

# codex alimentarius commission



FOOD AND AGRICULTURE  
ORGANIZATION  
OF THE UNITED NATIONS

WORLD  
HEALTH  
ORGANIZATION



JOINT OFFICE: Viale delle Terme di Caracalla 00100 ROME Tel: 39 06 57051 www.codexalimentarius.net Email: codex@fao.org Facsimile: 39 06 5705 4593

**Agenda Item 7**

**CX/FFP 05/27/8**

## JOINT FAO/WHO FOOD STANDARDS PROGRAMME CODEX COMMITTEE ON FISH AND FISHERY PRODUCTS

**Twenty-seventh Session**  
Cape Town, South Africa  
28 February – 4 March 2005

### **PROPOSED DRAFT STANDARD FOR QUICK FROZEN SCALLOP ADDUCTOR MUSCLE MEAT DISCUSSION PAPER ON MOISTURE CONTENT (Prepared by Canada, Australia, France, Germany, Japan and Thailand)**

#### **BACKGROUND**

At the 26<sup>th</sup> Session of the Codex Committee on Fish and Fishery Products (CCFFP), the moisture content of scallops was discussed in connection with the Proposed Draft Standard for Quick Frozen Scallop Adductor Muscle Meat. The “*Discussion Paper on the Moisture Content and Phosphates in Scallops (CX/FFP 03/9-Add.1)*” was referenced by the Committee.

The Committee noted that the heterogeneity of scallops, seasonality, the variability in commercial harvest practices and locations, can have a large influence on establishing one internationally accepted moisture limit. These variations notwithstanding, several proposals were considered for the standard:

- Provide upper moisture limits according to Good Manufacturing Practice (GMP) and give consideration that moisture/protein ratio value might replace the percentage value;
- In case it was not possible to establish one acceptable moisture limit the following criteria might be considered by countries in developing a moisture content limit:
  - species
  - harvest practice
  - seasonality
  - geographical location and other criteria that relate to amount of water uptake occurring during processing in accordance with GMP;
- Retain the current moisture content for further discussion;
- Delete the provisions on maximum moisture content from the standard.

After an exchange of views on this matter, the Committee was unable to reach agreement and decided to leave section 3.3.2 on moisture content unchanged. The Delegation of Canada together with Australia, France, Germany, Japan and Thailand were requested to work further on moisture content especially in conjunction with the work on GMPs.

#### **PURPOSE**

The purpose of this discussion paper is to outline options that the Committee could consider on moisture content in the Proposed Draft Standard for Scallop Adductor Muscle Meat.

## **OPTIONS TO BE CONSIDERED BY THE CCFFP**

### **Option 1 - Statement(s) of Principle**

The standard should be developed without a moisture value. As an alternative, a statement(s) of principle on moisture content could be used to signify that scallops are natural and high value products and that soaking scallop adductor muscle meat in freshwater is not an acceptable practice. An example of a moisture content statement could be as follows:

*"It is a legitimate objective for a country to establish a standard for excess moisture in scallop meat to prevent economic fraud and unfair trade practices. In order to meet this objective, the excessive addition of freshwater during harvesting, storage and processing of scallops must be adequately controlled in accordance with good manufacturing practices.*

*A country may establish a scientifically supported and technically feasible moisture limit for their domestic requirements based on the above principles. Where an exporting country has relevant scientific information on the moisture standard of their scallops, they may approach an importing country to discuss the standard on a species by species basis."*

#### Advantages

- Standards management:  
Places a "marker" in the standard for future work when more information becomes available.  
A means to achieve consensus.
- Flexible: Countries can operate under the same principle for multiple species based on national knowledge.

#### Disadvantages

- Countries to resolve upper moisture limit issue bilaterally.
- Perception that without strict upper limit in standard, it is easy to cause economic fraud.

### **Option 2 - Moisture Value According to Species**

To reduce the variability of the moisture value in this standard, it may be possible to develop a list of scallop species with a corresponding moisture value. For inclusion of species on this list, criteria for the data that will need to be submitted and the process which is to be followed will need to be established by the Committee.

#### Advantages

- Less variability than establishing one internationally acceptable moisture value.

#### Disadvantages

- Will require more time and significant work by the Committee.

### **Option 3 - One Moisture Limit or Moisture/Protein Ratio Limit**

The standard should include one moisture limit applied for all species.

#### Advantages

- A single internationally established moisture limit is achieved.

#### Disadvantages

- This work will require considerable more time and significant work by the Committee.
- Difficult to get agreement on a single limit.
- A single limit could be difficult to administer for various species of scallops.

## **Option 4 - Moisture Range**

The standard should be developed using a moisture content range. Countries can establish moisture limits in scallop meat within this range.

### **Advantages**

- Flexible: Countries can operate within a range of values for various species around the world.

### **Disadvantages**

- Might be difficult to get agreement on the limits of the range.
- Upper limit will inevitably be chosen.
- Countries to resolve moisture upper limit issue bilaterally.
- Require more time and work by the Committee.

## **OTHER CONSIDERATIONS**

The delegation of France also proposed that in order to elaborate on a qualitative moisture value (e.g. Moisture/Nitrogen), a new study should be undertaken to determine the real heterogeneity of scallops. This study would also be useful for GMP.

## **GOOD MANUFACTURING PRACTICES**

To provide guidance on conformity with the standard (i.e. statement(s) of principle, moisture value per species, etc.), a new section on the processing of scallop meat should be elaborated for inclusion into the Code of Practice for Fish and Fishery Products. Annex 1 provides an illustrative example of a code of practice on the processing of scallop meat (post harvest and processing examples). The description of “*Added Water*” in the Defects section and its identification as a potential defect in the text promotes and takes into account the controls for freshwater water use during handling and processing.

## **RECOMMENDATIONS**

The Committee is invited to consider the applicability of the above options in addressing moisture content in scallop meat in the Proposed Draft Standard for Quick Frozen Scallop Adductor Muscle Meat.

The Committee is also invited to consider the appropriateness of the attached section on the processing of scallop meat for inclusion into the Code of Practice for Fish and Fishery Products (Annex 1) in connection with the Proposed Draft Standard for Quick Frozen Scallop Adductor Muscle Meat. This discussion paper and Annex 1 could be used as a basis for recommending new work.

**ANNEX 1**

**'PRELIMINARY' DRAFT CODE OF PRACTICE FOR THE PROCESSING OF SCALLOP MEAT**

(Prepared and submitted by Canada)

**TABLE OF CONTENTS**

<b>SECTION X</b>	<b>Processing of Fresh and Frozen Scallop Meat</b>
<b>X.1</b>	General Addition to Pre-requisite Program
<b>X.2</b>	Identification of Hazards and Defects
<b>X.3</b>	Processing Operations
<b>X.3.1</b>	Processing of Fresh Scallop Meat on Board a Long Haul Harvesting Vessel Prior to Offloading
<b>X.3.1.1</b>	Live Scallop Landing/Deck Dump
<b>X.3.1.2</b>	Shucking
<b>X.3.1.3</b>	Washing with Sea Water
<b>X.3.1.4</b>	Pre-chilling
<b>X.3.1.5</b>	Bagging
<b>X.3.1.6</b>	Chilled Storage
<b>X.3.2</b>	Processing of IQF Frozen Scallop Meat
<b>X.3.2.1</b>	Scallop Reception
<b>X.3.2.2</b>	Chilled Storage
<b>X.3.2.3</b>	Washing
<b>X.3.2.4</b>	Application of Additives to Scallop Meat
<b>X.3.2.5</b>	Size Grading
<b>X.3.2.6</b>	Freezing Process
<b>X.3.2.7</b>	Glazing
<b>X.3.2.8</b>	Weighing
<b>X.3.2.9</b>	Labelling
<b>X.3.2.10</b>	Packaging
<b>X.3.2.11</b>	Frozen Storage
<b>Appendix 'X'</b>	Optional Final Product Requirements

## SECTION 2 DEFINITIONS

For the purpose of this Code:

<b>Refrigerated Sea Water</b>	is sea water in fixed tanks chilled by mechanical refrigeration
<b>Roe on scallop</b>	is the scallop adductor muscle meat and the roe sac remaining after the viscera has been completely detached from the scallop shell.
<b>Scallop Meat</b>	is the adductor muscle meat remaining after the viscera and/or roe have been completely detached from the scallop shell.
<b>Shucking</b>	is the process of removing the adductor muscle meat and completely detaching the viscera or viscera and roe from the shell of live scallops.

## SECTION X PROCESSING OF FRESH AND FROZEN SCALLOP MEAT

In the context of recognising controls at individual processing steps, this section provides examples of potential hazards and defects and describes technological guidelines, which can be used to develop control measures and corrective action. At a particular step only the hazards and defects, which are likely to be introduced or controlled at that step, are listed. It should be recognised that in preparing a HACCP and/or DAP plan it is essential to consult Section 5 which provides guidance for the application of the principles of HACCP and DAP analysis. However, within the scope of this Code of Practice it is not possible to give details of critical limits, monitoring, record keeping and verification for each of the steps since these are specific to particular hazards and defects.

As stressed by this Code, the application of appropriate elements of the pre-requisite program (Section 3) and HACCP principles (Section 5) at these steps will provide the processor with reasonable assurance that the essential quality, composition and labelling provisions of the appropriate Codex standard will be maintained and food safety issues controlled.

The commercial harvest practices of scallops can be quite variable. For instance, shucking can occur either on board fishing vessels or in land based facilities. In addition, fishing voyages can typically range from 1 to 10 days. For long fishing voyages where shucking is performed at sea and kept chilled by the application of freshwater ice, the time that the scallop meat is exposed to the melting ice can affect both the product quality and composition. The washing of scallop meat during processing is also a source of freshwater exposure affecting product composition. For the product to meet international and/or regulatory standards aimed to prevent consumer fraud and unfair trade practices, scallop fishers and processors should have proper controls in place with particular attention paid to limit excessive addition of freshwater water to the product.

This section covers the processing of fresh scallop meat on board a long haul harvesting vessel prior to offloading and the processing of IQF frozen scallop meat at the processing facility. This section will also address the use of freshwater and polyphosphate treatment during processing. The example of the flow diagram (Figure X.1) will illustrate some of the common steps involved in the processing of scallop meat.

### X.1 GENERAL ADDITION TO PRE-REQUISITE PROGRAMME

Section 3 - Pre-requisite programme gives the minimum requirements for good hygienic practices for a harvesting vessel and processing facility prior to the application of hazard and defect analysis. In addition to the guidelines described in Section 3, the following should also be considered:

- *To be elaborated*

### X.2 IDENTIFICATION OF HAZARDS AND DEFECTS

Refer also to Section 5.3.3 Conduct Hazard and Defect Analysis.

#### X.2.1 Hazards

Refer also to Section 5.3.3.1 Identification of Hazards and Defects. Where marketing of whole scallops and roe-on scallops is concerned, these products should meet the relevant hygienic provisions outlined in the Proposed Draft Codex Standard for Live [and Raw] Bivalve Molluscs (*under development*). For example, marine biotoxins will need to be included in the hazard analysis since the gonads and roe may be toxic.

This Section describes the main hazards and defects specific to scallop meat.

#### **X.2.1.1 Marine Biotoxins**

Phycotoxins such as DSP, PSP or ASP are generally not a food safety concern in scallop adductor muscle meat alone and therefore do not pose a human health risk. Scientific data regarding the contamination of scallop meat with biotoxins are limited and suggests that only some scallops may be affected by marine biotoxins in scallop meat. For instance, it appears that the purple-hinged rock scallop (*Crassidoma giganteum* / *Hinnites multirugosus*) accumulates PSP toxin in the adductor muscle.

#### **X.2.2 Defects**

The potential defects below are outlined in the essential quality, labelling and composition requirements described in the Proposed Draft Codex Standard for Quick Frozen Scallop Adductor Muscle Meat (*under development*).

End product specifications outlined in Appendix 'X' describe optional requirements specific to scallop meat.

##### **X.2.2.1 Parasites**

Parasites are known to affect the respiratory system, organs and the connective tissue of organs (i.e. Perkinsis spp.). Sulcascaris sulcata, a nematode, has been known to parasitize the adductor muscle of calico scallops. Scientific information is limited on the significance of scallop parasites to public health. Never the less, the infestation of mature parasites in scallops or the presence of cysts can be aesthetically offensive to consumers.

##### **X.2.2.2 Excessive Viscera**

During the shucking of scallops, incomplete removal of the viscera and other parts of the intestine from the scallop meat could occur. Excessive amounts could result in undesirable physical attributes in the final product that would be objectionable to consumers.

##### **X.2.2.3 “Added water”**

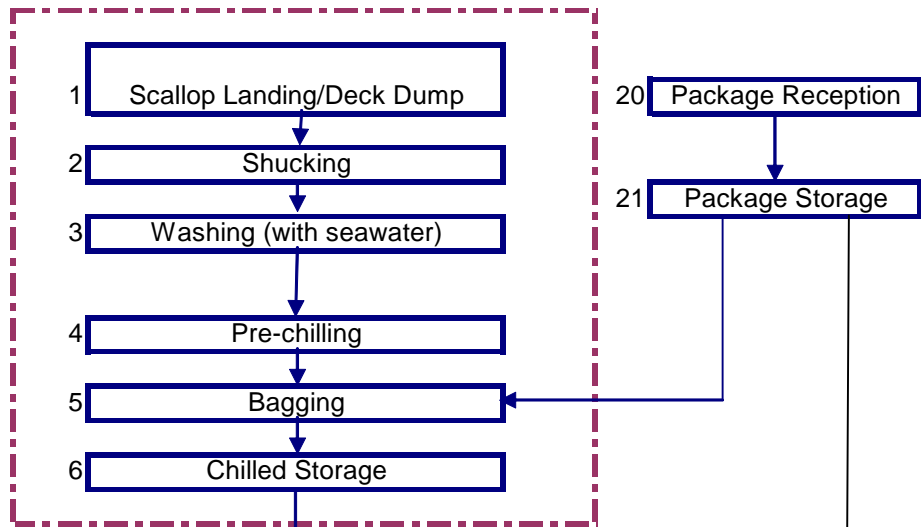
It has been shown that freshwater in contact with scallop adductor muscle meat will increase its moisture content over time. This is because the adductor muscle of a scallop is made up of parallel strands of fibers that can absorb water through capillary action. If scallop adductor muscle meat has been in contact with freshwater for an excessive amount of time, water is added to the product and consumer fraud and unfair trade practices could result. The use of polyphosphates in scallops during processing will bind added water and if used improperly, can potentially lead to consumer fraud and unfair trade practices.

Product labelling can help minimize economic fraud by providing information to consumers so that informed purchasing choices can be made. However, proper processing controls should also be in place by the processor to ensure that added water and polyphosphate use meets international and regulatory standards. (i.e. GMP's must be properly applied and adhered to by the processor.)

This flow chart is for illustrative purposes only. For in-factory HACCP implementation a complete and comprehensive flow chart has to be drawn up for each process.

**References correspond to relevant Sections of the Code**

**Long Haul Harvesting Vessel Operations**



**Land Based Facility Operations**

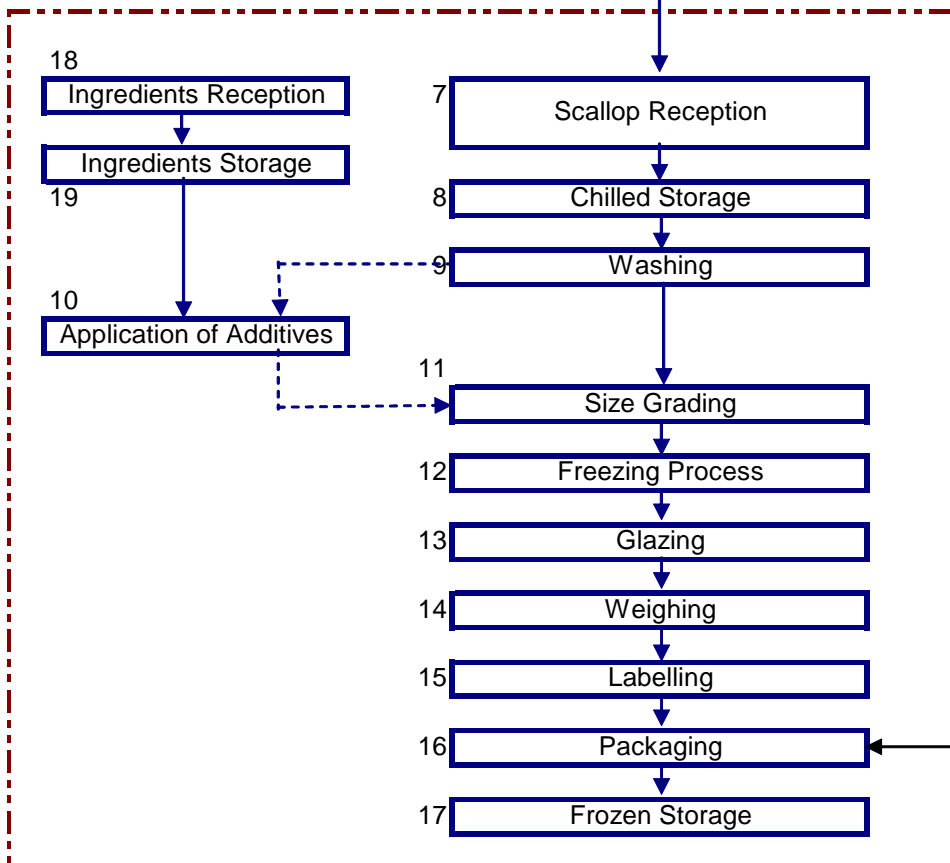


Figure X.1 Example of flow chart of processing of scallop meat

### **X.3 PROCESSING OPERATIONS**

#### **X.3.1 Processing Of Fresh Scallop Meat On Board a Long Haul Harvesting Vessel Prior To Offloading**

Generally, there are two categories of voyages characterized by the proximity of the harvest site (fishing ground) relative to the land based processing facility. “Short haul voyages” are typically 1 - 2 days in the case of inshore wild caught fisheries and daily as in the case of aquaculture controlled harvest. “Long haul voyages” are typically offshore fishing voyages that last 10 days or less. On long haul voyages, shucking of scallops is carried out on board fishing vessels. Products are kept chilled by the application of freshwater ice and placed in appropriate refrigerated storage.

##### **X.3.1.1 Scallop Landing/Deck Dump (Processing Steps 1)**

*Potential*                      *Not likely*

Hazards:

Potential Defects:    *Not likely*

Technical Guidance:

- Live scallops should be collected and placed in clean storage containers without undue delay.
- Scallops requiring shucking on arrival at the processing facility should be adequately chilled, handled without undue delay and with care to avoid contamination.

##### **X.3.1.2 Shucking (Processing Steps 2)**

*Potential*                      *Not likely*

Hazards:

Potential Defects:    *Remaining viscera*

Technical Guidance:

- Care should be taken to ensure that the viscera, connective tissue and roe (if applicable) are completely removed from the scallop meat.

##### **X.3.1.3 Washing with Sea Water (Processing Steps 3)**

*Potential*                      *Shell fragments*

Hazards:

Potential Defects:    *Remaining viscera, physical contamination (sand, debris)*

Technical Guidance:

- An adequate supply of clean sea water should be available for washing of:
  - live scallops prior to shucking;
  - scallop meat after shucking to remove any viscera, connective tissue, foreign matter and shell fragments.

##### **X.3.1.4 Pre-chilling (Processing Steps 4)**

*Potential*                      *Not likely*

Hazards:

Potential Defects:    *Moisture (added water) - applies to pre-chilling using freshwater*

Technical Guidance:



- Pre-chilling of the scallop meat should be employed to reduce the core temperature of the scallop meat prior to being placed in chilled storage. This step can minimize the amount of ice melt and consequently freshwater contact with the scallop meat during chilled storage.
- Pre-chilling involves the immersion of the scallop meat in refrigerated sea water for a specified period of time.
- If freshwater ice is used in conjunction with sea water, the contact time for each batch should be kept as short as practical.
- Water used for pre-chilling should be periodically replaced minimise the bacterial load and ensure functional water temperature.

### **X.3.1.5 Bagging (Processing Steps 5, 20, 21)**

*Potential Not likely*

Hazards:

Potential Defects: *Not likely*

Also refer to Section 8.5.1 - Reception – Packaging, Labels & Ingredients; Section 8.5.2 – Storage - Packaging, Labels & Ingredients and Section 8.4.4 - Wrapping and Packing,

Technical Guidance:

- After the scallop meats are packed in clean bags made of a suitable material, a tag or other appropriate identification should be attached to each bag to determine the date of harvest and other relevant product information.
- The bagged scallop meats should be kept in a clean condition.

### **X.3.1.6 Chilled Storage (Processing Steps 6)**

*Potential Not likely*

Hazards:

Potential Defects: *Decomposition, Moisture (added water)*

Also refer to Section 8.1.2 – Chilled Storage

Technical Guidance:

- The bags of scallop meat should be surrounded by sufficient finely divided ice.
- The chilled storage or storage containers should be adequately drained so that freshwater from the melted ice has minimal contact with the product near the bottom layer.
- Stock rotation schemes/plans should be developed to ensure proper utilisation of the scallops.

## **X.3.2 Processing of IQF Frozen Scallop Meat**

This section is designed to augment the Processing of Fresh Scallop Meat On Board a Long Haul Harvesting Vessel section with additional operation steps pertaining specifically to the processing of IQF frozen scallop meat.

### **X.3.2.1 Scallop Reception (Processing Steps 7)**

*Potential Marine Biotxin (applies to roe-on scallops)*

Hazards:

Potential Defects: *Decomposition, Moisture (added water)*

Technical Guidance:

- Product specifications could include the following characteristics:  
⇒ organoleptic characteristics such as appearance, odour, texture, etc;

- ⇒ acceptable upper limit moisture content (*DN: possible methods of analysis (ie. % moisture and M/P ratio could be appended as an annex for reference purposes)*);
  - ⇒ workmanship (excessive viscera/roe (in the case of adductor muscle meat only));
  - ⇒ presence of parasites;
  - ⇒ foreign matter.
- For the marketing of roe-on scallops, a processor should have a process in place to ensure that the toxicity content meets the regulatory requirements to the satisfaction of the official agency having jurisdiction. For example, this could be accomplished by, but not limited to, adherence to monitoring programs or end product testing.
  - Skills should be acquired by scallop handlers and appropriate personnel in sensory evaluation techniques to ensure incoming lot meet essential quality provisions of the Codex Standard for Quick Frozen Scallop Adductor Muscle Meat.
  - Scallop meats should be processed efficiently, without undue delay and with care to avoid contamination.
  - Scallop meat should be rejected if known to contain harmful, decomposed or extraneous substances, which will not be eliminated or reduced to an acceptable level by normal procedures of sorting or preparation. An appropriate assessment should be carried out to determine the reason(s) for loss of control and the HACCP or DAP plan should be modified where necessary.

#### **X.3.2.2 Chilled Storage (Processing Steps 8)**

*Potential Not likely*

*Hazards:*

*Potential Defects: Decomposition*

Also refer to Section 8.1.2 – Chilled Storage

*Technical Guidance:*

- For scallop meat packed in cotton bags, their identification tag facilitate the determination of the harvest date and the number of days the product has been kept in contact with freshwater ice. Stock rotation schemes/plans should be developed to ensure proper utilisation of the scallops.

#### **X.3.2.3 Washing (Processing Step 9)**

*Potential Shell fragments*

*Hazards:*

*Potential Defects: Excessive moisture (added water), physical contamination (sand, debris)*

*Technical Guidance:*

- Scallop meat should be gently agitated to allow separation from each other and to ensure the removal of foreign matter.
- Since washing requires typically 20 – 40 minutes, chilled salt water (3%) should be used for the washing of scallop meat to minimize the uptake of moisture.
- Chilled salt water should be prepared from potable water and food grade salt.
- The use of freshwater should be avoided. If used, a washing method should be clearly defined and should address the contact time.
- The washing schedule (contact time parameters) should be carefully monitored.
- The washed scallop meats should be adequately drained.
- After washing, the scallop meat should be immediately processed or refrigerated and kept at the adequate temperature (temperature of melting ice).

#### **X.3.2.4 Application of Additives to Scallop Meat (Processing Step 10, 18, 19)**

Potential                      *Not likely*

Hazards:

Potential Defects:    *Excess Moisture (added water), off-flavours*

Also refer to Section 8.5.1 Reception – Packaging, Labels & Ingredients and Section 8.5.2 Storage - Packaging, Labels & Ingredients.

Technical Guidance:

- Soaking scallop meat in a phosphate solution is the most common method of polyphosphate application. Polyphosphates can also be applied by dipping, spraying or tumbling in phosphate solution. (add reference??)
- If polyphosphates are used, a processor should develop a process for its application in order to consistently achieve its beneficial functional goals such as retention of natural moisture (i.e. to prevent drip loss) and flavour, inhibiting fluid losses of fresh shipments during transport and prior to sale, inhibiting oxidation flavours and lipids by chelation of heavy metals and cryoprotection, thereby extending shelf life.
- Polyphosphates should be blended in the proper proportions and should adhere to the appropriately validated contact time. The amount of water absorbed by the scallop meat will increase with soaking time.
- Additives should comply with the requirements of the Codex General Standard for Food Additives.

#### **X.3.2.5                      Size Grading (Processing Steps 11)**

Potential                      *Not likely*

Hazards:

Potential Defects:    *Decomposition*

Technical Guidance:

- Size grading of scallop meat is typically undertaken through mechanical graders of various degrees of sophistication. There is a possibility of scallop meat becoming trapped in the bars of the graders so that regular inspection is required to prevent “carry-over” of old scallop meat.
- After grading, the scallop meat should be immediately processed or refrigerated and kept at the adequate temperature (temperature of melting ice).

#### **X.3.2.6                      Freezing Process (Processing Step 12)**

Potential Hazards:        *Not likely*

Potential Defects:        *Texture deterioration, development of rancid odours, dehydration*

Refer to Section 8.3.1 Freezing Process

#### **X.3.2.7                      Glazing (Processing Step 13)**

Potential Hazards:        *Not likely*

Potential Defects:        *Subsequent dehydration, incorrect net weight*

Refer to Section 8.3.2 Glazing

- Care should be taken to ensure that the entire surface of the frozen scallop meat is covered with a suitable protective coating of ice and should be free of exposed areas where dehydration (freezer burn) can occur.

#### **X.3.2.8                      Weighing (Processing Step 14)**

Potential Hazards: Unlikely  
Potential Defects: Incorrect net weight

Refer to Section 8.2.1 Weighing

### **X.3.2.9 Labelling (Processing Steps 15)**

Potential Hazards: Unlikely  
Potential Defects: Incorrect labelling, undeclared additive

Also refer to Section 8.2.3 Labelling

Technical Guidance:

- Where polyphosphate was used in the process, a system should be in place to ensure that this additive is properly declared on the label.
- Where moisture content prescribed by national legislation has been exceeded, the label must indicate that water was added in accordance with the Codex Standard for QF Scallop Adductor Muscle Meat

### **X.3.2.10 Packaging (Processing Steps 18, 19, 20, 21)**

Potential Hazards: Not likely  
Potential Defects: Not likely

Refer to Section 8.5.1 Reception – Packaging, Labels & Ingredients; Section 8.5.2 Storage - Packaging, Labels & Ingredients and Section 8.4.4 Wrapping and Packing

### **X.3.2.11 Frozen Storage (Processing Steps 17)**

Potential Hazards: Unlikely  
Potential Defects: Dehydration, decomposition, loss of nutritional quality

Refer to Section 8.1.3 Frozen Storage

\*\*\*\*\*

## **APPENDIX ‘X’ – OPTIONAL FINAL PRODUCT REQUIREMENTS – SCALLOP MEAT [TO BE COMPLETED]**

- **Varying colour (i.e light orange verses milk white):** In the spring, sea scallops have orange-colored roe that can bleed into the adductor muscle. This cosmetically different product known as "pumpkins" in the scallop industry, they may not be preferred in some markets.