



Food and Agriculture  
Organization of the  
United Nations



# **Codex Alimentarius, recommendations and best practices**

**Esther Garrido Gamarro**

Fishery Officer

Food and Agriculture Organization of  
the United Nations

# Contents

- i. What is the Codex Alimentarius?
- ii. How does Codex Alimentarius work?
- iii. FAO and WHO role for the provision of scientific advice
- iv. Available Codex Alimentarius resources

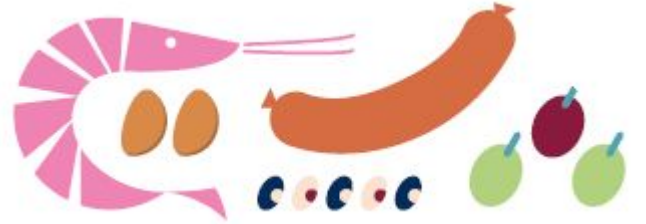
# What is the Codex Alimentarius?

- The Codex Alimentarius is a collection of internationally adopted food standards and related texts presented in a uniform manner.
- These food standards and related texts aim at protecting consumers' health and ensuring fair practices in the food trade.
- The publication of the Codex Alimentarius is intended to guide and promote the elaboration and establishment of definitions and requirements for foods to assist in their harmonization and in doing so to facilitate international trade.

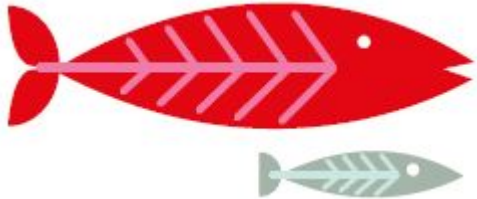
# What is the Codex Alimentarius?

- The Codex Alimentarius **includes** standards for all the principal foods, whether processed, semi-processed or raw, for distribution to the consumer.
- The Codex Alimentarius **includes** provisions in respect of food hygiene, food additives, residues of pesticides and veterinary drugs, contaminants, labelling and presentation, methods of analysis and sampling, and import and export inspection and certification.

# What is the Codex Alimentarius?



Codex standards, guidelines and codes of practice (together referred to as “**Codex texts**”) are recommendations – meaning their application is voluntary. Member countries need to take legal steps at the national level to incorporate Codex guidance into their legislation or regulations for it to be enforceable.



# How does Codex Alimentarius work?

For Codex Member countries that are also members of the World Trade Organization (WTO) there are some international obligations to be taken into consideration:

Countries that are Members of WTO and therefore are signatories to the *Application of sanitary and Phytosanitary Measures* (SPS) and *Technical Barriers to Trade* (TBT) agreements are **expected to participate to the extent possible in the standard-setting work** of the Codex Alimentarius Commission.

# Codex standards under WTC



WORLD TRADE  
ORGANIZATION

- The status of Codex standards under World Trade Organization (WTO) agreements has **increased the significance of Codex standards.**
- Codex standards are **explicitly referenced in the Agreement on the Application of Sanitary and Phytosanitary Measures** (SPS Agreement) as the international benchmark for food safety.

# Codex standards under WTO

- According to this agreement, Members shall ensure that any sanitary or phytosanitary measure is applied **only to the extent necessary to protect human, animal or plant life or health**, and shall not be applied in a manner that would constitute a disguised restriction on international trade.
- the Agreement on the Application of Sanitary and Phytosanitary Measures entered into force for most WTO Members on January 1, **1995**.



## Milestones in the evolution of food standards

### Ancient times

Attempts are made by  
early civilizations to  
**codify foods**.

### Early 1800s

**Canning** is invented.

### Mid- 1800s

Bananas are **first shipped** to Europe from  
the Tropics.

### 1800s

The **first general food laws** are adopted and  
enforcement agencies  
established

**Food chemistry** gains  
credibility, and reliable  
methods are developed  
to test for food  
adulteration.

### Late 1800s

A new era of  
**long-distance food**  
transportation is  
ushered in by the first  
international shipments  
of **frozen meat** from  
Australia and New  
Zealand to the United  
Kingdom.

### 1903

The International  
Dairy Federation (IDF)  
develops **international  
standards for milk  
and milk products**.  
(IDF was later to be an  
important catalyst in  
the conception of the  
Codex Alimentarius  
Commission).

### 1945

**FAO is founded**, with  
responsibilities covering  
nutrition and associated  
international food  
standards.

### 1948

**WHO is founded**, with  
responsibilities covering  
human health and, in  
particular, a mandate to  
establish food standards.

### 1949

Argentina proposes a  
regional **Latin American  
food code**, Código  
Latinoamericano de  
Alimentos.

### 1950

**Joint FAO/WHO** expert  
meetings begin on  
nutrition, food additives  
and related areas.

### 1953

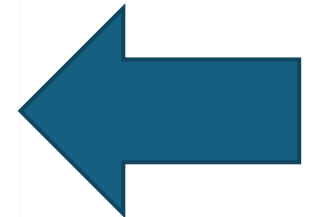
WHO's highest governing  
body, the **World Health  
Assembly**, states that  
the widening use of  
chemicals in the food  
industry presents a new  
public health problem  
that needs attention.

### 1954– 1958

Austria actively pursues  
the creation of a  
regional food code, the  
**Codex Alimentarius  
Europaeus**, or European  
Codex Alimentarius.

### 1960

The first FAO Regional  
Conference for Europe  
endorses the desirability  
of international – as  
distinct from regional –  
agreement on minimum  
food standards and  
invites the Organization's  
Director-General to  
submit proposals for  
a joint **FAO/WHO  
programme on food  
standards** to the FAO  
Conference.





**1961**

The Council of the Codex Alimentarius Europaeus adopts a resolution proposing that its work on **food standards** be taken over by FAO and WHO.

With the support of WHO, the United Nations Economic Commission for Europe (UNECE), the Organisation for Economic Cooperation and Development (OECD) and the Council of the Codex Alimentarius Europaeus, the FAO Conference establishes the **Codex Alimentarius** and resolves to create an **international food standards programme**.

The FAO Conference decides to establish a **Codex Alimentarius Commission** and requests an early endorsement by WHO of a joint FAO/WHO food standards programme.

**1962**

The Joint FAO/WHO Food Standards Conference requests that the Codex Alimentarius Commission implement a joint FAO/WHO food standards programme and create the **Codex Alimentarius**.

**1963**

Recognizing the importance of WHO's role in all health aspects of food and considering its mandate to establish food standards, the World Health Assembly approves establishment of the Joint FAO/WHO Food Standards Programme and adopts the Statutes of the Codex Alimentarius Commission.

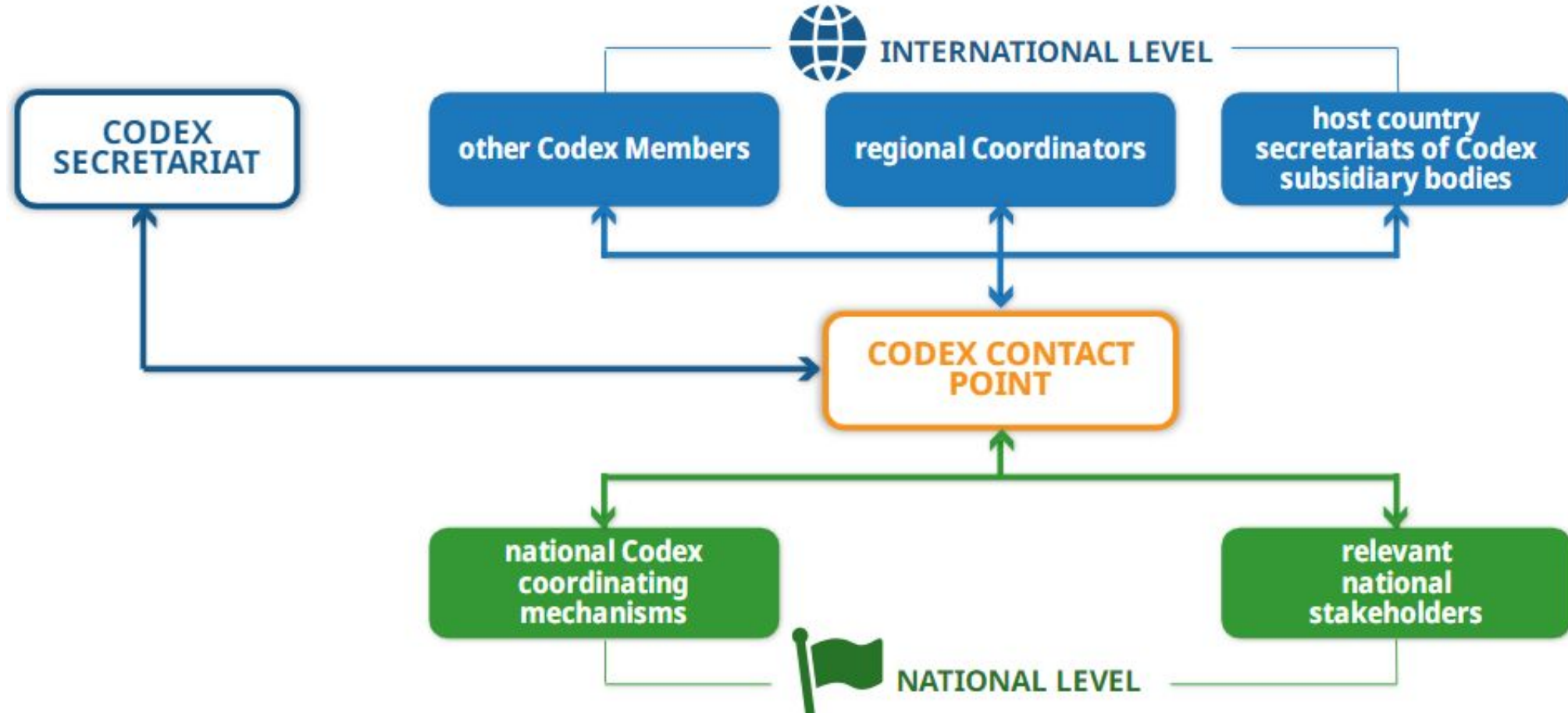
**Inaugural meeting of the Codex Alimentarius Commission held in Rome.**

The Statutes of the Codex Commission were adopted by its parent organizations, FAO and WHO, and the Commission held its first meeting in Rome, Italy in June 1963.







# Codex Alimentarius

- The Codex Alimentarius system presents a unique opportunity **for all countries** to join the international community in formulating and harmonizing food standards and ensuring their global implementation.
- The **mandate** of Codex is to establish international food standards **to protect the health of consumers and to ensure fair practices in the food trade**, while promoting coordination of food standards work undertaken by international governmental and non-governmental organizations.

# Who is participating in Codex?





Member	Region	Member since	email
 Afghanistan	Asia	2005	CodexAfghanistan2005@gmail.com
 Albania	Europe	1992	matilda.xhepa@bujqesia.gov.al
 Algeria	Near East	1970	cncodex.algerie@commerce.gov.dz
 Angola	Africa	1990	codexangola@yahoo.com.br
 Antigua and Barbuda	Latin America and the Caribbean	1988	codex@ab.gov.ag
 Argentina	Latin America and the Caribbean	1963	codex@magyp.gob.ar
 Armenia	Europe	1994	codexarmenia@gmail.com
 Australia	Southwest Pacific	1963	Codex.Contact@aff.gov.au
 Austria	Europe	1963	Bettina.brandtner@bml.gv.at
 Azerbaijan	Europe	2011	alimentarius@afsa.gov.az
 Bahamas	Latin America and the Caribbean	2002	PATRICIAJJOHNSON@BAHAMAS.GOV.BS
 Bahrain	Near East	1981	zmohamed@mun.gov.bh
 Bangladesh	Asia	1975	dg@bsti.gov.bd
 Barbados	Latin America and the Caribbean	1970	codex.contactpoint@barbados.gov.bb
 Belarus	Europe	2006	afedorenko71@mail.ru
 Belgium	Europe	1963	codex.be@health.fgov.be
 Belize	Latin America and the Caribbean	1992	CodexCP-Belize@bbs.gov.bz
 Benin	Africa	1974	maepdana@gmail.com
 Bhutan	Asia	1999	bhutancodex@gmail.com
 Bolivia (Plurinational State of)	Latin America and the Caribbean	1971	bolivia.codex@gmail.com
 Bosnia and Herzegovina	Europe	2007	codex.bih@fsa.gov.ba
 Botswana	Africa	1978	botswanacodex@gov.bw
 Brazil	Latin America and the Caribbean	1968	codexbrasil@inmetro.gov.br
 Brunei Darussalam	Asia	1997	brunei.codex@gmail.com
 Bulgaria	Europe	1969	IYancheva@mzh.government.bg
 Burkina Faso	Africa	2002	pointcontactcodexburkina@yahoo.fr
 Burundi	Africa	1964	info@bbnburundi.org
 Cabo Verde	Africa	1981	Edson.Cabral@eris.cv
 Cambodia	Asia	1974	codex.cambodia@gmail.com

**Government**

**Private sector**

**Academia**

**Consumer  
organizations**



# The Joint FAO/WHO Food Standards Programme

The work of FAO and WHO with respect to food standards consists of the following three independent yet complementary activities:

1. the **provision of scientific advice** by expert bodies and meetings established by FAO and WHO;
2. the **elaboration of food standards** by the Codex Alimentarius Commission taking into consideration the scientific advice provided by FAO and WHO; and
3. the creation of **capacity building programmes** related to strengthening food control systems taking into account the standards developed by the Codex Alimentarius Commission.

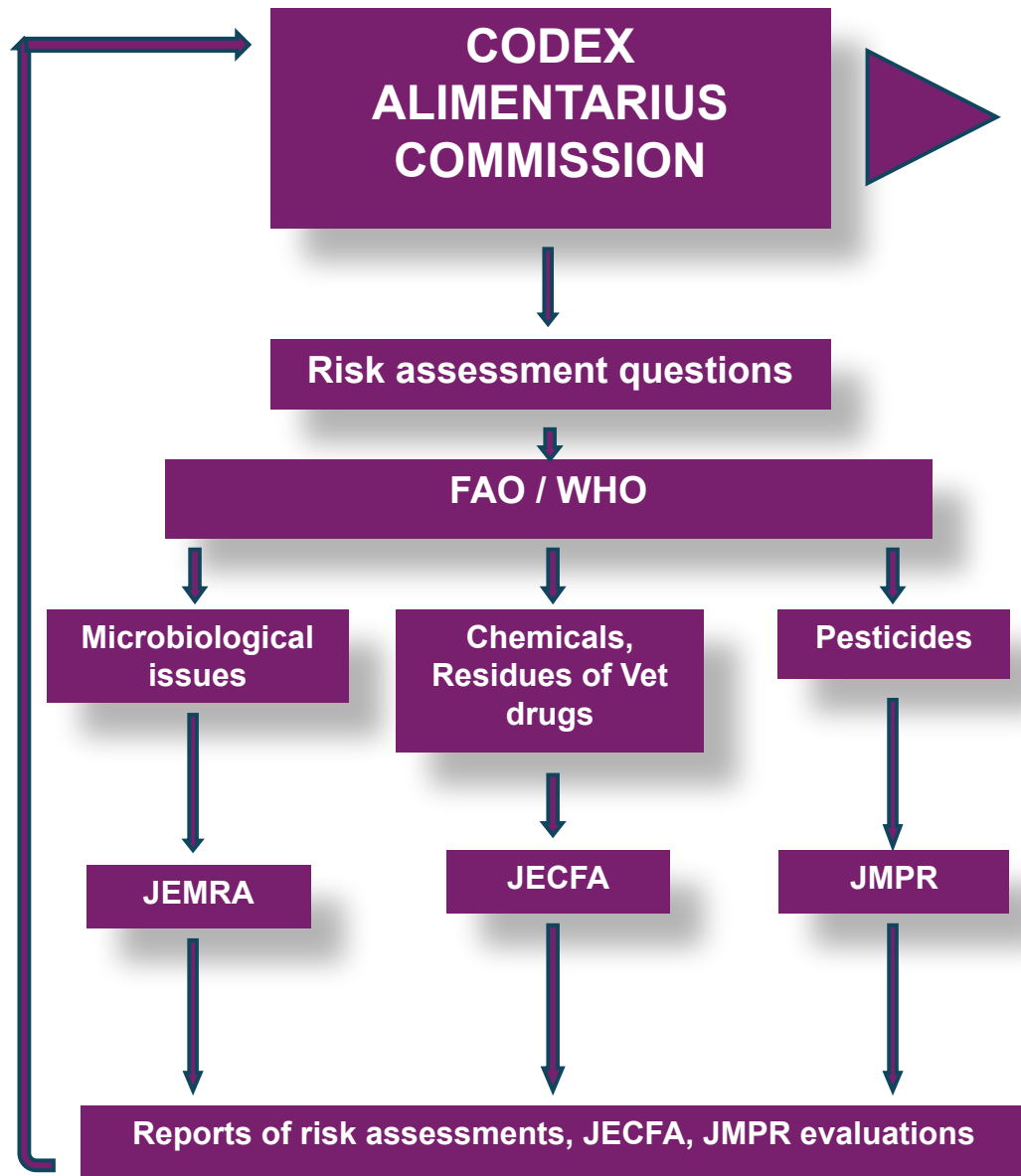
**FAO and WHO implement a joint programme to provide scientific advice to:**

The Codex Alimentarius Commission and its subsidiary bodies;  
Member countries.

**FAO/WHO scientific advice is provided through two main mechanisms:**

- 1. Expert bodies** that have a permanent joint secretariat (e.g. the Joint FAO/WHO Expert Committee on Food Additives – JECFA)
- 2. *Ad hoc* expert consultations or meetings** established to address a specific food safety issue (e.g. The Joint FAO/WHO Expert Consultation on Evaluation of Allergenicity of Genetically Modified Foods).





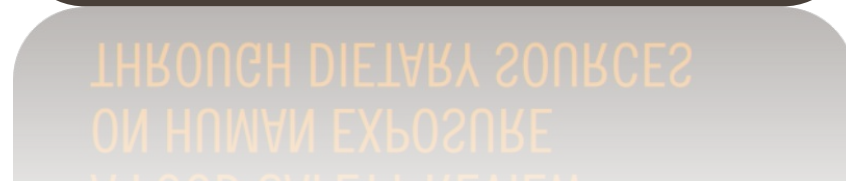
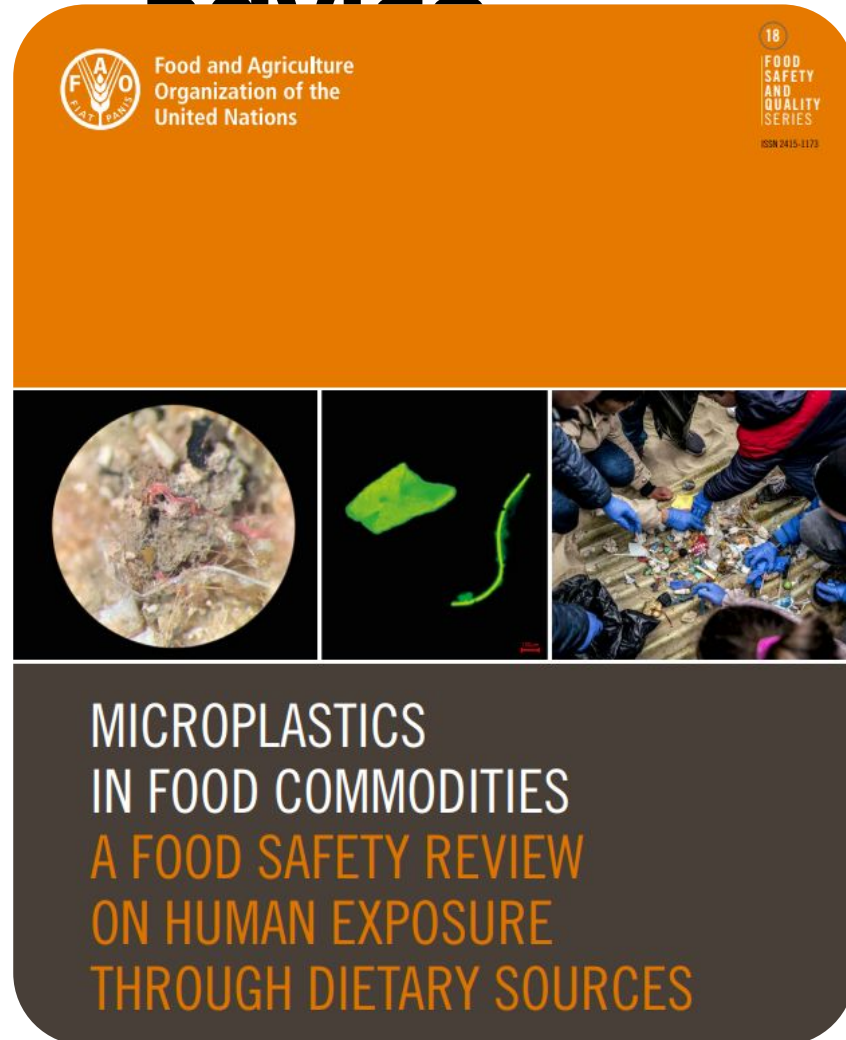
**Food Standards,  
Guidelines, Codes of  
practice**

# Scientific Advice

## Principles of developing science

- Excellence
- Independence
- Transparency
- Universality

# Recent provision of scientific

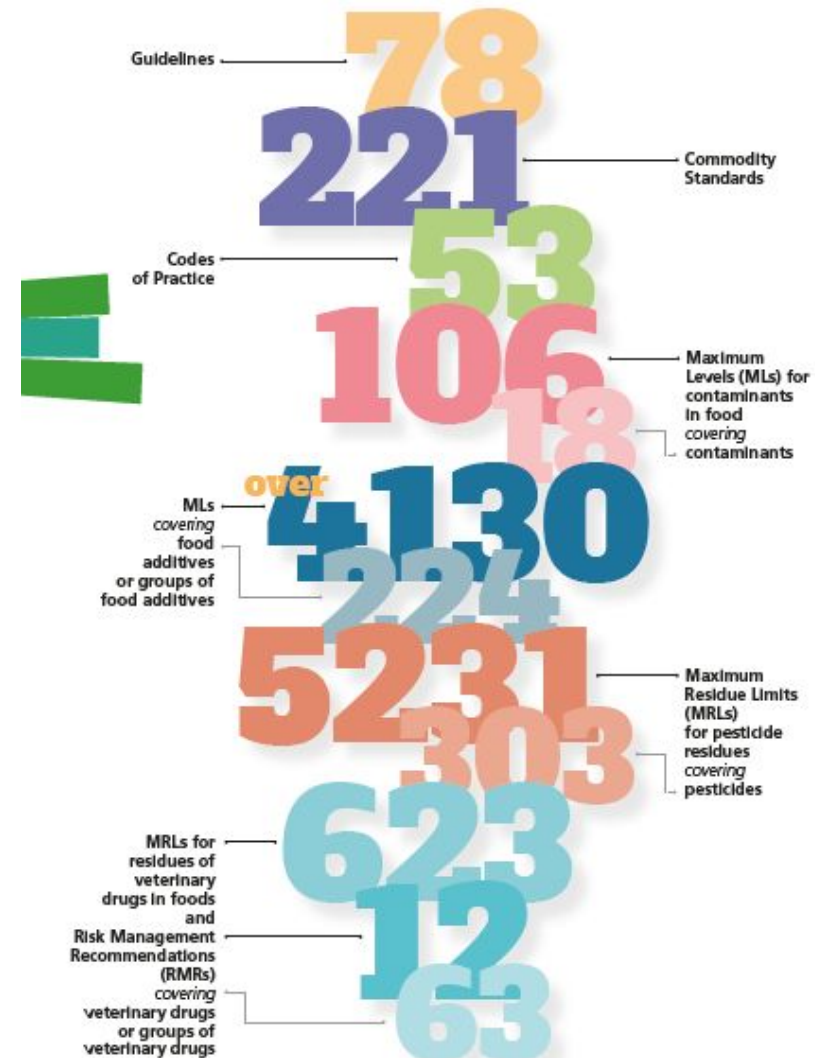


# Food standards

- The Codex Alimentarius Commission develops **science-based standards** taking into account the **scientific advice provided** by FAO/WHO expert bodies and *ad hoc* consultations and meetings.
- The Commission undertakes its standard setting work through a number of **subsidiary bodies** (Committees and Task Forces).

# The Codex scorecard

This table gives the number of Codex standards, guidelines and codes of practice by subject matter as of July 2017 after the decisions of the 40<sup>th</sup> Session of the Codex Alimentarius Commission.



~~~~~

General Standards,  
Guidelines and  
Codes of Practice are  
applied to all foods

**Food additives** permitted to be used are typically identified by referencing the *Codex General Standard for Food Additives*. Exceptions from, or addition to, the *General Standard for Food Additives* with respect to a food are rare and must be **fully justified**. Nevertheless, all additives must undergo a review by JECFA and be endorsed by the Codex Committee on Food Additives.

**Hygiene** makes reference to relevant Codex Codes of Hygienic Practice for the commodity concerned. In almost all cases it is required that the product shall be free from pathogenic micro-organisms, toxins or other poisonous or deleterious substances in amounts that represent a hazard to health.

**Contaminants** contains **limits** for contaminants that may occur in the product(s) covered by the standard. These limits are based on the scientific advice of FAO and WHO and must be **consistent** with the *Codex General Standard for Contaminants and Toxins in Food and Feed*. Where appropriate, reference is also made to the Codex Maximum Limits for **pesticide residues** and for **residues of veterinary drugs** in foods.



Commodity standards  
are the largest group  
of specific standards

cereals,  
pulses  
(legumes)  
and

fats and oils  
and  
related  
products

fish and  
fishery  
products

fresh  
fruits and  
vegetables

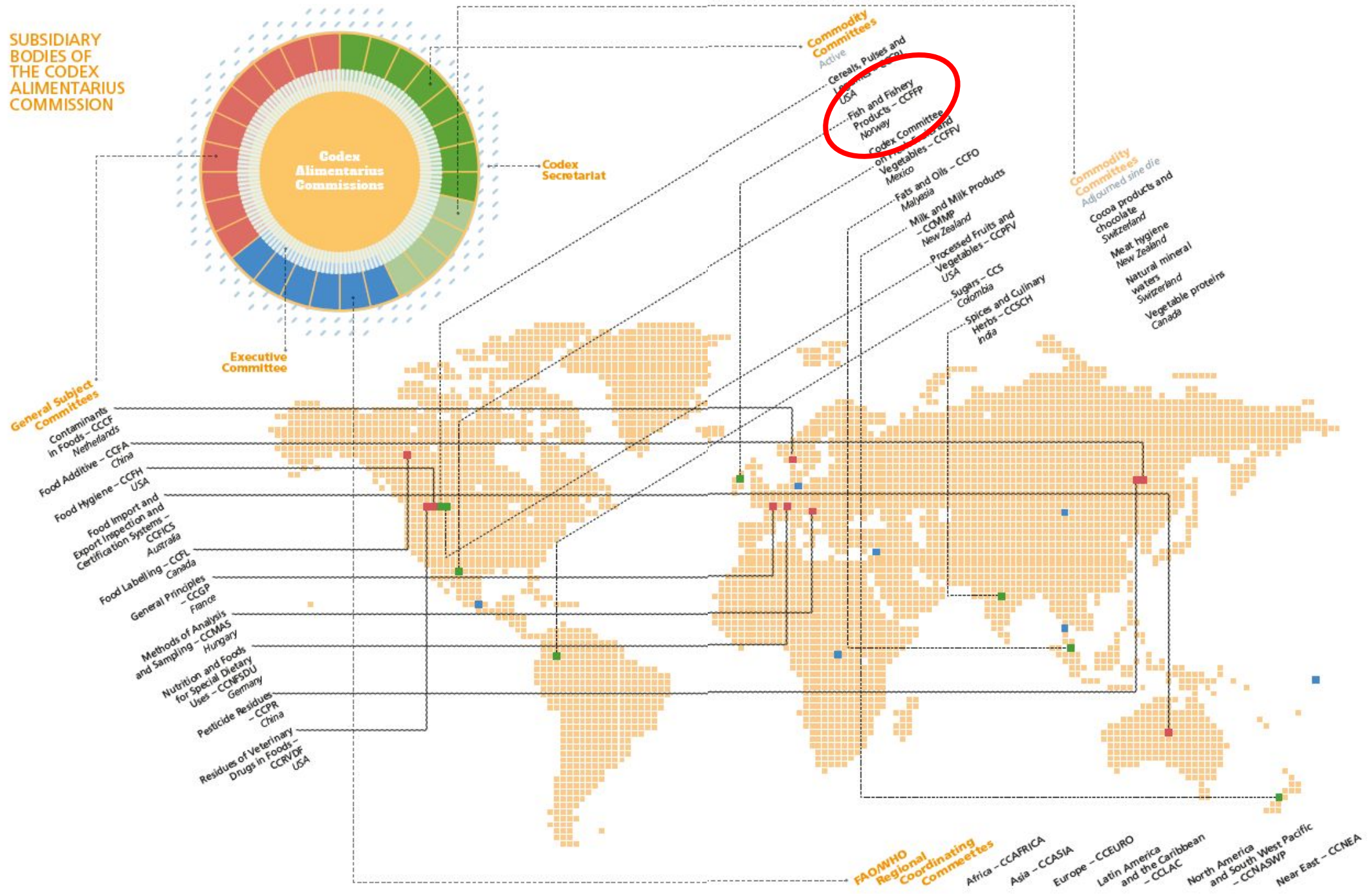
processed and  
quick-frozen  
fruits and  
vegetables

Each general subject and commodity group  
is represented by a **CODEX COMMITTEE**

**COMI  
STAN**



# SUBSIDIARY BODIES OF THE CODEX ALIMENTARIUS COMMISSION





Type any criteria in the search box to filter the data (e.g. a year, a committee code or a keyword). Download a standard by clicking on the green symbol in the available languages indicated.

| Reference    | Title                                                                                   | Committee | Last modified | EN | FR | ES | AR | ZH | RU |
|--------------|-----------------------------------------------------------------------------------------|-----------|---------------|----|----|----|----|----|----|
| CXS 1-1985   | General Standard for the Labelling of Prepackaged Foods                                 | CCFL      | 2018          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 3-1981   | Standard for Canned Salmon                                                              | CCFFP     | 2013          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 12-1981  | Standard for Honey                                                                      | CCS       | 2019          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 13-1981  | Standard for Preserved Tomatoes                                                         | CCPFV     | 2017          | ✓  | ✓  | ✓  | ⊘  | ✓  | ✓  |
| CXS 17-1981  | Standard for Canned Applesauce                                                          | CCPFV     | 2017          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 19-1981  | Standard for Edible Fats and Oils not Covered by Individual Standards                   | CCFO      | 2019          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 33-1981  | Standard for Olive Oils and Olive Pomace Oils                                           | CCFO      | 2017          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 36-1981  | Standard for Quick Frozen Finfish, Uneviscerated and Eviscerated                        | CCFFP     | 2017          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 37-1991  | Standard for Canned Shrimps or Prawns                                                   | CCFFP     | 2018          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 38-1981  | Standard for Edible Fungi and Fungus Products                                           | CCPFV     | 1981          | ✓  | ✓  | ✓  | ⊘  | ✓  | ✓  |
| CXS 39-1981  | Standard for Dried Edible Fungi                                                         | CCPFV     | 1981          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 40R-1981 | Regional Standard for Chanterelles                                                      | CCEURO    | 1981          | ✓  | ✓  | ✓  | ⊘  | ⊘  | ✓  |
| CXS 41-1981  | Standard for Quick Frozen Peas                                                          | CCPFV     | 2019          | ✓  | ✓  | ✓  | ⊘  | ⊘  | ⊘  |
| CXS 42-1981  | Standard for Canned Pineapple                                                           | CCPFV     | 1987          | ✓  | ✓  | ✓  | ⊘  | ✓  | ✓  |
| CXS 52-1981  | Standard for Quick Frozen Strawberries                                                  | CCPFV     | 2019          | ✓  | ✓  | ✓  | ⊘  | ⊘  | ⊘  |
| CXS 53-1981  | Standard for Special Dietary Foods with Low-Sodium Content (Including Salt Substitutes) | CCNFSDU   | 2019          | ✓  | ✓  | ✓  | ⊘  | ⊘  | ⊘  |
| CXS 57-1981  | Standard for Processed Tomato Concentrates                                              | CCPFV     | 2017          | ✓  | ✓  | ✓  | ⊘  | ✓  | ✓  |
| CXS 60-1981  | Standard for Canned Raspberries                                                         | CCPFV     | 1981          | ✓  | ✓  | ✓  | ⊘  | ✓  | ✓  |





## CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS

## CONTENTS

|                             |   |
|-----------------------------|---|
| <b>Introduction</b>         | 1 |
| <b>How to use this code</b> | 4 |

|                  |          |                               |           |
|------------------|----------|-------------------------------|-----------|
| <b>Section 1</b> | <b>7</b> | <b>Section 3</b>              | <b>31</b> |
| <b>Scope</b>     |          | <b>Prerequisite Programme</b> |           |

|                                                             |          |                                                                                    |    |
|-------------------------------------------------------------|----------|------------------------------------------------------------------------------------|----|
| <b>Section 2</b>                                            | <b>9</b> |                                                                                    |    |
| <b>Definitions</b>                                          |          |                                                                                    |    |
| 2.1 General definitions                                     | 11       | 3.1 Fishing and harvesting vessel design and construction                          | 33 |
| 2.2 Aquaculture                                             | 14       | 3.1.1 For ease of cleaning and disinfection                                        | 33 |
| 2.3 Live and raw bivalve molluscs                           | 16       | 3.1.2 To minimize contamination                                                    | 34 |
| 2.4 Fresh and quick frozen raw scallop products             | 16       | 3.1.3 To minimize damage to the fish, shellfish and other aquatic invertebrates    | 34 |
| 2.5 Fresh, frozen and minced fish                           | 17       | 3.1.4 To minimize damage during harvesting of aquacultured and molluscan shellfish | 35 |
| 2.6 Frozen surimi                                           | 18       | 3.2 Facility design and construction                                               | 35 |
| 2.7 Quick-frozen coated fish products                       | 19       | 3.2.1 For ease of cleaning and disinfection                                        | 35 |
| 2.8 Salted and dried salted fish                            | 20       | 3.2.2 To minimize contamination                                                    | 36 |
| 2.9 Smoked fish, smoked-flavoured fish and smoke-dried fish | 21       | 3.2.3 To provide adequate lighting                                                 | 36 |
| 2.10 Lobsters and Crabs                                     | 23       | 3.3 Design and construction of equipment and utensils                              | 37 |
| 2.11 Shrimps and prawns                                     | 26       | 3.3.1 For ease of cleaning and disinfection                                        | 37 |
| 2.12 Cephalopods                                            | 26       | 3.3.2 To minimize contamination                                                    | 37 |
| 2.13 Canned fish and shellfish                              | 26       | 3.3.3 To minimize damage                                                           | 37 |
| 2.14 Fish sauce                                             | 27       | 3.4 Hygiene control programme                                                      | 38 |
| 2.15 Sturgeon caviar                                        | 27       | 3.4.1 A permanent cleaning and disinfection schedule                               | 38 |
| 2.16 Transportation                                         | 28       | 3.4.2 Designation of personnel for cleaning                                        | 39 |
| 2.17 Retail                                                 | 28       | 3.4.3 Maintenance of premises, equipment and utensils                              | 39 |
|                                                             |          | 3.4.4 Pest control systems                                                         | 39 |
|                                                             |          | 3.4.5 Supply of water, ice and steam                                               | 39 |
|                                                             |          | 3.4.5.1 Water                                                                      | 39 |
|                                                             |          | 3.4.5.2 Ice                                                                        | 40 |
|                                                             |          | 3.4.5.3 Steam                                                                      | 40 |

|       |                                       |    |
|-------|---------------------------------------|----|
| 3.4.6 | Waste management                      | 40 |
| 3.5   | Personal hygiene and health           | 40 |
| 3.5.1 | Facilities and equipment              | 40 |
| 3.5.2 | Personnel hygiene                     | 40 |
| 3.6   | Transportation                        | 41 |
| 3.7   | Product tracing and recall procedures | 41 |
| 3.8   | Training                              | 42 |

## Section 4 45

### General considerations for the handling of fresh fish, shellfish and other aquatic invertebrates

|       |                                              |    |
|-------|----------------------------------------------|----|
| 4.1   | Time and temperature control                 | 47 |
| 4.1.1 | Minimize deterioration – time                | 47 |
| 4.1.2 | Minimize deterioration – temperature control | 47 |
| 4.2   | Minimize deterioration – handling            | 48 |

## Section 5 51

### Hazard Analysis and Critical Control Point (HACCP) and Defect Action Point (DAP) Analysis

|           |                                                            |    |
|-----------|------------------------------------------------------------|----|
| 5.1       | HACCP principles                                           | 53 |
| 5.2       | Defect action point analysis                               | 55 |
| 5.3       | Application                                                | 55 |
| 5.3.1     | Describe product                                           | 56 |
| 5.3.2     | Flow diagram                                               | 58 |
| 5.3.3     | Conduct hazard and defect analysis                         | 58 |
| 5.3.3.1   | Identification of hazards and defects                      | 58 |
| 5.3.3.1.1 | Hazards                                                    | 61 |
| 5.3.3.1.2 | Defects                                                    | 62 |
| 5.3.3.2   | Significance of hazards and defects                        | 62 |
| 5.3.4     | Determine critical control points and defect action points | 64 |
| 5.3.5     | Establish critical limits                                  | 65 |
| 5.3.6     | Establish monitoring procedures                            | 66 |

|        |                                                       |    |
|--------|-------------------------------------------------------|----|
| 5.3.7  | Establish corrective action                           | 67 |
| 5.3.8  | Establish verification procedures                     | 68 |
| 5.3.9  | Establish documentation and record-keeping procedures | 68 |
| 5.3.10 | Review of HACCP and DAP plans                         | 68 |
| 5.4    | Conclusion                                            | 69 |

## Section 6 71

### Aquaculture Production

|         |                                                         |    |
|---------|---------------------------------------------------------|----|
| 6.1     | General                                                 | 74 |
| 6.1.1   | Site selection                                          | 74 |
| 6.1.2   | Growing water quality                                   | 75 |
| 6.1.3   | Source of fry and fingerlings                           | 75 |
| 6.2     | Identification of hazards and defects                   | 75 |
| 6.2.1   | Hazards                                                 | 75 |
| 6.2.2   | Defects                                                 | 76 |
| 6.3     | Production operations                                   | 76 |
| 6.3.1   | Feed supply                                             | 76 |
| 6.3.2   | Veterinary drugs                                        | 77 |
| 6.3.3   | Growing                                                 | 78 |
| 6.3.4   | Harvesting                                              | 78 |
| 6.3.5   | Holding and transportation                              | 79 |
| 6.3.6   | Storage and transportation of live fish                 | 79 |
| 6.3.6.1 | Live fish stored and transported at ambient temperature | 80 |
| 6.3.6.2 | Live fish stored and transported at low temperatures    | 81 |

## Section 7 83

### Processing of live and raw bivalve molluscs

|     |                                                         |    |
|-----|---------------------------------------------------------|----|
| 7.1 | General remarks. Addition to the prerequisite programme | 85 |
| 7.2 | Classification and monitoring of growing areas          | 87 |

|         |                                                                             |     |
|---------|-----------------------------------------------------------------------------|-----|
| 7.2.1   | Classification of growing areas                                             | 88  |
| 7.2.2   | Monitoring of growing areas                                                 | 89  |
| 7.2.2.1 | Escherichia coli/faecal coliforms/total coliforms                           | 90  |
| 7.2.2.2 | Pathogen monitoring                                                         | 90  |
| 7.2.2.3 | Marine biotoxin control                                                     | 90  |
| 7.2.2.4 | Marine biotoxin test methods                                                | 92  |
| 7.2.2.5 | Chemical contaminants                                                       | 92  |
| 7.3     | Harvesting and transportation of live bivalve molluscs                      | 92  |
| 7.4     | Relaying                                                                    | 94  |
| 7.5     | Depuration                                                                  | 94  |
| 7.6     | Processing of bivalve molluscs in a distribution centre or an establishment | 96  |
| 7.6.1   | Reception                                                                   | 96  |
| 7.6.2   | Conditioning and storage of bivalve molluscs                                | 97  |
| 7.6.3   | Washing, declumping, debysing and grading                                   | 98  |
| 7.6.4   | Packaging and labelling                                                     | 98  |
| 7.6.4.1 | Packaging and labelling of live bivalve molluscs                            | 98  |
| 7.6.4.2 | Packaging and labelling of raw bivalve molluscs                             | 99  |
| 7.6.5   | Storage                                                                     | 100 |
| 7.6.5.1 | Storage of live bivalve molluscs                                            | 100 |
| 7.6.5.2 | Storage of raw bivalve molluscs                                             | 100 |
| 7.6.6   | Distribution/transportation                                                 | 100 |
| 7.6.6.1 | Distribution of live bivalve molluscs                                       | 100 |
| 7.6.6.2 | Distribution of raw bivalve molluscs                                        | 101 |
| 7.7     | Processing to reduce or limit target organisms                              | 101 |
| 7.8     | Shucking                                                                    | 102 |
| 7.8.1   | Hand and mechanical shucking and washing                                    | 102 |
| 7.8.2   | Heat shocking of bivalve molluscs followed by packaging                     | 102 |
| 7.9     | Documentation                                                               | 103 |
| 7.10    | Lot identification and recall procedures                                    | 103 |

## Section 8 105

### Processing of fresh and quick frozen scallop products

|         |                                                                               |     |
|---------|-------------------------------------------------------------------------------|-----|
| 8.1     | Identification of hazards and defects                                         | 107 |
| 8.1.1   | Hazards                                                                       | 107 |
| 8.1.1.1 | Marine biotoxins                                                              | 108 |
| 8.1.2   | Defects                                                                       | 108 |
| 8.1.2.1 | Objectionable and foreign matter                                              | 108 |
| 8.1.2.2 | Excess water uptake                                                           | 108 |
| 8.2     | Processing operations                                                         | 109 |
| 8.2.1   | Vessel operations (shucking on vessel)                                        | 111 |
| 8.2.1.1 | Scallop landing/deck dump (Processing Step 1)                                 | 111 |
| 8.2.1.2 | Washing live scallops/size grading (Processing Step 2)                        | 111 |
| 8.2.1.3 | Shucking (Processing Steps 3, 21)                                             | 111 |
| 8.2.1.4 | Washing shucked scallops (Processing Steps 4, 22)                             | 112 |
| 8.2.1.5 | Pre-chilling (Processing Step 5)                                              | 112 |
| 8.2.1.6 | Packing (Processing Step 6)                                                   | 113 |
| 8.2.1.7 | Chilled Storage (Processing Step 7)                                           | 113 |
| 8.2.2   | Vessel operations (shucking on land)                                          | 114 |
| 8.2.2.1 | On board storage (deck/hold) of scallops (Processing Step 18)                 | 114 |
| 8.2.2.2 | Landing of scallops to processor (Processing Step 19)                         | 114 |
| 8.2.3   | Processing facility operations                                                | 114 |
| 8.2.3.1 | Reception (shucked scallops) (Processing Step 8)                              | 114 |
| 8.2.3.2 | Reception (Processing Step 20)                                                | 115 |
| 8.2.3.3 | Chilled storage (Processing Steps 9, 23)                                      | 116 |
| 8.2.3.4 | Addition of a solution of water and phosphate (Optional) (Processing Step 10) | 117 |
| 8.2.3.5 | Addition of water (Optional) (Processing Step 10)                             | 117 |
| 8.2.3.6 | Size grading and examination (Processing Step 11)                             | 118 |
| 8.2.3.7 | Freezing Process (Processing Step 12)                                         | 118 |



|          |                                     |     |
|----------|-------------------------------------|-----|
| 8.2.3.8  | Glazing (Processing Step 13)        | 118 |
| 8.2.3.9  | Weighing (Processing Step 14)       | 118 |
| 8.2.3.10 | Packaging (Processing Step 15)      | 119 |
| 8.2.3.11 | Labelling (Processing Step 16)      | 119 |
| 8.2.3.12 | Frozen storage (Processing Step 17) | 119 |

## Section 9 121

### Processing of fresh, frozen and minced fish

|         |                                                                       |     |
|---------|-----------------------------------------------------------------------|-----|
| 9.1     | Finfish preparation                                                   | 125 |
| 9.1.1   | Raw, fresh or frozen fish reception (Processing Step 1)               | 125 |
| 9.1.1.1 | Sensory evaluation of fish                                            | 126 |
| 9.1.2   | Chilled storage (Processing Steps 2 and 14)                           | 126 |
| 9.1.3   | Frozen storage (Processing Steps 3 and 20)                            | 126 |
| 9.1.4   | Controlled thawing (Processing Step 4)                                | 127 |
| 9.1.5   | Washing and gutting (Processing Steps 6 and 7)                        | 128 |
| 9.1.6   | Filleting, skinning, trimming and candling (Processing Steps 8 and 9) | 128 |
| 9.2     | Processing of vacuum or modified atmosphere packaged fish             | 129 |
| 9.2.1   | Weighing (Processing Step 10)                                         | 129 |
| 9.2.2   | Vacuum or modified atmosphere packaging (Processing Step 11)          | 129 |
| 9.2.3   | Labelling (Processing Steps 12 and 18)                                | 130 |
| 9.2.4   | Metal detection (Processing Steps 13 and 19)                          | 130 |
| 9.3     | Processing of frozen fish                                             | 131 |
| 9.3.1   | Freezing process (Processing Step 15)                                 | 131 |
| 9.3.2   | Glazing (Processing Step 16)                                          | 131 |
| 9.4     | Processing of minced fish                                             | 132 |
| 9.4.1   | Mincing fish using mechanical separation process (Processing Step 21) | 132 |
| 9.4.2   | Washing of minced fish (Processing Step 22)                           | 133 |

|       |                                                                                                |     |
|-------|------------------------------------------------------------------------------------------------|-----|
| 9.4.3 | Blending and application of additives and ingredients to minced fish (Processing Step 23 e 24) | 133 |
| 9.4.4 | Wrapping and packaging (Processing Steps 17 and 25)                                            | 133 |
| 9.5   | Packaging, labels and ingredients                                                              | 134 |
| 9.5.1 | Reception – packaging, labels and ingredients (Processing Steps 26 and 28)                     | 134 |
| 9.5.2 | Storage – packaging, labels and ingredients (Processing Steps 27 and 29)                       | 134 |

## Section 10 137

### Harvesting, processing, storage and distribution of fish and fishery products at risk of scombrototoxin (histamine) formation

|          |                                                                         |     |
|----------|-------------------------------------------------------------------------|-----|
| 10.1     | Harvest vessel operations                                               | 141 |
| 10.1.1   | Catching and handling fish before chilling                              | 141 |
| 10.1.2   | Gutting and gilling (optional)                                          | 142 |
| 10.1.3   | Chilling and/or freezing                                                | 142 |
| 10.1.4   | Refrigerated and/or frozen storage (fishing vessel and transfer vessel) | 143 |
| 10.1.5   | Monitoring records                                                      | 144 |
| 10.2     | Receiving establishment operations (fish reception)                     | 145 |
| 10.2.1   | Temperature monitoring                                                  | 145 |
| 10.2.2   | Sensory evaluation                                                      | 146 |
| 10.2.3   | Review of vessel control records (receiving establishment)              | 147 |
| 10.2.4   | Histamine testing                                                       | 147 |
| 10.2.4.1 | Histamine levels                                                        | 148 |
| 10.2.4.2 | Histamine testing, sampling strategies                                  | 148 |
| 10.2.4.3 | Histamine testing, analytical methods                                   | 149 |
| 10.2.5   | Monitoring records (receiving establishment)                            | 149 |
| 10.3     | Transportation                                                          | 150 |

|        |                                                            |     |
|--------|------------------------------------------------------------|-----|
| 10.4   | Processing operations                                      | 150 |
| 10.4.1 | Reception (processing establishment)                       | 150 |
| 10.4.2 | Processing time and temperature control                    | 151 |
| 10.4.3 | Heat processing                                            | 152 |
| 10.4.4 | Processing, other technological measures                   | 152 |
| 10.4.5 | Refrigerated and frozen storage (processing establishment) | 153 |
| 10.4.6 | Monitoring records (processing establishment)              | 153 |

## Section 11 155

### Processing of frozen surimi

|        |                                                                            |     |
|--------|----------------------------------------------------------------------------|-----|
| 11.1   | General considerations of hazards and defects for frozen surimi production | 159 |
| 11.1.1 | Hazards                                                                    | 159 |
| 11.1.2 | Defects                                                                    | 159 |
| 11.2   | Fish preparation (Processing Steps 1–8)                                    | 160 |
| 11.2.1 | Raw fresh and frozen fish reception (Processing Step 1)                    | 160 |
| 11.2.2 | Chilled storage (Processing Step 2)                                        | 161 |
| 11.2.3 | Washing and scaling (Processing Step 6)                                    | 161 |
| 11.2.4 | Washing (Processing Step 8)                                                | 161 |
| 11.3   | Meat separation process (Processing Step 9)                                | 162 |
| 11.4   | Washing and dewatering process (Processing Step 10)                        | 162 |
| 11.5   | Refining process (Processing Step 11)                                      | 163 |
| 11.6   | Final dewatering process (Processing Step 12)                              | 163 |
| 11.7   | Mixing and addition of adjuvant ingredients process (Processing Step 13)   | 164 |
| 11.8   | Packaging and weighing (Processing Step 14)                                | 164 |
| 11.9   | Freezing operation (Processing Step 15)                                    | 165 |

|       |                                                                                |     |
|-------|--------------------------------------------------------------------------------|-----|
| 11.10 | Dismantling freezing pan (Processing Step 16)                                  | 165 |
| 11.11 | Metal detection (Processing Step 17)                                           | 165 |
| 11.12 | Boxing and labelling (Processing Step 18)                                      | 166 |
| 11.13 | Frozen storage (Processing Step 19)                                            | 166 |
| 11.14 | Raw material reception. Packaging and ingredients (Processing Steps 21 and 23) | 166 |
| 11.15 | Raw material storage. Packaging and ingredients (Processing Steps 22 and 24)   | 166 |

## Section 12 169

### Processing of quick-frozen coated fish products

|          |                                                                    |     |
|----------|--------------------------------------------------------------------|-----|
| 12.1     | General. Addition to prerequisite programme                        | 171 |
| 12.2     | Identification of hazards and defects                              | 173 |
| 12.2.1   | Hazards                                                            | 173 |
| 12.2.2   | Defects                                                            | 173 |
| 12.3     | Processing operations                                              | 173 |
| 12.3.1   | Reception                                                          | 173 |
| 12.3.1.1 | Fish                                                               | 173 |
| 12.3.1.2 | Other ingredients                                                  | 174 |
| 12.3.1.3 | Packaging materials                                                | 174 |
| 12.3.2   | Storage of raw material, other ingredients and packaging materials | 174 |
| 12.3.2.1 | Fish (frozen storage)                                              | 174 |
| 12.3.2.2 | Fish (chilled storage)                                             | 174 |
| 12.3.2.3 | Other ingredients and packaging materials                          | 175 |
| 12.3.3   | Frozen fish block/fillet tempering                                 | 175 |
| 12.3.4   | Unwrapping, unpacking                                              | 175 |
| 12.3.5   | Production of fish core                                            | 176 |
| 12.3.5.1 | Sawing                                                             | 176 |
| 12.3.5.2 | Application of additives and ingredients                           | 176 |
| 12.3.5.3 | Forming                                                            | 176 |

|          |                                                                    |     |
|----------|--------------------------------------------------------------------|-----|
| 12.3.6   | Separation of pieces                                               | 177 |
| 12.3.7   | Coating                                                            | 177 |
| 12.3.7.1 | Wet coating                                                        | 177 |
| 12.3.7.2 | Dry coating                                                        | 177 |
| 12.3.8   | Pre-frying                                                         | 178 |
| 12.3.9   | Re-freezing – final freezing                                       | 178 |
| 12.3.10  | Packaging and labelling                                            | 179 |
| 12.3.11  | Storage of end products                                            | 179 |
| 12.3.12  | Transportation of end product                                      | 180 |
| 12.4     | Processing operations. <i>Molluscan shellfish</i>                  | 180 |
| 12.4.1   | Reception                                                          | 180 |
| 12.4.1.1 | Molluscan shellfish                                                | 180 |
| 12.4.1.2 | Other ingredients                                                  | 182 |
| 12.4.1.3 | Packaging materials                                                | 182 |
| 12.4.2   | Storage of raw material, other ingredients and packaging materials | 182 |
| 12.4.2.1 | Molluscan shellfish (frozen storage)                               | 182 |
| 12.4.2.2 | Other ingredients and packaging materials                          | 182 |
| 12.4.2.3 | Molluscan shellfish (refrigerated storage)                         | 182 |
| 12.4.3   | Unpacking and unwrapping                                           | 182 |
| 12.4.4   | Production of coated molluscan shellfish                           | 182 |
| 12.4.4.1 | Thawing frozen product                                             | 182 |
| 12.4.4.2 | Deglazing                                                          | 183 |
| 12.4.4.3 | Separation of individual molluscan shellfish                       | 183 |
| 12.4.5   | Coating                                                            | 183 |
| 12.4.5.1 | Wet coating                                                        | 183 |
| 12.4.5.2 | Dry coating                                                        | 183 |
| 12.4.6   | Pre-frying                                                         | 183 |
| 12.4.7   | Re-freezing – final freezing                                       | 183 |
| 12.4.8   | Packaging and labelling                                            | 183 |
| 12.4.9   | Storage of end product                                             | 183 |
| 12.4.10  | Transportation of end product                                      | 183 |
| 12.5     | Processing operations. <i>Coated shrimps</i>                       | 184 |
| 12.5.1   | Reception                                                          | 185 |
| 12.5.1.1 | Shrimps                                                            | 185 |
| 12.5.1.2 | Other ingredients                                                  | 185 |

|          |                                                                    |     |
|----------|--------------------------------------------------------------------|-----|
| 12.5.1.3 | Packaging material                                                 | 185 |
| 12.5.2   | Storage of raw material, other ingredients and packaging materials | 186 |
| 12.5.2.1 | Shrimps (frozen storage)                                           | 186 |
| 12.5.2.2 | Other ingredients and packaging material                           | 186 |
| 12.5.2.3 | Shrimps (refrigerated storage)                                     | 186 |
| 12.5.3   | Unpacking and unwrapping                                           | 186 |
| 12.5.4   | Production of coated shrimps                                       | 186 |
| 12.5.4.1 | Thawing frozen product                                             | 186 |
| 12.5.4.2 | Peeling, deveining, butterflying                                   | 186 |
| 12.5.5   | Coating                                                            | 187 |
| 12.5.5.1 | Wet coating                                                        | 187 |
| 12.5.5.2 | Dry coating                                                        | 188 |
| 12.5.6   | Pre-frying                                                         | 188 |
| 12.5.6.1 | Frying                                                             | 188 |
| 12.5.7   | Packaging and labelling                                            | 188 |
| 12.5.8   | Re-freezing – final freezing                                       | 189 |
| 12.5.9   | Casing                                                             | 189 |
| 12.5.10  | Frozen storage of end product                                      | 189 |
| 12.5.11  | Transportation of end product                                      | 189 |

## Section 13 191

### Processing of salted and dried salted fish

|        |                                                      |     |
|--------|------------------------------------------------------|-----|
| 13.1   | General                                              | 193 |
| 13.2   | Preparing for salting                                | 194 |
| 13.2.1 | Splitting, washing and rinsing (Processing Step 7)   | 194 |
| 13.2.2 | Filleting, skinning and trimming (Processing Step 8) | 194 |
| 13.2.3 | Round fish (Processing Step 9)                       | 194 |
| 13.2.4 | Nobbing (Processing Step 10)                         | 196 |
| 13.2.5 | Gibbing (Processing Step 11)                         | 196 |
| 13.3   | Salt handling and salt requirements                  | 196 |
| 13.3.1 | Salt requirements (Processing Step 12)               | 196 |
| 13.3.2 | Handling (Processing Step 13)                        | 197 |

|        |                                                                        |     |
|--------|------------------------------------------------------------------------|-----|
| 13.4   | Salting and maturing                                                   | 197 |
| 13.4.1 | Brining (Processing Step 14)                                           | 198 |
| 13.4.2 | Brine injection (Processing Step 15)                                   | 198 |
| 13.4.3 | Wet-salting (Processing Step 16)                                       | 198 |
| 13.4.4 | Dry-salting (Processing Step 17)                                       | 199 |
| 13.4.5 | Pickling (Processing Step 18)                                          | 199 |
| 13.4.6 | Maturing (Processing Step 19)                                          | 200 |
| 13.5   | Sorting, drying, weighing, packaging, wrapping and labelling           | 200 |
| 13.5.1 | Sorting (Processing Step 20)                                           | 200 |
| 13.5.2 | Drying (Processing Step 21)                                            | 200 |
| 13.5.3 | Weighing, wrapping and packaging (Processing Step 22)                  | 201 |
| 13.5.4 | Labelling (Processing Step 23)                                         | 201 |
| 13.6   | Chilled storage (Processing Step 24)                                   | 201 |
| 13.7   | Packaging, labels and ingredients (Processing Steps 25, 26, 27 and 28) | 201 |

## Section 14 203

### Smoked fish, smoke-flavoured fish and smoke-dried fish

|         |                                                     |     |
|---------|-----------------------------------------------------|-----|
| 14.1    | Processing of Smoked Fish                           | 205 |
| 14.1.1  | Reception of raw materials                          | 206 |
| 14.1.2  | Salting                                             | 206 |
| 14.1.3  | Hanging and racking                                 | 207 |
| 14.1.4  | Drying                                              | 209 |
| 14.1.5  | Reception of wood or plant material for smoking     | 209 |
| 14.1.6  | Storage of wood or plant material for smoking       | 209 |
| 14.1.7  | Reception and storage of smoke condensate           | 210 |
| 14.1.8  | Regeneration of smoke                               | 210 |
| 14.1.9  | Smoke generation from wood and other plant material | 210 |
| 14.1.10 | Hot smoking                                         | 211 |
| 14.1.11 | Cold smoking                                        | 211 |
| 14.1.12 | Cooling                                             | 212 |
| 14.1.13 | Slicing                                             | 212 |

|         |                      |     |
|---------|----------------------|-----|
| 14.1.14 | Packaging            | 212 |
| 14.1.15 | Cooling or freezing  | 213 |
| 14.1.16 | Storage              | 213 |
| 14.1.17 | Labelling            | 213 |
| 14.2    | Smoke-flavoured fish | 214 |
| 14.3    | Smoke-dried fish     | 216 |
| 14.3.1  | Pre-drying           | 216 |
| 14.3.2  | Smoke-drying         | 216 |
| 14.3.3  | Cooling              | 217 |
| 14.3.4  | Packaging            | 217 |
| 14.3.5  | Labelling            | 217 |
| 14.3.6  | Storage              | 217 |

## Section 15A 219

### Processing of lobsters

|           |                                                               |     |
|-----------|---------------------------------------------------------------|-----|
| 15A.1     | General. <i>Addition to prerequisite programme</i>            | 221 |
| 15A.1.1   | Design and construction of equipment and utensils             | 221 |
| 15A.1.2   | Hygiene control programme                                     | 221 |
| 15A.2     | General considerations for the handling of lobsters           | 222 |
| 15A.2.1   | Potential hazards and defects associated with lobsters        | 222 |
| 15A.2.1.1 | Potential hazards                                             | 222 |
| 15A.2.1.2 | Potential defects                                             | 223 |
| 15A.2.2   | Minimize the deterioration of lobster – handling              | 223 |
| 15A.3     | Processing operations                                         | 224 |
| 15A.3.1   | Frozen raw lobster tail                                       | 224 |
| 15A.3.1.1 | Live lobster reception (Processing Step 1)                    | 224 |
| 15A.3.1.2 | Live lobster holding (Processing Step 2)                      | 226 |
| 15A.3.1.3 | Tailing (Processing Step 3)                                   | 226 |
| 15A.3.1.4 | Washing (Processing Step 4)                                   | 226 |
| 15A.3.1.5 | Application of additives to lobster tails (Processing Step 5) | 227 |
| 15A.3.1.6 | De-veining/trimming/washing (Processing Step 6)               | 227 |



|            |                                                                        |     |
|------------|------------------------------------------------------------------------|-----|
| 15A.3.1.7  | Grading/weighing/wrapping<br>(Processing Step 7)                       | 228 |
| 15A.3.1.8  | Chilling (Processing Step 8)                                           | 228 |
| 15A.3.1.9  | Freezing (Processing Step 9)                                           | 228 |
| 15A.3.1.10 | Glazing (Processing Step 10)                                           | 229 |
| 15A.3.1.11 | Final Packaging/Labelling<br>(Processing Step 11)                      | 229 |
| 15A.3.1.12 | Frozen storage (Processing Step 12)                                    | 229 |
| 15A.3.1.13 | Packaging and label reception<br>(Processing Step 13)                  | 229 |
| 15A.3.1.14 | Additives reception<br>(Processing Step 15)                            | 230 |
| 15A.3.1.15 | Additives, packaging and label<br>storage (Processing Steps 14 and 16) | 230 |
| 15A.3.1.16 | Distribution and transport<br>(Process Step 17)                        | 230 |
| 15A.3.2    | Chilled and frozen cooked whole<br>lobster and cooked lobster meat     | 230 |
| 15A.3.2.1  | Live lobster reception<br>(Processing Step 1)                          | 230 |
| 15A.3.2.2  | Live lobster holding<br>(Processing Step 2)                            | 230 |
| 15A.3.2.3  | Drowning or pacifying<br>(Processing Step 3)                           | 230 |
| 15A.3.2.4  | Cooking (Processing Step 4)                                            | 232 |
| 15A.3.2.5  | Cooling (Processing Step 5)                                            | 232 |
| 15A.3.2.6  | Trimming (Processing Step 7)                                           | 233 |
| 15A.3.2.7  | Shucking, de-veining and washing<br>(Processing Step 6)                | 233 |
| 15A.3.2.8  | Grading/weighing/wrapping<br>(Processing Step 8)                       | 233 |
| 15A.3.2.9  | Chilling (Processing Step 9)                                           | 234 |
| 15A.3.2.10 | Freezing (Processing Step 10)                                          | 234 |
| 15A.3.2.11 | Glazing (Processing Step 11)                                           | 234 |
| 15A.3.2.12 | Final packaging/labelling<br>(Processing Step 12)                      | 234 |
| 15A.3.2.13 | Chilled storage (Processing Step 13)                                   | 234 |
| 15A.3.2.14 | Frozen storage (Processing Step 14)                                    | 235 |
| 15A.3.2.15 | Packaging/label reception<br>(Processing Step 15)                      | 235 |
| 15A.3.2.16 | Packaging/label storage<br>(Processing Step 16)                        | 235 |
| 15A.3.2.17 | Distribution/Transportation<br>(Process Step 17)                       | 235 |

## Section 15B 237

### Processing of crabs

|            |                                                            |     |
|------------|------------------------------------------------------------|-----|
| 15B.1      | General. Addition to prerequisite<br>programme             | 239 |
| 15B.1.1    | Design and construction<br>of equipment and utensils       | 239 |
| 15B.1.2    | Hygiene control programme                                  | 239 |
| 15B.2      | General considerations<br>for the handling of crabs        | 240 |
| 15B.2.1    | Potential hazards and defects<br>associated with crabs     | 240 |
| 15B.2.1.1  | Potential hazards                                          | 240 |
| 15B.2.1.2  | Potential Defects                                          | 240 |
| 15B.2.2    | Minimize the deterioration<br>of crabs — handling          | 241 |
| 15B.3      | Processing operations                                      | 242 |
| 15B.3.1    | Chilled pasteurized crab meat                              | 242 |
| 15B.3.1.1  | Live crab reception<br>(Processing Step 1)                 | 242 |
| 15B.3.1.2  | Live crab holding<br>(Processing Step 2)                   | 242 |
| 15B.3.1.3  | Washing and drowning<br>or pacifying (Processing Step 3)   | 244 |
| 15B.3.1.4  | Cooking (Processing Step 4)                                | 244 |
| 15B.3.1.5  | Cooling (Processing Step 5)                                | 245 |
| 15B.3.1.6  | Sectioning/meat extraction<br>(Processing Step 6)          | 245 |
| 15B.3.1.7  | Shell- and viscera-fragment<br>removal (Processing Step 7) | 246 |
| 15B.3.1.8  | Filling and weighing<br>(Processing Step 8)                | 246 |
| 15B.3.1.9  | Primary-packaging/sealing<br>(Processing Step 9)           | 247 |
| 15B.3.1.10 | Pasteurization (Processing Step 10)                        | 247 |
| 15B.3.1.11 | Cooling (Processing Step 11)                               | 248 |
| 15B.3.1.12 | Final packaging/labelling<br>(Processing Step 12)          | 248 |
| 15B.3.1.13 | Chilled storage (Processing Step 13)                       | 248 |
| 15B.3.1.14 | Packaging and labelling reception<br>(Processing Step 14)  | 248 |

|            |                                                          |     |
|------------|----------------------------------------------------------|-----|
| 15B.3.1.15 | Packaging/labelling storage<br>(Processing Step 15)      | 249 |
| 15B.3.1.16 | Distribution/transportation<br>(Processing Step 16)      | 249 |
| 15B.3.2    | Chilled and frozen cooked crab                           | 249 |
| 15B.3.2.1  | Live-crab reception<br>(Processing Step 1)               | 249 |
| 15B.3.2.2  | Live-crab holding<br>(Processing Step 2)                 | 249 |
| 15B.3.2.3  | Washing and drowning<br>or pacifying (Processing Step 3) | 249 |
| 15B.3.2.4  | Cooking (Processing Step 4)                              | 249 |
| 15B.3.2.5  | Cooling (Processing Step 5)                              | 250 |
| 15B.3.2.6  | Sectioning (Processing Step 6)                           | 250 |
| 15B.3.2.7  | Meat extraction (Processing Step 7)                      | 252 |
| 15B.3.2.8  | Shell fragment removal/cleaning<br>(Processing Step 8)   | 252 |
| 15B.3.2.9  | Freezing (Processing Step 9)                             | 252 |
| 15B.3.2.10 | Glazing (Processing Step 10)                             | 252 |
| 15B.3.2.11 | Packaging/labelling<br>(Processing Step 11)              | 252 |
| 15B.3.2.12 | Chilled storage (Processing Step 12)                     | 252 |
| 15B.3.2.13 | Frozen storage (Processing Step 13)                      | 253 |
| 15B.3.2.14 | Packaging/labelling reception<br>(Processing Step 14)    | 253 |
| 15B.3.2.15 | Packaging/labelling storage<br>(Processing Step 15)      | 253 |
| 15B.3.2.16 | Distribution/Transportation<br>(Processing Step 16)      | 253 |

## Section 16 255

### Processing of shrimps and prawns

|        |                                                            |     |
|--------|------------------------------------------------------------|-----|
| 16.1   | Frozen shrimps and prawns. General                         | 257 |
| 16.2   | Shrimp preparation<br>(Processing Steps 15.2.1 to 15.2.18) | 258 |
| 16.2.1 | Raw fresh and frozen shrimp<br>reception (process steps)   | 258 |
| 16.2.2 | Frozen storage                                             | 260 |
| 16.2.3 | Controlled thawing                                         | 260 |
| 16.2.4 | Chilled storage                                            | 260 |

|         |                                                      |     |
|---------|------------------------------------------------------|-----|
| 16.2.5  | Selection                                            | 261 |
| 16.2.6  | Size grading                                         | 261 |
| 16.2.7  | Addition of ingredients and use<br>of additives      | 261 |
| 16.2.8  | Full and partial peeling                             | 262 |
| 16.2.9  | Deveining                                            | 262 |
| 16.2.10 | Washing                                              | 263 |
| 16.2.11 | Cooking processes                                    | 263 |
| 16.2.12 | Peeling of cooked shrimps                            | 263 |
| 16.2.13 | Cooling                                              | 264 |
| 16.2.14 | Freezing processes                                   | 264 |
| 16.2.15 | Glazing                                              | 264 |
| 16.2.16 | Weighing, packaging and labelling<br>of all products | 265 |
| 16.2.17 | Metal detection                                      | 265 |
| 16.2.18 | Frozen storage of end-product                        | 266 |

## Section 17 269

### Processing of cephalopods

|        |                                                                             |     |
|--------|-----------------------------------------------------------------------------|-----|
| 17.1   | Reception of cephalopods<br>(Processing Step 1)                             | 273 |
| 17.2   | Storage of cephalopods                                                      | 273 |
| 17.2.1 | Chilled storage<br>(Processing Steps 2 and 10)                              | 273 |
| 17.2.2 | Frozen storage<br>(Processing Steps 2 and 10)                               | 273 |
| 17.3   | Controlled thawing (Processing Step 3)                                      | 274 |
| 17.4   | Splitting, gutting and washing<br>(Processing Steps 4, 5, 6, 11, 12 and 13) | 274 |
| 17.5   | Skinning, trimming (Processing Step 7)                                      | 275 |
| 17.6   | Application of additives                                                    | 275 |
| 17.7   | Grading/packaging/labelling<br>(Processing Steps 8 and 9)                   | 275 |
| 17.8   | Freezing (Processing Step 10)                                               | 276 |
| 17.9   | Packaging, labels and ingredients.<br>Reception and storage                 | 276 |

## Section 18

### Processing of canned fish, shellfish and other aquatic invertebrates

279

|          |                                                                                            |     |
|----------|--------------------------------------------------------------------------------------------|-----|
| 18.1     | General. Addition to prerequisite programme                                                | 283 |
| 18.2     | Identification of hazards and defects                                                      | 283 |
| 18.2.1   | Hazards                                                                                    | 283 |
| A        | Biological hazards                                                                         | 283 |
| A1       | Naturally occurring marine toxins                                                          | 283 |
| A2       | Scombrotoxin                                                                               | 284 |
| A3       | Microbiological toxins                                                                     | 284 |
| B        | Chemical hazards                                                                           | 284 |
| C        | Physical hazards                                                                           | 284 |
| 18.2.2   | Defects                                                                                    | 284 |
| 18.3     | Processing operations                                                                      | 285 |
| 18.3.1   | Reception of raw material, containers, covers and packaging material and other ingredients | 285 |
| 18.3.1.1 | Fish and shellfish (Processing Step 1)                                                     | 285 |
| 18.3.1.2 | Containers, covers and packaging materials (Processing Step 1)                             | 285 |
| 18.3.1.3 | Other ingredients (Processing Step 1)                                                      | 285 |
| 18.3.2   | Storage of raw material, containers, covers and packaging materials                        | 286 |
| 18.3.2.1 | Fish and shellfish (Processing Step 2)                                                     | 286 |
| 18.3.2.2 | Containers and packaging (Processing Step 2)                                               | 286 |
| 18.3.2.3 | Other ingredients (Processing Step 2)                                                      | 286 |
| 18.3.3   | Unwrapping, unpacking (Processing Steps 3 and 4)                                           | 286 |
| 18.3.4   | Thawing (Processing Step 5)                                                                | 286 |
| 18.3.5   | Fish and shellfish preparatory processes (Processing Step 6)                               | 286 |
| 18.3.5.1 | Fish preparation (gutting, trimming, etc.)                                                 | 286 |
| 18.3.5.2 | Preparation of molluscs and crustaceans                                                    | 287 |

|            |                                                                                           |     |
|------------|-------------------------------------------------------------------------------------------|-----|
| 18.4       | Precooking and other treatments                                                           | 287 |
| 18.4.1     | Precooking                                                                                | 287 |
| 18.4.1.1   | General considerations                                                                    | 287 |
| 18.4.1.1.2 | Precooking schedule                                                                       | 288 |
| 18.4.1.1.3 | Control of quality of precooking oils and other fluids                                    | 288 |
| 18.4.1.1.4 | Cooling                                                                                   | 288 |
| 18.4.1.2   | Smoking                                                                                   | 288 |
| 18.4.1.3   | Use of brine and other dips                                                               | 288 |
| 18.4.2     | Packing in containers (filling, sealing and coding) (Processing Step 8)                   | 289 |
| 18.4.2.1   | Filling                                                                                   | 289 |
| 18.4.2.2   | Sealing                                                                                   | 290 |
| 18.4.2.3   | Coding                                                                                    | 291 |
| 18.4.3     | Handling of containers after closure – staging before heat processing (Processing Step 9) | 291 |
| 18.4.4     | Thermal processing (Processing Step 10)                                                   | 292 |
| 18.4.4.1   | Sterilization schedule                                                                    | 292 |
| 18.4.4.2   | Heat processing operation                                                                 | 292 |
| 18.4.4.3   | Monitoring of heat processing operation                                                   | 293 |
| 18.4.5     | Cooling (Processing Step 11)                                                              | 293 |
| 18.4.5.1   | Monitoring after heat processing and cooling                                              | 294 |
| 18.4.6     | Labelling, casing and storage of finished products (Processing Steps 12 and 13)           | 294 |
| 18.4.7     | Transportation of finished products (Processing Step 14)                                  | 295 |

## Section 19

### Processing of fish sauce

297

|        |                                |     |
|--------|--------------------------------|-----|
| 19.1   | Reception of raw materials     | 302 |
| 19.1.1 | Fish                           | 302 |
| 19.1.2 | Salt handling and requirements | 303 |
| 19.2   | Mixing of fish and salt        | 303 |
| 19.3   | Fermenting                     | 304 |
| 19.4   | First separation               | 304 |

|       |                                                            |     |
|-------|------------------------------------------------------------|-----|
| 19.5  | Brine preparation                                          | 304 |
| 19.6  | Succeeding extraction                                      | 305 |
| 19.7  | Separation                                                 | 305 |
| 19.8  | Blending                                                   | 305 |
| 19.9  | Filtering                                                  | 305 |
| 19.10 | Storage                                                    | 306 |
| 19.11 | Filling of containers                                      | 306 |
| 19.12 | Capping                                                    | 306 |
| 19.13 | Labelling/packaging                                        | 306 |
| 19.14 | Transportation/distribution                                | 307 |
| 19.15 | Application of fermentation aids (optional)                | 307 |
| 19.16 | Heating (optional)                                         | 307 |
| 19.17 | Ingredients and additives reception and storage (optional) | 307 |
| 19.18 | Packaging materials reception and storage                  | 308 |

## Section 20

### Processing of sturgeon caviar

311

|       |                                                                   |     |
|-------|-------------------------------------------------------------------|-----|
| 20.1  | Live fish reception (Processing Step 1)                           | 316 |
| 20.2  | Slaughter (bleeding and washing) (Processing Step 2)              | 316 |
| 20.3  | Belly cutting and ovary removal (Processing Step 3)               | 317 |
| 20.4  | Cutting ovaries into small pieces and sieving (Processing Step 4) | 317 |
| 20.5  | Laying induction (Processing Step 5)                              | 318 |
| 20.6  | Anaesthesia for large fish (Processing Step 6)                    | 318 |
| 20.7  | Microcaesarean or hand-stripping (Processing Step 7)              | 318 |
| 20.8  | Treatment of eggs by shell improving methods (Processing Step 8)  | 319 |
| 20.9  | Washing and draining the eggs (Processing Step 9)                 | 318 |
| 20.10 | Ingredients reception (Processing Step 10)                        | 320 |
| 20.11 | Ingredient storage (Processing Step 11)                           | 320 |

|       |                                                      |     |
|-------|------------------------------------------------------|-----|
| 20.12 | Packaging reception (Processing Step 12)             | 321 |
| 20.13 | Packaging storage (Processing Step 13)               | 321 |
| 20.14 | Cleaning of packaging materials (Processing Step 14) | 322 |
| 20.15 | Blending and grading (Processing Step 15)            | 322 |
| 20.16 | Extra saltwater removal (Processing Step 16)         | 323 |
| 20.17 | Caviar packaging (Processing Step 17)                | 323 |
| 20.18 | Cooling and maturation (Processing Step 18)          | 324 |
| 20.19 | Pasteurization (optional step) (Processing Step 19)  | 324 |
| 20.20 | Weighing and labelling (Processing Step 20)          | 325 |
| 20.21 | Cold storage (Processing Step 21)                    | 325 |
| 20.22 | Repackaging (Processing Step 22)                     | 325 |
| 20.23 | Transportation and distribution (Processing Step 23) | 326 |

## Section 21

### Transportation

329

|      |                                             |     |
|------|---------------------------------------------|-----|
| 21.1 | For fresh, refrigerated and frozen products | 331 |
| 21.2 | For live fish and shellfish                 | 332 |
| 21.3 | For canned fish and shellfish               | 332 |
| 21.4 | For all products                            | 332 |



---

## Section 22

### Retail

335

|        |                                                                                          |     |
|--------|------------------------------------------------------------------------------------------|-----|
| 22.1   | Reception of fish, shellfish and their products at retail. <i>General considerations</i> | 338 |
| 22.1.1 | Reception of chilled products at retail                                                  | 338 |

|        |                                                       |     |
|--------|-------------------------------------------------------|-----|
| 22.1.2 | Reception of frozen products at retail                | 338 |
| 22.1.3 | Chilled storage of products at retail                 | 339 |
| 22.1.4 | Frozen storage of products at retail                  | 339 |
| 22.1.5 | Preparation and packaging chilled products at retail  | 339 |
| 22.1.6 | Preparation and packaging of frozen seafood at retail | 340 |
| 22.1.7 | Retail display of chilled seafood                     | 340 |
| 22.1.8 | Retail display of frozen seafood                      | 341 |

---

## Annexes

### Annex I

#### Potential Hazards associated with fresh fish, shellfish and other aquatic invertebrates

|    |                                         |     |
|----|-----------------------------------------|-----|
|    |                                         | 343 |
| 1. | Examples of possible biological hazards | 345 |
| 2. | Chemical hazards                        | 348 |
| 3. | Physical hazards                        | 348 |

### Annex II

#### List of acronyms

349

| Reference  | Title                                                                                                             | Committee | Last modified | EN | FR | ES | AR | ZH | RU |
|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-----------|---------------|----|----|----|----|----|----|
| CXC 52-2003                                                                               | Code of Practice for Fish and Fishery Products                                                                    | CCFFP     | 2019          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXG 31-1999                                                                               | Guidelines for the Sensory Evaluation of Fish and Shellfish in Laboratories                                       | CCFFP     | 1999          | ✓  | ✓  | ✓  | ⊘  | ✓  | ✓  |
| CXG 48-2004                                                                               | Model Certificate for Fish and Fishery Products                                                                   | CCFFP     | 2004          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 3-1981                                                                                | Standard for Canned Salmon                                                                                        | CCFFP     | 2013          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 36-1981                                                                               | Standard for Quick Frozen Finfish, Uneviscerated and Eviscerated                                                  | CCFFP     | 2017          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 37-1991                                                                               | Standard for Canned Shrimps or Prawns                                                                             | CCFFP     | 2018          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 70-1981                                                                               | Standard for Canned Tuna and Bonito                                                                               | CCFFP     | 2018          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 90-1981                                                                               | Standard for Canned Crab Meat                                                                                     | CCFFP     | 2018          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 92-1981                                                                               | Standard for Quick Frozen Shrimps or Prawns                                                                       | CCFFP     | 2017          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 94-1981                                                                               | Standard for Canned Sardines and Sardine-Type Products                                                            | CCFFP     | 2018          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 95-1981                                                                               | Standard for Quick Frozen Lobsters                                                                                | CCFFP     | 2017          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 119-1981                                                                              | Standard for Canned Finfish                                                                                       | CCFFP     | 2018          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 165-1989                                                                              | Standard for Quick Frozen Blocks of Fish Fillets, Minced Fish Flesh and Mixtures of Fillets and Minced Fish Flesh | CCFFP     | 2017          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 166-1989                                                                              | Standard for Quick Frozen Fish Sticks (Fish Fingers), Fish Portions and Fish Fillets - Breaded or in Batter       | CCFFP     | 2017          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 167-1989                                                                              | Standard for Salted Fish and Dried Salted Fish of the Gadidae Family of Fishes                                    | CCFFP     | 2018          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 189-1993                                                                              | Standard for Dried Shark Fins                                                                                     | CCFFP     | 1993          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 190-1995                                                                              | Standard for Quick Frozen Fish Fillets                                                                            | CCFFP     | 2017          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 191-1995                                                                              | Standard for Quick Frozen Raw Squid                                                                               | CCFFP     | 1995          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| CXS 222-2001                                                                              | Standard for Crackers from Marine and Freshwater Fish, Crustaceans and Molluscan Shellfish                        | CCFFP     | 2018          | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |



|              |                                                                                                                        |       |      |        |
|--------------|------------------------------------------------------------------------------------------------------------------------|-------|------|--------|
| CXS 236-2003 | Standard for Boiled Dried Salted Anchovies                                                                             | CCFFP | 2003 | ✓✓✓✓✓✓ |
| CXS 244-2004 | Standard for Salted Atlantic Herring and Salted Sprat                                                                  | CCFFP | 2018 | ✓✓✓✓✓✓ |
| CXS 291-2010 | Standard for Sturgeon Caviar                                                                                           | CCFFP | 2018 | ✓✓✓✓✓✓ |
| CXS 292-2008 | Standard for Live and Raw Bivalve Molluscs                                                                             | CCFFP | 2015 | ✓✓✓✓✓✓ |
| CXS 302-2011 | Standard for Fish Sauce                                                                                                | CCFFP | 2018 | ✓✓✓✓✓✓ |
| CXS 311-2013 | Standard for Smoked Fish, Smoke-Flavoured Fish and Smoke-Dried Fish                                                    | CCFFP | 2018 | ✓✓✓✓✓✓ |
| CXS 312-2013 | Standard for Live Abalone and for Raw Fresh Chilled or Frozen Abalone for Direct Consumption or for further Processing | CCFFP | 2016 | ✓✓✓✓✓✓ |
| CXS 315-2014 | Standard for Fresh and Quick Frozen Raw Scallop Products                                                               | CCFFP | 2017 | ✓✓✓✓✓✓ |

# CODEX ALIMENTARIUS

INTERNATIONAL FOOD STANDARDS



Food and Agriculture  
Organization of  
the United Nations



World Health  
Organization

E-mail: [codex@fao.org](mailto:codex@fao.org) - [www.codexalimentarius.org](http://www.codexalimentarius.org)

## MAXIMUM RESIDUE LIMITS (MRLs) AND RISK MANAGEMENT RECOMMENDATIONS (RMRs) FOR RESIDUES OF VETERINARY DRUGS IN FOODS

**MAXIMUM RESIDUE LIMITS (MRLs) AND RISK MANAGEMENT RECOMMENDATIONS (RMRs)  
FOR RESIDUES OF VETERINARY DRUGS IN FOODS**

**CX/MRL 2-2021**

<https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?Ink=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252Fstandards%252FCXM%2B2%252FMRL2e.pdf>

## Index of Veterinary Drugs

This page contains an index of veterinary drugs for which MRLs or RMRs have been set by the Codex Alimentarius Commission.

Clicking on a veterinary drug takes the user to a page with details on the MRLs or the RMR of the veterinary drug, established by Codex. The page also provides information on the functional class of the veterinary drug and a link to the relevant JECFA (Joint FAO/WHO Expert Committee on Food Additives) residue monograph(s).

### A

- Abamectin
- Albendazole
- Amoxicillin
- Ampicillin
- Avilamycin
- Azaperone

### B

- Benzylpenicillin/Procaine benzylpenicillin

### C

- Carazotol

### I

- Imidocarb
- Ipronidazole
- Isometamidium
- Ivermectin

### L

- Lasalocid sodium
- Levamisole
- Lincomycin
- Lufenuron

### M

# Codex Index of veterinary drugs

Veterinary Drugs |  
CODEXALIMENTARI  
US FAO-WHO

# Amoxicillin

Functional Class: **Antimicrobial agent**

[Search JECFA](#)

Click the above link to access the relevant JECFA residue monograph(s)

[Search WHO](#)

Click the above link to access the relevant WHO evaluation

## Maximum Residue Limits for Amoxicillin

| Species |  Tissue | MRL      | Year of Adoption | Note                                                                                |
|---------|------------------------------------------------------------------------------------------|----------|------------------|-------------------------------------------------------------------------------------|
| Cattle  | Muscle                                                                                   | 50 µg/kg | 2012             |                                                                                     |
| Cattle  | Kidney                                                                                   | 50 µg/kg | 2012             |                                                                                     |
| Cattle  | Liver                                                                                    | 50 µg/kg | 2012             |                                                                                     |
| Cattle  | Milk                                                                                     | 4 µg/kg  | 2012             |                                                                                     |
| Cattle  | Fat                                                                                      | 50 µg/kg | 2012             |                                                                                     |
| Finfish | Fillet                                                                                   | 50 µg/kg | 2018             | The term finfish includes all fish species. Muscle plus skin in natural proportion. |
| Finfish | Muscle                                                                                   | 50 µg/kg | 2018             | The term finfish includes all fish species.                                         |
| Pig     | Liver                                                                                    | 50 µg/kg | 2012             |                                                                                     |
| Pig     | Kidney                                                                                   | 50 µg/kg | 2012             |                                                                                     |
| Pig     | Muscle                                                                                   | 50 µg/kg | 2012             |                                                                                     |
| Pig     | Fat/Skin                                                                                 | 50 µg/kg | 2012             |                                                                                     |
| Sheep   | Kidney                                                                                   | 50 µg/kg | 2012             |                                                                                     |
| Sheep   | Muscle                                                                                   | 50 µg/kg | 2012             |                                                                                     |
| Sheep   | Milk                                                                                     | 4 µg/kg  | 2012             |                                                                                     |
| Sheep   | Liver                                                                                    | 50 µg/kg | 2012             |                                                                                     |
| Sheep   | Fat                                                                                      | 50 µg/kg | 2012             |                                                                                     |

Veterinary Drug Detail |  
CODEXALIMENTARIUS  
FAO-WHO





## Course 1: Introduction to Codex



This series of four courses is designed to improve understanding and develop sustainable national capacities to engage in and benefit from the Codex Alimentarius Commission. This first course explains why Codex exists and why it is important, the history of the establishment of the Codex Alimentarius Commission, its mandate and legal basis, as well as the initial steps for becoming a member.



### Audience

People who need an overview of Codex, with the following profiles will benefit from taking this course:

- Codex Contact Points
- Government officials

### Audience

People who need an overview of Codex, with the following profiles will benefit from taking this course:

- Codex Contact Points
- Government officials
- Policy-makers
- Food producers
- Consumer representatives
- Codex observer organizations
- Members of the scientific community

<https://elearning.fao.org/course/view.php?name=codex-series>



Food and Agriculture  
Organization of the  
United Nations



**THANK YOU FOR YOUR  
ATTENTION**

**Esther Garrido Gamarro**

Fishery Officer

Food and Agriculture Organization of  
the United Nations