen sulphide gas.

3.29**Iodoform**

The odour/flavour stimulus associated with some iodine compounds, and having a chemical-like or medicinal quality. A reference is triiodomethane.

3.30**Inspector**

a person designated as an Inspector pursuant to the Standards Act or relevant legislation

¹ Persistent and distinct are not applicable to trace or slight odours such as slight fruit, slight vegetable or slight salt fish-like, or slight musty.

3.31

IQF

An acronym for individually quick frozen fillets.

3.32

Jelly

Fish flesh which has an abnormally high moisture content of 86% or more by weight resulting in the flesh having a gelatinous texture and a glossy translucent appearance.

3.33

Layer Pack

A fillet pack where the fillets are individually separated by cellowrap.

3.34

Liver Stain

A discolouration ranging from yellow to dark brown caused by intestinal contents contacting the flesh of shrimp.

3.35

Lot

with respect to fish, other than fresh fish, means a shipment or part of a shipment of fish that is of the same species, is processed in the same manner by the same producer, is packaged in the same size of container and bears the same label. A lot of fresh fish refers to a shipment or part of a shipment of fish which has been processed in the same manner by the same producer in a 24-hour period. For fresh fish, the lot may contain more than one species of fish.

3.36

Lot size

the number of units of product in a lot.

3.37

Mealy Texture

Soft, dry and friable (easily crumbled), like meal.

3.38

Minced Fish

Particles of fish flesh that have been separated from clean, sound fish material free from internal organs, heads and discolored flesh.

3.39

Musty

The odour/flavour stimulus associated with the presence of mold or mildew decay of wood. A reference is geosmin.

3.40

Non-destructive Inspection

an inspection in which the container is not destroyed.

3.41

Oxidized Oil

The odour/flavour stimulus associated with the oxidation of fats or oils.

3.42

Persistent¹

Existing without significant change; not fleeting.

3.43

Pre-packaged product

any product packaged in a container in such a manner that it is ordinarily sold to, or used or purchased by a consumer without being re-packaged.

3.44**Pungent**

A sharp or stinging sensation of an odour such as that of aldehyde.

3.45**Putrid**

The odour/flavour stimulus associated with the advanced decay of protein.

3.46**Rancid**

The odour/flavour stimulus associated with oxidized oil or an oil such as linseed oil.

3.47**Random Sample**

one in which all elements in the lot have an equal and independent chance of being included in the sample.

3.48**Readily Detectable**

Visible under normal inspection conditions and procedures, not requiring artificial aids such as magnification.

3.49**Representative Sample**

one in which the sample units selected for the sample exhibit all the attributes of the lot proportionately.

3.50**Saltfish-like**

The odour/flavour stimulus such as that associated with saltfish.

3.51**Sample**

a collection of one or more sample units selected from a lot for inspection. The sample comprises all of the sample units drawn for examination or testing purposes from a particular lot.

3.52**Sampling Plan**

specifies the number of sample units required to make an accurate inspection decision (acceptance or rejection) on a lot. The number of sample units required may depend upon the net weight of the units, the number of units in the lot, and the type of hazard associated with the inspection analysis being performed.

3.53**Sample Size (n)**

the number of sample units comprising the total sample drawn from a lot or production.

3.54**Sample Unit**

one of a number of individual containers, or a portion of a fish or primary container examined or evaluated as a single unit.

3.55**Sickly-sweet**

An odour/flavour stimulus having an unpleasant or cloying sweetish characteristic, such as that of chloroform.

3.56

Sour

The odour/flavour stimulus associated with acidic compounds such as vinegar and characterized by a pungent sensation.

3.57

Sour milk-like

The odour/flavour stimulus associated with the bacterial breakdown of milk.

3.58

Vegetable

The odour/flavour stimulus associated with certain vegetables such as turnips or cabbage.

3.59

Vein

With respect to shrimp, the visible intestinal tract which runs dorsally along the abdomen.

3.60

Yeasty

The odour/flavour stimulus associated with the primary fermentation process as illustrated by the production of wine or the rising of bread.

4 Sampling policy

4.1 General

Only samples drawn in accordance with current, approved procedures by inspectors or other authorized personnel will be acceptable for evaluation.

Any intervention or interference during sampling must be noted and reported because it may invalidate sampling.

A lot shall not consist of more than one species of fish with the exception of lots comprised of fresh fish.

Sample continuity is essential. Samples should be assigned a unique number, labeled with all pertinent information, and logged for continuity purposes.

The integrity and condition of samples must be protected to ensure proper evaluation of the sample. Analyses will not be performed on product which has been compromised (damaged or deteriorated) in a manner which would result in an improper evaluation.

The selection of a sample for inspection should result in an official Inspection Report being issued to the owner or representative of the lot upon completion of the inspection.

4.2 Sampling plans and inspection levels

Sampling plans are necessary to query one or more characteristics of a lot because not every unit in a large lot can be inspected. Sampling plans are designed to ensure defensible, statistically valid decision making regarding the acceptance or rejection of a lot.

Selection of the appropriate Inspection Level is dependent on the current stage of inspection. Inspection Level I is chosen when the quality of the lot is not in question as in initial inspections. Inspection Level II is used when the quality of goods is in question and a referee method is required for the examination or re-examination of the lot (re-inspection). An increased number of sample units affords greater protection against the inherent risk associated with sampling.

4.3 Requirements of sampling

4.3.1 In drawing, preparing, storing and handling test samples, the following precautions and directions shall be observed.

4.3.2 Sampling shall be done in the presence of vendor and vendee or their authorized representatives.

4.3.3 Samples shall be taken in a protected and clean place.

4.3.4 The samples, the material being sampled, the sampling instrument(s) and containers for samples shall be protected from adventitious contamination.

4.3.5 The sampling instrument(s) shall be of suitable size, capacity and clean and dry. Only sterilized sampling instruments shall be used for taking the samples to be tested for microbiological requirements.

4.3.6 All sampling instruments shall preferably be made of glass or stainless steel.

4.3.7 Samples shall be placed in clean and dry glass/ stainless steel containers. These containers, wherever applicable, shall also be sterilized whenever samples are drawn for testing microbiological requirements.

4.3.8 The sample containers shall be of such size that they are almost filled by the sample.

4.3.9 Samples in containers shall be stored and transported in such a manner that there is no deterioration of the material. For frozen fish, temperature of storage transportation shall be -20°C. If samples are not immediately analyzed, these shall be stored and transported without any direct contact with ice. In the case of canned the sample cans shall be stored and transported to the laboratory without any appreciable difference in the temperature.

4.3.10 Samples shall be sent to the laboratory for testing as early as possible.

4.3.11 Each sample container, after filling shall be sealed air-tight with a stopper or a suitable closure in such a way that it cannot be opened and resealed without detection. It shall be marked with full details of sampling, such as date and place of sampling, name of the vendor and other important particulars of the consignment.

5 Procedures

The purpose of this section is to assist the inspector in the tasks of lot identification, equipment selection, sample selection, sample unit determination, sample storage and transportation, and sample labeling. The concepts of sample integrity and continuity are also addressed in the following sections.

5.1 Required equipment

Use equipment, materials and apparatus which are appropriate for maintaining the condition of the sample in sample collection.

When drawing samples, ensure there is no potential for cross-contamination from equipment, materials and apparatus (e.g., aseptic for micro).

List of suggested equipment, materials and apparatus:

- forms as appropriate (master carton label report, Fish Inspection Worksheet, Visual Can Inspection Worksheet, Permission to Move Fish Under Detention form)
- Notice of Detention/Notice of Release/Held tags
- inspector notebook

- hand coverings (plastic gloves, rubber gloves)
- safety boots and rubber boots (for plant inspections), hard hat, coveralls, hairnet
- adhesive tape and clear adhesive tape
- utility knife
- marker
- hand towels
- plastic bags (various sizes), tags and labels
- flashlight
- thermometer
- sanitizer and saw
- cooler and ice packs

5.2 Locating and identifying the lot

Ensure all containers of product are available and accessible for sampling. Where applicable, obtain the following information prior to inspection to ensure the correct lot is being sampled:

- reason for inspection (e.g., initial inspection)
- location of the lot
- name and address of agent/owner
- lot size (number of cases, containers per case)
- lot codes and their interpretation
- brand name
- product type and style of pack
- container type and unit weight
- processing establishment
- country of origin or destination
- requirements for importing country when an export certificate is being issued.

5.3 Defining the lot

Define the lot in accordance with the definition given in Section 3.0. When dealing with fish or fish products which possess the same label, but are packaged in different styles (e.g., different sauces) consider the different styles to be of one lot.

5.4 Defining a sample unit

Define the sample unit according to the following instructions:

- a) When a lot consists of pre-packaged product, each package and the package thereof constitutes a sample unit.
- b) For fresh and frozen groundfish block and groundfish fillet or fresh and frozen finfish, the sample unit shall consist of a container of fish and the contents thereof.
- c) Use one of the following three approaches when sampling from bulk packages:
 - (i) the sample shall consist of the bulk package and the contents thereof;
 - (ii) for fresh or individually frozen whole or dressed finfish or fresh or individually frozen finfish fillets, the individual fish or fillet may be considered as a representative sub-sample;
 - (iii) for scenarios other than described in (ii), a 1 kg sub-sample of product obtained from the bulk pack may be considered a representative sample.

NOTE Refer to the sampling section of the individual product standard for further guidance.

- d) In lots consisting of salt or pickled fish packed in boxes or barrels, the container constitutes the sample unit. Inspect the entire contents of the container.
- e) When a lot of fresh fish consists of more than one species, all of the sample units used to form a sample shall consist of one species type.
- f) When inspecting large fish, each fish constitutes a sample unit. When an inspector has confidence a representative sub-sample may be obtained from a large, whole fish, the sub-sample becomes the sample unit. The sub-sample must be obtained in a manner which does not compromise the integrity of the sample.

To obtain a representative sub-sample from large, whole fish for chemical and microbiological analysis, take three 1" slices from each of the following areas: 1) behind the pectoral fins, 2) halfway between the first slice and the vent, and 3) behind the vent. These three slices form the sample unit, representing the large fish.

When sampling for sensory analysis, the three slice method described above is recommended. If in the inspector's view, fewer or more slices are required to make an accurate decision on the quality of the lot, the inspector may exercise his/her discretion to decide what constitutes a representative sample unit for that fish. If the inspector decides only one slice is required as a representative sub-sample from the fish, the one slice should not be taken from behind the vent because this slice does not usually exhibit signs of early decomposition.

5.5 Determining the number of sample units required

Determine the number of sample units required. The sample units needed for other analyses may be drawn from the units selected for sensory evaluation.

When a sample unit is drawn for more than one analysis, ensure the sample unit is of sufficient mass to perform all of the required analyses.

When microbiological analysis is required, submit the samples to the microbiological section for analysis first to ensure the integrity of the sample is not jeopardized.

For export certificates, there may be instances where the number of sample units required may be specified. Follow the directions associated with the export certificate.

5.5.1 Sensory, net content and package integrity

The sampling plan for these analyses is CODEX STAN 233 found in Annex A. Decide which inspection level is appropriate (Level I for initial inspections and Level II for re-inspections).

Using the parameters of net weight per sample unit and the lot size (see Annex A), determine the number of sample units required for inspection. Note that the Sampling Plan in Annex A applies to destructive and non-destructive sampling for net content.

5.5.2 Container integrity

When sampling, if any wet, stained or damaged cases are detected, stop sampling. Detain the entire lot until the source of the problem is determined. Once corrective action is taken, resume sampling.

If at any time during sampling, a leaker, swollen can or flipper is found, discontinue sampling until the lot has been evaluated to determine if the defect(s) is(are) due to under-processing or post-process contamination.

Initial inspection

- Draw 200 sample units from a minimum of 40 cases with no more than 5 sample units being selected from each case.
- For lots with less than 200 sample units, inspect all units. Record the total number of containers on the report form.

Re-inspection

- Select a minimum of 250 cases. Draw 1250 cans from the cases but do not select more than 5 cans from one case.
- When there are fewer than 1250 units, examine each unit and record the number on the report form.

5.5.3 Sampling for microbiological analysis

5.5.3.1 General procedures

It is essential that all samples accurately reflect microbiological conditions at the time that sampling is performed. To maintain sample integrity, follow the procedures listed below.

- Procure the samples aseptically so as to not contaminate the sample.
- Draw **five** sample units (minimum of 250 g per unit) per lot unless otherwise specified.

5.5.3.2 Sampling running water

- Collect the five sample units of water in clean containers of suitable size. Use a container with 100 to 200 ml capacity for routine water analysis.
- To obtain a representative sample from a tap, open the tap fully and allow the water to run for 2 or 3 minutes or a sufficient time to permit clearing of the service line.
- Leave sufficient head space in the water sampling container so the sample can be adequately mixed by shaking.

5.5.3.3 Procuring ice samples

- Take five sample units of ice from the ice storage area in sterile plastic jars or bags. Maintain the frozen state of the ice.

5.5.3.4 Sampling raw shellfish

- Examine samples of shellstock, shucked unfrozen shellfish, and live shellfish within 24 hours after collection. When analysis is unavoidably delayed beyond 24 hours, report the actual time elapsed between collection and analysis.

- Use heavy plastic bags (6 mil gauge) for shellstock collection to ensure that shells do not puncture the plastic and compromise the sample integrity.
- Take 5 units of 12-18 shellfish per unit. This number should ensure the selection of 10 sound animals suitable for shucking. Ensure the shellfish yield approximately 200 g of meats and shell liquor.
- Aseptically transfer the shellfish to the sample jar with sterile forceps or alternatively, samples of the final product may be taken in the packing cans or containers.
- Consumer packages are acceptable for examination.

5.5.4 Sampling for chemical analysis

5.5.4.1 General sampling

- See Annex B for descriptions of chemical analyses.
- Chemical analyses require five sample units for initial inspection. For re-inspections, a sample size of ten units is required. For re-inspections of chemical indices analysis, use Inspection Level II of the sampling plan given in Annex A.
- Perform chemical analyses on edible tissue.
- Sample units chosen for chemical analysis should not undergo any adulteration (such as rinsing with water) which may change the chemistry results.
- All chemical analyses are performed on the edible portion of the product.

5.5.4.2 Additive and proximate analysis

- Draw five sample units each consisting of a minimum of 100 g. For sample units which are less than 100 g, submit all of the available sample for analysis.

5.5.4.3 Product safety parameters and drug residues

- Draw five sample units each consisting of a minimum of 200 g.
- When sampling for drug residue analysis, sample 5 entire fish or full fillet.
- Ensure that samples submitted for drug residue analysis are not exposed to areas or equipment where medicated feed has been stored or used.

5.5.4.4 Chemical contaminants

- For lots which contain fish or fish products of similar size, draw five sample units each consisting of a minimum of 100 g. **Mercury:** For lots which contain fish or fish products of varying sizes, draw five units which represent the size distribution in the lot.

5.5.4.5 Chemical indicators

- The sampling plan for chemical indicators is analogous with that for sensory evaluation (Annex A). After performing the sensory evaluation, forward what remains of the sample to the chemistry laboratory immediately.

5.5.4.6 Other chemical testing

- For species identification testing, draw a minimum of **five** individual fish or fillets. Store the fish or fillets in five individual containers.
- For other types of chemistry sampling, draw five units of 100 g.

5.5.5 Sampling for shellfish toxin analysis

5.5.5.1 Import and QMP samples

- Take 5 units of 12-18 shellfish per unit. This number should ensure the selection of 10 sound animals suitable for shucking. Ensure the shellfish yield approximately 200 g of meats and shell liquor.
- When sampling geoducks (*Panope generosa*), take three animals. Analysis is conducted on the viscera of the three animals.
- When sampling crabs, take three animals. Analysis is conducted on the viscera of the three animals.

5.5.5.2 Molluscan shellfish monitoring program

- Take 1 unit of 12-18 shellfish. This number should ensure selection of 10 sound animals suitable for shucking. Ensure the shellfish yield approximately 200 g of meats and shell liquor.

5.6 Selecting sample units

Select a systematic random sample from the lot. Please refer to Annex C for further instruction. When an inspector thinks it is not possible to draw a true random sample, the inspector may draw a representative sample from the lot.

5.7 Labeling samples

- a) Record details of sampling in a notebook (i.e., lot location, no. of samples drawn, unique identification no., time of sampling, codes drawn).
- b) Ensure all samples are accompanied by a completed sample information form. Include the following information where appropriate:
 - type of analysis required (sulfite, net weight, etc.)
 - country of origin
 - collection date and time
 - packer and packer code
 - shipment identification number
 - held tag number (if product is detained)
 - lot size and unit weight
 - samplers's name
 - lake code (body of water and landmarks), statistical area and sub-area
 - length and weight of fish (contaminant sampling)
 - number of units sampled

- plant name and registration number
 - harvest site (shellfish samples)
 - harvest date (shellfish samples)
 - processing date
 - species and product type
 - farm and pen information (farmed fish)
 - inspection status and type (Alert, QMPR, random, etc.)
 - name of importer
 - analyses required for export certificate
 - cost recoverable (yes/no)
- c) Include any other relevant information when requesting **chemistry** analyses which would assist in performing the analysis or assessing the results, such as:
- (i) for packaged fish, a copy of the label;
 - (ii) observations of abnormal odours, taste, colours, or texture; and
 - (iii) for species identification, the common name as labeled on the package of the product and the suspected substituted species.
- d) Mark or tag all samples using waterproof markers for identification purposes. In the case of large whole fish, tag each fish. Include the sample sheet in a separate plastic bag with the sample. Mark pre-packaged products as soon as the unit is drawn.
- e) Analyze the samples as soon as is practical after collection.

5.8 Sample storage and transportation

5.8.1 Special considerations regarding sample shipping and storing:

- a) **Microbiology**
- i) Until the sample is analyzed, maintain the sample under conditions which will preserve the original bacterial flora as completely as possible. Maintain the sample at a maximum of 5 degrees Celsius. In some instances, samples must be frozen. Do not freeze samples unless the laboratory has been consulted. Freezing is undesirable because bacterial numbers may decrease in the sample.
 - ii) Fresh samples must be refrigerated (5 degrees Celsius) until analyzed. When storing samples, remember that analysis of unfrozen product should take place within 24h of sampling. Note the time of sampling and the time of analysis. Reports must state whether or not the samples have been frozen.
 - iii) Refrigerate (do not freeze) samples of shucked or live **shellfish** immediately after collection by packing in crushed ice and keeping them in ice until examined. The shellfish must not come into direct contact with ice. Care must be taken with these samples to minimize cold shock by insulating these samples from direct contact with refrigerant while still ensuring samples are chilled. For example, frozen ice packs can be placed below and

above the samples with insulating layers of newsprint or other food quality insulating material placed between the refrigerant and the sample.

- iv) **Water samples:** The bacterial examination of impure water and sea water samples must begin within six hours of collection. The storage of water samples should not exceed 24 hours. Should this time limit be exceeded, record the actual time between sampling and analysis.

b) **Proximate analysis and chemical indicators**

Curtailling bacterial growth and limiting autolytic spoilage is facilitated through temperature control. Keep the product at a temperature below -20 °C where possible. Do not leave thawed samples on bench for any long period of time. The growth of bacteria in the sample may influence the analysis of the product. For **proximate analysis**, prevent the dehydration of the sample.

5.8.2 Sample Storage

Ensure that the integrity of the sample is maintained by proper storage. Maintain the state of the sample.

- a) Keep frozen samples in a freezer (at -18 °C) or in a carton/cooler with ice packs and ship the sample as quickly as possible to ensure that the sample remains in the frozen state.
- b) Store unfrozen samples at refrigeration temperatures (below 5 °C). When the time of storage is lengthy, it may be necessary to freeze the samples.
- c) Keep cans at ambient room temperature.

5.8.3 Sample shipping or delivery

Samplers may have to ship samples to another location for testing or the samples may be delivered to other inspection personnel at the same location. When providing samples to other inspection staff at the same location, ensure the other staff are notified (with a hard copy of the sample sheet) and information regarding the location of the sample (freezer, cooler, etc.) when the sample is delivered.

When **shipping** a sample:

- a) make arrangements with receiving person at the laboratory prior to shipping the sample;
- b) address the shipment to the person and include the person's phone number;
- c) ensure perishable samples are properly marked for handling by the carrier;
- d) advise the laboratory of the estimated arrival time of the sample and the carrier information. If the inspector is not able to contact the laboratory or if the microbiology sample delivery cannot be completed within 24 hours, he/she should consider the merits of sampling at another time; and
- e) take special precautions when transporting samples of canned product that are obviously swollen or under pressure. Place swollen cans in plastic bags and transport inside a box or cooler.

5.9 Receipt by laboratory

Log in the samples upon arrival at the laboratory, noting the time received and the condition at the time of receipt (i.e., physical damage, temperature). If the condition compromises the sample integrity, the sample may be rejected.

Check the sample information form to ensure all pertinent information has been included. If the form contains insufficient information, contact the inspector for the missing information (additions to be dated and initialed).

5.10 Sampling for external organizations

Fish Inspection personnel may receive requests to perform sampling for external groups or organizations (e.g., provincial governments, other federal government departments). In these instances, the external organizations may have sampling policy and procedures that differ from those specified in this document. Please follow the procedures specified by the organization requesting the sample when it is for their purposes.

6 Sampling of canned fish

6.1 Deficiencies

6.1.1 Rusting — Peeling of outside lacquer on the can body seams visible to naked eye.

6.1.2 Dent — Change out the content through the seam of damaged container.

6.1.3 Flipper — A can that normally appears flat, but when brought down sharply on its end on a flat surface, one end flips out. When pressure is applied to this end, it flips in again and can appear flat.

6.1.4 Springer — A can with one end permanently bulged. When sufficient pressure is applied to this end, it will flip in, but the other end will flip out.

6.1.5 Bulging — A can bulged at one end or both ends, which by pressure is not flipped.

6.2 Lot

Cans of the same type of pack containing material of the same variety, same grade and packed at the same place on the same day shall a lot.

6.3 Scale of sampling

6.3.1 For ascertaining the conformity of material to the requirements of the relevant standard, samples shall be tested from each lot separately.

6.3.2 The number of cartons/cans to be selected from a lot shall depend on the size of the lot and shall be according to Table 1.

Table 1 — Scale of sampling

Number of cartons in the lot	Sample Size
(1)	(2)
Up to 24	5
25 to 50	8
51 to 100	10
101 to 250	12
251 to 500	14
501 to 1000	18
1001 and above	24

6.3.3 If sampling is done before packing the number of cartons shall be computed as 24 cans to a carton up to 150 g pack and 12 cans to a pack if the type of pack is more than 150 g and sampling scale at 6.3.2 shall be applied.

6.4 Number of tests and criteria for conformity

6.4.1 Each of the cans selected according to Table 1 shall be examined, before opening, for visual requirements, such as rustiness, leakage, denting, springering, bulging, flipping and proper stenciling. A can failing to satisfy one or more of these requirements shall be considered as defective, and the lot shall not be analyzed for other parameters.

6.4.2 The lot having been found satisfactory according to 6.4.1 shall be further tested for microbiological parameters. In case the standard requires that the cans have to be tested for microbiological parameters after incubation at more than one temperature (for example 37 °C and 55 °C), the number of cans at 6.3.2 shall be suitably increased so that a minimum of 5 cans are available at each temperature separately,

6.4.2.1 The lot shall be declared as conforming to specification if each group of cans meets the relevant specification requirement.

6.4.3 The can contents after removal of inoculum under aseptic condition shall be tested for physical and chemical requirements as per specification.

6.4.4 The lot shall be considered to have met physical and chemical requirements if there is no failure as per specifications.

6.4.5 The lot shall be further tested for metallic impurities given in the relevant material specification. A composite sample shall be prepared by thoroughly mixing approximately equal quantity of material taken from each selected can and shall be tested for these requirements.

6.4.5.1 The lot shall be considered to have met the requirements for metallic impurities if all the test results on the composite sample meet the relevant specification requirements.

7 Sampling of fresh fish

7.1 Scale of sampling

7.1.1 Lot

All the containers of the material of the same variety, same size grade and packed on the same day and at the same unit shall constitute a lot.

7.1.2 For ascertaining the conformity of the material to the requirements of the relevant specification, samples shall be according to Table 2.

Table 1 — Selection of containers for fresh fish

Number of Containers In the Lot	Sample Size
(1)	(2)
Up to 8	2
9 to 25	3
26 to 50	5
51 to 100	7
101 to 150	8
151 to 300	9
301 and above	10

7.1.3 These containers shall be selected at random from the lot.

7.1.4 In order to select at random the required number of fishes, from each of the containers, Table 2 may be applied. In this case, coil may be taken to represent the number of cartons, and col 2 the number of fishes to be selected from each carton. The selection of fishes shall be done at random.

7.1.5 In addition to the fishes selected from each selected carton (see 7.1.3), one fish shall be selected at random from the carton for testing microbiological requirements.

7.1.5.1 Representative portions from the tail, middle and upper middle portion of the fishes so selected at 7.1.5 shall be aseptically cut and transferred into sterile containers for testing for microbiological parameters. Five such composite sample shall be made from each lot.

7.2 Number of tests

7.2.1 Each of the fishes selected according to 7.1.4 shall be tested for all the requirements of the standard except the microbiological requirements.

7.2.2 The 5 composite samples selected according to 7.1.5.1 shall be tested separately for microbiological requirements.

7.3 Criteria for conformity

7.3.1 The lot shall be declared as conforming to the requirements of the standard if 7.3.1.1 and 7.3.1.2 are satisfied.

7.3.1.1 An the fishes tested according to 7.2.1 shall satisfy the corresponding requirements given in the relevant standard.

7.3.1.2 Each of the fishes tested for microbiological requirements according to 7.2.2 shall satisfy the relevant specification requirement.

8 Sampling of frozen fish

8.1 Scale of sampling

8.1.1 Lot

All the blocked packages cartons of the same type of pack containing the material of same variety (species) and packed on the same day and at the same unit shall constitute a lot.

8.1.2 For ascertaining the conformity of the material to the requirements of the relevant specification, samples shall be tested from each lot separately.

8.1.3 The number of blocks/packages/cartons to be selected from a lot shall depend on the size of the lot and shall be according to coli and 2 of Table 3.

8.1.3.1 In case, more than 10 blocks/packages are packed in cartons, the sampling scale at Table 3 shall be applied to select the number of blocks/packages.

8.1.4 The cartons, and blocks/packages from the cartons shall be selected at random.

8.1.5 From the blocks/packages selected, 5 composite samples shall be drawn aseptically in sterile containers from each lot for testing for microbiological requirement.

Table 3 — Selection of blocks/packages/cartons and permissible number of defectives

Number or cartons in the Lot	Sample size
(1)	(2)
Up to 20	2
21 to 50	3
51 to 100	5
101 to 350	8
301 to 500	13
501 and above	16

8.2 Number of tests

8.2.1 Each of the blocks/packages selected according to 8.1.3 shall be tested for all the requirements of the standard except the microbiological requirements.

8.2.2 The 5 composite samples selected according to 8.1.5 shall be tested separately for microbiological requirements.

8.3 Criteria for Conformity

8.3.1 The lot shall be declared as conforming to the requirements of the specification if the results of test as per 8.2.1 meet the relevant specified requirements.

8.3.1.1 The block tested for microbiological requirements according to 8.2.2 satisfy the relevant specified requirement.

9 Sampling of dried and dry-salted fish

9.1 Scale of sampling

9.1.1 Lot

All the bundles/bags/packages in a single consignment, of the same size, grade and material of same variety and packed on the same day, in a single unit shall constitute a lot.

9.1.2 For ascertaining the conformity of the material to the requirements of the relevant specification, samples shall be tested from each lot separately.

9.1.3 The number of bundles/bags/packages to be selected from a lot shall depend on the size of the lot and shall be according to Table 4.

9.1.3.1 These bundles/bags/packages shall be selected at random from the lot. In order to ensure the randomness of selection, procedures given in Annex C may be followed.

Table 4 — Number of Bundles/packages to be selected for dried and dry-salted fish

Number of bundles/bags/packages in the lot (1)	Sample size (2)
Up to 8	2
9 to 25	3
26 to 50	4
51 to 100	5
101 to 150	6
151 and above	7

9.2 Number of tests and criteria for conformity

9.2.1 Pick up with an appropriate sampling instrument, required number of fishes at random from different parts of each bundle/bag/package selected according to 9.1.3 so as to get about 750 g of material from each bundle. It shall be examined visually for variety, moisture and other physical characteristics given in the relevant East African Standard.

9.2.1.1 In the case of bigger fishes weighing more than 250 g per fish, a minimum 5 fishes shall be selected. In the case of fishes of small varieties about 5 kg of the material shall be selected, and by cornering 811d quartering assuring thorough mixing, about 750 g of the material selected.

9.2.1.2 The lot shall be considered to have satisfied these requirements if the material in each selected bundle/bag/package so examined is found to meet the corresponding requirements given in the relevant East African Standard.

9.2.2 The lot having been found satisfactory according to 9.2.1 shall be further tested for chemical requirements, such as sodium chloride content and acid insoluble ash on the basis of a composite sample. For this purpose, each of the fishes found satisfactory according to 9.2.1 shall be cut into small pieces. These pieces may be cut from approximately 10 mm to 20 mm broad strips cut from across each of the fishes. The positions at which the strips are to be cut should correspond to approximate centres of three equal sections across the length of the fish. These pieces may also be cut from different parts of each fish, such as tails region, head region, mid region, dorsal region and ventral region.

The pieces thus obtained shall be thoroughly mixed so as to obtain at least 250 g of material. This shall constitute the composite sample. The composite sample thus obtained shall be transferred to a thoroughly clean and dry sample container and sealed air tight. The sample container shall be labelled with the details given in 3.10.

9.2.2.1 Representative composite sample shall be cut using sterile knives and transfer in aseptic conditions into a sterile container for microbiological analysis.

9.2.3 The lot shall be declared as conforming to the requirements of the specification if all the results on the composite sample are found to meet the corresponding requirements given in the relevant material specification in samples drawn at 9.2.1 and 9.1.1.1.

10 Sampling of fish oils

10.1 Scale of sampling

10.1.1 Lot

All the containers, in a single consignment, of the same size, containing the material of same type and belonging to the same batch of manufacture shall constitute a lot. If a consignment is declared to consist of different batches of manufacture, the batches shall be marked separately and the groups of containers in each batch shall constitute separate lots.

10.1.2 For ascertaining the conformity of the material to the requirements of the relevant material specification, samples shall be tested from each lot separately.

10.1.3 The number of containers to be selected from the lot shall depend on the size of the lot and shall be according to Table 5.

Table 5 — Scale or sampling for fish oils

Number of containers in the lot	Sample size
(1)	(2)
Up to 25	5
26 to 50	8
51 to 100	13
101 and above	20

10.1.3.1 These containers shall be selected at random.

10.2 Preparation of test samples

10.2.1 Before drawing the test samples, mix thoroughly the contents of each selected container, whether it is a drum, bottle, can or other container, by shaking or stirring or any other suitable means. Draw small portions of the material from each container selected (see Table 5) by inserting the

suitable sampling instrument through the bung hole or other opening. The total quantity of material drawn from each container shall be sufficient to conduct the tests for all the characteristics given in the standard.

10.2.2 Mix thoroughly all portions of the material drawn from the same container. Out of these portions, a small but approximately equal quantity shall be taken for each selected container and shall be put into a clean and dry receptacle. The content of this receptacle shall be thoroughly mixed. This shall constitute the composite sample. The minimum quantity of material in the composite sample shall be 500 ml.

10.3 Number of tests and criteria for conformity

10.3.1 All the characteristics given in the standard shall be tested on the composite sample.

10.3.2 The lot shall be declared as conforming the requirements of the specification if all the test results on the composite sample meet the corresponding standard requirements.

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

Annex A
(normative)

Sampling plans

Sampling Plan 1

(Inspection Level I)

Net weight is equal to or less than 1 kg (2.2 lb)

Lot Size (N)	Sample Size (n)
4,800 or less	6
4,801 - 24,000	13
24,001 - 48,000	21
48,001 - 84,000	29
84,001 - 144,000	48
144,001 - 240,000	84
more than 240,000	126

Net weight is greater than 1 kg (2.2 lb) but not more than 4.5 kg (10 lb)

Lot Size (N)	Sample Size (n)
2,400 or less	6
2,401 - 15,000	13
15,001 - 24,000	21
24,001 - 42,000	29
42,001 - 72,000	48
72,001 - 120,000	84
more than 120,000	126

Net weight is greater than 4.5 kg (10 lb)

Lot Size (N)	Sample Size (n)
600 or less	6
601 - 2,000	13
2,001 - 7,200	21
7,201 - 15,000	29
15,001 - 24,000	48
24,001 - 42,000	84
more than 42,000	126

Sampling plan 2
(Inspection Level II)

Net weight is equal to or less than 1 kg (2.2 lb)

Lot Size (N)	Sample Size (n)
4,800 or less	13
4,801 - 24,000	21
24,001 - 48,000	29
48,001 - 84,000	48
84,001 - 144,000	84
144,001 - 240,000	126
more than 240,000	200

Net weight is greater than 1 kg (2.2 lb) but not more than 4.5 kg (10 lb)

Lot Size (N)	Sample Size (n)
2,400 or less	13
2,401 - 15,000	21
15,001 - 24,000	29
24,001 - 42,000	48
42,001 - 72,000	84
72,001 - 120,000	126
more than 120,000	200

Net weight is greater than 4.5 kg (10 lb)

Lot Size (N)	Sample Size (n)
600 or less	13
601 - 2,000	21
2,001 - 7,200	29
7,201 - 15,000	48
15,001 - 24,000	84
24,001 - 42,000	126
more than 42,000	200

Annex B (normative)

Categorization of chemical analyses

Chemical analyses of samples can be divided into five categories: (A) additives and proximate analysis, (B) product safety parameters and drug residue, (C) chemical contaminants, (D) chemical indicators, and (E) other chemistry testing. If categorizing the analysis proves difficult, consult the testing laboratory.

- A) Additives** are chemicals added to the product during processing in order to preserve it in some manner, modify the colour, modify the taste, or alter the characteristics of the product. The application methods for these substances may vary which affects the distribution of the substance in the product. Substances included in this category are sulphite (bleaching agent), benzoate (preservative), and saccharin (sweetener).

Proximate Analyses are those analyses used to determine the components of a product and the percentage of those components in a product including fat, protein, moisture.

- B) Product safety parameters** are those parameters which are used to curtail bacterial growth in a product and prolong the product shelf life. The parameters may be used in combination in a product or only one parameter may be controlled to prevent bacterial growth. Salt, water activity, and pH are included in this category.

Drug Residue is residue that has resulted from the application of antibiotics or similar substances to the fish to prevent or treat disease. Tetracyclines, sulfonamides, and chloramphenicol are included in this category.

- C) Chemical contaminants** are substances which are present in the fish products as a result of the environmental conditions to which the fish was exposed. Organic contaminants concentrate in the lipid portion of the fish whereas inorganic contaminants are more uniformly distributed throughout the muscle (protein) tissue. Mercury, PCBs, and Mirex are included in this category.

- D) Chemical Indicators (quality indices)** are substances which are produced from decomposition processes that are occurring in the fish. Chemical testing is often used to corroborate results from sensory analysis. Quality indices include histamine, indole, and total volatile base nitrogen (TVBN).

- E) Other chemistry testing** refers to testing which does not correspond with one of the aforementioned categories. The tests contained in this category cannot be grouped with other tests. Species identification by electrophoresis is included in this category.

Annex C (normative)

Systematic random sampling

1. Identify the N units in the population to be sampled by serially numbering them from 1 to N.
2. If a sample of size n is desired, find an integer k, called the sampling interval, where $k=N/n$. (round up)
3. Randomly select a number j between 1 and k.
4. The required systematic sample is then produced by the population units corresponding to the numbers: j, j + k, j + 2k, ..., j + (n-1)k.

Example:

Lot of 2.2 kg packages of frozen, block shrimp

Number of cases:	2000
Boxes per case:	6
Lot Size (N):	12,000 cases
Number of sample units required (n):	13

Procedure:

1. Serially number the packages from 1 to 12,000 according to their placement on the skid.
2. Evaluate the sampling interval as $k = N/n = 12,000/13 = 923$.
3. Choose a random number (j) between 1 and 923, e.g., 11.
4. The packages of shrimp selected to make up a systematic sample of size 13 will then be those which position numbers are:

$$j, j + k, j + 2k, \dots, j + 12k$$

$$11, 11 + 923, 11 + (2 \times 923), \dots, 11 + (12 \times 923)$$

$$11, 934, 1857, \dots, 11087$$

that is, select the 11th package and every 923rd package after that until thirteen packages have been identified.

Sampling Plan 1
(Inspection Level I, AQL = 6.5)

Net weight is equal to or less than 1 kg (2.2 lb)

Lot Size (N)	Sample Size (n)	Acceptance Number	
		No.	(c)*
4,800 or less	6	1	(0)
4,801 - 24,000	13	2	(1)
24,001 - 48,000	21	3	(2)
48,001 - 84,000	29	4	(3)
84,001 - 144,000	48	6	(4)
144,001 - 240,000	84	9	(6)
more than 240,000	126	13	(9)

Net weight is greater than 1 kg (2.2 lb) but not more than 4.5 kg (10 lb)

Lot Size (N)	Sample Size (n)	Acceptance number	
		No.	(c)*
2,400 or less	6	1	(0)
2,401 - 15,000	13	2	(1)
15,001 - 24,000	21	3	(2)
24,001 - 42,000	29	4	(3)
42,001 - 72,000	48	6	(4)
72,001 - 120,000	84	9	(6)
more than 120,000	126	13	(9)

Net weight is greater than 4.5 kg (10 lb)

Lot Size (N)	Sample Size (n)	Acceptance Number	
		No.	(c)*
600 or less	6	1	(0)
601 - 2,000	13	2	(1)
2,001 - 7,200	21	3	(2)
7,201 - 15,000	29	4	(3)
15,001 - 24,000	48	6	(4)
24,001 - 42,000	84	9	(6)
more than 42,000	126	13	(9)

* The figure in brackets under the Acceptance Number (c) indicates the Acceptance Number for decomposition.

Sampling plan 2

(Inspection Level II, AQL = 6.5)

Net weight is equal to or less than 1 kg (2.2 lb)

Lot Size (N)	Sample Size (n)	Acceptance Number	
		No.	(c)*
4,800 or less	13	2	(1)
4,801 - 24,000	21	3	(2)
24,001 - 48,000	29	4	(3)
48,001 - 84,000	48	6	(4)
84,001 - 144,000	84	9	(6)
144,001 - 240,000	126	13	(9)
more than 240,000	200	19	(13)

Net weight is greater than 1 kg (2.2 lb) but not more than 4.5 kg (10 lb)

Lot Size (N)	Sample Size (n)	Acceptance Number	
		No.	(c)*
2,400 or less	13	2	(1)
2,401 -15,000	21	3	(2)
15,001 -24,000	29	4	(3)
24,001 -42,000	48	6	(4)
42,001 -72,000	84	9	(6)
72,001 -120,000	126	13	(9)
more than 120,000	200	19	(13)

Net weight is greater than 4.5 kg (10 lb)

Lot Size (N)	Sample Size (n)	Acceptance Number	
		No.	(c)*
600 or less	13	2	(1)
601 - 2,000	21	3	(2)
2,001 - 7,200	29	4	(3)
7,201 -15,000	48	6	(4)
15,001 -24,000	84	9	(6)
24,001 -42,000	126	13	(9)
more than 42,000	200	19	(13)

* The figure in brackets under the Acceptance Number (c) indicates the Acceptance Number for decomposition.

Annex D (informative)

Explanatory notes on acceptance sampling

SAMPLING

Sampling is the process of drawing or selecting containers or sample units from a lot or production. As a result of sampling, information is obtained by which an estimate can be made to accept, reject or negotiate the merchandise in question. Sampling procedures which contain both sample size and acceptance criteria are commonly referred to as "acceptance sampling".

There are many types of acceptance sampling systems in use today. A plan that is suitable for one product or type of inspection may be entirely unsuitable for another product or inspection system. The plan selected is determined to a large extent by the degree to which it satisfies the needs of the user.

In developing these acceptance sampling plans, initial consideration has been given to quality evaluation of the end product. This requires opening of containers with resultant loss of products. This type of inspection is referred to as "destructive sampling". Not only is the loss of product an important consideration, but also destructive sampling is generally quite time consuming. Consequently, both inspection time and economic loss of product through destructive inspection are significant limiting factors in developing sampling plans for quality evaluation of processed foods. Sample size must necessarily be relatively small in order to make the plan practical in application.

RISKS

The aim of any sampling plan should be to accept more "good" lots and reject more "bad" lots. Since probability and chance are involved, decisions will, of necessity, involve an element of risk. This risk factor has to be accepted as a part of any sampling procedure. One method of reducing the buyer's risk of accepting deliveries of non-conforming quality is to increase sample size. In other words, the larger the sample, the less risk involved in accepting "bad" lots. Inspection level is the term indicating the relative amount of sampling and inspection performed on lots of a given product or class of products. If the inspection lot is packed under close control and meets the requirements of the Codex Standard, changing inspection levels do not appreciably change the buyer-seller risk. In other words, this would be a "good" lot and should be passed practically all of the time by a good sampling plan. The effectiveness of a sampling plan in discriminating between "good" and "bad" lots can be estimated by examination of the OC curves (see Annex E) for the various sample sizes. For example, if a lot is produced so that it does not contain more than 6.5 percent defectives, such lot will be passed at least 95 percent of the time by the sampling plans applicable for an AQL of 6.5. On the other hand, if the production contains an appreciable amount of defective material, a higher inspection level (i.e. a larger sample size) will reduce the risk of accepting these non-conforming lots. The effect of increased sample size is explained in greater detail under the discussion of OC curves.

AQL

One of the initial considerations in the development of a statistical acceptance sampling plan is the selection of an appropriate AQL or **Acceptable Quality Level**. This characteristic is defined as the maximum percent defective units in lots that will be accepted most of the time (approximately 95 percent of the time). Lots or production containing more defective material will be accepted less often - the ratio of rejection to acceptance increasing as the sample size increases and as the percent defective material in the lot increases.

In developing these sampling plans, an AQL of 6.5 was selected for lot acceptance with respect to **quality evaluation**. In other words, an AQL of 6.5 is used in these sampling plans (Annex C) to determine whether or not the inspection lot meets minimum **quality** requirements of the Codex Standard. This value was selected on the basis of years of experience and the capability of industry to produce preserved fruits and vegetables and certain other processed foods at this level under good commercial practice. For other factors (such as Brix value and net weight) other AQLs may be selected. Sampling plans can be drawn up for a full range of AQLs from a very strict value of 0.10 to a rather lenient value of 25.0 and higher, depending either on the type of product and/or on the criteria involved.

INSPECTION LEVEL

These sampling plans provide for two inspection levels, I and II. These two levels provide some discretion in the application of the Sampling Plans to the inspection of a commodity, depending upon circumstances. For normal trading purposes Level I is recommended. In the case of dispute or controversy, i.e. for Codex referee purposes, Level II is recommended. Smaller sample sizes than those provided by Levels I and II may be justified, e.g. when a delivery is being checked for labelling or for detection of non-permitted additives. However, the acceptance sampling criteria of the Plans, which permit 6.5 percent “defectives”, do not apply to such an inspection.

OC CURVES

The problem of buyer's and seller's risks in relation to sample size and lot quality is illustrated through the use of **Operating Characteristic Curves** (OC Curves). Appendix III contains OC Curves for the sampling plans contained in Appendix I of this document. For purposes of destructive inspection sample sizes in excess of 84 are not practical, since any further inspection beyond this point will not generally provide sufficient additional data to warrant the time and expense of testing.

In studying the OC Curves for AQL 6.5 several conclusions can be drawn, namely:

- 1 All of the Curves have the same general slope although the curve for sample size 6 is flatter.
- 2 All curves intersect at a point represented by the coordinates of “6.5 percent defective” and approximately “95 percent probability of acceptance”.
- 3 As the sample size increases, the curves become steeper and more discriminating, i.e. lots having “defectives” in excess of 6.5 percent are rejected with greater frequency.
- 4 The reliability of the larger sample size is not in direct proportion to the increased sample. For example, for a lot that is 20 percent defective a sample size of 6 (curve E) will accept such lot 65 percent of the time; whereas a sample size of 48 (curve L) will accept the same lot 22 percent of the time. In this example the ratio between probabilities of acceptance is only 3 to 1.

To illustrate the use of the OC Curves (AQL 6.5) let it be assumed that a lot is 10 percent defective. A lot with 6.5 percent defectives will be accepted approximately 95 percent of the time, the frequency of acceptance increasing as the percent defective decreases. However, the 10 percent defective lot fails to measure up to requirements, and while it may be a marginal lot, it may not be acceptable. An examination of the OC curves shows that a sample size of 6 (curve E) will accept this marginal lot 88 percent of the time; a sample size of 84 (curve M) is somewhat better, accepting the lot 65 percent of the time.

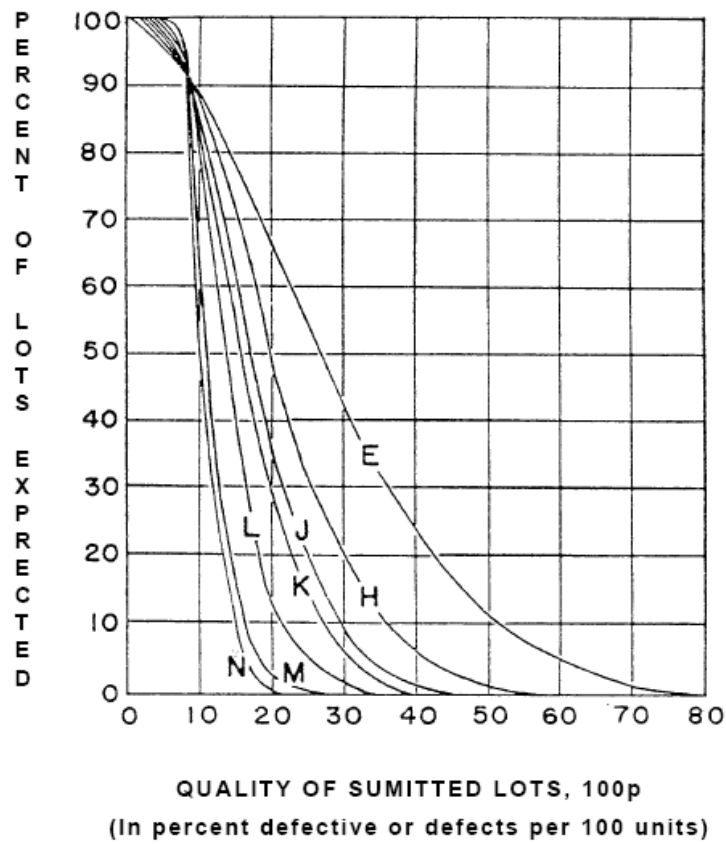
If, on the other hand, the lot is 30 percent defective, a sample size of 6 (curve E) will accept the lot only 42 percent of the time, whereas a sample size of 21 (curve J) will accept such a lot only 8 percent of the time and a sample size of 84 (curve M) will always fail such a lot.

**Annex E
(informative)**

**Operating characteristic curves
AQL=6.5**

Identification letter of OC curve																				
E			H			J			K			L			M		N			
n	c	r	n	c	r	n	c	r	n	c	r	n	c	r	N	c	r	n	c	r
6	1	2	13	2	3	21	3	4	29	4	5	48	6	7	84	9	10	126	13	14

OC CURVE - AQL = 6.5



Draft for comment

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

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