



Code of practice for fish and fishery products

Second edition



World Health
Organization



Food and Agriculture
Organization of
the United Nations

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WORLD HEALTH ORGANIZATION

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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THE CODEX ALIMENTARIUS COMMISSION

The Codex Alimentarius Commission is an intergovernmental body with over 180 members established by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO).

The **C O D E X A L I M E N T A R I U S** is the main result of the Commission's work: a set of international food standards, guidelines and codes of practice with the goal to protect the health of consumers and ensure fair practices in the food trade.

CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS

Second edition

The *Code of practice for fish and fishery products* is intended for all those engaged in the handling, production, storage, distribution, export, import and sale of fish and fishery products. The Code will help in attaining safe and wholesome products that can be sold on national or international markets and meet the requirements of the Codex Standards. All related individual standards for fish and fishery products, as well as other related specific hygiene guidance, such as the Guidelines on the Application of General Principles of Food Hygiene to the Control of Pathogenic *Vibrio* species in Seafood and the Application of General Principles of Food Hygiene to the Control of Viruses in Food (annex on Control of Hepatitis A virus (HAV) and Norovirus (NoV) in bivalve molluscs), can be found on the Codex website. The Code is a work in progress and a number of appendixes remain under development. This second printed edition contains revisions to the texts adopted by the Codex Alimentarius Commission up to 2011.

Further information on these texts, or any other aspect of the Codex Alimentarius Commission, may be obtained from:

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CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS

CAC/RCP 52-2003

INTRODUCTION

This *Code of practice for fish and fishery products* has been developed by the Codex Committee on Fish and Fishery Products from the merging of the individual codes listed in Appendix 12¹ plus a section on aquaculture and a section on frozen surimi. These codes were primarily of a technological nature offering general advice on the production, storage and handling of fish and fishery products on board fishing vessels and on shore. This Code also deals with the distribution and retail display of fish and fishery products.

This combined Code of Practice has been further modified to incorporate the Hazard Analysis Critical Control Point (HACCP) approach described in the *General principles of food hygiene* (CAC/RCP 1-1969), Annex: "Hazard Analysis and Critical Control Point (HACCP) system and guidelines for its application". A prerequisite programme is described in the Code covering technological guidelines and the essential requirements of hygiene in the production of fish, shellfish and their products that are safe for human consumption, and otherwise meets the requirements of the appropriate Codex product standards. The Code also contains guidance on the use of HACCP, which is recommended to ensure the hygienic production of fish and fishery products to meet health and safety requirements.

Within this Code, a similar systematic approach has been applied to essential quality, composition and labelling provisions of the appropriate Codex product standards. Throughout the Code, this is referred to as "defect action point (DAP) analysis". However, DAP analysis is optional.

The Codex Committee on Fish and Fishery Products recommended at its Twentieth Session that defects of a commercial nature, i.e. workmanship defects, which had been removed from Codex fish product standards, be transferred to the appropriate Codex Code of Practice for optional use between buyers and sellers during

¹ Under development.

commercial transactions. The Committee further recommended that this detail should be described in a section on Final Product Specifications, which now appear as Appendixes 2–11¹ of this document. A similar approach to HACCP has been incorporated into the Code as guidelines for the control of defects (DAP analysis).

This Code will assist all those who are engaged in the handling and production of fish and fishery products, or are concerned with their storage, distribution, export, import and sale in attaining safe and wholesome products that can be sold on national or international markets and meet the requirements of the Codex Standards (see Appendix 12¹).

How to use this Code

The aim of this Code is to provide a user-friendly document as background information and guidance for the elaboration of fish and shellfish process management systems that would incorporate good manufacturing practice (GMP) as well as the application of HACCP in countries where these, as yet, have not been developed. In addition, it could be used in the training of fishers and employees in the fish and shellfish processing industries.

The practical application of this *international* Code with regard to *national* fisheries would, therefore, require some modifications and amendments, taking into account local conditions and specific consumer requirements. Therefore, this Code is not intended to replace the advice or guidance of trained and experienced technologists regarding the complex technological and hygienic problems that might be unique to a specific geographical area or specific fishery and, in fact, is intended to be used as a supplement in such instances.

This Code is divided into separate though interrelated sections. It is intended that in order to set up an HACCP or DAP programme, these should be consulted as appropriate:

- (a) *Section 2 – Definitions* – Being acquainted with the definitions is important and will aid the overall understanding of the Code.
- (b) *Section 3 – Prerequisite programme* – Before HACCP or a similar approach can properly be applied to a process, it is important that a solid foundation of good hygienic practice exists. This section covers the groundwork that should be regarded as the minimum requirements for a facility prior to the application of hazard and defect analyses.
- (c) *Section 4 – General considerations for the handling of fresh fish, shellfish and other aquatic invertebrate* – This section provides an overall view of the potential hazards and defects that may have to be considered when building up an HACCP or DAP plan. This is not intended to be an exhaustive list but is designed to help an HACCP or DAP team to think about what hazards or defects should be considered in the fresh fish, shellfish and other aquatic invertebrates, and then it is up to the team to determine the significance of the hazard or defect in relation to the process.
- (d) *Section 5 – Hazard Analysis and Critical Control Point (HACCP) and defect action point (DAP) analysis* – Only when the groundwork in Section 3 has been completed satisfactorily should the application of the principles outlined in Section 5 be considered. This section uses an example of the processing of a canned tuna product to help illustrate how the principles of HACCP should be applied to a process.
- (e) *Sections 6 and 7 – Aquaculture production and Live and raw bivalve molluscs* – These sections deal with pre-harvest and primary production of fish, crustaceans and molluscan shellfish not caught in the wild.

Although potential hazards and potential defects are listed for most steps in Sections 6–18, it should be noted that this is only for guidance and the consideration of other hazards and/or defects may be appropriate. Also, the format in these sections has been designed for maximum “ease of use” and, therefore, the “potential hazards” or “potential defects” are listed only where they may be introduced into a product or where they are controlled, rather than repeating them at all the intervening processing steps.

In addition, it must be stressed that hazards and defects, and their subsequent control or action points, are product- and line-specific and, therefore, a full critical analysis based on Section 5 must be completed for each individual operation.

- (f) *Section 8 – Processing of fresh, frozen and minced fish* – This section forms the foundation for most of the subsequent processing sections. It deals with the major process steps in the handling of raw fish through to cold storage and gives guidance and examples on the sort of hazards and defects to expect at the various steps. This section should be used as the basis for all the other processing operations (Sections 9–16), which give additional guidance specific to the appropriate product sector.
- (g) *Sections 9–16 – Processing of specific fish and shellfish products* – Processors operating in particular sectors will need to consult the appropriate section to find additional information specific to that sector¹.
- (h) *Sections 17–18 – Transportation and Retail* cover general transportation and retail issues. Transportation and retail apply to most if not all sections for processing of specific products. They should be considered with the same care as the other processing steps¹.
- (i) Additional information will be found in the *Appendixes*¹.

SECTION 1 – SCOPE

This Code applies to the growing, harvesting, handling, production, processing, storage, transportation and retail of fish, shellfish and aquatic invertebrates and products thereof from marine and freshwater sources that are intended for human consumption.

SECTION 2 – DEFINITIONS

For the purposes of this Code:

2.1 General definitions

Biotoxins Poisonous substances naturally present in fish and fishery products or accumulated by the animals feeding on toxin-producing algae or in water containing toxins produced by such organisms.

Chilling The process of cooling fish and shellfish to a temperature approaching that of melting ice.

Clean water means water from any source where harmful microbiological contamination, substances and/or toxic plankton are not present in such quantities that may affect the safety of fish, shellfish and their products intended for human consumption.

Cleaning The removal of soil, food residues, dirt, grease or other objectionable matter.

Contaminant Any biological or chemical agent, foreign matter or other substances not intentionally added to food that may compromise food safety or suitability.

Contamination The introduction or occurrence of a contaminant in fish, shellfish and their products

Control measure Any action and activity that can be used to prevent or eliminate a food safety hazard or reduce it to an acceptable level. For the purposes of this Code, a control measure is also applied to a defect.

Corrective action Any action to be taken when the results of monitoring at the CCP indicate a loss of control. For the purposes of this Code, this also applies to a DAP.

Critical control point (CCP) A step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Critical limit A criterion that separates acceptability from unacceptability. For the purposes of this Code, this also applies to a DAP.

Decision tree A sequence of questions applied to each process step with an identified hazard to identify which process steps are CCPs. For the purposes of this Code, this also applies to a DAP.

Decomposition The deterioration of fish, shellfish and their products including texture breakdown and causing a persistent and distinct objectionable odour or flavour.

Defect A condition found in a product that fails to meet essential quality, composition and/or labelling provisions of the appropriate Codex product standards.

Defect action point (DAP) A step at which control can be applied and a quality (non-safety) defect can be prevented, eliminated or reduced to an acceptable level, or a fraud risk eliminated.

Disinfection The reduction by means of chemical agents and/or physical methods in the number of micro-organisms in the environment to a level that does not compromise food safety or suitability.

Dressed That portion of fish remaining after heading and gutting.

Facility Any premises where fish and fishery products are prepared, processed, chilled, frozen, packaged or stored. For the purposes of this Code, premises also include vessels.

Fish Any of the cold-blooded (ectothermic) aquatic vertebrates. Amphibians and aquatic reptiles are not included.

Hazard A biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect.

Hazard analysis The process of collecting and evaluating information on hazards and conditions leading to their presence in order to decide which are significant for food safety and, therefore, should be addressed in the HACCP plan.

Hazard Analysis and Critical Control Point (HACCP) A system that identifies, evaluates and controls hazards that are significant for food safety.

Microbiological contamination The presence, introduction, reintroduction, growth and/or survival of pathogens of public health concern.

Monitor The act of conducting a planned sequence of observations or measurements of control parameters to assess whether a CCP is under control. For the purposes of this Code, this also applies to a DAP.

Potable water Freshwater fit for human consumption. Standards of potability should not be lower than those contained in the latest edition of the *International Standards for Drinking-water* issued by the World Health Organization.

Prerequisite programme A programme that is required prior to the application of the HACCP system to ensure that a fish and shellfish processing facility is operating according to the Codex Principles of Food Hygiene, the appropriate Code of Practice and appropriate food safety legislation.

Raw materials Fresh and frozen fish, shellfish and/or their parts that may be utilized to produce fish and shellfish products intended for human consumption.

Refrigerated water Clean water cooled by a suitable refrigeration system.

Shelf-life The period during which the product maintains its microbiological and chemical safety and sensory qualities at a specific storage temperature. It is based on identified hazards for the product, heat or other preservation treatments, packaging method and other hurdles or inhibiting factors that may be used.

Shellfish Those species of aquatic molluscs and crustaceans that are commonly used for food.

Step A point, procedure, operation or stage in the food chain including raw materials from primary production to final consumption.

Validation Obtaining evidence that the elements of the HACCP plan are effective.

Verification The application of methods, procedures, tests and other evaluations, in addition to monitoring to determine compliance with the HACCP plan. For the purposes of this Code, this also applies to a DAP.

Whole fish (or round fish) Fish as captured, ungutted.

2.2

Aquaculture

Aquaculture The farming during part or the whole of their life cycle of all aquatic animals, except mammalian species, aquatic reptiles and amphibians, intended for human consumption, but excluding species covered in Section 7 of this Code. These aquatic animals are hereafter referred to as "fish" for ease of reference in Section 2.2 and Section 6.

Aquaculture establishment Any premises for the production of fish intended for human consumption, including the supporting inner infrastructure and surroundings under the control of the same management.

Chemicals Any substance either natural or synthetic that can affect the live fish, its pathogens, the water, equipment used for production or the land within the aquaculture establishment.

Colouring Obtaining specifically coloured feature (e.g. flesh, shell or gonad) of a targeted organism by incorporating into the fish food a natural or artificial substance or additive approved for this purpose by the agency having jurisdiction.

Diseased fish A fish on or in which pathological changes or other abnormalities that affect safety and quality are apparent.

Extensive farming Raising fish under conditions of little or incomplete control over the growing process and production conditions where their growth is dependent upon endogenously supplied nutrient inputs.

Feed additives Chemicals other than nutrients for fish that are approved for addition to their feed.

Fish farm An aquaculture production unit (either land- or water-based); usually consisting of holding facilities (tanks, ponds, raceways, cages), plant (buildings, storage, processing), service equipment and stock.

Fish feed Fodder intended for fish in aquaculture establishments, in any form and of any composition.

Good aquaculture (or good fish farming) practices Those practices of the aquaculture sector that are necessary to produce quality and safe food products conforming to food laws and regulations.

Harvesting Operations involving taking the fish from the water.

Intensive farming Raising fish under controlled growing process and production conditions where their growth is completely dependent on externally supplied fish feed.

Official agency having jurisdiction The official authority or authorities charged by the government with the control of food hygiene (sometimes referred to as the competent authority) as well as/or with sanitation in aquaculture.

Pesticide Any substance intended for preventing, destroying, attracting, repelling or controlling any pest including unwanted species of plants or animals during the production, storage, transportation, distribution and processing of food, agricultural commodities or animal feeds or which may be administered to animals for the control of ectoparasites. The term normally excludes fertilizers, plant and animal nutrients, food additives and veterinary drugs.

Pesticide residue Any specified substance in food, agricultural commodities or animal feed resulting from the use of a pesticide. The term includes any derivatives of a pesticide, such as conversion products, metabolites, reaction products, and impurities considered to be of toxicological significance.

Residues Any foreign substances, including their metabolites, that remain in fish prior to harvesting as a result of either application or accidental exposure.

Semi-intensive farming Raising fish under conditions of partial control over the growing process and production conditions where their growth is dependent upon endogenously supplied nutrient inputs and externally supplied fish feed.

Stocking density The amount of fish stocked per unit of area or volume.

Veterinary drug Any substance applied or administered to any food-producing animal, such as meat- or milk-producing animals, poultry, fish or bees, whether used for therapeutic, prophylactic or diagnostic purposes or for modification of physiological functions or behaviour.

Withdrawal time The period of time necessary between the last administration of a veterinary drug to fish, or exposure of these animals to a veterinary drug, and harvesting of them to ensure that the concentration of the veterinary drug in their edible flesh intended for human consumption complies with the maximum permitted residue limits.

2.3 Live and raw bivalve molluscs

Accepted/acceptable/approved Accepted by the official agency having jurisdiction.

Conditioning Placing live bivalve molluscs in tanks, floats or natural sites to remove sand, mud or slime and improve product acceptability.

Distribution centre Any approved onshore or offshore installation or establishment for the reception, conditioning, washing, cleaning, grading and packaging of live bivalve molluscs fit for human consumption from which the bivalve molluscs are dispatched alive.

Growing areas All brackish and marine areas approved for the production or harvesting of bivalve molluscs 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 depuration or relaying.

Heat shocking 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 to facilitate rapid removal of meat from the shell for the purpose of shucking.

Depuration The reduction of micro-organisms 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 seawater suitable for the process, which may be treated or untreated.

Depuration centre Any approved establishment for the depuration of live bivalve molluscs.

Relaying The removal of bivalve molluscs from a 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.

2.4 Fresh, frozen and minced fish

Candling Passing fillets of fish over a translucent table illuminated from below to detect parasites and other defects.

Dehydration The loss of moisture from frozen products through evaporation. This may occur if the products are not properly glazed, packaged or stored. Deep dehydration adversely affects the appearance and surface texture of the product and is commonly known as “freezer burn”.

Fillet A slice of fish of irregular size and shape removed from the carcass by cuts made parallel to the backbone.

Freezer Equipment designed for freezing fish and other food products, by quickly lowering the temperature so that after thermal stabilization the temperature in the thermal centre of the product is the same as the storage temperature.

Freezing process A process that is carried out in appropriate equipment in such a way that the range of temperature of maximum crystallization is passed quickly. The quick freezing process shall not be regarded as complete unless and until the product temperature has reached -18°C (0°F) or lower at the thermal centre after thermal stabilization.

Frozen storage facility A facility that is capable of maintaining the temperature of fish at -18°C .

Fresh fish Fish or fishery products that have received no preserving treatment other than chilling.

Frozen fish Fish that have been subjected to a freezing process sufficient to reduce the temperature of the whole product to a level low enough to preserve the inherent quality of the fish and that have been maintained at this low temperature as specified in the *Standard for quick frozen finfish, uneviscerated and eviscerated* (CODEX STAN 36-1981) during transportation, storage and distribution up to and including the time of final sale. For the purposes of this Code, the terms “frozen”, “deep frozen”, “quick frozen”, unless otherwise stated, shall be regarded as synonymous.

Glazing The application of a protective layer of ice formed at the surface of a frozen product by spraying it with, or dipping it into, clean seawater, potable water or potable water with approved additives, as appropriate.

Minced fish Comminuted flesh produced by separation from skin and bones.

Modified atmosphere packaging (MAP) Packaging in which the atmosphere surrounding the fish is different from the normal composition of air.

Separation A mechanical process for producing minced fish whereby the skin and bone are substantially removed from the flesh.

Separator A mechanical device used for separation.

Steak A section of fish removed by cutting approximately at right angles to the backbone.

2.5

Frozen surimi

Dewatering Removal of excess wash water from the minced fish flesh.

Frozen surimi The fish protein product for further processing that has been processed by heading, gutting and cleaning fresh fish, and mechanically separating the edible muscle from the skin and bone. The minced fish muscle is then washed, refined, dewatered, mixed with cryoprotective food ingredients and frozen.

Gel-forming ability The ability of surimi to form an elastic gel when fish meat is comminuted with the addition of salt and then formed and heated. This elasticity is a function possessed by myosin as the primary component of myofibrillar protein.

Myofibrillar protein A generic term for skeletal muscle proteins such as myosin and actin.

Refining A process of removing from washed meat by the use of a strainer small bones, sinews, scales and bloody flesh of such sizes as may not be mixed in a final product, thereby concentrating myofibrillar protein.

Surimi-based products A variety of products produced from surimi with addition of ingredients and flavour such as "surimi gel" and shellfish analogues.

Water-soluble components Any water-soluble proteins, organic substances and inorganic salts contained in fish meat.

Washing A process of washing away blood and water-soluble components from minced fish with cold water by the use of a rotary filter, thus increasing the level of myofibrillar proteins thereof.

Washed meat Fish meat that is washed and then drained of water.

2.6 Quick-frozen coated fish products

Batter Liquid preparation from ground cereals, spices, salt, sugar and other ingredients and/or additives for coating. Typical batter types are: non-leavened batter and leavened batter.

Breading Dry breadcrumbs or other dry preparations mainly from cereals with colourants and other ingredients used for the final coating of fishery products. Typical breading types are: free-flowing breading, coarse breading, and flour-type breading.

Coating Covering the surface of a fishery product with batter and/or breading.

Pre-frying Frying of breaded and battered fishery products in an oil bath in a way so that the core remains frozen.

Sawing Cutting (by hand or fully mechanized) of regular shapes of fish blocks into pieces suitable for later coating.

2.7 Salted and dried salted fish

Barrel A cylindrical container made of wood or plastic or other suitable food contact material with a lid for watertight closure.

Black membrane Parietal peritoneum, the pigmented lining of the abdominal cavity.

Brine Solution of salt in water.

Brine injection The process for injecting brine directly into the fish flesh.

Brining The process of placing fish in brine for a period of sufficient length for the fish tissue to absorb a specific quantity of salt.

Dry-salting The process of mixing fish with suitable food-grade salt and stacking the fish in such a manner that the resulting brine drains away.

Dun A discoloration and a development of the mould *Sporendonema epizoum*, which affects the fish surface and makes it look peppered. The fish flesh is unaffected.

Fatty fish Fish in which the main reserves of fat are in the body tissue and the fat content is more than 2 percent.

Gibbing The process of removing the gills, long gut and stomach from fatty fish, such as herring, by inserting a knife or using hands at the gills; the milt or roe and some of the pyloric caeca are left in the fish.

Lean fish (white fish) Fish in which the main reserves of fat are in the liver and less than 2 percent fat in the body tissue.

Maturing The process from salting until the fish is salt-matured.