



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

Thirty-fourth Session

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19 – 24 October 2015

**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 with a copy to Codex Contact Point, Norwegian Food Control Authority, P.O. Box 8187 Dep. 0034 Oslo, Norway, Email: ccffp@mattilsynet.no, **by 1 June 2015**.

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. At the 33rd session of the CCFFP (REP 14/FFP) the Proposed Draft Code of Practice for Fish and Fishery Products (section on sturgeon caviar) (CX/FFP 14/33/9) was discussed. In view of the comments made and the need for further information and due to time constraints, the Committee agreed to return the Proposed Draft CoP to Step 2/3 for re-drafting. It was decided that for this purpose an eWG should be established chaired by Iran to redraft the document on the basis of the comments made in writing and at the session, incorporating the decisions made at the session, for comments at Step 3. The comments would be considered in a physical working group to be held prior to the next session, led by Iran and working in English, French and Spanish in order to facilitate the discussion in the plenary.
2. Regarding different views in the working group as to whether caviar production from ovulated fish eggs and related processing steps should be allowed in the code. The Chairperson recalled that the Standard adopted in 2010 included caviar production through various techniques, including hormonal induction, and that the Code should be consistent with the Standard and provide guidance to ensure compliance with its provisions. The Committee agreed with this approach.

Conduct of the Electronic Working Group (eWG)

3. In 20 May 2014 the Codex Contact Point of Iran distributed an invitation and proposed working schedule to participate in the eWG in order to prepare the Proposed Draft Code of Practice for Fish and Fishery Products (section on sturgeon caviar). The following countries announced their interest: Canada, Croatia, Ecuador, European Union, France, Germany, India, Italy, Japan, Korea, Nigeria, Norway, Poland, Russian Federation, Spain, Thailand and USA.
4. A complete list of participants is included in Appendix I.

Circulation of the first draft

5. On 16 June 2014, the Proposed Draft Code of Practice for Fish and Fishery Products (section on sturgeon caviar) was redrafted and circulated by Iran as a first draft to the eWG members, taking into account all decision made by the 33rd session of the Committee and also other submitted written comments.

6. Comments received from 10 countries (Canada, Croatia, France, Germany, India, Japan, Norway, Poland, Spain, and USA) in addition to EU and these comments were the basis for second draft.
7. According to comments cited by the majority of eWG members, the drafted COP was amended as follows:
 - Definition section was removed, because the terms of fish eggs and caviar have been previously defined in the Standard and the other terms were clear enough.
 - Unnecessary and very specific information removed from general consideration.
 - Sections X.1 and X.2 (fish storage) merged together because of simplifying the flow diagram.
 - X.18 section moved to appropriate position in the chart, because caviar should be matured before pasteurizing.
 - Some titles and technical guidance were changed.

Circulation of the second draft

8. According to the received comments, COP for sturgeon caviar was redrafted and circulated for eWG members as a second draft in 13 October 2014.
9. Comments were received from 7 countries (Canada, France, Germany, India, Japan, Norway and USA) in addition to the EU and these comments were the basis for the third draft.
10. One eWG member emphasized that further information on the scope was needed to avoid confusion by firms and regulatory authorities. Another member suggested to use potable or clean water throughout the draft for consistency and according to the Code of Practice for Fish and Fishery Products both potable water and clean water can be used for production, storage and handling of fish and fishery products. Some members submitted suggestions to amend some technical guidance that may mislead the users.

Circulation of the third and fourth draft

11. The third and fourth draft circulated for eWG members in 25 November and 8 December 2014 were based on comments received.
12. Four countries (Canada, Germany, Spain and USA) in addition to the EU, submitted their comments,
13. One eWG member submitted that clarification is required for the hazards from non-spore forming microorganisms and the pasteurization process as an optional steps whether, caviar can be pasteurized or not (sample flow diagram). In this regard, the general consideration section in the COP was amended accordingly. The eWG also agreed that pasteurization should remain as an optional process.
14. Labelling of caviar packs, salt content, holding temperature, additives and use of shell improving agents were other issues submitted by members. One country submitted that there is not an obligation to include any temperature treatment on the label of the products, neither in the CODEX STAN 1-1985 nor CODEX STAN 291-2010. Another member suggested that listing 10°C in the COP is inconsistent with the temperature limit in the Standard and will cause confusion (the Standard states a maximum temperature of 4°C) and 3-5 g salt/100g should be placed in the COP too (drafted COP should include the salt requirement by weight).
15. One eWG member recommended that additives should be used in compliance with the Standard for Sturgeon Caviar (CODEX STAN 291-2010), not the General Standard for Food Additives (CODEX STAN 192-1995).
16. In the eWG, there were diverging interpretations on the using of shell improving agents as a food additive or processing aid whether shell texturizing agents are not permitted in accordance with Section 4 (Food Additives) of the Standard for Sturgeon Caviar (CODEX STAN 291-2010), meanwhile, one eWG member reminded that the Standard for Sturgeon Caviar (CODEX STAN 291 -2010) does not allow the use of colours and texturizing agents as food additives, but it does not mean that the standard excludes shells improving agents as processing aids. However, processing aids are usually not discussed in CODEX standards because they have no function and should not be in relevant concentrations in the final product.
17. The new final draft for consideration at the 34th session of CCFFP is included in Appendix II to this document.

RECOMMENDATION

1. The Committee is invited to consider the eWG Report and the Proposed Draft Code of Practice in Appendix II for advancement in the Step process.

Appendix I

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**PROPOSED CODE OF PRACTICE FOR FISH AND FISHERY PRODUCTS
(SECTION ON STURGEON CAVIAR)**

At Step 3 of the Procedure

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 actions. 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 a Hazard Analysis and Critical Control Point (HACCP) and/or Defect Action Point (DAP) plan it is essential to consult Section 5 of the Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003), 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, and to the process used.

This section applies to products covered by the Standard for Sturgeon Caviar (CODEX STAN 291-2010), and covers the production of caviar, by extraction of non-ovulated eggs and the production of caviar from ovulated eggs by induction of ovulation using natural means as well as by the use of authorized products. Potential hazards and defects that may be introduced at a processing step are identified in this code of practice, a summary of major defects and additional prerequisites programs are listed below:

Microbial hazards: Ovaries remain sterile as long as they are located in the belly cavity. Contamination may occur through contact with hands, equipment and utensils, air, water, additives, fish skin and guts. Therefore, implementation of good hygienic practices (Section 3 of the Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003)), use of potable or clean water and regular monitoring are very important. Time/ temperature control (shortest possible processing time under cold chain condition) followed by rapid transfer to cold area will reduce risk of microbial growth and related toxin production.

Proteolytic and non-proteolytic *Clostridium botulinum* are spore forming microbial hazards which should be controlled in packed caviar. These pathogens are controlled by an adequate quantity of salt (product salt content $\geq 3\text{g}/100\text{g}$ and $\leq 5\text{g}/100\text{g}$, $\geq 5\%$ in the water phase, or a water activity of < 0.97) and proper cold storage, (temperatures $\leq 4^{\circ}\text{C}$). Other controlling factors shown to prevent *Clostridium botulinum* growth and toxin production in the caviar can be used when shown to be effective by scientific studies. In addition to the control of *C. botulinum*, countries producing caviar should ensure that the process used (e.g., pasteurization step, use of permitted food additives, % salt, microbiological testing, temperature controls) will control non-spore forming microorganisms (e.g., *Salmonella* spp., *Listeria monocytogenes*).

Chemical hazards: Contaminants such as heavy metals, pesticides, oil derivatives, residues of veterinary drugs, including hormones, need to be considered. Technical guidelines mentioned in section 6 of the Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003) should be considered. Potential chemical hazards can also come from the water used for washing fish eggs and from other processing steps. Therefore, potable or clean water shall be used for this purpose. Contaminants from the salt and additives may also introduce chemical hazards.

Physical hazards: Sharp and hard fish body fragments, glass and metal inclusion (from utensils and packaging materials) can be introduced. The introduction of these hazards should be controlled. The control measures should be monitored and verified.

Defects: potential defects could be classified in 3 categories:

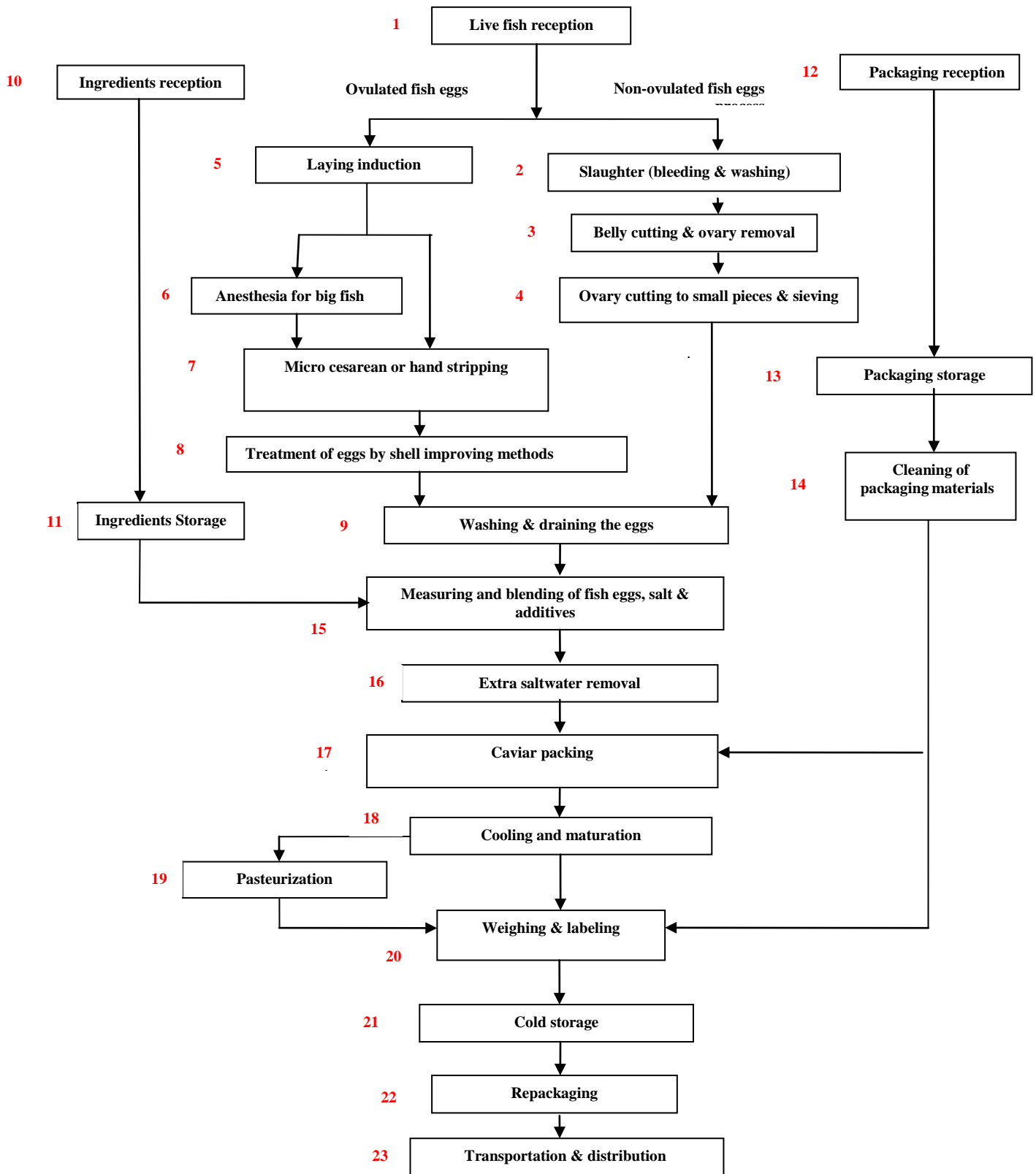
- 1- Development of microbial and chemical decomposition due to temperature abuse during caviar production process, handling and storage. This can be prevented by controlling time and temperature.
- 2- Fat tissues, ovarian follicles and blood clots in caviar (from slaughtered sturgeon), could be avoided by proper bleeding, careful sieving and ovarian washing.
- 3- A number of factors can have an effect on physico-chemical and sensory properties of caviar; for example; eggs breakage, shell loosening, eggs softening or hardening as a result of overpressure on caviar and temperature abuse. Impure salt or additives, dust, smoke and aromatics in detergents or disinfecting agents can be absorbed by caviar and affect flavour and taste.

This code provides guidance for the common steps used for processing caviar as shown in the Example Flow Chart for Caviar Production (Figure x.1).

Figure x.1 Example flow chart 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, physical damage

Technical guidance:

- Refer to the Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003) sections 6.1, 6.2 and 6.3.
- Farmed fish should be harvested from growing area where water quality should comply with section 6.1.2 (Code of Practice for Fish and Fishery Product (CAC/RCP 52-2003)).
- Fish handling should be undertaken in a manner to avoid stress (e.g. direct sunlight, high temperature, oxygen depletion) and contamination.
- In order to prevent the mortality of live fish which could result in decomposition, fish should be handled with care, stored in clean (filtered), oxygenated water and rapidly prepared for ovary removal.
- Live fish should be transported to a processing establishment quickly without causing physical damage.
- Training should be provided to persons who harvest, handle or receive fish.
- 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 the fish has been subjected to the proper withdrawal time for the specific products in question e.g., antibiotics or hormones.
- To facilitate traceability/product tracing of the fish, a record keeping system should be in place including a name and address of the farm sites (in case of farmed fish). If fish is kept out of water, the period of time should be short and the places used for this purpose should be clean.
- In the case of fresh fish, the fish should be stored under refrigeration or in cold and clean water.

X.2 Slaughter (bleeding and washing)

Potential hazards: Microbiological contamination

Potential defects: Blood remaining in fish organs

Technical guidance:

- Stunning may be used to reduce stress after fish are harvested. It should be done by a skilled person in order not to damage the fish or eggs.
- As soon as the live fish have been slaughtered the fish should be bled to prevent blood dispersion into the eggs.
- Fish should be bled by cutting gills in both sides or by cutting the tail.
- Bleeding process should be fully completed before ovary removal.
- After bleeding is completed, fish should be washed with potable or clean water to clean all residual blood leftover from surface and reduce the risk of contaminating the eggs.
- Suitable facilities for waste disposal should be available in bleeding site.

X.3 Belly cutting and ovary removal

Potential hazards: Microbiological and physical contamination

Potential defects: Physical damage to the eggs, off flavour, off odour, decomposition

Technical guidance:

- Prior to cutting, the belly part (around cutting area) should be fully brushed with potable or clean water to remove all foreign matter (e.g. sand and blood) and to reduce microbial load on the skin.
- All equipment/utensils used for cutting the belly, such as tables, knives, bowls used for ovary transfer and storage should be cleaned and disinfected.

- Cleaning and disinfection agents used for hand washing and on equipments should not affect the flavour and odour of the eggs.
- Belly cutting should be done by trained and skilled personnel using an appropriate method to preclude any contamination with viscera and damage to the eggs.
- All utensils that come in contact with fish eggs should not be used for other purposes and should be carefully cleaned, disinfected and stored in a proper place.
- Knives that are used for belly cutting should be distinct from those used for ovary cutting.

X.4 Ovary cutting to small pieces and sieving

Potential hazards: Microbiological contamination

Potential defects: Physical damage to the eggs, off flavour and off odour, eggs with bad consistency

Technical guidance:

- Prior to cutting to small pieces, ovaries could be placed in cold potable or clean water or cold potable or clean water with added salt to improve consistency.
- To prevent microbial contamination:
 - all caviar processing steps should be performed within areas set apart from belly cutting and gutting areas in order to prevent possible microbial cross-contamination.
 - all utensils and work surfaces should be cleaned and disinfected. Cleaning and disinfection agents used should not affect the flavour and odour of the eggs.
 - staff should be trained and have appropriate experience in cutting and sieving.
 - sieve should be washable and made from suitable material. Mesh size should be matched with egg size.
- Ovaries should be cut into small pieces to improve sieving process and reduce friction among eggs.
- Sieving should be performed in a manner that minimizes damage to the eggs to the extent possible while removing ovary follicles and other undesirable matters (fat and blood).
- The ambient temperature and duration of exposure to the ambient temperature should be controlled and monitored to minimize microbial growth.

X.5 Laying induction

Potential hazards: Chemical contamination (residues of veterinary drugs), use of unapproved drugs

Potential defects: Quality deterioration

Technical guidance:

- If hormones are used to induce ovulation (or to assist in the release of eggs), the hormones should have undergone regulatory assessment and be approved for use, for the purpose of food production, by the competent authorities having jurisdiction.
- Hormon dosage and treatment time should be applied in accordance with fish size and manufacturer's instructions.
- Eggs should only be harvested after the appropriate withdrawal period, following the injection of the hormone has been completed.

X.6 Anaesthesia for big fish

Potential hazards: Chemical contamination (residues of veterinary drugs), use of unapproved drugs

Potential defects: Physical damage to the eggs, off flavour and off odour, quality deterioration

Technical guidance:

- If using electric shock, it should be done by skilled personnel with allowed voltage to minimize stress to fish and physical damage to eggs.
- If anaesthetics are used, their use must be approved for sturgeon intended for human consumption by the competent authorities having jurisdiction.

- Anaesthetic dosage and treatment time should be applied in accordance with fish size and the manufacturer's instructions.
- Refer to section 6.3.2 (Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003)).

X.7 Micro caesarean or hand stripping

Potential hazards: Microbiological contamination

Potential defects: Physical damage to the eggs, foreign matter, off flavour and off odour

Technical guidance:

- Prior to cutting, belly area should be appropriately brushed and washed with potable or clean water to remove all foreign matters (sands and blood) and reduce microbial load.
- Cleaning and disinfection agents used for hand washing and on equipment should not affect the flavour and odour of eggs.
- Belly-cutting and the extraction of the eggs should be done by skilled personnel to minimize contamination with fish guts and faecal matter and reduce physical damage to the eggs.
- Hand stripping should be performed gently taking into account the anatomical position and direction of the oviduct in order to release the eggs quickly.

X.8: Treatment of eggs by shell improving methods

Potential hazards: Chemical contamination (e.g. use of texturizing agents), microbiological contamination, drug residue

Potential defects: Damage to the egg texture, off flavour and off odour, quality deterioration

Technical guidance:

- Shell texturizing agents are not permitted in accordance with Section 4 (Food Additives) of the Standard for Sturgeon Caviar (CODEX STAN 291-2010)
- Treatment of eggs by shell improving methods should occur in a manner that does not result in chemical or microbiological contamination and growth.

X.9: Washing and draining the eggs

Potential hazards: Microbiological and chemical contamination

Potential defects: Quality deterioration (damage to texture, off flavours and off odours)

Technical guidance:

- The water used for washing the eggs should be potable or clean, free of any off odour and taste and it should be cold enough to prevent a loss in the texture quality. Salt may be added to the water in order to prevent water uptake by the eggs.
- The eggs should be washed until they are free from all foreign matter.
- The eggs should be drained using a sieve to avoid water remaining in fish eggs which may impact the final weight at packaging.

X.10 Ingredients reception

Potential hazards: Microbiological, chemical and physical contamination (impurities), non permitted additives

Potential defects: Quality deterioration, foreign matter

Technical guidance:

- Refer to Section 8.5.1 (Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003)). Additives should be used in compliance with requirements mentioned in Section 4 of the Standard for Sturgeon Caviar (CODEX STAN 291-2010).
- The ingredients should be inspected to ensure that they are clean and show no visible sign of contamination with dirt, oil, bilge or other extraneous materials.
- Ingredients should be sourced from reliable suppliers, received with appropriate documentation about their composition and verified against the specifications requested.

- Salt used for caviar should be in compliance with the Standard for Food Grade Salt (CODEX STAN 150-1985).
- Salt impurities such as magnesium (Mg^{2+}) and calcium (Ca^{2+}) can affect the taste of the caviar and the penetration of sodium chloride into the eggs.
- Granule size of salt crystals and permitted additives should be tiny to allow for rapid dissolution and absorption into the eggs and to prevent damage to the eggs.

X.11 Ingredients 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 (Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003)).
- Salt and additives should be packed and protected from chemical pollutants and foreign matters such as dust that may affect safety, odour and other sensory characteristics.
- Suitable procedures and controls should be in place to prevent exposure of ingredients to insects and pests.
- Storage area and packaging materials used for additives and salt should comply with section 3 (Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003)).
- All stored additives and salt should be kept with labels with the name, expiry date and storage requirements.

X.12 Reception of packaging materials

Potential hazards: Microbiological, chemical and physical contamination

Potential defects: Improper quality of packaging materials (material, paint coating, construction, sealing, corrosion). Inaccurate or misleading label information, contaminated packaging materials, foreign matter inclusion.

Technical guidance:

- Refer to section 8.5.1 (Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003)).
- All packaging materials such as metal or plastic cans, glass jars and rubber bands should be resistant to the components of caviar especially salt and additives and be able to preserve the product during its shelf-life without any quality loss.
- All packaging materials should be verified prior to use by trained personnel to ensure that specifications are met and that they are not damaged or contaminated.
- Any non-compliant items should be rejected and all corrective measures should be recorded.
- Prior to their application, labels should be verified to ensure that all information declared meets, where applicable the General Standard for the Labelling of Pre-Packaged Foods (CODEX STAN 1 - 1985) and labelling provisions of the Standard for Sturgeon Caviar (CODEX STAN 291-2010).
- Packaging materials and labels should be sourced from reliable suppliers and accompanied by appropriate documentation on the specifications and composition.

X.13 Storage of packaging materials

Potential hazards: Microbiological, chemical and physical contamination

Potential defects: Quality deterioration, physical damage, foreign matter inclusion

Technical guidance:

- Refer to section 8.5.2 (Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003)).
- Packaging materials and labels should be stored in dry and clean area to avoid any chemical and microbial contamination.
- Storage area should be clean and free of insects and pests.
- Trained personnel should periodically monitor storage environment and records should be kept.

X. 14 Cleaning of packaging materials

Potential hazards: Microbiological, chemical and physical contamination

Potential defects: Damage of containers

Technical guidance:

- The cleanliness, integrity and safety of packaging materials should be monitored prior to use, to prevent cross-contamination of the caviar.
- Cleaning and disinfection should be performed outside of the processing area. Controls should be done at the reception step and related records should be checked.
- Cleaning and disinfection of packaging materials should be done by trained personnel with potable or clean water and permitted detergents.
- The effectiveness of the cleaning and disinfection of packaging materials should be validated, and revalidated after any changes of the procedures, e.g. change of disinfectants, cleaners etc.

X. 15 Measuring and blending of fish eggs, salt and additives

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

Potential defects: Spoilage, microbial growth, foreign matters, additive misuse

Technical guidance:

- The quantity or weight of eggs, salt and as applicable, additives should be measured adequately to ensure that the appropriate percentage of salt and additives are met.
- Additives should be used in compliance with the Standard for Sturgeon Caviar (CODEX STAN 291-2010).
- Additives should be used under conditions of good manufacturing practices in compliance with Section 3 (General Principles for the Use of Food Additives) of the General Standard for Food Additives (CODEX STAN 192-1995).
- The ingredients should be verified prior to use to ensure they are free from hazardous glass or other foreign matters.
- To prevent the growth and toxin production by non-proteolytic *Clostridium botulinum*, the quantity of salt added should result in at least 5% water phase salt or a water activity of ≤ 0.97 .
- The ingredients and additives should be blended uniformly with the eggs.
- The ambient temperature, humidity, and the duration of exposure to the ambient temperature, should be controlled and monitored so that it does not affect the homogeneous distribution of ingredients and additives and to prevent microbial growth.
- Grading and blending should be done by trained personnel.

X. 16 Extra saltwater removal

Potential hazards: Microbiological contamination

Potential defects: Quality deterioration due to improper saltwater removal

Technical guidance:

- Extra saltwater removal (sieving) should be done in a manner that does not damage the quality of caviar.
- Extra saltwater removal should be performed by trained personnel.
- The salt content should remain $\geq 5\%$ in the water phase or a water activity of ≤ 0.97 .
- In addition, the salt content shall be equal to or above 3g/100g and below or equal to 5g/100g
- The ambient temperature and duration of exposure to the ambient temperature should be controlled and monitored to minimize microbial growth.

X. 17 Caviar packing

Potential hazards: Microbiological contamination,

Potential defects: Oxidation, physical damage, off flavour, egg discoloration due to corrosion of container's epoxy coatings, improper coding

Technical guidance:

- All packaging materials should be verified prior to use to ensure that they are not contaminated and are free from physical damage. These materials should be dry.
- The cans/jars should be filled to capacity to minimize the air space but should not put pressure on the caviar.
- Air exhausting and sealing of cans or jars should be performed by trained personnel to ensure that air is fully removed from cans/jars to inhibit the growth of aerobic micro-organisms as well as fat oxidation.
- During the exhausting process, the cans/jars should be kept clean from salt water that leaves the cans/jars.
- The ambient temperature and duration of exposure to the ambient temperature should be controlled and monitored to minimize microbial growth by maintaining caviar temperature $\leq 4^{\circ}\text{C}$.
- The primary coding should be verified by trained personnel to ensure that it is legible, accurate and permanent.

X.18 Cooling and maturation

Potential hazards: Microbiological contamination

Potential defects: Decomposition, quality deterioration

Technical guidance:

- Packaged caviar should be stored in an appropriate manner prior to final cold storage (for example in a refrigerator; 2-4 °C for 24 hours) upon packaging to facilitate salt absorption, equilibrium and maturation (equal salt distribution in caviar, giving enough time for saltwater removal) and also to minimize microbial growth.
- Laboratory check should be performed for proper caviar salt content (e.g. by water phase by weight as appropriate) after maturation is complete.
- Cooling system should be cleaned and equipped with thermometer and thermograph to frequently monitor and record caviar temperature.
- Cooling system should be frequently calibrated to ensure accuracy and efficiency.

X.19 Pasteurization(optional step)

Potential hazards: Microbiological contamination

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

Technical guidance:

- Pasteurization process should be performed and monitored by trained personnel to ensure process specifications are followed and the equipment is functioning appropriately.
- The containers should be sealed hermetically prior to pasteurizing in order to prevent post-contamination.
- Caviar cans/jars should be cooled to lower temperature (0°C to 4°C) immediately after pasteurization to prevent germination, growth and toxin production of spore forming microorganisms and prolonged heating of proteins which might affect taste and texture.
- 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 is applied on the caviar for a suitable period of time.
- All thermal equipment and monitoring devices should be regularly checked and calibrated based on a schedule to ensure accuracy.

X.20 Weighing and labelling

Potential hazards: Incorrect or misleading labelling

Potential defects: Unlikely

Technical guidance:

- Information printed on the labels should be in compliance with the General Standard for the Labelling of Pre-Packaged Foods (CODEX STAN 1-1985) and the Standard for Sturgeon Caviar (CODEX STAN 291-2010). The country of origin (where the sturgeon is born, reared, slaughtered and where the caviar is produced) should be labelled.
- [Pasteurization treatment or a reference to pasteurization should be indicated on the label.]
- The cans/jars should be weighed to ensure the quantity of caviar filled meets weight declared on the label.
- Net weight, refrigeration instructions and a maximum shelf-life for caviar should be clearly labelled.
- Caviar cans/jars should not be described or presented on any label in a manner that is false or misleading to consumers.
- Labels should be monitored for accuracy by trained personnel.

X.21 Cold storage

Potential hazards: Microbiological contamination

Potential defects: Freezing, decomposition and quality deterioration

Technical guidance:

- The product should be held at cold storage temperatures between -4°C and 0°C.
- Care should be taken to avoid temperatures below -5°C which will cause freezing and quality deterioration.
- 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 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.
- Containers of caviar should be periodically checked regarding air existence and any affected containers should be re-exhausted or rejected.

X.22 Repackaging

See section X.17 and X.20

X.23 Transportation and distribution

Potential hazards: Microbiological contamination

Potential defects: Decomposition, physical damage to the caviar cans/jars

Technical guidance:

- Refer to section 17, (Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003)).
- Proper handling and vehicle conditions should be followed to prevent physical damage to caviar cans/jars.
- Caviar temperature should be monitored during loading to make sure the temperature is between -4°C to 0°C.
- Temperature of vehicle storage cabin should be maintained between -4°C to 0°C.

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- The duration of caviar exposure to surrounding temperatures above 2°C should be monitored to prevent temperature abuse and pathogen growth.
 - Products should be transported in a way that allows cool air to circulate easily around cans/jars and that protects them from physical damages.
 - Product cabin should be completely insulated and clean. It should be cleaned and disinfected according to a regular sanitation schedule.
 - The storage cabin should be equipped with a thermometer and a thermograph to frequently monitor and record the storage temperature.
 - Handling should be done by trained 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 ~~strikethrough 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.