



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

Thirty-third Session

Bergen, Norway

17 – 21 February 2014

**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 **30 November 2013**.

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 31st session of the Committee on Fish and Fishery Products, the Committee agreed to a proposal for new work on a Code of Practice (COP) 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 34th Session of the Commission approved this new work (REP11/CAC, paragraph 131 and Appendix VI).
3. A proposed draft COP for sturgeon caviar was prepared by the eWG and presented to the 32nd Session of CCFFP.
4. During the 32nd Session of the Committee on Fish and Fishery Products, the Committee agreed to return the proposed draft Code to Step 2/3 for redrafting by the new electronic Working Group led by Iran for consideration by the next session of CCFFP.

The Electronic Working Group

1. In reply to the invitation, 14 members and one observer expressed interest in participation in the eWG: Germany, Canada, USA, Spain, Japan, France, Poland, Norway, Thailand, Indonesia, Malaysia, Hungary, Egypt, Kenya and FAO. The list of participants is included in Appendix I.
2. Meanwhile, Iran revised the Code of Practice for Sturgeon Caviar taking into account all written comments submitted to the Committee and the comments made by the plenary.

3. The new drafted COP was circulated for three rounds of comments within the eWG. Comments were received from Japan, Germany, France, Canada, USA, Hungary, Spain, Poland, Norway and FAO.
4. The final draft was prepared and the eWG members reached consensus on it.
5. The main points considered were:
 - a. Alignment of the COP with the scope of the Standard for Sturgeon Caviar (CODEX STAN 291-2010).
 - b. Revision of some definitions: fish eggs, caviar, ovulated fish eggs and pasteurization.
 - c. Revision of some titles and related guidance in the draft to be consistent with other sections of the Code of Practice for Fish and Fishery Products.
 - d. Removing or revising technical guidance which were covered by the pre-requisite program mentioned in the COP for Fish and Fishery Products.
 - e. Focusing on good safety and quality aspects for consumer protection.
 - f. Giving guidance to control both pathogenic spore-forming and non-spore forming microorganisms.
6. Also regarding caviar production from ovulated fish eggs and related processing steps, there were some different ideas between eWG members with respect to food safety aspects; therefore, it was decided to leave these steps in brackets for more discussion
7. The main viewpoints pointed out in the eWG in this regard (ovulated fish eggs) are listed as follows.

a. Removing these sections from the draft COP or at least placing in brackets

Reasons:

Hormones to induce ovulation are not internationally recognized as safe, and have not been approved within Codex/JEFCA/OIE. A processing step dedicated to the use of animal drugs that are not allowed in broad international trade should not be included in an international COP, although they may be appropriate in a regional COP.

Guidance on processing ovulated eggs should not be included in the COP because ovulated eggs cannot be produced without the use of egg texturizing additives, and provisions for these additives are not included in the Standard for Sturgeon Caviar. To include guidance on processing ovulated eggs in the COP is misleading because it will cause countries to believe that caviar from ovulated eggs can be produced in compliance with Codex. However, this cannot be done until the appropriate additive provisions are adopted into the Standard for Sturgeon Caviar. At this time, these sections of the COP should be removed or at least placed in brackets.

b. Keeping these sections in the draft COP

Reasons:

The Standard for Sturgeon Caviar (CODEX STAN 291-2010) covers clearly “*ovulated eggs*” and “*hormonal induction*” under point 2. Description / 2.1. Definitions and under point 2.3 Process definition 2.3.1. These points were accepted by the members of Codex and the COP should be in alignment with the Standard.

Caviar from aquacultured sturgeon is a good alternative to protect wild sturgeon populations and furthermore the harvest of ovulated eggs allows sustainable caviar production without killing the fish. Although animal welfare is not really a subject of the Codex Alimentarius, however, we should have in mind that ethical questions should not be completely excluded in manufacture of food products from animals.

According to European legislation it is in general possible to apply Gonadotropin releasing factors in food-supplying animals. EMEA - The European Agency for the Evaluation of Medicinal Products evaluated the D-PHE 6-LUTEINIZING-HORMONE-RELEASING-HORMONE for animals in December 1996. The agency concluded there is no need to establish an MRL and recommends its inclusion into the positive list of pharmacologically active substances (EMEA EMEA/MRL/159/96-

FINAL). Following from this the competent authority and licensed veterinarian in every European country have to make sure that the drug is approved.

c. Keeping ovulated fish eggs branch in the draft COP but by using naturally inducing methods

Reasons:

The code of practice on sturgeon caviar has to include the issue of "ovulated-eggs" since it is covered by the Standard for Sturgeon Caviar. The COP should be in alignment with the Standard. Currently there is no specific veterinary medicine for fish and for the use of egg production, thus we think it is not possible to use hormones in the aim of producing caviar and even if it were possible, we think that we would be obliged to apply a withdrawal period to eggs as well. In this context, we would face an administrative blockage. Moreover, hormone treatment is only used for breeding purposes and no treated fish enter the food chain (neither their eggs). Therefore, we think that it is important to deal only with environmental means to induce ovulation in the code of practice.

RECOMMENDATION

8. The Committee is invited to consider the eWG Report and the Proposed Draft Code of Practice for Sturgeon Caviar (*see* Appendix II).

Appendix I

List of Participants

CANADAManon Picard

Senior Analyst - Fish, Seafood and Production
Division
Canadian Food Inspection Agency
Email: manon.picard@inspection.gc.ca

EGYPTHoda Mohamed Fathi

Secretary of the national mirror committee to CCFFP
Senior Food Standards Specialist at EOS
Tel: 00202 22845531
Fax : 00202 22845504
E-mail: hfathi55@yahoo.com

FAODr. Karunasagar Iddya

Senior Fishery Industry Officer
Products, Trade and Marketing Service
Room F-521, Food and Agriculture Organization
Viale delle Terme di Caracalla
00153, Rome, Italy
Tel: +39 06 57054873
Email: Iddya.Karunasagar@fao.org

FRANCEVirginie Hossen

Head of the National reference laboratory on marine
biotoxins
E-mail: virginie.hossen@agriculture.gouv.fr

Nicolas Berhault

Organization: ICIA (International Caviar Importers
Association)
Adress: ICIAb 43 rue de l'Evangile
75018 PARIS.
Email: nberhault@gmail.com

Michel BERTHOMMIER

Represent the French sturgeon producers group
E-mail: clouzioux@wanadoo.fr

GERMANYUte Schroder

Scientist Federal Research Institute of Nutrition and
Food Department for Fish Quality
Palmaille 9 D-22767 Hamburg
Tel.: +49 40 38905-271 Fax: + 49 40 38905-262
E-Mail: ute.schroeder@mri.bund.de

Ines Lehmann

Scientist Federal Research Institute of Nutrition and
Food Department for Fish Quality
Palmaille 9 D-22767 Hamburg
Tel.: +49 40 3890-153
Fax: + 49 40 38905-262
E-Mail: ines.lehmann@mri.bund.de

Angela kohler

Alfred Wegener institute for polar and marin research
Department of biosciences
E-Mail: angela.koehler@awi.de

HUNGARYMs. Kata Jámborné Dankó

Official position: FOP sectoral officer
Institution: Ministry of Rural Development
E-mail: kata.danko@vm.gov.hu

Mr. János Gábor

Official position: chief counselor, FOP coordinator
Institution: Ministry of Rural Development
E-mail: janos.gabor@vm.gov.hu

Ms. Ágnes Szegedyné Fricz

Head of division
Ministry of Rural Development
E-mail: agnes.fricz@vm.gov.hu

INDONESIADr. Santoso

Position: Director of Fisheries Product Processing
Ministry of Marine Affairs and Fisheries, Republic of
Indonesia
Email: codex_kkp@yahoo.com

IRANMajid Mosadegh

Fisheries of Iran
E-mail: majidmosadegh@gmail.com

Afsaneh samiee

Codex contact point
Email: Fishcommittee@gmail.com

Yazdan Morady

Email: ymorady@yahoo.com

JAPANMr. Akira MIKI

Deputy Director
Inspection and Safety Division, Department of Food
Safety, Ministry of
Health, Labour and Welfare
E-mail: codexj@mhlw.go.jp

Ms. Rei NAKAGAWA

Assistant Director for Standards and Evaluation
Division, Department of Food Safety, Ministry of
Health, Labour and Welfare
E-mail: codexj@mhlw.go.jp

Dr. Hajime TOYOFUKU

Head of Food Safety Department of International
Health and Collaboration, National
Institute of Public Health, Ministry of Health, Labour

and Welfare

E-mail: toyofuku@niph.go.jp

Mr. Haruo TOMINAGA

Associate Director for Fisheries Processing Industries and Marketing Division Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries
Email: haruo_tominaga@nm.maff.go.jp

KENYA

Lucy Obungu

Designation: Ag. Director of Fisheries, Directorate of Marine and Coastal Fisheries
P.O. Box 58187-00200, Nairobi, Kenya
E-mail: lucyobungu@yahoo.com

Richard Ngetich

Designation: Principal Fisheries Officer, Directorate of Marine and Coastal Fisheries
Mombasa, Kenya
E-mail: ngetich72@yahoo.com

MALAYSIA

Codex Contact Point Food Safety and Quality Division, Ministry of Health Malaysia
Level 4, Plot 3C4 Building,
No. 26, Jalan Persiaran Perdana
Presint 3, 62675 Putrajaya, MALAYSIA.
Phone: +603 8885 0600 ext 4066
Fax: +603 8885 0790
Email : ccp_malaysia@moh.gov.my

Ms. Yeo Moi Eim

Head of biosecurity and standard Development Section Fisheries Biosecurity Division
Level3, Podium 2, Block 4G2
Wisma Tani, Precinct 4, Federal Government Administrative Center
62628 Putrajaya , MALAYSIA
Phone: +6038890 3794
E-mail: meyeo@dcf.gov.my

NORWAY

Ms Marit Fallebø

Senior Adviser Norwegian Food Safety Authority, Head Office
E-mail: mafal@mattilsynet.no

Mr Geir Olav Valset

Senior Adviser Norwegian Food Safety Authority, Head Office
E-mail: geir.valset@mattilsynet.no

Mrs Vigdis Synnøve Veum Møllersen

Senior Adviser Norwegian Food Safety Authority
Codex Contact Point
E-mail: visvm@mattilsynet.no

POLAND

Professor Ryszard Kolman, PhD, ScD
Head of the Department of Ichthyology
The Inland Fisheries Institute
e-mail: kolrys@infish.com.pl ;
kodeks@ijhars.gov.pl

Ms Joanna Zurawska-Lagoda

Main Expert in the Department of Fisheries
Ministry of Agriculture and Rural Development
e-mail: joanna.zurawska@minrol.gov.pl
kodeks@ijhars.gov.pl

Professor Jacek Sadowski

West Pomeranian University of Technology Szczecin
e-mail: jsadowski@zut.edu.pl

Grzegorz Tokaczyk, PhD

West Pomeranian University of Technology Szczecin
e-mail: gtokarczyk@zut.edu.pl

SPAIN

Carola Gonzalez Kessler

Position: Head of Area.
Sub directorate General for Fishing Economy.
Organization: Ministry of Agriculture, Food and Environment
Phone: +34913476055
Email: cgonzalez@marm.es

Cristina Perdiguero Arenas

Position: Head of Service.
Subdirector General for Fishing Economy.
Organization: Ministry of Agriculture, Food and Environment
Phone: +34913476200
Email: CPerdiguero@magrama.es

THAILAND

Mr. Manat Larpphon

Senior Standards Officer, National Bureau of Agricultural Commodity and Food Standard, Ministry of Agriculture and Cooperatives, Thailand
Tel: +662 561 2277, Fax: +662 561 3357
Email: manat@acfs.go.th

USA (United States of America)

Clarke Beaudry

USFDA
Email: clarke.beaudry@fda.hhs.gov

Tim Hansen

Email: timothy.hansen@noaa.gov

Ken Lowery

Email: kenneth.lowery@fsis.usda.gov

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 non-ovulated fish eggs separated from the connective tissue of ovaries of the *Acipenseridae* family and treated with food grade salt and permitted additives.

[Caviar from ovulated fish eggs: The product made from ovulated fish eggs of the *Acipenseridae* family by treating with food grade salt and permitted additives]

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 99.9% sodium chloride in dry weight.

Maturation: The process and period of time from salting until the caviar has developed its full taste and optimal consistency.

Pasteurization: Heating the caviar to a specific temperature, for defined length of time to reduce the number of viable non- spore forming spoilage and pathogenic micro-organisms of public health concern.

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

Vacuum sealing: Removing the air in an appropriate manner from the packaged caviar to prevent growth of aerobic microorganism and reduce the oxidation of fat during storage (extend shelf life).

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.

This section applies to caviar production from sturgeon fish both by slaughtering [and by extracting the eggs after ovulation (without slaughtering the sturgeons; allowing multiple harvests). Ovulation can be induced by releasing factors (synthetic or natural), naturally by homogenates/lysates of carp or sturgeon pituitary gland containing these factors and/or environmental means to trigger natural hormone release from the fish brain under appropriate conditions (light/temperature).]

Caviar is produced traditionally using basic practices which have never been mechanized due to the sensitivity of the product and the depletion of wild sturgeon stocks. The use of advanced complex machinery has been less popular for caviar production due to the simplicity of caviar production.

The physico-chemical properties of caviar classifies this food as perishable. There are minimal processing steps which are mostly performed manually and may therefore increase the risk of contamination. There is also no step which eliminates microorganisms (e.g. thermal processing), therefore microbial contamination and growth in the final product have to be prevented by strict sanitary and hygienic controls throughout the processing steps and appropriate preservation techniques.

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. Pathogenic and non-pathogenic contamination may be introduced 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) the use of clean, potable water 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 related toxin production.

Proteolytic and non-proteolytic *Clostridium botulinum* are spore forming microorganisms that present a microbial hazard in vacuum packed caviar. These pathogens are controlled by adding an adequate quantity of salt to the fish eggs (> 5% salt in the water phase or water activity <0.97), lowering product pH (pH < 5.0) and proper cold storage (*temperature* < 5°C).The growth of non-spore forming microorganisms (i.e., *Salmonella*, *Listeria*) can be controlled with pasteurization or adding appropriate quantities of permitted additives in combination with proper removal of air by vacuum sealing and cold storage under appropriate temperatures (microbial hurdles).To minimize microbial growth, ambient (work space) temperature and duration of exposure to the ambient temperature from ovary removal to refrigeration or cold storing steps should be controlled

Chemical hazards: Contaminants such as heavy metals, pesticides, oil derivatives, residues of veterinary drugs in the case of farmed fish 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. Risk of pollutants transfer from water used for washing the fish eggs and other process steps, is another potential chemical hazard. Clean potable water shall be used for this purpose. Contaminants from the salt and additives may also present a chemical hazard.

Physical hazards: Sharp and hard fish body fragments, glass and metal inclusion (from utensils and packaging materials) can be introduced and should be monitored and verified.

Defects: potential defects could be classified in 3 categories:

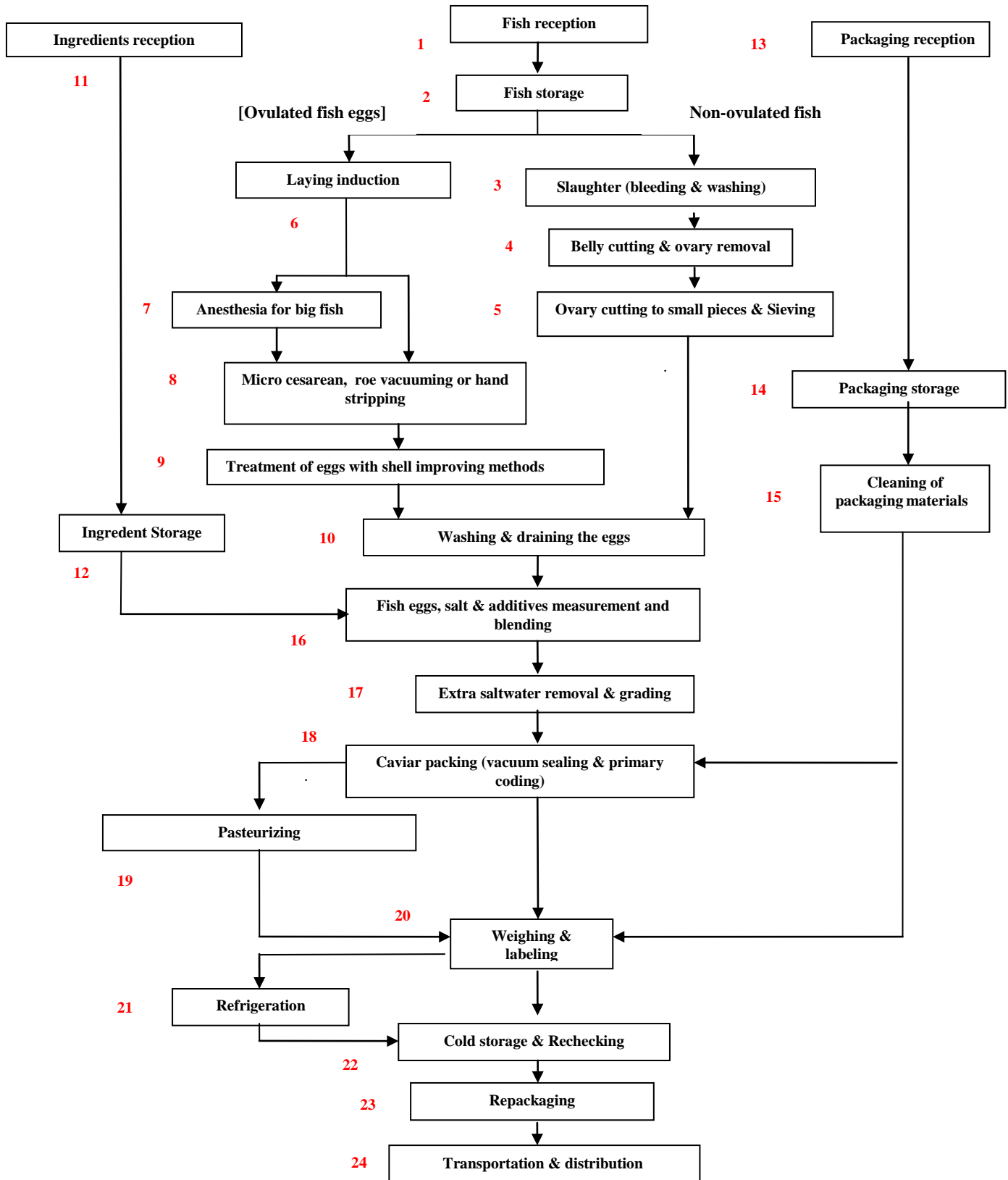
- 1- Development of microbial and chemical decomposition due to temperature abuse during caviar production process, handling and storage. This can be prevented by controlling time and temperature.
- 2- Fat tissues, ovarian shells and blood clots in caviar (from slaughtered sturgeon), could be avoided 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 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) provides guidance for some of the common steps involved for processing caviar.

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 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 stress (direct sunlight, high temperature, oxygen depletion) and contamination.
- Live fish should be transported to a processing establishment quickly without causing physical damage.
- In case of fresh (non-live) fish, sensory evaluation charts and tables should be accessible at fish reception sites according to section 8.1.1.1 (Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003)) and the person who receives the fish should assess the fish accordingly and dispose of the unacceptable fish.
- 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 the fish has been subject to the proper 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 pathogens

Potential defects: Fish mortality, Decomposition, off flavour and off-odour

Technical guidance:

- 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.
- If fish is kept out of water, the period of time should be short and the places used for this purpose should be clean.
- Stunning may be used to reduce stress after fish are harvested. It should be done by a skilled person using appropriate voltage that would not damage the fish or eggs.
- In the case of fresh (non-live) fish, the fish should be stored under refrigeration or in chilled (<5°C), clean water.)
- Refer to Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003) sections 6.1 and 6.2 6.3.

X.3 Slaughter (bleeding and washing)

Potential hazards: Microbiological contamination

Potential defects: Blood remaining in fish organs

Technical guidance:

- Once the live fish have been killed the fish should be bled to prevent blood dispersion in 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 brushed with potable 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.4 Belly cutting and ovary removal

Potential hazards: Microbiological and physical contamination

Potential defects: Physical damage to the eggs, off flavour, off odour, decomposition, tough fish body fragments

Technical guidance:

- Prior to cutting, the belly part (around cutting area) should be fully brushed with potable water to remove all foreign matter (sand and blood) and reduce skin's microbial load.
- All equipment/utensils used while cutting the belly, such as tables, knives, ovary transfer and storage bowls should be cleaned and disinfected.
- Hand washing and disinfection agents 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 which are in contact with fish eggs should not be used for other purposes and 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.5 Ovary cutting to small pieces and sieving

Potential hazards: Microbiological contamination

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

Technical guidance:

- Prior to cutting to small pieces, ovaries should be placed in cool potable water to improve 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 work surfaces should be cleaned and disinfected.
 - 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 shells 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.6 Laying induction

Potential hazards: Chemical contamination (Residues of veterinary drug)

Potential defects: Deterioration of Quality

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 by the competent authority and the 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.7 Anaesthesia for big fish

Potential hazards: Chemical contamination (Residues of veterinary drug)

Potential defects: Physical damage to the eggs, flavour and odour change, 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, the dosage and treatment time should be applied in accordance with fish size and manufacturer's instructions and their use must be approved by the competent authority.
- Refer to section 6.3.2 (Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003)).]

[X.8 Micro caesarean, roe vacuuming or hand stripping

Potential hazards: Microbiological contamination

Potential defects: Physical damage to the eggs, foreign matter

Technical guidance:

- 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.
- Hand washing and disinfection agents should not affect on the flavour and odour of caviar.
- Belly-cutting and the extraction of the eggs should be done by trained, skilful person 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.9: Treatment of eggs with shell improving methods

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

Potential defects: Damage to the egg texture, off flavour and odour, quality loss of the caviar

Technical guidance:

- Physical shell improving methods should be applied in a manner that does not result in microbiological contamination and growth
- Chemical shell improving agents are unpermitted as additives in accordance with the Standard for Sturgeon Caviar (CODEX STAN 291-2010)
- Biological shell stabilisation from the eggs themselves through enzyme activation should occur in a manner that does not result in microbiological contamination and growth.
- The eggs have to be handled with care to protect them from damage.]

X.10: Washing and draining the eggs

Potential hazards: Microbiological and chemical contamination

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

Technical guidance:

- The water used to wash the eggs should be potable, free of any off odour and taste and it should be cold to prevent a loss in the texture quality.
- 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 packing.

X.11 Ingredients reception

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

Potential defects: Quality loss, foreign matter

Technical guidance:

- Additives should be 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 its composition and verified against the specifications requested.

- Salt that is used for caviar processing should be extra pure food grade salt (99.9% pure sodium chloride) with minimum impurities such as magnesium (Mg^{2+}) and calcium (Ca^{2+}). These elements affect the taste of the caviar and the penetration of sodium chloride into the eggs.
- Sea salts should not be used as they may contain bacteria and halophylic moulds which could affect the safety and quality of the caviar.
- Granule size of salt crystals and additives should be tiny to allow for rapid absorption into the eggs and prevent damage to the eggs.
- Refer to Section 8.5.1 (Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003)).

X.12 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 packing materials used for additives and salt should meet the requirements mentioned in 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, date of expiry and storage requirements.

X.13 Reception of packaging materials

Potential hazards: Microbiological, chemical and physical contamination

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

Technical guidance:

- All packing 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 packing materials should be verified prior to use by trained personnel to ensure that specifications are met and they are not damaged or contaminated.
- Any non-compliant items should be returned and all corrective measures 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).
- Packing materials and labels should be sourced from reliable suppliers and accompanied by appropriate documentation on the specifications and composition.

X.14 Storage of packaging material

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 (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 free of dust, insects and pests.
- Trained personnel should periodically monitor aforesaid procedures and records should be kept.

X. 15 Cleaning of packaging materials

Potential hazards: Microbiological, chemical and physical contamination

Potential defects: Can/jar damage

Technical guidance:

- The cleanliness, integrity and safety of packaging materials should be verified prior to use, to prevent cross contamination of the caviar.
- Cleaning and disinfection may 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 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.

X. 16 Fish eggs, salt and additives measurement and blending

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 additives must be measured adequately to ensure that the appropriate percentage of salt and additives are met.
- Use permitted additives in compliance with General Standard for Food Additives (CODEX STAN 192 -1995) and importing country requirements.
- The ingredients should be verified prior to use to ensure they are free from hazardous glass or other foreign matters.
- To prevent growth of non-proteolytic *Clostridium botulinum*, there should be 3-5% salt in the final product (the quantity of salt added should result in at least 5% water phase of salt or a water activity of < 0.97).
- The ingredients and additives should be blended uniformly with the eggs.
- Ambient temperature and moisture of the work space should be controlled 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. 17 Extra saltwater removal and grading

Potential hazards: Microbiological contamination

Potential defects: Quality loss of caviar due to improper saltwater removal, improper grading

Technical guidance:

- Extra saltwater removal (sieving) should be done in a manner that does not damage the quality of caviar.
- Extra saltwater removal process should be performed by trained personnel.
- Grading process should be performed by trained personnel.
- The ambient temperature and duration of exposure to the ambient temperature should be controlled and monitored to minimize microbial growth.

X. 18 Caviar packing (vacuum sealing and primary coding)

Potential hazards: Microbiological contamination,

Potential defects: Oxidation, mould and yeast growth, physical damage, off flavour and discoloration due to corrosion of 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.

- Vacuum 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 bacteria, moulds, and yeasts as well as fat oxidation.
- During the exhausting process, the cans/jars should be kept clean from salt water that leaves the cans/jars.
- Sealing efficiency should be monitored and checked by trained personnel.
- The primary coding should be verified by trained personnel to ensure that it is legible, accurate and permanent.
- The ambient temperature and duration of exposure to the ambient temperature should be controlled and monitored to minimize microbial growth. The cans/jars should be weighed prior to sealing to ensure the quantity of caviar added meets the weight for which the pasteurization setting are established and the weight declared on the label.

X.19 Pasteurizing

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 cold temperature (0°C to 4°C) immediately after pasteurization to prevent 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 that they work accurately and adequately.

X.20 Weighing and labelling

Potential hazards: unlikely

Potential defects: Incorrect or misleading labelling

Technical guidance:

- Information printed on the labels should be in compliance with General Standard for the Labelling of Prepackaged Foods (CODEX STAN 1-1985) and The Standard for Sturgeon Caviar (CODEX STAN 291-2010).
- Refrigeration instructions must be clearly labelled. Caviar cans/jars should not be described or presented on any label or in any labelling in manner that is false or misleading to consumers.

X.21 Refrigeration

Potential hazards: Microbiological contamination pathogenic microbial growth

Potential defects: Decomposition, quality loss

Technical guidance:

- Packaged caviar should be stored in an appropriate manner prior to final 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 removal) 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 possible cross contamination, any other food stuff should not be stored together with caviar cans/jars.
- After maturation, caviar packed in cans should be sealed by rubber strips or other means and wiped clean, or repacked and transferred to cold storage (- 4°C to 0°C).
- In the case of pasteurized caviar or vacuum packed caviar (jars and tins), the packs could be transferred directly to cold storage (- 4°C to 0°C).

X.22 Cold storage and rechecking

Potential hazards: Pathogenic microbiological growth

Potential defects: Freezing, decomposition and loss of quality

Technical guidance:

- 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 affected containers should be re-exhausted.

X.23 Repackaging

See section X.19

X.24 Transportation and distribution

Potential hazards: Pathogenic microbiological growth

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

Technical guidance:

- Refer to Section 17, Code of Practice for Fish and Fishery Products.
- 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.
- The duration of exposure to surrounding temperatures above 2°C should be monitored to prevent temperature abuse of the caviar.
- Products should be transported in a way that allows cool air to circulate easily around cans/jars and that to protect 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 thermo recorder to frequently record and monitor 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.