



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

**Thirty-second Session**

**Bali, Indonesia**

**1 – 5 October 2012**

**PROPOSED DRAFT CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS (SECTION ON  
STURGEON CAVIAR)  
(At Step 3 of the Procedure)**

Prepared by the Electronic Working Group led by Iran

Governments and interested international organizations are invited to submit comments on the attached Proposed Draft Code at Step 3 (*see* Appendix II) and should do so in writing in conformity with the Uniform Procedure for the Elaboration of Codex Standards and Related Texts (*see Procedural Manual of the Codex Alimentarius Commission*) to: the Secretariat, Codex Alimentarius Commission, Joint WHO/FAO Food Standards Programme, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy, by email [codex@fao.org](mailto:codex@fao.org) or fax: +39-06-5705-4593 with a copy to Codex Contact Point, Norwegian Food Control Authority, P.O. Box 8187 Dep. 0034 Oslo, Norway, Email: [ccffp@mattilsynet.no](mailto:ccffp@mattilsynet.no), by **31 August 2012**.

**Format for submitting comments:** In order to facilitate the compilation of comments and prepare a more useful comments document, Members and Observers, which are not yet doing so, are requested to provide their comments in the format outlined in the Annex to this document.

## BACKGROUND

1. During the 31st session of the Codex Committee on Fish and Fishery Products, the Committee agreed to a proposal for new work on a Code of Practice for Sturgeon Caviar for inclusion in the Code of Practice for Fish and Fishery products (CAC/RCP 52-2003). The Committee further agreed to establish an electronic Working Group led by Iran and working in English, to prepare the proposed draft section on sturgeon caviar in the Code of Practice for Fish and Fishery Products (REP11/FFP, paragraph 178).
2. The 34<sup>th</sup> Session of the Commission approved this new work (REP11/CAC, paragraph 131 and Appendix VI).
3. In October, 2011, Iran submitted an invitation to participate in the electronic Working Group (eWG) to all Codex Members and Observers to express interest in participation in the eWG by 1 November 2011. This invitation contained the terms of reference of the eWG, a general outline of the work of the eWG, and the expected outcome of the work, namely a proposed draft Code of Practice for Sturgeon Caviar for inclusion in the Code of Practice for Fish and Fishery Products.

### The Electronic Working Group

4. In reply to the invitation, nine members and 1 observer expressed interest in participation in the eWG: Germany, Canada, Kenya, Italy, Japan, France, Poland, Argentina, Norway, the European Union and FAO. The list of participants is included in Appendix I.
5. A proposal for Code of Practice for Sturgeon Caviar was prepared by Iran and circulated for comments within the eWG. Two rounds of comments were called for. Comments were received from the

following members of the eWG : Japan, Germany, France, Italy, Canada and Norway. The proposed draft is presented in Appendix II.

### **Key issues that were taken into account in the development of the proposed draft Code of Practice**

#### 6. New Definitions

- General consideration about caviar background, sanitary controls within processing steps and use of appropriate combination of preservation techniques.
- preparing an example of a flow diagram of caviar processing regarding farmed and marine origin sturgeon fish.
- Identifying potential hazards and defects for each step and the elaboration of technical guidance in this regard.

7. The aforesaid draft was forwarded to each working group country member and during the first round, some revisions were made according to their comments, including: writing-structure, merging some clauses and removing repetitive identical sections as well as corrections to the flow diagram and further step analysis resulted from that.

8. The revised draft was forwarded for a second time to all working group members.

9. During the second round most of the comments were on the nature of the potential hazards and defects as well as the anticipated solutions to prevent them. Those comments were taken into account and the COP revised again.

10. Meanwhile there were some disagreements among members during discussions.

11. On the following key issues, the working group could not reach an agreement as follows:

- a. Inefficiency of considered techniques in the COP for elimination of some pathogenic microorganisms.

Justification: in accordance with Iran's views, with applying combination of preservation techniques such as ;salting, air exhausting, proper cold chain, using allowed preservatives, personal hygiene and sanitation regulation, it is highly possible to avoid cross contamination and risk of microbial growth. Laboratory records and documents also verify this claim.

- b. Widening the Scope of the COP (applying to any fish roes other species than *Acipenseridae* family).

Justification: This COP was prepared just for "standard for sturgeon caviar" (CODEX STAN 291-2010)

- c. Adding "reconditioning" or "repacking" step to the flow diagram.

Justification: Since repackaging is not obligatory and it is identical to the packing step, it was not re-inserted in flow diagram.

- d. Inappropriate applied ambient (working space) temperature for processing of caviar.

Justification: the processing time (from removal of ovary from fish to refrigeration or cold storage) is too short. (Max 10 min)

- e. Refrigeration step could be deleted.

Justification: According importance of salt distribution and absorption by caviar, keeping caviar in refrigerator temperature (0-4 °C) prior to cold storage, is necessary and this step is a key process step.

### **RECOMMENDATION**

12. The Working Groups recommends that the Committee consider the Proposed Draft of "Code of Practice for Sturgeon Caviar". (*see* Appendix II).

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## Appendix II

**PROPOSED DRAFT CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS  
(SECTION ON STURGEON CAVIAR)****(At Step 3 of the Procedure)****Definitions**

**Fish eggs:** Non-ovulated eggs separated from the connective tissue of ovaries. Ovulated eggs may be used from aquacultured sturgeons.

**Caviar:** The product made from fish eggs of the *Acipenseridae* family by treating with food grade salt.

**Foreign matters:** Any matter not derived from caviar and readily recognizable without magnification, or present at a level determined by any method including magnification that indicates non compliance with standards and rules.

**Extra pure food grade salt:** Food grade salt which contain at least 99% sodium chloride in dry weight.

**Maturing:** The process from salting until the caviar is stable in its salt content.

**Pasteurization:** Subjecting caviar grains to heat for a time and at a temperature, which inactivates spoilage and non- spore forming pathogenic micro-organisms of public health concern.

**Micro-caesarean:** The delivery of fish eggs by micro surgical incision through the abdominal wall and ovary.

**Air exhausting:** Removing the air in a appropriate manner from caviar packs to prevent aerobic microorganism growth and reducing of fat oxidation during storage (shelf life extending). •

**General considerations:**

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

This section applies to caviar production from sturgeon fish with its traditional and uncomplicated practices which have never been mechanized due to simplicity and raw material stocks shortening. Therefore using advanced complex machinery has been less popular for caviar production.

Physicochemical properties of caviar causes to classify this food as a highly perishable. Most of processing procedures also are performed manually which increase the risk of contamination. Additionally, lack of microorganism removal step to ensure safety of final product, (e.g. thermal processing) made remaining microbial contaminants risk in the final products drastically probable. However, minimal processing (non-thermal processing) and using of combination of preservation techniques may guarantee the caviar safety as well as fresh and natural characteristics. As a result, sanitary controls within processing steps and using of appropriate combination techniques are essential.

Potential hazards and defects of the process are identified in this code of practice, however in order to avoid repetitions, major defects and additional prerequisites programs are listed below:

Microbial hazards: ovaries remain sterile as long as they are located in the belly cavity. Any pathogenic or none-pathogenic contamination may occur through contact with hands, equipment and utensils, air, water, additives, fish skin and guts. Therefore good hygienic practices according to section 3 of CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS (CAC/RCP 52-2003) and regular monitoring are very important. Time temperature control, (shortest possible processing time under cold chain condition) and rapid transfer to cold area will reduce risk of microbial growth and toxin production.

Chemical hazards: water characteristics such as heavy metals, pesticides and oil derivatives, feed and residues are critical in case of farmed fish. Technical guidelines mentioned in section 6 followed by withdrawal time for eggs injected with hormones should be considered. Sea water in harvest area (in case of marine fish) should not be in excess of recommended guidelines pollutants including heavy metals , pesticides , oil derivatives and be monitored via a regular schedule.

Risk of pollutants transfer from water that used for fish eggs washing and other process steps, is another potential chemical hazard. Clean potable water shall be used for this purpose. Probable contaminants in salt and other additives also may cause chemical hazards.

Physical hazards: No purification process is applied for caviar processing for physical hazards so verification, monitoring, and removal of physical hazards such as tough fish body segments, glass and metal inclusion (from knives and metal particles from cans) is necessary.

Defects: potential defects could be classified in 3 categories:

1- Development of microbial and chemical decomposition due to temperature abuse during caviar production process, handling and storage. This can be prevented by controlling time and temperature.

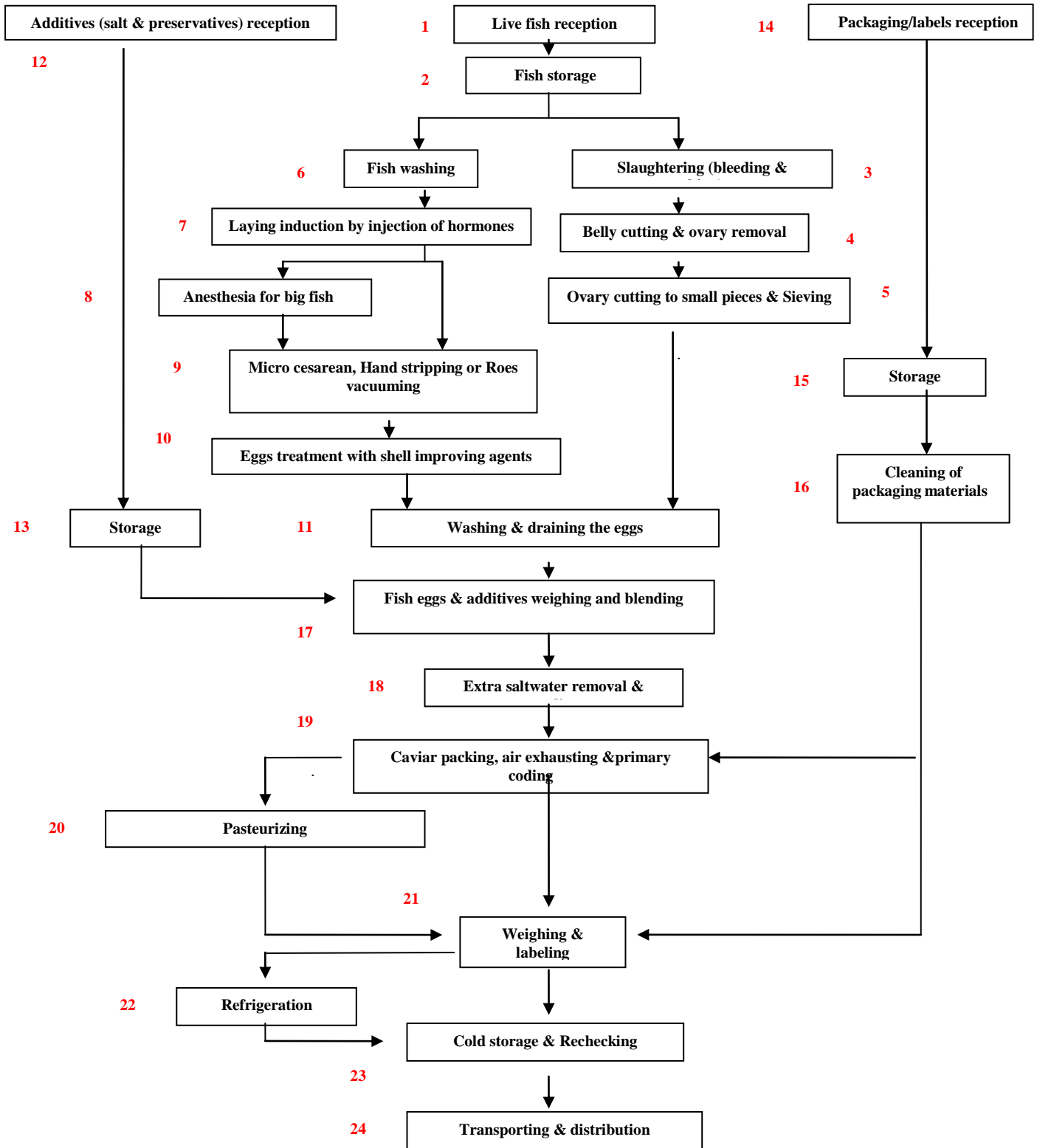
2- Fat tissues, ovarian shells and blood clots in caviar, could be avoided by proper bleeding, careful sieving and ovarian washing.

3- A number of factors can produce physicochemical and sensory properties changes; for example eggs breaking, shell loosening, consistency reduction or intensification as a result of overpressure on caviar grains and temperature abuse. Impure salt or additives. Dust and smoke, and aromatics in detergents or disinfecting agents can be absorbed by caviar and affect flavour and taste.

The example of the flow diagram (Figure x.1) will provide guidance to some of the common steps involved caviar processing.

**Figure x.1 Sample of flow diagram for caviar production**

*This flow chart is for illustrative purposes only. For in-factory HACCP implementation a complete and comprehensive flow chart has to be drawn up for each process. References correspond to relevant Sections of the Code*



## **X.1 Live fish reception**

**Potential Hazards:** Microbiological and chemical contamination (e.g. oil pollutants, heavy metals, pesticides, drugs residue)

**Potential defects:** Decomposition, physically damage, discoloration

### **Technical guidance:**

- Farmed or captured fish should be harvested from authorized areas which are compatible to codex requirements mentioned in section 6-1-2 (CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS (CAC/RCP 52-2003)).
- Fish handling should be undertaken in a manner to avoid from direct sunlight and contaminants.
- Fish should be transported to processing plant as soon as possible, alive with minimum stress and physical damages.
- In case of dead fish, sensory evaluation charts and tables should be accessible at fish reception sites according to section 8.1.1.1 (CODEX CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS (CAC/RCP 52-2003)) and the person who receives the fish should take maximum care to consider them and non compatible fish should be rejected.
- Training should be provided to person(s) who harvest or handle fish from landing points to processing plants.
- The person, who receives fish, should be trained and his/her competence should be approved.
- All documents related to health status of farmed fish such as veterinary drug or medicated feed dosage and period of treatment as well as feed composition should be reviewed at the reception points. For example it should be ensured that fish passed withdrawal time.
- To facilitate traceability/product tracing of the fish, record keeping system should be in place including a name and address of the farm sites (in case of farmed fish).

## **X.2 Fish storage**

**Potential Hazards:** Microbiological and chemical contamination (detergents and disinfecting agents)

**Potential defects:** Early fish mortality and following decomposition, off flavour and off-odour, physical and chemical changes due to damages or stress

### **Technical guidance:**

- In order to prevent fish mortality and reduce stress to minimum levels, fish should be rapidly prepared to ovary removal or kept alive in oxygenated water.
- In case of keeping fish alive, water conditions should be suitable and do not affect fish roe negatively (water filtration and replacement).
- If fish is kept out of water, the period of time should be short and the places used for this purpose should be clean, to reduce stress and potential contamination to minimum levels.
- Stunning is the best method for stress reduction after fish harvest.
- Various methods are used to make farmed or sea sturgeon fishes to keep them alive and reduce stress and struggle during eggs extraction.
- In case of using electric shock, it should be done by skilled person with allowed voltage to minimize stress to fish and physical damage to eggs.
- For preventing any physical damages especially to the belly area, maximum care should be taken during fish handling.
- In case of dead fish, time/temperature conditions should be adjusted in way that precludes fish eggs decomposition. (Storage in chilled water)
- Refer to sections 6.1 and 6.2 and 6.3 (CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS (CAC/RCP 52-2003)).

### **X.3 Slaughtering (bleeding and washing)**

**Potential hazards:** Microbiological contamination

**Potential defects:** Blood remaining in fish organs

**Technical guidance:**

- After stunning and killing by appropriate methods the fish should be bled, to prevent blood dispersion in caviar. Bleeding also causes fish weakness and results in struggle and stress reduction.
- Fish should be bled by cutting gills in both sides or by cutting the tail.
- Bleeding process should be fully completed.
- After bleeding completion, fish should be brushed with potable water to clean all residual blood leftover from surface and reduce the risk of caviar contamination.
- Suitable facilities for waste disposal should be available in bleeding site.

### **X.4 Belly cutting and ovary removal**

**Potential hazards:** Microbiological and physical contamination (tough fish body segments)

**Potential defects:** Physical damages to eggs, off flavour, off odour, decomposition, parasites

**Technical guidance:**

- Prior to cutting, belly part (around cutting area) should be fully brushed with potable water to remove all foreign matters (sands and blood marks) and reduce skin's microbial load and chemical contamination as well.
- All equipments/utensils used while cutting the belly, such as tables, knives, ovary transfer and store bowls should be cleaned and disinfected.
- Hand washing and disinfection agents should not affect on the flavour and odour of caviar.
- Belly cutting should be done by trained and skilled personnel to preclude any contamination with viscera and any damage to caviar.
- Personal hygiene requirements during process, such as hand washing and disinfection and prerequisite programs as mentioned in CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS (CAC/RCP 52-2003) section 3, are required.
- Dust and smoke in processing area will lead to flavour and odour change and should be avoided.
- All utensils which are in contact with fish eggs should not be used for other purposes and carefully cleaned, disinfected and stored in proper place.
- Knives that used for belly cutting should be distinct from those used for ovary cutting.
- Belly cutting should be done from gills to anus to avoid cutting the guts..

### **X.5 Ovary cutting to small pieces and sieving**

**Potential hazards:** Microbiological contamination

**Potential defects:** Eggs physical damages, off flavour and off odour

**Technical guidance:**

- Prior to cutting to small pieces, ovaries may place in cool potable water to improve ovarian consistency.
- To prevent microbial contamination:
- all caviar processing steps should be performed within areas set apart from belly cutting and gutting areas. (Clean and dirt area separation).
- all utensils and working surfaces should be cleaned and disinfected.
- all staff should wash and disinfect their hands regularly before and during process (if contaminated).
- staff should be trained and have appropriate experience in cutting and sieving.
- sieve should be washable and made from suitable material. Mesh sizes should be matching with egg sizes. Ovaries should be cut into small pieces to improve sieving process and reduce friction among eggs.



- Sieving should be performed in a manner that reduces damages to ovaries texture to least possible amount. Ovary shells and foreign additional matters should be separated (fat and blood).
- Process time and temperature should be monitored to minimize risk of microbial growth.

### **X.6 Fish Washing**

**Potential hazards:** Physical (sands) and chemical contamination

**Potential defects:** Physical damages

**Technical guidance:**

- In order to clean fish exterior and reduce microbial load, fish should be brushed and rinsed with clean water.
- Fish should be brushed with potable water to clean all residual blood leftover from surface and reduce caviar contamination risk to minimum levels.
- Suitable facilities for waste disposal should be available in bleeding site.

### **X.7 Laying induction by injection of hormones**

**Potential hazards:** Residues of veterinary drug

**Potential defects:** Flavour and odour change, quality worsening

**Technical guidance:**

- Fish could be injected 1 to 3 times and once the female release the eggs she is asleep for large fish (otherwise they are impossible to handle and can be injured).
- It should be mentioned that the waiting time between the injection of hormone and the human consumption of caviar must be respected: there should not be residuals of hormones in caviar.

### **X.8 Anaesthesia for big fish**

**Potential hazards:** Residues of veterinary drug

**Potential defects:** Eggs physical damages, flavour and odour change, quality worsening

**Technical guidance:**

- Various methods are used to keep farmed or wild sturgeon fishes alive and reduce stress and struggle during eggs extraction.
- In case of using electric shock, it should be done by skilled personnel with allowed voltage to minimize stress to fish and physical damage to eggs.
- In case of using drugs, dosage and treatment time should be applied in accordance with fish size and manufacturer's instructions and must be approved by the competent authority and the waiting time between application and harvest for human consumption must be respected.
- Refer to section 6.3.2 (CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS (CAC/RCP 52-2003)).

### **X.9 Micro caesarean, hand stripping or eggs vacuuming**

**Potential hazards:** Microbiological contamination

**Potential defects:** Physical damages of eggs, foreign matters

**Technical guidance:**

- Micro-caesarean method is used to remove the eggs from the sturgeon fish belly cavity without slaughter.
- Micro-caesarean is done by making a small cut in mature female fish belly and eggs extracted manually or by vacuum pump.
- Prior to cutting, belly area should be appropriately brushed and washed with potable water to remove all foreign matters (sands and blood) and reduce microbial load and chemical contaminations.

- All equipments/utensils, working tables, transfer and storing bowls should be cleaned and disinfected.
- Belly-cutting should be done by trained, skilful person to minimize contamination with fish guts and faecal matter and reduce physical damage to ovaries.

#### **X.10: Eggs treatment with shell improving agents**

**Potential hazards:** Chemical contamination (e.g. unpermitted agents), drug residue

**Potential defects:** Eggs texture damages, flavour and odour change, quality loss of caviar

**Technical guidance:**

- For farmed fishes treated with hormonal releasing factors via the pituitary gland to induce ovulation of eggs into the belly cavity, shell improving agents may be applied to prevent adhesiveness and enhance consistency of grains.
- Any texture improving agents should be approved by competent authority and also in compliance with requirements mentioned in Section 4 of CODEX STAN 291-2010.

#### **X.11 : Washing and draining the eggs**

**Potential hazards:** Microbiological and chemical contamination

**Potential defects:** Foreign matters, loss of eggs consistency, off flavour and off odour

**Technical guidance:**

- Water that is used for fish eggs washing should be potable.
- Any type of foreign matters in water used for washing may transfer to caviar.
- Cold water should be used for washing to prevent loss of fish eggs texture consistency.
- Water used for washing should be free of any off odour and taste (remained chlorine, manganese and magnesium or other metal elements that produce flavour and odour).
- Washing should be fully performed to make eggs free from any foreign matters inclusion.
- Draining process should be performed by using sieves to avoid water remaining in fish eggs which may affect weighting process.

#### **X.12 Additive reception (salt and preservatives)**

**Potential hazards:** Microbiological, chemical and physical contamination (impurities), unpermitted additives

**Potential defects:** Improper chemical compounds, quality loss, foreign matters inclusion

**Technical guidance:**

- Salt that used for caviar processing should be extra pure food grade salt (sodium chloride with 99.9% of purity) with minimum impurities such as Magnesium and Calcium. These elements affect taste of the caviar and as well as sodium chloride penetration to caviar grains.
- Sea salts may contain bacteria and halophylic moulds and may lead to caviar decomposition therefore should not be used.
- Salt and permitted additives should be provided by reliable suppliers and documents of chemical ingredients should be also received.
- Salt and permitted additives should be checked visually for foreign matters and chemical pollutants.
- Granule size of salt crystals and additives should be tiny to prevent any damages to caviar eggs and should be rapidly absorbed.
- Additives should be in compliance with requirements mentioned in Section 4 of The Standard for Sturgeon Caviar (CODEX STAN 291-2010).

### **X.13 Additives storage**

**Potential hazards:** Microbiological, chemical and physical contamination

**Potential defects:** Loss of effectiveness, moisture absorption, dust and foreign matters.

**Technical guidance:**

- Refer to section 8.5.2 (CODEX CODE OF PRACTICE FOR FISH AND FISHERY PEODUCTS(CAC/RCP 52-2003)).
- Salt and additives should be packed and kept away from chemical pollutants and foreign matters such as dust that may affect safety, odour and other sensory characteristics.
- Suitable procedures should be taken to avoid exposure of additives to insects and pests.
- Storage area and packing materials used for additives and salt should have requirements mentioned in section 3 (CODEX CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS (CAC/RCP 52-2003)).
- All stored additives and salt should be kept with labels showing name, date of expiry and storage requirements.

### **X.14 Reception of packing materials and labels**

**Potential hazards:** Microbiological, chemical and physical contamination

**Potential defects:** Improper quality of packing materials (material, epoxy coating, construction, sealing, corrosion).label misleading information, contaminated packing materials, foreign matter inclusion.

**Technical guidelines:**

- All packing materials such as metal or plastic cans, glass jars and rubber bands should be resistant against components of caviar especially salt and additives and able to preserve the product during its shelf life without any quality loss.
- At reception point, all packing materials should be checked and recorded by trained and skilful personnel for quality and sanitary specifications.
- Any non-compliant items should be returned and all corrective measures recorded.
- Product labels should be made from allowable and resistant material and contain necessary information.
- Correctness and exactness of information on labels should be checked.
- Empty cans/jars and labels should be received within wholesome resistant and portable packages.
- Packing materials and labels should be supplied by recognized suppliers accompanying with related documents and handling condition should be reviewed for sanitary aspects.

### **X.15 Labels and packing materials storage**

**Potential hazards:** Microbiological, chemical and physical contamination

**Potential defects:** Loss of quality properties, physical damage, foreign matter inclusion

**Technical guidance:**

- Refer to section 8.5.2 (CODEX CODE OF PRACTICE FOR FISH AND FISHERY PEODUCTS(CAC/RCP 52-2003)).
- Packing materials and labels should be stored in dry and clean area to avoid any chemical and microbial contamination.
- Storage area should be free of dust, insects and pests.
- Trained and skilled personnel should periodically monitor aforesaid procedures and records should be kept.

### **X.16 Cleaning of packaging materials**

**Potential hazards:** Microbiological, chemical and physical contamination

**Potential defects:** Can/jars damages

**Technical guidance:**

- Producer should be ensure about cleanliness and safety of packaging materials prior to use, to minimize cross contamination to caviar.
- Cleaning and disinfection may be performed outside of the processing plant. Controls should be done at the reception step and related records should be checked.
- Cleaning and disinfection step should be done by trained and skilled workers with clean water and permitted detergents. It is possible to carry out this process by other methods, if there is not risk of damage to material and approved by competent authorities.
- Prior to use, cans/jars should be checked for cleanness and quality characteristics such as fracture, epoxy coating, sealing and tin layer.

### **X.17 Fish eggs and additives weighting and blending**

**Potential hazards:** Microbiological and physical contamination (e.g. glass and metal inclusion)

**Potential defects:** Spoilage microbial growth, foreign matters, flavour and odour change, additive abuse

**Technical guidance:**

- Weight scale should be periodically calibrated.
- Precise eggs and additives weighting to ensure maximum efficiency of additives.
- Use allowed additives in compliance with General Standard for Food Additives (CODEX STAN 192 -1995) and importing country requirements.
- All additives should be free from hazardous glass, chemical pollutants or foreign matters.
- Additives should be used in accordance with eggs weight.
- Salt should be extra pure food grade in way that its impurities do not affect flavour and aroma of caviar.
- To prevent growth of non-proteolytic of *Clostridium botulinum*, amount of used salt should be 3-5% in final product (at least 5% of water phase of caviar). The amount, type and weight of additives may change regarding regulations and customer specifications.
- Additives should be completely and uniformly blended with caviar.
- Ambient temperature (work space) and moisture should be set so that it does not affect the homogeneous distribution of additives and also does not cause microbial growth (proper temperature is lower than 15°C).
- Using any additives to improve taste and colour of tainted or inedible eggs is prohibited.
- Grading and blending should be done by trained and experienced personnel.
- The process of caviar maturing in salt lasts up to 48 hours.

### **X.18 Extra saltwater removal and grading**

**Potential hazards:** Microbiological contamination

**Potential defects:** Quality loss of caviar grains because of improper saltwater removal, improper grading

**Technical guidance:**

- Utensils and surface of all equipment should be clean and disinfected.
- Extra Saltwater removal procedure (sieving) should be done in a manner that does not affect the quality of caviar.
- Extra saltwater removal process should be performed by trained and experienced personnel.
- Grading process should be performed by trained and skilled personnel.
- To minimize possibility of any microbial growth during extra saltwater removal (sieving), the ambient temperature should be set cold (lower than 15 °C).

### **X.19 Caviar packing, air exhausting and primary coding**

**Potential hazards:** Microbiological contamination,

**Potential defects:** Caviar taste and flavour changes due to improper exhausting, Moulds and yeasts growth, physical damages to caviar eggs due to overfilling , caviar taste and flavour changes and discoloration due to corrosion of epoxy coatings, traceability may not be done due to improper coding

**Technical guidance:**

- All packaging materials should be checked prior to use to ensure that they are uncontaminated and free from any physical damages. These materials should be dry, consistent and persistent against environmental conditions.
- Caviar should be filled in proper cans with high tolerated epoxy coating against salt and preservatives.
- Caviar should be filled regarding capacity of cans/jars to preclude from air existence or over pressure on caviar grains.
- Exhausting and sealing of cans or jars should be performed by trained and skilled personnel to ensure that air fully left from cans/jars to prevent growth of aerobic bacteria , moulds , yeasts and fat oxidation as well.
- During exhaust process, amount of salt water way out of cans/jars, should be cleaned from cans with proper matter.
- Regarding weight pressure of caviar cans, saltwater will leave cans during cold storage and should be continuously cleaned from cans.(Except of pasteurized jars).
- Sealing sufficiency of final products should be monitored and checked by skilled and trained personnel.
- To minimize possibility of any microbial growth, the ambient temperature should be set cold (lower than 15 °C).
- Primary coding should be set for all cans/jars to ease traceability/product tracing.

### **X.20 Pasteurization**

**Potential hazards:** Pathogenic microbiological contamination

**Potential defects:** Taste and flavour change, hardening of caviar grains

**Technical guidance:**

- Pasteurization process is applied to eliminate non spore forming pathogenic bacteria and reduce microbial load as well as to extend shelf life of caviar in cool temperature and to reduce need for preservatives
- Pasteurization process changes taste and texture of caviar through proteins denaturizing.
- Pasteurization process should be performed and monitored by trained and skilled personnel to ensure process precision and efficiency of pasteurization equipment.
- Pasteurization process should be applied on hermetically sealed cans/jars to preclude cross contamination.
- Caviar cans/jars should be cooled to cold temperature (0°C to 4°C) immediately after pasteurization to prevent growth and toxin production of spore forming microorganisms.
- Pasteurization time and temperature should be determined in relation to cans/jars volume, shape and material, as well as weight of caviar in cans and type of pasteurization equipment used for process to ensure required temperature applied on caviar during suitable time.
- All thermal equipment and monitoring devices should be regularly checked and calibrated based on a schedule to ensure that work accurately and competently.

### **X.21 Weighing and labelling**

**Potential hazards:** unlikely

**Potential defects:** Incorrect labelling

**Technical guidance:**

- Information printed on the labels should be in compliance with General Standard for the Labelling of Pre-Packed Foods (CODEX STAN 1-1985) and The Standard for Sturgeon Caviar (CODEX STAN 291-2010).
- Caviar cans/jars should not be described or presented on any label or in any labelling in manner that is false or misleading consumers.
- In case of information change, the rationale and the justifications should be provided.

### **X.22 Refrigeration**

**Potential hazards:** Microbiological contamination pathogenic microbial growth

**Potential defects:** Decomposition, quality loss

**Technical guidance:**

- Caviar cans should be stored in an appropriate manner before cold storage (for example in refrigerator; 2-4 °C for 24 hours) upon packaging to facilitate salt absorption and maturation, equal salt distribution in caviar, giving enough time for saltwater exit(maturing) and also minimize microbial growth.
- Time/ temperature of refrigerator should be frequently monitored and recorded.
- Refrigerator should be clean and regularly cleaned and disinfected by sanitation schedule.
- Refrigerator should be equipped with thermometer and thermograph to frequently record and monitor caviar temperature.
- Refrigeration (cooling) systems, thermometers and thermographs, should be frequently checked and calibrated to ensure accuracy and efficiency.
- To avoid cross contamination, any other food stuff should not be stored together with caviar cans/jars.
- After maturing, caviar packed in cans, should be sealed by rubber strips or any other packing or repacking manners and transferred to cold storage (0°C to -4°C).
- In case of pasteurized caviar or fresh vacuumed caviar (jars and tins), the packs could be transfer directly to cold storage (0°C to -4°C).

### **X.23 Cold storage and Caviar recheck**

**Potential hazards:** Pathogenic microbiological growth

**Potential defects:** Freezing or decomposition due to temperature rise or fall, sensory characteristics change due to long period storage.

**Technical guidance:**

- Caviar should be storage in an appropriate temperature (e.g. -2 °C for caviar with 3-5% salt (acceptable deviation is 0°C to -4°C)).
- Care should be taken to avoid temperatures below -5°C which will cause freezing and quality loss.
- Caviar cold storage room should be cleaned and disinfected based on a permanent cleaning and disinfection schedule.
- The chilled storage facility should have a temperature monitoring device and a preferably a continuous recording unit to monitor and record ambient temperatures properly.
- Temperature monitoring system should be supplied with an alarm to alert any fluctuations from allowed limits.
- All time/temperature monitoring and record systems should be calibrated regularly through a permanent schedule to ensure accurate and precise performance.
- Air existence in caviar cans should be periodically checked and any defected items should be re-exhausted.

**X.24 Transporting and distribution**

**Potential hazards:** Pathogenic microbiological growth

**Potential defects:** Decomposition, physical damages to caviar cans/jars

**Technical guidance:**

- Refer to Section 17.
- Handling and vehicle conditions should be proper to prevent any physical damages to caviar cans.
- Caviar temperature should be monitored prior to loading to make sure the temperature is between 0°C to -4 °C.
- Temperature of vehicle storage cabin should be set 0°C to -4°C during loading and transporting time.
- Temperature of caviar cans/jars should be controlled to avoid temperature rising through loading.
- Products should be arranged in storage cabin in a way that cool air may easily circulate around cans and prevent physical damages.
- Product storage cabin should be completely insulated and clean. It should be cleaned and disinfected according to a regular sanitation schedule.
- Storage room should be equipped with thermometer and thermo recorder to frequently record and monitor caviar temperature.
- Other food stuff should not be kept and handled with caviar cans to avoid cross contamination.
- Driver should be received essential trainings for handling caviar in determined temperature condition.
- Handling should be done by trained, skilful personnel.

**Annex****GENERAL GUIDANCE FOR THE PROVISION OF COMMENTS**

In order to facilitate the compilation and prepare a more useful comments' document, Members and Observers, which are not yet doing so, are requested to provide their comments under the following headings:

- (i) General Comments
- (ii) Specific Comments

Specific comments should include a reference to the relevant section and/or paragraph of the document that the comments refer to.

When changes are proposed to specific paragraphs, Members and Observers are requested to provide their proposal for amendments accompanied by the related rationale. New texts should be presented in underlined/bold font and deletion in ~~striketrough font~~.

In order to facilitate the work of the Secretariats to compile comments, Members and Observers are requested to refrain from using colour font/shading as documents are printed in black and white and from using track change mode, which might be lost when comments are copied/pasted into a consolidated document.

In order to reduce the translation work and save paper, Members and Observers are requested not to reproduce the complete document but only those parts of the texts for which any change and/or amendments is proposed.