

# codex alimentarius commission



FOOD AND AGRICULTURE  
ORGANIZATION  
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Agenda Item 5b)

CX/FFP 05/27/6

## 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 CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS (OTHER SECTIONS)

#### GOVERNMENT COMMENTS AT STEP 3

(Brazil, New Zealand, United States)

#### BRAZIL

##### Section 11 – Processing of Salted Fish

An important point to ensure document's coherence is the need to revise the *Potential Hazard* and *Potential Defects* in accordance with Section 5 of the CX/FFP 02/5 PART I Document (see items 11.3.1; 11.3.2; 11.4.1; 11.4.2; 11.4.3; 11.4.4; 11.4.5; and 11.4.6).

**Reason:** Consistency.

##### Section 13 – Processing of Lobsters and Crabs

###### Item 13.1.2 – Hygiene Control Programme

First and second paragraphs – delete square brackets.

###### Item 13.2.1. – Potential Hazards and Defects Associated with Lobsters and Crabs

The items Chemical Hazards and Defects should be numbered (13.2.1.2 and 13.2.1.3, respectively)

**Reason:** Clarity.

**Defects:** Aiming at correct and improve the document, it is proposed to insert a short description and move the rest of the text to relevant Appendix, in accordance with the Drafting Group recommendations:

###### *Blue discoloration in crab meat*

*The problem of the blue discoloration in canned crab meat has caused trouble until recent times. The blue meat often appears not only on the surface of crab meat in the cans, but also, though rarely, on crab meat several hours after boiling and cooling of the carcasses. The blue meat appears more often on the surface of joint of shoulder meat, claw meat and other leg joints. It appears in canned horse hair crab meat (“kegani”) more often than in king crab. The appearance of the blue meat is undoubtedly due to the copper contained in haemocyanin, which is a component of the blood of molluscs or arthropods.*

###### *Black discoloration*

*Black discoloration (melanosis) is caused by melanin formation in the ventral tail segments of lobsters owing to oxidative enzymatic reaction (polyphenol oxidase), followed by auto-oxidation and polymerisation.*

###### Item 13.2.2 - Minimise the Deterioration of Crustaceans – Handling

Delete square brackets in the phrase “good quality of crab butchered sections can be maintained by immediate cooking and chilling or freezing”.

#### Item 13.3.1.4 - Washing

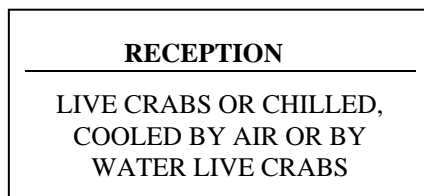
Delete square brackets in the technical guidance text.

#### Items 13.3.2.4 – Trimming; 13.3.2.5 – Shucking, De-veining and Washing; 13.3.2.6 – Chilling, Final Packaging, Labelling; 13.3.3.3 – Washing and Drowning or Insensibilizing; 13.3.3.10 - Cooling

Delete square brackets where chlorinated or chlorinated water is mentioned.

#### Figure 13.3 Example of a flow chart for a chilled pasteurised crab meat processing line

To facilitate document's understanding, delete parentheses in the Processing step 1 – Reception. The new reading would be:



#### Item 13.3.3.3 – Washing and Drowning or Insensibilising

New text for the 3<sup>rd</sup> Technical Guidance: “*cooling the crabs at 0°C or lower, for a period of time in accordance with existing different species.*”

#### Item 13.3.3.9 – Pasteurisation

New text for the 3<sup>rd</sup> and 4<sup>th</sup> Technical Guidance, putting them together in only two phrases, as following: “*to prevent any possible deterioration of the product the crab meat should be pasteurised immediately, after picking and packaging.*”

### Section 18 - Retail

#### 18.1.1. Reception of Chilled Products at Retail

Brazil suggests:

- *Potential Hazards* - It should be changed “*C. botulinum* formation” to “*C. botulinum* toxin formation”.

**Reason:** Consistency.

- It should be changed 28°F to 38°F in the Technical Guidance.

**Reason:** The temperature indicated in the text is wrong.

#### 18.1.3. Chilled Storage of Products at Retail

Brazil suggests to change the sequence of potential hazards, as following: “scombrotoxin formation; pathogen growth, microbiological pathogens and chemical contamination, *C. botulinum* toxin formation”.

**Reason:** It makes easier to understand.

#### 18.1.5. Preparation and Packaging Chilled Product at Retail

Brazil suggests changing the sequence of potential hazards as following: “scombrotoxin formation, pathogen growth, microbiological pathogens, physical and chemical contaminations, allergens”.

**Reason:** It makes easier to understand.

#### 18.1.7. Retail Display of Chilled Seafood

*Potential Hazards:* It should be changed “*C. botulinum* formation” to “*C. botulinum* toxin formation”.

**Reason:** Consistency.

## **NEW ZEALAND**

### **General comment**

New Zealand suggests that a lot more technical guidance could be usefully given in this section of the Code of Practice and it would be worthwhile for the Committee to invest a greater amount of time and energy on this section because shellfish are arguably the highest risk commodity under the CCFFP committee. Existing documentation exists in a number of countries that could be used to provide a comprehensive base for this guidance. For example the New Zealand documentation available at <http://www.nzfsa.govt.nz/animalproducts/seafood/iaais/5/iaais-005.1.pdf>

We note that both the bivalve mollusc standard and code of practice would benefit from further editing for language, grammar and spelling. There are also a number of instances in the standard where the nature of the text would more appropriately place it into the code of practice.

For these reasons, New Zealand suggests that once the scope and content of the bivalve shellfish standard is more developed then it would make sense to convene a working group of interested countries to develop the code of practice document more fully to cover all aspects of bivalve shellfish management and deal effectively with editorial matters between meetings of the full Committee.

### **Specific Comments**

#### **7.1**

New Zealand suggests that the first sentence of the third to last paragraph of this section be reworded as follows:

“Bivalve molluscs from waters subject to low levels of microbiological contamination, as determined by the authority having jurisdiction, can be made safe in a variety of ways. These include relaying in a suitable area, application of a purification process to reduce the level of bacteria and viruses, heat treatment to destroy pathogens generally or application of post-harvest treatments designed to eliminate or reduce the levels of specific pathogens. Purification is a short-term process commonly used to reduce low levels of microbiological contamination, but long term relaying into clean water is required if there is a greater risk of contamination.”

The final sentence of this section should either be deleted because it contains no specific information. If it is to be retained specific examples of species both suitable and unsuitable for purification should be given along with the rationale as to why they are suitable or unsuitable.

#### **7.2.2.2 Third Sentence**

New Zealand suggests this should be reworded to say “The pathogen species, and preferably the actual strain, should be known....”

#### **7.2.2.3 First sentence, second paragraph**

New Zealand suggests this should be reworded to say “The official agency having jurisdiction should close the affected area immediately and effectively patrol.....”

#### **7.2.2.4**

This section advises that growing areas should be monitored on a “regular” basis for chemical contaminants. Some indication about what “regular” might mean in this context is appropriate. For example, “regular” in the context of heavy metal monitoring where there are no point sources of such contamination known might mean every three years. Where there is a source of a specific industrial pollutant in the rainfall catchment for a growing area, “regular” might mean as frequently as weekly.

#### **7.6.1**

This section lists viable parasites as a hazard that should be managed at reception. New Zealand seeks clarification as to what viable parasites of human health significance would be likely to be able to be managed in a visual examination of live shellfish at reception. If this statement is intended to cover the presence of harmless commensal organisms such as pea crabs then these should be specifically listed as a defect, not a hazard.

#### **7.7**

The potential hazard in this section is microbiological contamination. “Failure to eliminate or reduce etc” is not a hazard itself – it simply leads to the hazard remaining in the product.

## UNITED STATES

In response to CL2003/37-FFP, October 2003, the United States respectfully submits the following comments on Code of Practice for Fish and Fishery Products, Proposed Draft Section 7– Live and [Raw] Bivalve Molluscs at Step 3. Recommended additional language within sentences is highlighted in bold for the convenience of the reader. Attached to these comments is a draft showing how the code of practice would look if the comments were adopted.

### SECTION 7 – LIVE AND [RAW] BIVALVE MOLLUSCS, delete brackets.

Reason: The United States recommends that the brackets be removed from the title and that the scope of Section 7 of the code include only live and raw bivalve molluscs for direct human consumption and for further processing. The “further processing” such as smoking, canning, marinating, etc. would be addressed in sections of the Code of Practice for the respective processes. Those sections could reference Section 7 as needed.

#### Definitions:

### 2.3 BIVALVE MOLLUSCS

**Distribution Centre**, delete this term and definition.

Reason: The Distribution Centre as defined in the current draft describes a facility where bivalve mollusks are taken for cleaning, conditioning, grading, etc. and from which they must leave alive. Consequently, post harvest treatment, shucking, or further processing must occur elsewhere. This kind of arrangement, e.g. where cleaning and shucking must take place in different facilities, is not consistent with international practice as we know it. Much of the world permits functions beyond preparation for live consumption in facilities that receive, condition, wash, declump and grade bivalve mollusks. These products may be treated or further processed in the same facility in which the products are initially received. The United States is unaware of public health problems that would require geographical separation of these functions. Consequently, to accommodate all international practices that are scientifically defensible, we propose deleting the term “distribution centre” from this code of practice. Instead the code could address how bivalve mollusks should be prepared, but not be explicit about what may or may not occur in any specific facility.

**Post Harvest Treated Bivalve Molluscs**, delete this term from the “Definitions” section

Reason: This term is defined within the code of practice and does not need to be duplicated here.

**Figure 7.1**, delete original flow chart and remove brackets around the new flow chart, remove brackets from “and raw” in the caption

Reason: The new flow chart would accurately reflect the scope of a code section for live and raw bivalve molluscs, that included shucking, freezing, and post harvest treatment, as is currently being proposed in the draft standard for bivalve molluscs. The inclusion of shucking, freezing and post harvest treatments within this code section makes sense for three reasons. First – These steps do not eliminate the sensory characteristics of live products. Second – The product may still be consumed directly by the consumer with no additional processing. Third – The alternative would be to include shucking, for example, within code sections for processed products such as canned products. That approach would be peculiar at best.

## SPECIFIC COMMENTS BY SECTIONS

### 7.1 GENERAL REMARKS, ADDITION TO THE PRE-REQUISITE PROGRAMME

7.1, para 5, revise to read:

“Bivalve molluscs from waters subject to ~~low levels of microbiological~~ contamination, as determined by the authority having jurisdiction, can be made safe by relaying in a suitable area or **by** a purification (**depuration**) process to reduce the level of bacteria and **the level** of viruses if the process is continued long enough, or by ~~a heat treatment to destroy the pathogens~~ **post harvest treatment to destroy target organisms**. Purification (**depuration**) is a short term process commonly used to reduce low levels of bacterial contamination, but long term relaying is required if there is a risk of viral contamination.”

Reason: Codex should recognize the progress being made in new forms of post harvest treatment to reduce target organisms. For example, post harvest treatment may be capable of destroying high levels of *Vibrio vulnificus* and *Vibrio parahaemolyticus* even though the water may contain low levels of microbiological contamination associated with human activity, e.g. sewage, that shellfish safety programs have traditionally targeted. Because post harvest treatment could destroy high levels of target organisms, we are recommending deletion of the phrase “low levels of microbiological contamination” from the first sentence. We are also recommending deletion of the phrase “heat treatment” from the first sentence and replacement with “post harvest treatment to destroy target organisms.” There is a form of heat treatment that is actually an example of post harvest treatment. Heat treatment could also be a form of “further processing” that would be outside the scope of this section of the Code of Practice if the scope of the section were limited to live and raw, as is being recommended.

## **7.2 CLASSIFICATION AND MONITORING OF GROWING AREAS**

### **7.2.1 Classification of growing areas, 6<sup>th</sup> para, second bullet, revise to read:**

“Classified growing areas should be clearly defined by the official agency having jurisdiction as suitable for harvesting for either:

- direct human consumption;
- relaying in acceptable water or purification in an approved purification centre or ~~other~~ forms of approved **post harvest** treatment e.g. heat treatment, radiation, **hydrostatic pressure, IQF**;
- non-suitable for growing or harvesting Bivalve Molluscs.”

Reason: To emphasize that bivalve molluscs that will be post harvest treated must also come from classified growing areas.

#### **7.2.2.1, third para, add a second sentence:**

**“Because these indicators do not correlate well with the presence of viruses, other controls such as shoreline surveys should always be employed.”**

#### **7.2.2.1, fourth para, remove the brackets and retain the sentence**

Reason: The sentence accurately represents the direction of current efforts to improve this aspect of safety programs for bivalve molluscs.

#### **7.2.2.3 Marine biotoxin control, para one, add the following sentence after the first sentence:**

**“Growing areas should also be monitored for environmental signals that a toxic event may be occurring, e.g., dead or dying birds, mammals, or fish.”**

## **7.3 HARVESTING AND TRANSPORTATION OF LIVE BIVALVE MOLLUSCS**

**Second paragraph, revise to read, “This section applies to the transportation of bivalve molluscs for the purpose of direct human consumption, ~~further processing~~-relaying, purification, **post harvest treatment or further processing.**”**

Reason: To include post harvest treatment and to move “further processing” to the last item in the sentence because it would be the last of the activities to occur in time.

### **7.3 Potential Hazards:** delete “Biotoxins”

Reason: Presence of biotoxins at hazardous levels would have been detected by monitoring and the authority would have closed the area to harvest under section 7.2.2.3.

### **7.3 Technical Guidance, third bullet, add two additional sentences at the end:**

**“No overboard discharge of waste, including human faecal material, should occur from harvest vessels in and around shellfish growing areas. No animals should be allowed on harvest vessels.”**

### **7.4 Relaying, revise section to read:**

“The requirements for classification and monitoring of growing areas also apply to relaying areas.

Relaying is intended to reduce the level of biological contaminants that may be present in bivalve molluscs which have been harvested from contaminated areas to such levels that the bivalve molluscs will be acceptable for human consumption without further processing. Bivalve molluscs harvested for relaying

should only be harvested from areas that are so designated/classified by the official agency having jurisdiction. **Relaying methods vary worldwide. Bivalve molluscs may be placed in floats, rafts or directly on the bottom.**

*Potential hazards: Microbiological contamination, Biotoxins, ~~Chemical contamination.~~*

*Potential Defects: unlikely.*

*Technical Guidance:*

- Relaying operations should be strictly supervised by the official agency having jurisdiction to prevent contaminated bivalve molluscs from being diverted directly to the consumer market or from cross contamination of other bivalve molluscs. ~~Boundaries of relaying areas should be clearly identified by buoys, poles or other fixed means.~~
- **Boundaries of relaying areas should be clearly identified by buoys, poles or other fixed means. These areas should be adequately separated from the bivalve molluscs in adjacent waters to prevent cross contamination and commingling.**
- **Bivalve molluscs undergoing relaying should remain immersed in clean seawater until they satisfy the sanitary requirements of the official agency having jurisdiction.**
- Holding time and minimum temperature in the accepted area prior to harvest will be determined by the official agency having jurisdiction according to the degree of contamination before relaying, the temperature of the water, the bivalve molluscs species involved and local geographic or hydrographic conditions.
- **The relaying sites used could become biotoxic from a bloom, or could become (an unexpected) a source of environmental pathogens such as *vibrio* bacteria.**
- Bivalve molluscs should be laid out at a density that will permit them to open and undergo natural purification.
- Appropriate documentation should be maintained for relaying operations.

Reason: For clarification on relaying procedures. Chemical contamination should be deleted from the list of potential hazards because such a hazard would not be present in an approved growing area. Microbiological contamination and biotoxins are not always as easily controlled and may be reasonably likely to occur during the relaying process.

#### **7.5 PURIFICATION OF BIVALVE MOLLUSCS IN TANKS, FLOATS AND RAFTS; change title to “PURIFICATION (DEPURATION)”**

Reason: Purification is also known as depuration and that fact should be made clear here. To be consistent with 7.4 “RELAYING,” the type of system does not need to be specified in the title. We are unaware of purification that occurs in a system without tanks and the text within the section refers to tanks only. We associate floats and rafts with relaying rather than with purification (depuration).

**7.5, second para, last sentence, replace second “that” with “are”**

Reason: Editorial correction.

**7.5, Technical Guidance, third bullet, revise to read:**

“The process and the equipment, **e.g.** tanks, ~~float, rafts~~ used for purification purposes should be acceptable to the official agency having jurisdiction.”

Reason: To be consistent with the notion that purification (depuration) occurs in tanks only. Again, floats and rafts are used for relaying but we are not aware of their use in purification (depuration).

#### **7.6 [PROCESSING OF BIVALVE MOLLUSCS IN A DISTRIBUTION CENTRE OR AN ESTABLISHMENT], change the title to, “PREPARATION OF BIVALVE MOLLUSCS FOR DIRECT CONSUMPTION, POST HARVEST TREATMENT OR FURTHER PROCESSING” and delete brackets.**

Reason: This change reflects the previous deletion of the term “distribution centre” in order to accommodate legitimate international practices. It is important to note that this deletion does not preclude countries from having “distribution centres” as previously defined. The purpose of the deletion is to avoid mandating them in all countries, since they are not essential from a public health standpoint.

**7.6, first para, revise to read as follows:**

~~“Distribution centres~~ **Establishments that prepare bivalve molluscs for direct consumption, post harvest treatment or further processing** should maintain the same hygiene standards as sections 3.2, 3.3, 3.4, 3.5.”

Reason: To allow but not mandate the use of “distribution centres” as previously defined. This change in terminology better describes the activities that may occur in these facilities in countries that do not require separate facilities for cleaning and shucking, for example, while allowing such separation in countries that wish to maintain it.

**7.6, after the first para,** add the following general statement as a second paragraph,

**“All steps in the process should be performed without unnecessary delay and under conditions which will prevent the possibility of contamination, deterioration and the growth of pathogenic and spoilage micro-organisms.”**

Reason: This statement applies to all subsections under 7.6 so it should be written as a general statement here and may be removed from the subsections.

**7.6.1 Reception, *Technical Guidance*,** revise bullets to read:

- ~~“Bivalve Molluscs dispatched by a distribution centre must leave the distribution centre alive. Therefore~~ Stress and excessive shocks of the bivalve molluscs must be avoided **if they are intended to be distributed alive.**
- ~~Distribution centres~~ **Establishments that prepare bivalve molluscs for direct consumption, or that engage in post harvest treatment, freezing, shucking, or further processing** should only accept bivalve molluscs which ~~meet the end product specification and which~~ originate directly from approved growing areas or after relaying in an approved relaying area or after purification in an approved purification centre or tank.”

Reason: To allow but not mandate facilities that are limited to live products and to recognize that bivalve molluscs must originate from approved growing areas or after relaying in an approved relaying area, etc. regardless of whether they will be further processed.

**7.6.3 Washing, declumping, debysing and grading, *Technical Guidance*, first bullet,** delete because it would be included under general technical guidance for all subsections under 7.6 in accordance with our recommendation for 7.6, above.

**7.6.4 Packing,** rename and renumber to **“7.9 PACKING AND LABELING,”** include the bulleted information under a new section titled **“7.9.1 LIVE PACKING AND LABELING”** and revise entire subsection to read:

## **“7.9 PACKING AND LABELING**

Refer also to Sections: 3.2, 3.3, 3.4 and 3.5

**All steps in the process of packaging should be performed without unnecessary delay and under conditions that will prevent the possibility of contamination, deterioration and the growth of pathogenic and spoilage micro-organisms.**

The packaging material should be appropriate for the product to be packed and for the expected conditions of storage and should not transmit to the product harmful or other objectionable substances or odours and tastes. The packaging material should be sound and should provide appropriate protection from damage and contamination.

### **7.9.1 Live Packing and Labeling**

Potential Hazards: *Microbiological pathogens, physical contamination, **chemical contamination***

Potential Defects: *Incorrect labeling, presence of damaged or dead bivalve molluscs, foreign matter*

Technical Guidance:

- Before packing bivalve molluscs should undergo visual inspection. Bivalve molluscs which are dead, with broken shells, with adhering soil or otherwise unwholesome, should not be passed for human consumption.
- ~~The packaging material should be appropriate for the product to be packed and for the expected conditions of storage and should not transmit to the product harmful or other objectionable substances or odours and tastes. The packaging material should be sound and should provide appropriate protection from damage and contamination.~~

- The packaging material should avoid contamination and should be drained.
- Labels should be clearly printed and must comply with the labeling laws of the country where the product is marketed. The packaging material may be used to bear an indication as to how the bivalve molluscs should be kept from the time they were bought at the retailer. It is recommended to ~~mention~~ **include** the date of packaging.
- All packaging material should be stored in a clean and sanitary manner. Product containers should not have been used for any purpose, which may lead to contamination of the product. Packaging material should be inspected immediately before use to ensure that they are in a satisfactory condition and where necessary disposed of or cleaned and/or disinfected; when washed they should be well drained before filling. Only packaging material required for immediate use should be kept in the packing or filling area.”

Reason: The U.S. suggests that there should be one subsection for “live” packing and labeling (proposed 7.9.1) and another for “raw” packing and labeling (proposed 7.9.2, below) because the time temperature controls differ for live and raw products. There is increased risk for packing and labeling of raw products. This section as originally written in 7.6.4 “Packing” addressed live packing and labeling and therefore, only the minor changes written above are necessary. Chemical contamination is a potential hazard for live bivalve molluscs because they may be packaged in permeable sacks. Labeling for “live” and “raw” should be consistent and the recommendation is for the date of packaging to be included. The section should be renumbered to be consistent with the new Figure 7.1 flow diagram.

Add a **new subsection “7.9.2 Raw Packing and Labeling”** to read as follows:

**“7.9.2 Raw Packing and Labeling**

***Potential Hazards:*** *Microbiological pathogens, physical contamination*

***Potential Defects:*** *objectionable matter such as shell pieces; incorrect labeling*

***Technical Guidance:***

- Labels should be clearly printed and must comply with the labeling laws of the country where the product is marketed. The packaging material may be used to bear an indication as to how the bivalve molluscs should be kept from the time they were bought at the retailer. It is recommended to include the date of packaging
- All packaging material should be stored in a clean and sanitary manner. Only packaging material required for immediate use should be kept in the packing or filling area.
- Shucked and post harvest treated product should be packed and chilled as soon as possible.
- Freezing should take place quickly. Slow freezing will damage meat.
- If labels on post harvest treated raw bivalve molluscs make safety claims relating to the post harvest treatment, the claims should be specific to the target hazard that has been eliminated or reduced.”

Reason: There is need for more guidance about packing and labeling “raw” product. This was not included in the Draft Code, but is necessary to reflect and explain the changes made to the flow diagram.

**7.6.5 STORAGE**, renumber to **7.10 “STORAGE,”** include the bulleted information now in “7.6.5 Storage” under a new subsection titled **“7.10.1 Live Storage.”** Under *Potential Hazards*, add **“chemical and physical contamination.”**

(proposed) **7.10.1 Live Storage, Technical Guidance, 1st bullet, 2<sup>nd</sup> sentence**, retain as a new bullet

(proposed) **7.10 STORAGE**, expand to include a new subsection **“7.10.2 Raw Storage”** to read as follows:

**“7.10.2 Raw Storage**

***Potential Hazards:*** *microbiological pathogens*

***Potential Defects:*** *unlikely*

***Technical Guidance:***

- Storage periods should be kept as short as possible
- Avoid damage to packaging of frozen product.”



Reason: The U.S. suggests that guidance is needed for “Raw Storage.” The original “7.6.5 Storage” addressed only live storage and therefore, may remain as live storage guidance with the addition of guidance for raw storage. Moving this whole section to 7.10 coincides with the new flow diagram.

**7.6.6 Distribution**, renumber to “**7.11 DISTRIBUTION**,” include the bulleted information now in “7.6.6 Distribution” under a new subsection titled “**7.11.1 Distribution of Live**,” and *Potential Hazards*, change “*unlikely*” to “*Microbiological pathogens*.”

(proposed) **7.11.1 Distribution of Live**, 2<sup>nd</sup> bullet, revise to read:

- “Bivalve molluscs intended for human consumption should only **be distributed** in closed packaging.”

(proposed) **7.11 DISTRIBUTION**, expand to include a new subsection “**7.11.2 Distribution of Raw**” to read as follows:

#### **“7.11.2 Distribution of Raw**

*Potential Hazards:* *Microbiological pathogens*

*Potential Defects:* *unlikely*

*Technical Guidance:*

- **Temperature must be maintained during distribution to control microbial growth.**
- **The product should be dispatched in the sequence of the lot numbers.**
- **Transportation must be able to maintain chilled or frozen product for safety and quality.”**

Reason: The U.S. suggests that guidance is needed for “Distribution of Raw.” The original “7.6.6. Distribution” addressed distribution only of live and therefore, may remain as is with the addition of guidance for distribution of raw. Moving this whole section to 7.11 coincides with the new flow diagram.

**7.7 POST HARVEST TREATMENT**, remove brackets.

Reason: This section should be included in this code in order to recognize the types of post harvest treatment currently being used such as low heat, hydrostatic pressure, irradiation, and individual quick freezing.

**7.7 POST HARVEST TREATMENT, *Potential Hazards***, revise to read, “~~*Failure to eliminate or reduce microbiological contamination by target organisms*~~.”

Reason: The description of potential hazards should be consistent throughout the text and with other sections of the Code of Practice.

**7.7 POST HARVEST TREATMENT, *Technical Guidance*, third bullet**, revise to read, “The treatment parameters established to reduce or eliminate pathogens should be approved by the ~~appropriate~~ official agency having jurisdiction.”

Reason: Editorial change for consistency throughout the text.

**7.7 POST HARVEST TREATMENT, last three paras**, delete.

Reason: The information in these paragraphs is unnecessary here because it is generally included in other sections.

**7.7.1 Heat treatment for purification purposes**, delete entire subsection.

Reason: This section of the Code of Practice currently limits the definition of purification to mean depuration and therefore, it would be confusing to link heat treatment to “purification.” We are aware of only two types of heat treatment in current use that are within the scope of this section of the code of practice. Those include low heat as a type of post harvest treatment, mentioned in 7.7, and heat shocking as described in 7.7.2.

**7.7.2 Heat shocking of bivalve molluscs followed by packing**, renumber to “**7.8.2**,” delete **last bullet** and revise **third bullet** to read as follows:

- “Before heat shocking the bivalve molluscs should be inspected ~~if to determine whether~~ the bivalve molluscs are alive and not badly damaged.”

Reason: Heat shocking is a method to remove shells from the bivalve molluscs. This method is a type of shucking process and should be included under a separate section that describes shucking processes (see new

section 7.8 SHUCKING below). The third bullet should be revised as above for clarity as to why the inspection is conducted. The last bullet may be deleted because this section refers to heat use for shucking only.

(proposed) **7.8.2 Heat shocking of bivalve molluscs followed by packing**, the term “heat shocking” should be used consistently in this section rather than be used interchangeably with “heat shucking.”

**7.8 DOCUMENTATION**, renumber to “**7.12**,” and 7.8 becomes a new section (see below). The term “distribution centre and/or establishment” should be replaced with “**establishment that prepares bivalve molluscs for direct consumption, or that engages in post harvest treatment, freezing, shucking, or further processing**” in all instances.

Reason: These changes remove the need to refer to a “distribution center.”

“**7.8 SHUCKING**,” add as a new subsection to read as follows and expand to include a new subsection “**7.8.1 Hand and Mechanical Shucking and Washing**”:

#### “**7.8 SHUCKING**

**Shucking is the processing step that removes the edible portion of the mollusk from the shell. It is usually done by hand, mechanically or through heat shock with steam or hot water. This step may expose the product to microbiological or physical contamination.**

##### **7.8.1 Hand and Mechanical Shucking and Washing**

**Physical removal of shellfish meat from the shell will often expose the product to dirt, mud and detritus that should be removed before further processing through washing or other means.**

**Potential Hazards:** Physical contamination, microbiological contamination

**Potential Defects:** Cuts and tears of the flesh, presence of sand and mud

**Technical Guidance:**

- **Care should be taken to eliminate excess mud, detritus and sand from the shucking tables.**
- **The product should be examined to ensure that cuts and tears are minimized.**
- **Shucked molluscs should be rinsed or washed to further eliminate mud, sand, detritus and reduce the microbiological level of the product.”**

Reason: The Draft Code did not include shucking by hand or by mechanical means, only by shocking by heat/steam. Both of these shucking processes should be included here. Shucking is often the last step before “further processing” and therefore should be included in this section of the code rather than be included in sections of the code devoted to “further processing” (i.e. canning, marinating, breeding, etc.).

**7.9 LOT IDENTIFICATION AND RECALL PROCEDURES**, renumber to “**7.13**” and revise first two bullets to read as follows:

- “Each product should have an easy identifiable lot number. This lot number must include an identification code, the number of the establishment **that distributes the product**, the country of origin and day and month of packing, in order to facilitate the trace-back of the product. A record keeping system **should be** based on these lot numbers so that individual lots of bivalve molluscs can be traced from the growing area to the end user.
- If a recall must be carried out, its success depends on **having** certain **recall procedures prepared** in advance.

Reason: These suggested changes remove the need to refer to a “distribution center.”

## 2.3 LIVE AND RAW BIVALVE MOLLUSCS

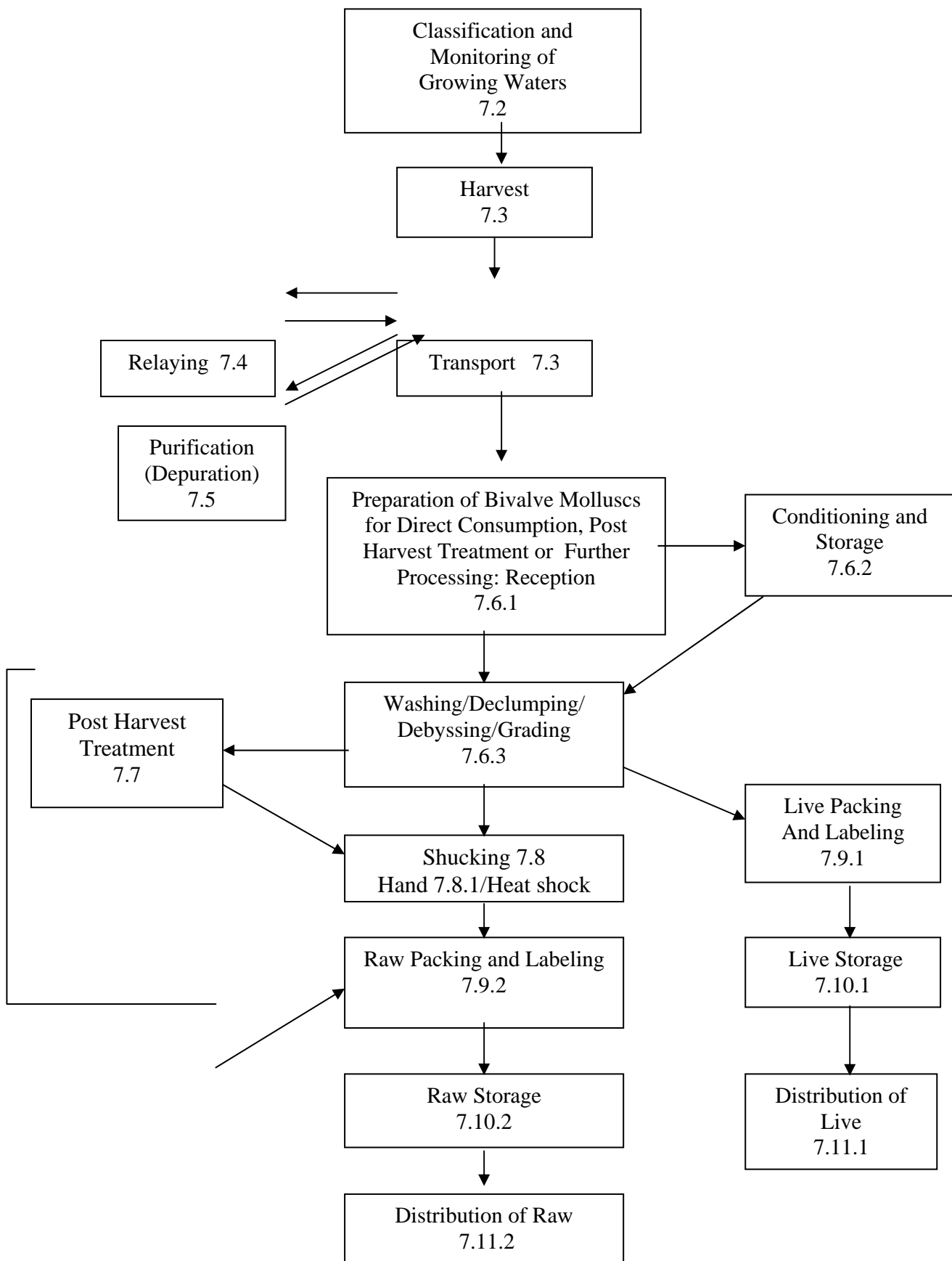
<b>Accepted / Acceptable / Approved</b>	means accepted by the official agency having jurisdiction;
<b>Conditioning</b>	means placing live bivalve molluscs in tanks, floats or natural sites to remove sand, mud or slime and improve product acceptability;
<b>Growing Areas</b>	means all brackish and marine areas approved for the production or harvesting of bivalve mollusks either by natural growth or by aquaculture destined for human consumption. The growing areas may be approved as production or harvesting areas for bivalve molluscs for direct consumption, or they may be approved as production or harvesting areas for bivalve molluscs for either purification or relaying
<b>Heat Shocking</b>	means the process of subjecting bivalve molluscs in the shell to any form of heat treatment, such as steam, hot water, or dry heat for a short period of time, to facilitate rapid removal of meat from the shell for the purpose of shucking.
<b>Purification</b>	(depuration) means the reduction of microorganisms to a level acceptable for direct consumption by the process of holding live bivalve molluscs for a period of time under approved, controlled conditions in natural or artificial sea water suitable for the process, which may be treated or untreated.
<b>Relaying</b>	means the removal of bivalve molluscs from microbiologically contaminated growing area to an acceptable growing or holding area under the supervision of the agency having jurisdiction and holding them there for the time necessary for the reduction of contamination to an acceptable level for human consumption.

## SECTION – 7 – LIVE AND RAW BIVALVE MOLLUSCS

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.

[This flow chart is for illustrative purpose only. For implementation of HACCP principles, a complete and comprehensive flow chart has to be drawn up for each product.]

References correspond to relevant Sections of the Code.



## 7.1 GENERAL REMARKS, ADDITION TO THE PRE-REQUISITE PROGRAMME

Bivalve molluscs species like oysters, mussels, manilla and hard shell clams can survive for extended periods out of water and can be traded for human consumption as live animals. Other species like cockles can be traded live if carefully handled, but are normally processed. Species not adapted to dry conditions soon die out of water and are best handled as chilled products or processed.

When spawning (following “gonad ripening”), it becomes undesirable and in many instances impracticable to trade them as live animals. Stress can induce spawning.

The main hazard known for the production of bivalve molluscs is microbiological contamination of waters in which they grow, especially when the bivalve molluscs are intended to be eaten raw. Since molluscs are filter feeders they concentrate contaminants to a much higher concentration than the surrounding sea water. The contamination with bacteria and viruses in the growing area is therefore critical for the end product specification and determines the process requirements for further processing. Gastro-enteritis and other serious diseases such as hepatitis can occur as result from agricultural run-off and/or sewage contamination like enteric bacterial and/or viral pathogens (Norwalk like viruses, viruses causing hepatitis) or from natural occurring bacterial pathogens (*Vibrio* spp.). Another hazard is formed by biotoxins. Biotoxins produced by some algae can cause various forms of serious poisoning like diarrhetic shellfish poisoning (DSP), paralytic shellfish poisoning (PSP), neurotoxic shellfish poisoning (NSP), amnesic shellfish poisoning (ASP) or Azaspiracid (AZP). Chemical substances, such as heavy metals, pesticides, organochlorides, petro-chemical substances may also form a hazard in certain areas.

To control the hazards, identification and monitoring of growing areas is very important for bivalve molluscs safety. The identification, classification and monitoring of these waters is a responsibility for competent authorities in cooperation with fishermen and primary producers. Until better methods are available, *E. coli*/faecal coliforms or total coliforms may be used as an indicator for the possibility of bacterial and viral pathogens. If biotoxins are found in the bivalve molluscs flesh in hazardous amounts the growing area must be closed for harvesting bivalve molluscs until toxicological investigation has made clear that the bivalve molluscs meat is free from hazardous amount of biotoxins. Harmful chemical substances should not be present in such amounts that the calculated dietary intake exceeds the permissible daily intake.

Bivalve molluscs from waters subject to contamination, as determined by the authority having jurisdiction, can be made safe by relaying in a suitable area or a purification (depuration) process to reduce the level of bacteria and of viruses if the process is continued long enough, or by post harvest treatment to destroy target organisms. Purification (depuration) is a short-term process commonly used to reduce low levels of bacterial contamination, but long term relaying is required if there is a greater risk of contamination.

Especially when the bivalve molluscs need to undergo relaying or purification to be eaten raw, stress and excessive shocks of the bivalve molluscs must be avoided. This is important because these bivalve molluscs should be able to function again during purification, relaying or conditioning.

Many, but not all, species of bivalve molluscs are considered suitable for purification.

## 7.2 CLASSIFICATION AND MONITORING OF GROWING AREAS

Potential Hazards: *Microbiological pathogens, Biotoxins, Chemical contamination.*

Potential Defects:

*unlikely*

Technical Guidance:

There are 5 different types of important hazards coming from the bivalve molluscs growing environment:

- enteric bacterial pathogens;
- enteric viral pathogens (e.g. Norwalk like viruses, viruses causing hepatitis);
- naturally occurring bacterial pathogens (e.g. *Vibrio* spp.);
- biotoxins (e.g. DSP toxins, PSP toxins, NSP toxins, ASP toxins);
- chemical contaminants.

### **7.2.1 Classification of growing areas**

Surveys of the growing area, shoreline and land catchment should be conducted to determine sources of both domestic and industrial pollution which may affect the quality of the growing area water and bivalve molluscs. Sources may include municipal sewage outputs, industrial outputs, mine wastes, geophysical contaminants, domestic animal holding pens, nuclear power plants, refineries or other sources. The need to reschedule hygiene surveys will be determined by population shifts and changes in agricultural and industrial activities in the coastal area. Resurveys should be conducted at an acceptable frequency and known pollution sources should be re-evaluated on a regular basis to determine any changes to their impact on the growing area.

When pollution sources have been identified and evaluated, sampling stations for water and/or bivalve molluscs and/or sediments should be established and studies conducted to determine the effects of the pollutants on water and bivalve molluscs quality. The data should be evaluated by the official agency having jurisdiction and growing areas should be classified according to official standards and criteria.

When interpreting growing area data, the official agency having jurisdiction should take into account variations which may affect the level of pollution during the most unfavourable hydrographic and climatic conditions as influenced by rainfall, tides, winds, methods of sewage treatment, population variations and other local factors, since bivalve molluscs respond rapidly to an increase in the number of bacteria or viruses in their environment by accumulating these agents. The agency should also consider that bivalve molluscs have the ability to accumulate toxic chemicals in their tissue in concentrations greater than the levels found in the surrounding water. FAO, WHO, or other international or national food standards may be used as a guide to acceptable levels.

The official agency having jurisdiction should immediately announce decisions concerning the classification of growing areas to the affected producers and purification and distribution centres.

When the limits of any biological or chemical hazard set in the end product specification are exceeded, appropriate measures must be taken under the responsibility of the official agency having jurisdiction.

Classified growing areas should be clearly defined by the official agency having jurisdiction as suitable for harvesting for either:

- direct human consumption;
- relaying in acceptable water or purification in an approved purification centre or approved post harvest treatment e.g. heat treatment, radiation, hydrostatic pressure, IQF;
- non-suitable for growing or harvesting bivalve molluscs.

The presence of pathogenic *Vibrio* or viruses do not correlate with the bacterial organisms used as indicators of faecal contamination.

### **7.2.2 Monitoring of growing areas**

Growing areas should be routinely monitored for changes in water quality and/or bivalve molluscs quality, and sub-standard areas patrolled to prevent harvesting for purposes other than that established by the official agency.

Biotoxins in bivalve molluscs can be caused by plankton containing toxins. For early warning purposes it is recommended to have a programme present to monitor growing areas for the species of plankton that can produce toxins and to recognize other environmental signals that a toxic event may be developing.

Harmful chemical substances within bivalve molluscs should not be present in amounts so that the calculated dietary intake exceeds the permissible daily intake. A monitoring system should be present for harmful chemical substances.

When routine monitoring programmes or resurveys show that the growing area no longer meets the classification criteria, the area should be reclassified or closed for harvesting immediately by the official agency having jurisdiction.

In determining the public health suitability of bivalve molluscs classified growing areas the official agency having jurisdiction may take the following actions:

- Classification/reclassification of growing areas by sanitary survey, frequent monitoring of *E. coli*/faecal coliforms or total coliforms, and other sanitary control measures as applicable.
- Classification/reclassification of growing areas by frequent monitoring of pathogens in bivalve mollusc meat (see 7.2.2.2).
- Closure/Reopening of growing waters by the monitoring of biotoxins in bivalve molluscs alone or in combination with the monitoring of phytoplankton in seawater at an appropriate frequency based on the risk of contamination.
- Control of chemical contaminants.

Under the responsibility of the official agency having jurisdiction the growing areas providing bivalve molluscs for direct human consumption meet the following requirements at time of harvest:

- the area is not subject to contamination that may present an actual or potential hazard to human health;
- The bivalve molluscs harvested meet the end product specification.

Growing areas providing bivalve molluscs for indirect human consumption should be defined in relation to the further procedure of the lot.

#### **7.2.2.1 *E. Coli*/faecal coliforms/total coliforms**

All growing areas should be frequently monitored on the presence of *E. Coli*/faecal coliforms or total coliforms

Tests for suitable indicator bacteria such as faecal coliforms or *Escherichia coli* or total coliforms should be used to determine the degree of faecal contamination. The effectiveness of indicator bacteria used should be kept under constant review for their reliability as measures for the degree of faecal contamination. If faecal contamination exceeds a certain threshold-levels relaying or purification for a time approved by the official agency having jurisdiction may be allowed.

*E. coli*/faecal coliforms or total coliforms may be used as an indicator for the presence of enteric bacterial pathogens, enteric viral pathogens and some naturally occurring bacterial pathogens. Because these indicators do not correlate well with the presence of viruses, other controls such as shoreline surveys should always be employed.

Bacteriophage and viral detection could also be used as indicators when validated analytical methods become available in the future.

#### **7.2.2.2 Pathogen Monitoring**

Shellfish sanitation programs rely upon the use of indicator organisms for the presence of contamination rather than upon attempts to monitor for specific pathogens. However, where there has been a shellfish borne outbreak caused by an identified pathogen such as Salmonella, monitoring the shellfish meats may be appropriate as part of the process of reopening the affected harvest area. The species, and typically the actual strain, should be known to ensure that monitoring is addressing the source of the pathogen. Predetermined acceptance/rejection levels for the pathogen should have been established in order to use such monitoring results for decision making. Other conditions including the sanitary survey requirements should also have been satisfied as a condition of reopening this area.

#### **7.2.2.3 Marine biotoxin control**

All growing areas should be monitored for the presence of algae with potential for producing marine biotoxins/and marine biotoxins as appropriate. Growing areas should also be monitored for environmental signals that a toxic event may be occurring, e.g., dead or dying birds, mammals, or fish. The risk of blooms of toxic algae may show seasonal variability and areas may also be affected by toxic algae previously unknown in the surrounding sea or coastal waters. These risks should be recognised when drawing up monitoring schedules.

The official agency having jurisdiction should close immediately and effectively patrol affected areas when acceptable levels are exceeded in edible portions of bivalve molluscs meats. These areas should not be

opened before toxicological investigation has made clear that the bivalve molluscs meat is free from hazardous amounts of biotoxins.

The official agency having jurisdiction should immediately announce these decisions to the affected producers and purification and distribution centres.

#### **7.2.2.4 Chemical contaminants**

Growing areas should be monitored on regular basis for chemical contaminants.

### **7.3 HARVESTING AND TRANSPORTATION OF LIVE BIVALVE MOLLUSCS**

Refer also to Sections 3.1, 3.3, 3.4 and 3.5

This section applies to the transportation of bivalve molluscs for the purpose of direct human consumption, relaying or purification, post harvest treatment or further processing.

Appropriate handling procedures depend on different species, growing area and season.

Potential Hazards: *Microbiological pathogens, Chemical contamination*

Potential Defects: *Physical damage*

Technical Guidance:

- Dredges and other harvesting equipment, decks, holds and containers, which are contaminated from use in a polluted area, should be cleaned and if applicable disinfected (sanitised) before being used for bivalve molluscs from an unpolluted area.
- Holds in which bivalve molluscs are held or containers should be so constructed that the bivalve molluscs are held above the floor level and drained so that the bivalve molluscs is not in contact with wash-down or bilge water, or shell fluid. Where necessary a bilge pumping system must be provided.
- Suitable precautions should be taken to protect bivalve molluscs from being contaminated by polluted water, droppings from sea birds, footwear which may have been in contact with faecal matter or by other polluted material. No overboard discharge of waste, including human faecal material, should occur from harvest vessels in and around shellfish growing areas. No animals should be allowed on harvest vessels.
- Wash-down pumps should draw water only from non-contaminated seawater.
- Bivalve molluscs should be harvested from and stored in an growing area or relaying area acceptable to the official agency having jurisdiction.
- On removal from water or during handling and transportation, bivalve molluscs should not be subjected to extremes of heat or cold or sudden variations in temperature. Temperature control is critical in handling live bivalve molluscs. Special equipment, such as insulated containers and refrigeration equipment should be used if prevailing temperatures and the time involved so require. Bivalve molluscs should not be exposed to full sun or surfaces heated by the sun or come into direct contact with ice and other freezing surfaces, nor should it be held in closed containers with solid carbon dioxide. In most cases storage above 10°C (50°F) or below 2°C (35°F) should be avoided.
- Bivalve molluscs should be freed from excessive mud and weed soon after being harvested by washing it with clean seawater or potable water under suitable pressure. Wash water should not be allowed to flow over bivalve molluscs already cleaned. The water should not be re-circulated.
- The interval between harvesting and immersion in water for relaying, storage, conditioning or purification should be kept as short as possible. This also applies to the interval between final harvesting and handling in a distribution centre.



- If bivalve molluscs are to be re-immersed after harvest they should be re-immersed in clean seawater.
- Appropriate documentation should be maintained for harvesting and transportation activities.

#### **7.4 RELAYING**

The requirements for classification and monitoring of growing areas also apply to Relaying areas.

Relaying is intended to reduce the level of biological contaminants that may be present in bivalve molluscs which have been harvested from contaminated areas to such levels that the bivalve molluscs will be acceptable for human consumption without further processing. Bivalve molluscs harvested for relaying should only be harvested from areas that are so designated/classified by the official agency having jurisdiction. Relaying methods vary worldwide. Bivalve molluscs may be placed in floats, rafts, or directly on the bottom.

Potential Hazards:            *Microbiological pathogens*

Potential Defects:            *unlikely.*

Technical Guidance:

- Relaying operations should be strictly supervised by the official agency having jurisdiction to prevent contaminated bivalve molluscs from being diverted directly to the consumer market or from cross contamination of other bivalve molluscs.
- Boundaries of relaying areas should be clearly identified by buoys, poles or other fixed means. These areas should be adequately separated from the bivalve molluscs in adjacent waters to prevent cross contamination and commingling.
- Bivalve molluscs undergoing relaying should remain immersed in clean seawater until they satisfy the sanitary requirements of the official agency having jurisdiction.
- Holding time and minimum temperature in the accepted area prior to harvest will be determined by the official agency having jurisdiction according to the degree of contamination before relaying, the temperature of the water, the bivalve molluscs species involved and local geographic or hydrographic conditions.
- The relaying sites used could become biotoxic from a bloom, or could become (an unexpected) a source of environmental pathogens such as *vibrio* bacteria.
- Bivalve molluscs should be laid out at a density which will permit them to open and undergo natural purification.
- Appropriate documentation should be maintained for relaying operations.

#### **7.5 PURIFICATION (DEPURATION)**

Refer also to Sections: 3.2, 3.3, 3.4 and 3.5

Purification is intended to reduce the number of pathogenic micro-organisms that may be present in bivalve molluscs which have been harvested from moderately polluted areas to such levels that the bivalve molluscs will be acceptable for human consumption without further processing. Purification alone is not suitable for cleansing bivalve molluscs from more heavily contaminated areas or areas subject to contamination by hydro-carbons, heavy metals, pesticides, viruses or biotoxins. Bivalve molluscs harvested for purification should only be harvested from areas that are so designated/classified by the official agency having jurisdiction.

The required conditions vary according to the species of molluscs and the design of the purification system.

For natural functioning and therefore purification to occur it is essential that the molluscs have not been over-stressed or damaged during harvesting or handling prior to purification and are not in a seasonally weak or spawning condition.

Purification centres should maintain the same hygiene standards as sections 3.2, 3.3, 3.4, 3.5.

Potential Hazards:            *Microbiological pathogens*

Potential Defects:            *physical damage*

Technical Guidance:

Purification centres and tanks must be approved by the official agency having jurisdiction.

- Bivalve molluscs subjected to the purification process should not contain metallic ions, pesticides, industrial wastes or marine biotoxins in such quantities that it presents a health hazard to the consumer.
- Use only shellstock designated as acceptable by the official agency having jurisdiction.
- The process and the equipment, e.g. tanks, used for purification should be acceptable to the official agency having jurisdiction.
- Dead or damaged bivalve molluscs should be removed before the purification process, when practicable. Surfaces of shells should be free from mud and soft commensal organisms. If necessary the bivalve molluscs should be washed with clean sea water or potable water before the purification process.
- The length of the period of purification should be adapted to the water temperature and physical water quality parameters (clean sea water, salinity, dissolved oxygen and pH levels suitable to permit the bivalve molluscs to function normally), the degree of contamination before purification and the bivalve molluscs species. Microbiological investigation of process water and of bivalve molluscs meat should be used to assess purification parameters. It should be taken into account that viruses and *Vibrio* spp. are more persistent during purification than the indicator bacteria mostly used for microbiological monitoring (*E. coli* and faecal coliforms).
- Water used in purification tanks should be changed continuously or at suitable intervals or if recirculated be treated properly. The flow of water per hour should be sufficient to the amount of bivalve molluscs treated and should depend on the degree of contamination of the bivalve molluscs.
- Bivalve molluscs undergoing purification should remain immersed in clean sea water until it satisfies the sanitary requirements of the official agency having jurisdiction.
- Bivalve molluscs should be laid out at a density which will permit them to open and undergo natural purification.
- During the process of purification, the water temperature should not be allowed to fall below the minimum at which bivalve molluscs remain physiologically active; high water temperatures which adversely affect the pumping rate and the purification process should be avoided; tanks should be protected from the direct rays of the sun when necessary.
- Equipment in contact with water, i.e. tanks, pumps, pipes or piping, and other equipment should be constructed of non-porous, non-toxic materials. Copper, zinc, lead and their alloys should preferably not be used in tanks, pumps or piping systems used in purification processing.
- To avoid recontamination of bivalve molluscs undergoing purification, unpurified bivalve molluscs should not be placed in the same tank as bivalve molluscs which are already undergoing purification.
- On removal from the purification system, bivalve molluscs should be washed with running potable water or clean sea water, and handled in the same manner as living bivalve molluscs taken directly from a non-polluted area. Dead, with broken shells or otherwise unwholesome bivalve molluscs should be removed.
- Before removing the bivalve molluscs from the tanks drain the water from the system to avoid resuspension and reingestion. The tanks should be cleaned after each use and disinfected at suitable intervals.
- After purification the bivalve molluscs should meet the end product specification.
- Appropriate documentation should be maintained for purification.

## **7.6 PREPARATION OF BIVALVE MOLLUSCS FOR DIRECT CONSUMPTION, POST HARVEST TREATMENT OR FURTHER PROCESSING**

Establishments that prepare bivalve molluscs for direct consumption, post harvest treatment or further processing should maintain the same hygiene standards as sections 3.2, 3.3, 3.4, 3.5.

All steps in the process should be performed without necessary delay and under conditions which will prevent the possibility of contamination, deterioration and the growth of pathogenic and spoilage micro-organisms.

### **7.6.1 Reception**

*Potential Hazards:* Microbiological pathogens, chemical and physical contamination, viable parasites

*Potential Defects:* Physical damage, foreign matter, dead or dying bivalve molluscs

*Technical Guidance:*

- Stress and excessive shocks of the bivalve molluscs must be avoided if they are intended to be distributed alive.
- Establishments that prepare bivalve molluscs for direct consumption, or that engage in post harvest treatment, freezing, shucking, or further processing should only accept bivalve molluscs which originate directly from approved growing areas or after relaying in an approved relaying area or after purification in an approved purification centre or tank .

### **7.6.2 Conditioning and storage of bivalve molluscs in sea water tanks, basins etc.**

Refer also to Sections 3.2, 3.3, 3.4 and 3.5

*Potential Hazards:* Microbiological pathogens, chemical contamination, Biotoxins

*Potential Defects:* Physical damage, foreign matter, dead or dying bivalve molluscs

*Technical Guidance:*

Conditioning means storage of bivalve molluscs in sea water tanks, basins, floats, rafts or natural sites with the intention to remove mud, sand and slime.

- The process of storing bivalve molluscs in sea water tanks, basins, floats, natural sites or rafts can be used if it is acceptable to the official agency having jurisdiction.
- Only clean sea water should be used in the tanks, floats, natural sites or rafts and should be of an adequate salinity and adequate physical water quality parameters to permit the bivalve molluscs to function normally. Optimum salinity will vary with bivalve molluscs species and with the harvesting area. Water condition has to be satisfactory adequate for the process.
- Before conditioning or storage bivalve molluscs should be washed to remove mud and soft commensal organisms and dead or damaged bivalve molluscs should be removed when practicable.
- During storage bivalve molluscs should be laid out at a density and under such conditions that will permit them to open and function normally.
- The oxygen content in the seawater should be maintained at an adequate level at all times.
- The temperature of the water in storage tanks should not be allowed to rise to such levels as to cause weakness of the bivalve molluscs. If ambient temperatures are excessively high, tanks should be placed in a well-ventilated building or away from the direct rays of the sun. The length of the period of conditioning should be adapted to the water temperature.
- Bivalve molluscs should be stored in clean sea water only for such time as they remain sound and active.
- Tanks should be drained, cleaned and disinfected at suitable intervals.

- Recirculating wet storage systems must contain approved water treatment systems.

### **7.6.3 Washing, declumping, debyssing and grading**

Refer also to Sections 3.2, 3.3, 3.4 and 3.5

*Potential Hazards: Microbiological pathogens, Chemical and Physical contamination*

*Potential Defects: Mechanical damage*

*Technical Guidance:*

- Damage to shells and stress will shorten the shelf life of bivalve molluscs and increase the risk of contamination and deterioration. So bivalve molluscs have to be handled carefully:
  - The number of handlings with bivalve molluscs should be minimised;
  - Excessive shocks should be avoided.
- The different process steps should be supervised by technically competent personnel.
- The outsides of the shells should be washed free of mud, and all soft adhering organisms should be removed. Hard adhering organisms should also be removed when possible, care being taken not to chip lips of shells by vigorous washing. Washing should be carried out using pressurised clean (sea) water.
- Bivalve molluscs having formed clumps should be declumped and debyssed as appropriate. The equipment used should be designed and adjusted to minimise the risk of damage to the shells.

## **7.7 POST HARVEST TREATMENT**

Refer also to Sections 3.2, 3.3, 3.4, and 3.5.

Post harvest treated bivalve molluscs are products prepared from live bivalve molluscs that have been treated after harvest to eliminate, reduce or limit specified target organisms within the product to levels that are satisfactory to the official agency having jurisdiction. Post harvest treatment is intended to retain the sensory qualities of a live bivalve mollusc. As with all live and raw bivalve molluscs, post harvest treated bivalve molluscs must meet all microbiological criteria associated with traditional harvest water controls designed to prevent faecal contamination and resulting introduction of enteric pathogens as well as toxins and other contaminants. However, these traditional controls are not designed for control of pathogens that are independent from faecal contamination. These treatments may include the application of low heat, hydrostatic pressure, (e.g., 60K lb/6 min.) irradiation, and individual quick freezing.

*Potential Hazards: microbiological contamination*

*Potential Defects: Coagulation of meat, defective meat texture, hydrostatic medium forced into the flesh.*

*Technical Guidance:*

- Any treatment developed to eliminate or reduce pathogens should be thoroughly validated scientifically to ensure that the process is effective.
- The control treatments (heat, pressure, etc.) should be closely monitored to ensure that the product does not undergo textural changes in the flesh that are unacceptable to the consumer.
- The treatment parameters established to reduce or eliminate pathogens should be approved by the official agency having jurisdiction.

## 7.8 SHUCKING

Shucking is the processing step that removes the edible portion of the mollusc from the shell. It is usually done by hand, mechanically or through heat shock with steam or hot water. This step may expose the product to microbiological or physical contamination.

### 7.8.1 Hand and mechanical shucking and washing

Physical removal of shellfish meat from the shell will often expose the product to dirt, mud and detritus that should be removed before further processing through washing or other means.

*Potential Hazards:* Physical contamination, microbiological contamination

*Potential Defects:* Cuts and tears of the flesh, presence of sand and mud

*Technical Guidance:*

- Care should be taken to eliminate excess mud, detritus and sand from the shucking tables.
- The product should be examined to ensure that cuts and tears are minimized.
- Shucked molluscs should be rinsed or washed to further eliminate mud, sand, detritus and reduce the microbiological level of the product.

### 7.8.2 Heat shocking of bivalve molluscs followed by packing

Heat shocking is a method to remove shells from the bivalve molluscs.

Refer also to Sections 3.2, 3.3, 3.4 and 3.5

*Potential Hazards:* Physical contamination

*Potential Defects:* unlikely

*Technical Guidance:*

- The bivalve molluscs must come from approved growing areas and/or after relaying in an approved relaying area or purification in an approved purification centre or tank. Each establishment which heat shocks bivalve molluscs should develop a heat shock process schedule, acceptable to the official agency having jurisdiction, which addresses such critical factors as the species and size of bivalve molluscs, time of exposure to heat, internal bivalve molluscs temperature, type of heat process used, water/steam to bivalve molluscs ratios, nature of heat equipment, measurement devices and their calibration, post heating chilling operations, cleaning and sanitising of heat process equipment.
- All bivalve molluscs should be washed with pressurised potable water or clean sea water and culled for damaged and dead bivalve molluscs prior to heat treatment.
- Before heat shocking the bivalve molluscs should be inspected to determine whether the bivalve molluscs are alive and not badly damaged.
- Heat shocked bivalve molluscs should be cooled to 7°C or less within two hours of being heat treated (this time includes the shucking process). This temperature should be maintained during transport, storage and distribution.
- The heat shocked bivalve molluscs should be packed as soon as possible. Before packing the bivalve molluscs should be examined for objectionable matter such as shell pieces.

## 7.9 PACKING AND LABELLING

Refer also to Sections: 3.2, 3.3, 3.4 and 3.5

All steps in the process of packaging should be performed without unnecessary delay and under conditions that will prevent the possibility of contamination, deterioration and the growth of pathogenic and spoilage micro-organisms.

The packaging material should be appropriate for the product to be packed and for the expected conditions of storage and should not transmit to the product harmful or other objectionable substances or odours and tastes. The packaging material should be sound and should provide appropriate protection from damage and contamination.

### 7.9.1 Live Packing and Labelling

Potential Hazards: *Microbiological pathogens, physical contamination, chemical contamination*

Potential Defects: *Incorrect labelling, presence of damaged or dead bivalve molluscs, foreign matter*

Technical Guidance:

- Before packing bivalve molluscs should undergo visual inspection. Bivalve molluscs which are dead, with broken shells, with adhering soil or otherwise unwholesome, should not be passed for human consumption.
- The packaging material should avoid contamination and should be drained.
- Labels should be clearly printed and must comply with the labelling laws of the country where the product is marketed. The packaging material may be used to bear an indication as to how the bivalve molluscs should be kept from the time they were bought at the retailer. It is recommended to include the date of packaging.
- All packaging material should be stored in a clean and sanitary manner. Product containers should not have been used for any purpose, which may lead to contamination of the product. Packaging material should be inspected immediately before use to ensure that they are in a satisfactory condition and where necessary disposed of or cleaned and/or disinfected; when washed they should be well drained before filling. Only packaging material required for immediate use should be kept in the packing or filling area.

### 7.9.2 Raw Packing and Labelling

Potential Hazards: *Microbiological pathogens, physical contamination*

Potential Defects: *Objectionable matter such as shell pieces; incorrect labelling*

Technical Guidance:

- Labels should be clearly printed and must comply with the labelling laws of the country where the product is marketed. The packaging material may be used to bear an indication as to how the bivalve molluscs should be kept from the time they were bought at the retailer. It is recommended to include the date of packaging.
- All packaging material should be stored in a clean and sanitary manner. Only packaging material required for immediate use should be kept in the packing or filling area.
- Shucked and post harvest treated product should be packed and chilled as soon as possible.
- Freezing should take place quickly. Slow freezing will damage meat.
- If labels on post harvest treated raw bivalve molluscs make safety claims relating to the post harvest treatment, the claims should be specific to the target hazard that has been eliminated or reduced.

## 7.10 STORAGE

### 7.10.1 Live Storage

Potential Hazards: *Microbiological pathogens, chemical and physical contamination*

Potential Defects: *physical damage*

Technical Guidance:

- The end product should be stored under such conditions as will preclude the contamination with and/or proliferation of micro-organisms.
- The packaging material of the end product should not have direct contact with the floor but should be placed on a clean, raised surface.
- Storage periods should be kept as short as possible.
- Reimmersion in or spraying with water of live bivalve molluscs must not take place after they have been packed and have left the distribution centre except in the case of retail sale at the distribution centre.

## 7.10.2 Raw Storage

*Potential Hazards:* Microbiological pathogens

*Potential Defects:* Unlikely

*Technical Guidance:*

- Storage periods should be kept as short as possible.
- Avoid damage to packaging of frozen product.

## 7.11 DISTRIBUTION

### 7.11.1 Distribution of Live

Refer also to Section 3.6

*Potential Hazards:* Microbiological pathogens

*Potential Defects:* Physical damage

*Technical Guidance:*

- The product should be dispatched in the sequence of the lot numbers.
- Bivalve molluscs intended for human consumption should only be distributed in closed packaging.
- The means of transport should provide sufficient protection of the bivalve molluscs against damage to the shells from shocks. The bivalve molluscs should not be transported with other products which might contaminate them.

### 7.11.2 Distribution of Raw

*Potential Hazards:* Microbiological pathogens

*Potential Defects:* Unlikely

*Technical Guidance:*

- Temperature must be maintained during distribution to control microbial growth.
- The product should be dispatched in the sequence of the lot numbers.
- Transportation must be able to maintain chilled or frozen product for safety and quality.

## 7.12 DOCUMENTATION

- The transport of live bivalve molluscs from a growing area to a purification centre, relaying area or establishment that prepares bivalve molluscs for direct consumption, engages in post harvest treatment, freezing, shucking, or further processing must be accompanied by documentation for the identification of batches of live bivalve molluscs.
- Permanent, legible and dated records of relaying and purification should be kept concerning each lot. These records should be retained for a period of minimal one year.
- Purification centres or tanks and establishments that prepare bivalve molluscs for direct consumption, engage in post harvest treatment, freezing, shucking, or further processing should only accept lots of live bivalve molluscs with documentation issued by or accepted by the official agency having jurisdiction. This document should contain the following information
  - the gatherer's identity and signature;
  - the date of harvesting;
  - name and quantity of bivalve molluscs;
  - the location of the growing area.
- Complete records of harvest area and date of harvest and length of time of relaying or purification of each lot should be maintained by the establishment that prepares bivalve molluscs for direct consumption, engages in post harvest treatment, freezing, shucking, or further processing for a period designated by the official agency having jurisdiction.

## 7.13 LOT IDENTIFICATION AND RECALL PROCEDURES

Refer also to Section 3.7

- Each product should have an easy identifiable lot number. This lot number must include an identification code, the number of the establishment that distributes the product, the country of origin and day and month of packing, in order to facilitate the trace-back of the product. A record-keeping system should be based on these lot numbers so that individual lots of bivalve molluscs can be traced from the growing area to the end user.
- If a recall must be carried out its success depends on having certain recall procedures prepared in advance.
- Some important aspects are:
  - The affected product must be easy identifiable by lot numbers;
  - Destination and customers of the affected product must be identifiable;
  - Competencies and responsibilities of management and personnel must be clear;
  - Names and telephone numbers of affected personnel, organisations and customers must be present.

## Section 11. PROCESSING OF SALTED FISH

### SECTION 2 – DEFINITIONS

**2.7 Salted Fish**, delete “**Heavily Salted Fish**”, “**Medium Salted Fish**”, “**Lightly Salted Fish**”, “**Very Lightly Salted Fish**,” and “**Salt Cured Fish**”

Reason: These terms are defined in the Draft Standard for Salted Atlantic Herring and Salted Sprats and are not used in text of this code.

**2.7 Salted Fish**, revise the definition of “**Barrel**” to read: "A cylindrical container made from wood or plastic **or other suitable food contact material** with a lid for watertight closure."

Reason: Barrels can be made of enamel, steel, etc.

### SECTION 11 - PROCESSING OF SALTED FISH

#### Specific Comments

**11.1 GENERAL**, 4<sup>th</sup> bullet, add at the end: “(See Annex 1)”

Reason: Annex 1 contains procedures for killing living parasites by freezing.

**11.1 GENERAL**, add 6<sup>th</sup> bullet to read, “**when scombrototoxic fish are being salted, exposure to temperatures that would support toxin formation by bacteria should be limited at each step in the process.**”

**11.2.1 Splitting, Washing and Rinsing**, add "histamine" to *Potential Hazards* and revise 1<sup>st</sup> bullet to read, “the design of the splitting line should be continuous and sequential to permit the uniform flow without stops or slow-downs **in order to prevent histamine formation;**”

Reason: Histamine should be included as a potential hazard at this step and the first technical guidance bullet addresses the control.

**11.3.1 Handling and 11.3.2 Salt Requirements**, change “*Biological*” to “**Microbiological**” under *Potential Hazards* and change “*Biological*” to “**Decomposition**” under *Potential Defects*.

Reason: Consistency. “Microbiological” is the term that is used for the potential hazard and “decomposition” is the potential defect.

**11.3.1 Salt Handling**, 2<sup>nd</sup> bullet, change "infections" to "**microbial contamination (e.g. *listeria monocytogenes*)**."

Reason: Clarity.



**11.4 SALTING AND MATURING, 1<sup>st</sup> paragraph**, delete second sentence and replace with the following, **“The salting process, including the temperature, should be sufficiently controlled to prevent the development of Clostridium botulinum, or the fish should be eviscerated.”**

Reason: The flow diagram allows for uneviscerated fish so, the code of practice should be consistent with the intent as described by the flow diagram. This code of practice should be consistent with the standard to which it applies (Salted Atlantic Herring and Sprat), which allows for eviscerated and uneviscerated fish according to the country where the product will be consumed.

**11.4 Salting and Maturing, 2<sup>nd</sup> paragraph**, add to the end of the sentence, **“and temperature control.”**

Reason: To prevent scombrototoxin formation or botulinum outgrowth during the slow salting process.

**11.4 Salting and Maturing, 3<sup>rd</sup> paragraph, last sentence**, change "infections" to **"such microbial contamination."**

Reason: Clarity.

**11.4.1 Brining and 11.4.2 Brine Injection, *Potential Hazards***, delete "incorrect composition of brine"

Reason: Incorrect composition of brine is not, itself, a hazard. It can, however, be a cause for a microbiological hazard. Microbiological hazards are already included.

**11.4.1, 11.4.2, 11.4.3, 11.4.4, 11.4.5, 11.4.6 and 11.6, *Potential Defects***, delete “histamine.”

Reason: To use consistent language. “Histamine” is used to refer to the safety hazard associated with scombrototoxin.

**11.4.1 Brining, *Technical Guidance***, add a fourth bullet to read:

- **"to assure proper salt penetration, fish should be of similar size."**

**11.4.2 Brine Injection, *Technical Guidance***, add a fourth bullet to read:

- **"Conduct metal detection here or later in the process."**

Reason: Inspecting daily for broken tips, for blocking and deflections of needles, may not be sufficient to determine if any product was affected by broken needles or when the break occurred.

**11.5 SORTING, WEIGHING, PACKAGING, WRAPPING and LABELING**, delete references 6.4.4 and 6.5 and change to **8.2.3** (Labeling) and **8.4.4** (Wrapping and Packaging).

Reason: Editorial, to use the correct reference numbers.

## **SECTION 12 - PROCESSING OF SMOKED FISH**

**Section 12 - introductory paragraphs, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 6<sup>th</sup> paragraphs**, combine into one paragraph and maintain as the second paragraph.

Reason: Editorial.

**Section 12 - introductory paragraphs, bracketed 5<sup>th</sup> paragraph**, delete

Reason: The U.S. believes that liquid smoke should be within the scope of this document because it is often used as an alternative to the burning of wood and results in a product that is indistinguishable from wood-smoked fish. Liquid smoke is also used to incorporate flavor enhancement and prevent microbiological growth. We take the preliminary view that, to the extent that liquid smoke is a smoke generator, along with wood, it is a process that could be incorporated into the “Smoke Generation” step (as seen in Figure 12.1).

We are also considering proposing additional technical guidance points for the application of liquid smoke and are researching the extent to which liquid smoke is used for injection or surface application. We may propose additional modifications on these matters at a later date.

**Section 12 - introductory paragraphs, 8<sup>th</sup> paragraph**, remove brackets around “and hazardous” and replace “[for at least 24 hours at -20°C]” with **“in accordance with Annex 1”**

Reason: There are parasites that are not considered hazards so it should be made clear that we are referring to those that are harmful instead of all parasites. It is better to refer to Annex 1 because it contains a

discussion of parasites in general. The time period of 24 hours at -20°C refers to nematodes, but not to all parasites.

**Section 12 – introductory paragraphs, 9<sup>th</sup> paragraph, delete**

Reason: The draft Codex standard that this paragraph refers to is being expanded to include all smoked fish, not just cold smoked. Thus, the paragraph’s reference to a standard solely for cold smoked fish is neither accurate nor necessary.

**Section 12 – introductory paragraphs, 10<sup>th</sup> paragraph, delete**

Reason: The purpose is unclear.

**Section 12 – introductory paragraphs, 11<sup>th</sup> paragraph, delete**

Reason: All HACCP controls should be validated, not just controls not specifically covered in this section of the code of practice. Also, this provision is not consistent with the format of other sections of the code of practice.

**Figure 12.1**, the text box reading “Fish Preparation” should be replaced with **“Fish Reception”** and the text box reading “Packaging *Section 12.5*” should read **“Packaging Reception”**

Reason: As in other sections of the code of practice, the reception steps should be clearly indicated on the flow diagram. A revised flow diagram is included in these comments.

**Figure 12.1**, add an arrow from “Cooling (step 4)” to “Slicing (step 6)”. Revise the Section numbers referred to at these steps as follows: “Cooling (Section 12.4)”, “Freezing (Section 12.4)” and “Slicing (Section 12.5)”

Reason: The product does not have to go through the freezing step before slicing. Cooling and freezing would occur before slicing and the corresponding sections should refer to the processing steps in that order.

**Figure 12.1 and Section 12.1**, change the name of the processing step in Figure 1 from “Pre-Salting” to **“Salting”** and the section from “12.1 Pre-Salting” to **“12.2 Salting”**

Reason: Pre-salting should be changed to “salting” because this section discusses the salting step rather than pre-salting. The process definition of “salting” given in the Standard for Salted Atlantic Herring and Salted Sprat reads as follows: “Salting is the process of mixing fish with the appropriate amount of food grade salt, sugar, spices and all optional ingredients and/or of adding the appropriate amount of salt-solution of the appropriate concentration.” This process appears to be what is being referred to in current subsection 12.1.

**12.1**, We suggest adding a new section 12.1 and renumber all subsequent sections accordingly in the flow diagram and text. The new section should read as follows:

**“12.1 FISH AND FISHERY PRODUCT RECEPTION**

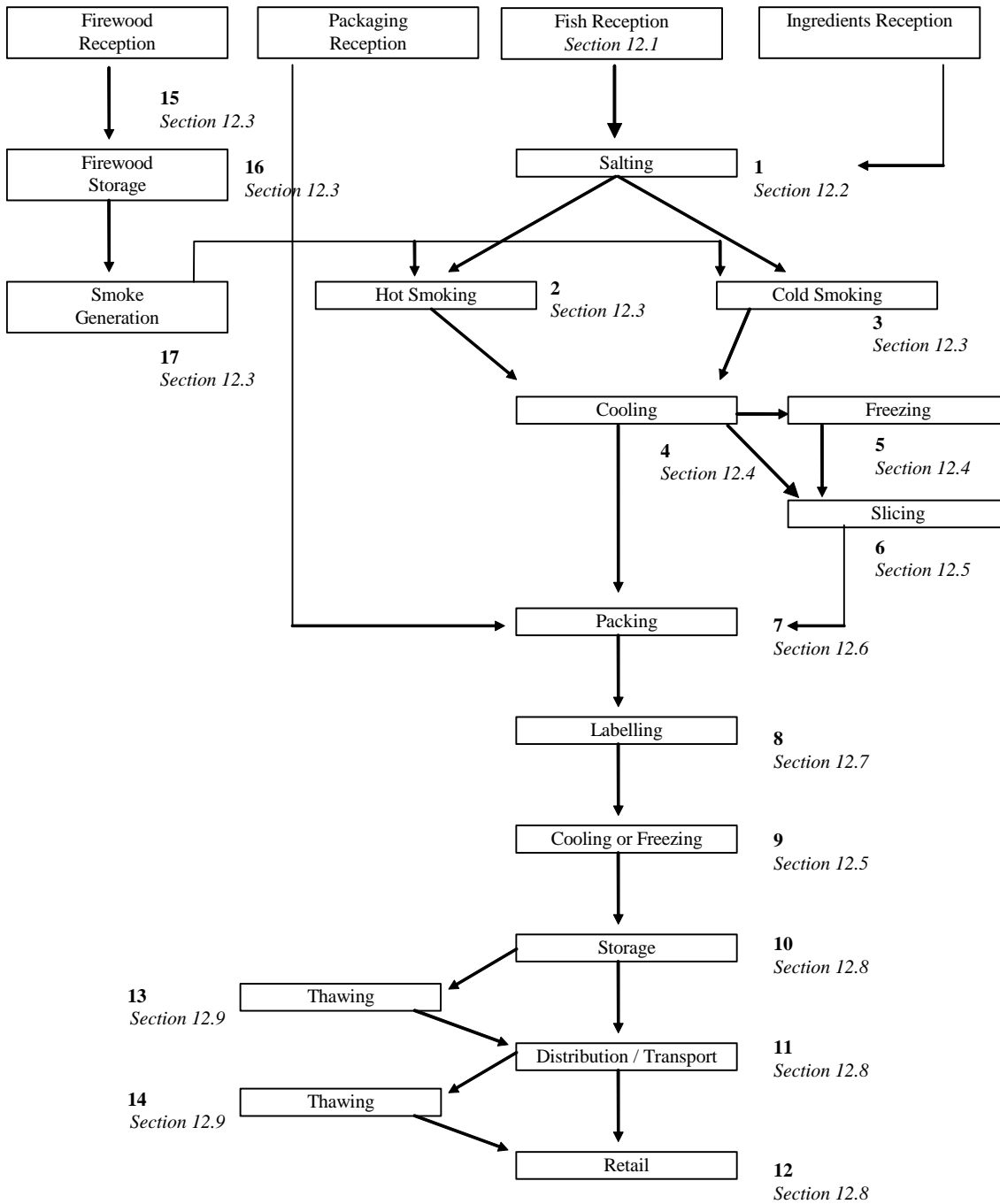
**See Section 8.1.1 for finfish**

**Molluscan shellfish shall be obtained from approved growing waters and from firms approved by the official agency having jurisdiction over shellfish safety (see Section 7).”**

Reason: The flow diagram was lacking a fish and fishery product reception step. The proposed text and section would correspond with that step.

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.



**Figure 12.1** Example of a flow chart of a Hot Smoking and Cold Smoking preparation Line, including possible slicing operation at the Cold Smoking line.

12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 12.8, Technical Guidance, change the paragraphs to bullets

Reason: These paragraphs should be written as technical guidance bullet points to be consistent with standard formatting.

**12.2 SALTING** (currently **12.1 PRE-SALTING**), Technical Guidance, revise the **1<sup>st</sup> paragraph** to read as follows: “Fish for hot smoking are **usually** salted only a short time to gain taste, e.g. 0-2 hours, by floating in medium strength salt brine.”

Reason: The “i.e.” is changed to “e.g.” because time should be adequate to achieve appropriate water phase salt for safety and may exceed 2 hours.

**12.2 SALTING** (currently **12.1 PRE-SALTING**), Technical Guidance, **2<sup>nd</sup> paragraph**, revise to read, “Fish for cold smoking are **usually** dry salted or salted by pickle injection of a medium strength salt brine to gain taste. The salted fish is left for about 24 hours under refrigeration **to allow the salt to diffuse equally throughout the fish.**”

Reason: Clarity.

**12.2 SALTING** (currently **12.1 PRE-SALTING**), Technical Guidance, **3<sup>rd</sup> paragraph**, delete and replace with a new bullet to read:

- **“Where product is brined at temperatures above those specified in Section 8.1.3, care should be taken to ensure that the processing is carried out rapidly to avoid possible spoilage or, in scombrototoxin species, histamine formation.**

**12.2 SALTING** (currently **12.1 PRE-SALTING**), Technical Guidance, **3<sup>rd</sup> bullet**, change to read:

- **“for product that will be packaged in reduced oxygen and where salt will constitute the primary barrier to the growth of *Clostridium botulinum*, the salt content in the fish should be at least 3% - 3.5% salt in the water phase as selected by the country where the product will be consumed;”**

Reason:

(a) A barrier of salt in the water phase for *Clostridium botulinum* is essential only where the product is to be packaged in modified atmosphere.

(b) Countries where the product is to be consumed should be free to require either 3% or 3.5% salt in the water phase based on conditions in the country and the level of protection they wish to have for their consumers. There are scientific data that can support a level of protection reflected by 3% and data that could lead a country to conclude that a minimum of 3.5% in the water phase is needed to protect its consumers. The process is the same regardless of whether the product is hot smoked or cold smoked.

**12.2 SALTING** (currently **12.1 PRE-SALTING**), Technical Guidance, add a new bullet to read as follows:

- **“ingredients used for brining should be examined at reception to ensure that the products are adequately packaged and have been held under hygienic conditions.”**

Reason: Since there is an ingredients reception step there should be corresponding technical guidance about what should be done at that step.

**12.2 THE SMOKING**, change the title to **“12.3 SMOKE GENERATION AND SMOKING”**

Reason: (a) For consistency with the flow diagram. (b) Expansion of the scope to include smoke generation facilitates mention of liquid smoke as a smoke generator in addition to wood.

**12.3 SMOKE GENERATION AND SMOKING** (currently **12.2 THE SMOKING**), Potential Hazards,

Comment: If “biochemical development” refers to histamine, then “histamine” is the term that should be used. Otherwise, the U.S. would like clarification on the meaning of “biochemical development.”

**12.3 SMOKE GENERATION AND SMOKING** (currently **12.2 THE SMOKING**), Technical Guidance, add a new 1<sup>st</sup> paragraph (will be the first bullet) to read as follows:

- **“Smoking may be accomplished by the controlled direct combustion of wood or by heat volatilization of liquid smoke into the smoking chamber.”**

Reason: A technical guidance bullet is needed to address smoke generation.

**12.3 SMOKE GENERATION AND SMOKING** (currently **12.2 THE SMOKING**), Technical Guidance, 1<sup>st</sup> paragraph, add at the end of the second sentence, **“...and to prevent pellicle (skinlike layer) formation that would inhibit subsequent smoke penetration.”**

Reason: There will be no penetration of the smoke during smoking if pellicle formation occurs.

**12.3 SMOKE GENERATION AND SMOKING** (currently **12.2 THE SMOKING**), Technical Guidance, 2<sup>nd</sup> paragraph, remove the brackets and revise the first sentence to read: **“In the hot smoking process the temperature in the centre of the product should reach 63°C or higher for at least 30 minutes.”**

Reason: Clarity. We think this is what the sentence meant to say. Also, we believe that 63°C is the correct temperature for the point being made.

## **SECTION 15 – PROCESSING OF CEPHALOPODS**

**Figure 15.1, Flow diagram**, revise box #9 to read **“Packing/Labelling”**

Reason: “Labelling” should be added to the title of section 15.6 and this addition should also be reflected in the flow diagram.

### **15.2.2 Frozen Storage, Potential Hazards,**

Comment: The U.S. recommends that before “cadmium migration from the gut” after capture is listed as a potential hazard, data to support this migration should be presented. We have been unable to locate data on this point in the literature. If migration from the gut is shown to occur, this point would appear to fit better at “15.4 Splitting, Gutting and Washing.”

**15.2.2 Frozen Storage, Technical Guidance,** add a new bullet to read as follows:

- **“Product should be properly protected from dehydration by sufficient packaging or glaze.”**

Reason: A technical guidance point is needed here to explain how to protect from freezer burn, which is a common potential defect of cephalopods.

**15.4 SPLITTING, GUTTING AND WASHING**, change “Unlikely” to “Microbiological pathogens” under Potential Hazards and add **“beaks”** and **“decomposition”** to Potential Defects.

Reason: The third technical guidance bullet addresses the prevention of microbiological growth so, decomposition should be listed as a potential defect and microbiological pathogens should be listed as a potential hazard because some product is potentially eaten raw. Beaks are also a potential defect and should be listed.

**15.4 SPLITTING, GUTTING AND WASHING, Technical Guidance,** 1<sup>st</sup> bullet, add “and beak” after “cephalopod shell” to read: **“Gutting should remove all intestinal material and the cephalopod shell and beak if present.”**

Reason: Beaks are a potential defect and should be included in this point to indicate that they should be removed.

**15.5 SKINNING, TRIMMING**, change “Unlikely” to **“Microbiological pathogens”** under Potential Hazards and add **“decomposition”** to Potential Defects

Reason: The first technical guidance bullet addresses the prevention of microbiological growth so; microbiological pathogens should be listed as a potential hazard and decomposition as a potential defect.

**15.6 GRADING/PACKING**, revise the title to read **“GRADING/PACKING/LABELLING”**; add **“sulfites”** to Potential Hazards and add a new Technical Guidance bullet to read as follows:

- “Where sulfites were used in the process, care should be taken to ensure that this additive is properly declared on the label.”

Reason: Sulfites are allergens and thus should be listed on the label.

**15.7 FREEZING**, last sentence, delete period and add “**and Annex I Potential Hazards Associated with Fresh Fish, Shellfish and Other Aquatic Invertebrates.**”

Reason: This section gives more specific time and temperature for parasite kill.

**12.3 SMOKE GENERATION AND SMOKING** (currently **12.2 THE SMOKING**), Technical Guidance, **4<sup>th</sup> paragraph**, delete the second sentence.

Reason: This is addressed in the 3<sup>rd</sup> bullet

**12.3 SMOKE GENERATION AND SMOKING** (currently **12.2 THE SMOKING**), Technical Guidance, **1<sup>st</sup> bullet**, delete

Reason: This is addressed in the 5<sup>th</sup> paragraph.

**12.3 SMOKE GENERATION AND SMOKING** (currently **12.2 THE SMOKING**), Technical Guidance, **4<sup>th</sup> bullet**, delete

Reason: This is addressed in the 1<sup>st</sup> paragraph.

**12.3 SMOKE GENERATION AND SMOKING** (currently **12.2 THE SMOKING**), Technical Guidance, **5<sup>th</sup> bullet**, add a sentence to read as follows: “**Continuous monitoring devices are recommended to ensure that both time and temperature conditions are met.**”

(currently **12.3**) **SLICING OF COLD SMOKED PRODUCTS** should come after **12.4 COOLING AND/OR FREEZING** and be renumbered to 12.5.

Reason: These sections should be switched and renumbered to reflect the processing steps and the proposed flow diagram.

(currently **12.3**) **12.5 SLICING OF COLD SMOKED PRODUCTS**, Potential Defects, replace “Unlikely” with “**Uneven slicing and torn slices**”

(currently **12.3**) **12.5 SLICING OF COLD SMOKED PRODUCTS**, Technical Guidance, **2<sup>nd</sup> and 3<sup>rd</sup> paragraphs** should be deleted, and **last bullet** should be modified to read:

- “keep the slicer and the conveyor belts clean by frequent and planned cleaning during the process **in order to prevent accumulation and growth of *Listeria monocytogenes* and other pathogens.**”

Reason: The second and third paragraphs are recommended for deletion because they are redundant with the last bullet as modified.

**12.4 COOLING AND/OR FREEZING**, Technical Guidance, delete **2<sup>nd</sup> paragraph** and revise **1<sup>st</sup> paragraph** to read as follows:

- “cooling after smoking (process step 4) **and packing (process step 9) are important and should be carried out promptly to avoid microbiological growth;**”

Reason: The statement is true for both smoking and packing so, the paragraphs may be combined with the explanation for promptness.

**12.4 COOLING AND/OR FREEZING**, Technical Guidance, delete **2<sup>nd</sup> bullet** and remove brackets in the **1<sup>st</sup> bullet**

Reason: The temperatures to which all smoked products are cooled after smoking should be the same and are described in the first bullet, making the second bullet unnecessary. The second bullet also contains temperature requirements that are colder than necessary.

**12.4 COOLING AND/OR FREEZING**, Technical Guidance, add a new bullet to read as follows:

- “**The freezing process should be carried out rapidly in order to minimize crystallization of the flesh.**”

**12.6** (currently 12.5) **PACKING OF HOT AND COLD SMOKED PRODUCTS**, clarify **Potential Hazards**, 3<sup>rd</sup> **Technical Guidance** paragraph and 1<sup>st</sup> **Technical Guidance** bullet

Comment: Reference is made in these three instances to “dilution of preservatives from smoke by condensing water.” The U.S. would like clarification on how this would occur.

**12.6** (currently 12.5) **PACKING OF HOT AND COLD SMOKED PRODUCTS**, after title add “**Refer to Section 8.2 Processing of Vacuum or Modified Atmosphere Packed Fish**”

**12.6** (currently 12.5) **PACKING OF HOT AND COLD SMOKED PRODUCTS**, **Technical Guidance**, add a new bullet to read as follows:

- **“If modified atmosphere packaged (MAP), barriers such as temperature (freezing or refrigeration with adequate monitoring, e.g. the use of time-temperature integrators on each package) or salt must be used to prevent growth of *C. botulinum*.”**

**12.7** (currently 12.6) **LABELLING**, after “Refer to Section 8.2.3 “Labeling” add “**and Section 8.5 “Packaging, Labels & Ingredients”**”

Reason: Both of these sections include information on labels and should be referenced.

**12.7** (currently 12.6) **LABELLING**, **Technical Guidance**, delete 3<sup>rd</sup> paragraph and 1<sup>st</sup> bullet

Reason: This information, if deemed necessary, should be included in the standard rather than the code of practice.

**12.8** (currently 12.7) **STORAGE, DISTRIBUTION AND RETAIL**, **Technical Guidance**, revise paragraph (bullet) to read as follows:

- “Definition of storage temperature and shelf life for both cold and hot smoked products should take into account the risk of microbiological growth during chilled storage, in particular growth of *Clostridium botulinum* and *Listeria monocytogenes* in cold smoked products but also in hot smoked filets in evacuated plastic bags.”

Reason: Both *C. botulinum* and *L. monocytogenes* need to be considered when determining temperatures for storage and during transportation.

## **SECTION 17 – TRANSPORT**

General Comment: At the beginning of the section, we recommend the insertion of the following: “**Refer to the Code of Practice General Principles of Food Hygiene, SECTION VIII – TRANSPORTATION, CAC/RCP 1-1969, Rev. 3 (1997), Amended 1999 and the Code of Hygienic Practice for the Transport of Food in Bulk and semi-Packed Food, CAC/RCP 47-2002.**”

**17.1 FOR FRESH, REFRIGERATED AND FROZEN PRODUCTS**, add “**Refer to 3.6 Transportation**” under the title and a new first *Technical Guidance* bullet to read as follows:

- “**Check temperature of chilled product before loading.**”

## **SECTION 18 – RETAIL**

**Bracketed sentence** after **18.1.5 Preparation and Packaging Chilled Product at Retail**, delete and add a new bullet to **18.1.7 Retail Display of Chilled Seafood** to read as follows:

- “**Seafood in full service display cases should be properly labeled by signs or placards to indicate the commonly accepted name of the fish so the consumer is informed about the product.**”

Reason: The U.S. does not believe that a new section on labeling of loose products sold from retail fish counters is necessary, but would suggest adding a new bullet to subsection 18.1.7 to address this labeling concern.